

# **Choosing Identities**

## The Politics and Practices of Classroom Discourse on Reproductive and Genetic Technologies

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For the award of Doctor of Philosophy

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*Declaration*

I hereby certify that this material, which I now submit for assessment on the programme of study leading to the award of Doctor of Philosophy in Communication Studies is entirely my own work and has not been taken from the work of others save and to the extent that such work has been cited and acknowledged within the text of my work.

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*Robbie Mackay*  
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## *Abstract*

### **Choosing identities: the politics and practices of classroom discourse on reproductive and genetic technologies**

Pádraig Murphy

In this thesis, I draw on contemporary social theory, media communication studies and discourse analysis to explore how micro-political discussions around identity and new reproductive and genetic technologies (NRGTs) in classroom discussions may be connected to wider discourses. Although biotechnology in Ireland is represented by industry and the healthcare sector as a solution to disease, Irish public opinion, as well as global discourses from popular culture, literature and film, suggests these technologies may represent a scientific or moral threat to humanity or nature. When biotechnology is raised in biology classrooms, identity is central, as existential questions about the essence of humanity are combined with future visions through genetic screening/engineering and cloning. Yet science curricula and pedagogy in Ireland rarely opens out to address these perspectives on genes and embryos.

Six schools with students aged from 15-17 years were presented with two central activities that brought social and moral relevance to NRGTs. Films were used to present reproductive decision scenarios (pre-implantation genetic diagnosis (PGD) and stem cell research), while a visiting health researcher presented on how his work related to society. Participants argued points of view based on the film. Ethnographic notes were taken and discussions recorded.

The thesis argues that Giddens' (1991) *life politics* emerges in how young people bring into discourse ideas about scientific progress, nature, agency, and the body through structured framing strategies of communication and local performed action. In addition to interpreting these, the thesis examines how *pedagogic practices* may respond to, and take part in, such discursive strategies.

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But most of all thank you Siobhán for the constant support over the past few years. And then, before I had finished, along came little Aisling...



## ***Glossary of abbreviations and terms***

### *Abstract systems*

Giddens (1991) thesis of high modernity, where there is a removal of social processes and practices from local space-time contexts to be moved across transient, globalised ones containing expert systems of knowledge and symbolic media of exchange.

### *Actors*

Socially active members in all society, not necessarily stakeholders.

### *ART*

Assisted reproduction technologies. There are many used at present for infertile couples, such as in vitro fertilisation (IVF), gamete intrafallopian transfer (GIFT), and zygote intrafallopian transfer (ZIFT).

### *Biobanks*

Stores of biological material, either blood, genetic material or tissue, for inclusion on medical databases.

### *Bioprospecting*

The accidental discovery of one scientific process when engaged in another; large scale 'mining' of natural occurring, extreme flora or fauna for commercial reasons.

### *Biosciences/bioscience*

All processes of living organisms as well as biotechnological processes in industry, healthcare and education; also referred to as 'life sciences'; In this study it more particularly describes the philosophical accounts of biology within humanity, society and nature.

### *Biotechnological art /' bioart'*

Art where biotechnology has been the tool, includes American-Brazilian artist Eduardo Kac's white rabbit, *Alba*, which glows fluorescent light in the dark (it contained a jellyfish gene). Other high profile 'bioartists' include Damien Hirst, Prof. Gunther van Hagens, and Steven Hurtz, who became involved in a legal battle in the US for allegedly using bacteria as an art form.

### *Biotechnology/biotechnologies*

The term biotechnology is a catch-all phrase for a range of manufacturing and medical processes involving living organisms or biological material. It is perhaps more correct to use *biotechnologies* as there is a huge range of biotechnological processes. Today, technologies using molecular biological processes are involved in manufacturing pharmaceuticals and medicine for the diagnosis and treatment of genetic diseases, brain and spinal disorders, cancer and diabetes; in food production and agriculture; making detergents and cleaning materials; forensic investigations and DNA profiling; environmental waste treatment; anthropology and archaeology.

The industry tends to distinguish between 'old' and 'modern' biotechnology, although there are complex relationships that blur the lines between all cellular technologies. The making of cheese, bread, beer, and wine are often considered 'old' or 'traditional' biotechnology. These are biological processes which have been used

to develop a particular product for thousands of years, even though the science wasn't always known. Since the discovery of the helical structure of DNA by Crick and Watson in 1953, scientists began to realise that individual genes themselves are involved in the control of particular characteristics of living organisms. In the 1960's the field of molecular biology developed around the study of the chemistry of the genetic composition of the cell. By the 1970s, scientists were successfully transferring genes from one species of either plant and animal to another to develop or enhance a trait in the recipient organism. This 'modern' biotechnology became known as *genetic manipulation* or *genetic engineering*. It has caused a revolution in health and industry. The key to its success is the ability to identify and transfer material that are common to all living things.

A recent categorisation of biotechnology uses colour codes: *red* means medical, *green*, agricultural, *blue* refers to marine applications, and *grey* refers to environmental applications.

'Biotech' is an abbreviated form of 'biotechnology' although I tend to make a subtle distinction here: biotechnology is the concept of the underlying technologies, whereas biotech is the product and processes of the biopharmaceutical industry, and the nomenclature for the industry itself.

#### *Bioterrorism*

Since September 11, 2001, the media has dedicated a large amount of time to the possibility of the deliberate release of dangerous biological agents or organisms into the environment by terrorist groups. Anthrax has been the main such threat reported.

#### *Cellular biology/biotechnology*

Cellular or molecular biology refers to the broader field of using cells and molecules to manufacture drugs and other biomedical treatments.

#### *Chimera*

The term comes from the name of a mythical monster, but is commonly used these days to describe an animal whose genetic makeup comes from zygotes of distinct species eg goat and sheep embryos were combined to form the 'geep.'

#### *Cloning -therapeutic and reproductive*

Although cloning is used extensively in biotechnology in reference to cloning cells, the public (and media) use of the term refers to:

- a) therapeutic cloning where a new embryo with an exact copy of genetic information of a human/animal is used to generate compatible drugs, treatment of even organs. The embryo is not brought to full term.
- b) reproductive cloning where an embryo with an exact copy of genetic information, through various different methods, is used to create an animal or human. The embryo is brought to full term. Dolly the sheep was the first and most famous cloned mammal. Several maverick scientists have claimed to have cloned , or in the process of cloning, human beings but there is no evidence as yet.

Cloning is banned in the UK under the 2001 Human Reproductive Cloning act, but there is still no legislation in Ireland.

#### *Designer babies*

A description for babies born after medical intervention at the embryonic stages to either reduce risk of disorder or enhance particular characteristics. This intervention

may be disease prevention by genetic screening or pre-implantation genetic diagnosis (PGD) However for many parents – the subjects of current 'designer baby' media coverage – PGD offers the only treatment to the more immediate issue of prevention of serious disease. Two recent cases in particular caught the public imagination: the Hashmi and the Whitaker families (see *Saviour siblings*). In both cases, screening technologies were required to facilitate the birth of a baby boy who would have an exact tissue match to treat a seriously ill brother. 'Designer' would appear to be a misnomer in these cases, as sex selection was considered out of necessity rather than choice.

#### *DNA profiling*

Profiling DNA has been used as a means of tracking criminals by matching forensic evidence. However DNA has also been suggested for use in identity cards for the general public.

#### *Eugenics*

This philosophy advocates using social intervention to 'improve' upon human hereditary, thus in proponents' view, reducing or eventually eradicating perceived health problems and increasing desirable traits such as intelligence and fitness in a population. Traditional eugenic methods included birth control and selective breeding. Many fear that pre-implantation genetic diagnosis may create a form of eugenics where those who have not been genetically screened would become second class citizens, as has traditionally happened. Habermas (2003), among others, distinguishes between *negative* eugenics, which is the complicit contribution to a gradual change in characteristics by normative practices of a technology like PGD, and *positive* eugenics, the active project of removing particular traits for evolutionary and /or social purposes. The ultimate conclusion of the latter occurred during the Nazi regime where, in the interests of creating a master race, those who were considered to have inferior qualities were murdered (This argument is also used in participants here who frame the embryo as a person).

#### *Foetal life*

A term given by Ferree et al (1996), in their media analysis of abortion discourse, for all perspectives of zygotes, embryos and fetuses where there is a pro-life perspective.

#### *Gene*

The gene, the central 'icon within an icon' that is DNA, is described as a single unit of heredity. It has come to symbolise the potent power of biotechnology, although as Jasanoff (2005a) points out, the field did not materialise out of a particular moment of scientific inspiration, but evolved slowly over time through gradual research. 'As every schoolboy knows,'<sup>1</sup> the DNA molecule which forms the gene is composed of a double-helical structure, with four compounds known as 'bases' – adenine (A), guanine (G), cytosine (C), and thymine (T). These bases become the alphabet for which every protein in the body is composed and therefore, from a scientific view, most processes and traits of the body. The chemistry of these bases dictates that C on one stand of DNA can only bond with G on the complementary strand and A with T. This reveals the true power of the technology. Each strand can, once it unravels from its opposite, replicate to create an identical strand.

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<sup>1</sup> I here use Jasanoff's (2005a, p32) sarcastic twist on Watson's phrase, showing up the gendered, dogmatic origins of the gene

*Gene patenting*

The patenting by biotech companies of the function of a sequence of genes, including the protein products (eg hormones) of those genes. Any research or treatment required on this sequence and products may then require payment first.

*Gene therapy*

A collective term for any technologies used for therapeutic reasons on genetic material. Germline therapy refers to a particular type of modification that will be passed on to successive generations.

*Genetic screening*

See *PGD/PID*

*GM (genetically modified) /GMO (genetically modified organism)*

An organism which has genetic material from another organism inserted into its genetic makeup, usually to enhance or regulate a particular trait. Genetically modified foods are the most controversial but there have also been recent press reports about athletes using 'genetic injections' into muscles to boost performance. This area is also referred to as using *transgenic* technologies.

*HESC*

Human embryo stem cells. See *Stem cell research- embryonic and non-embryonic*.

*HGP (Human Genome Project)*

The publication of the first draft of the human genome in June 2000 was greeted in many quarters as a very significant step in the fight against disease. It was one of the biggest international scientific projects ever undertaken. The term 'genome' refers to all the genetic material in an organism. In almost all known species, this consists of DNA, which is held in structures called chromosomes. The DNA is further subdivided into functional units called genes. These genes carry information for making all the proteins required by all organisms. The proteins determine how the organism looks, how well its body fights infection, how it metabolises food, and more. The human genome is the largest genome to be extensively sequenced so far, being about 25 times larger than the next biggest. It is also the first vertebrate genome to be sequenced in such detail.

*ID (Intelligent Design)*

A growing movement centred mostly in the US, which believes that nature must have a divine plan. There is an accompanying 'alternative science' to ID.

*Issue cultures*

This thesis follows O'Mahony and Schaffer's (2005) definition of issue cultures:

public beliefs, issue cycles, journalists' and media orientations, the interests and resources of societal actors, wider processes of inter-media and inter-textual knowledge production (p112).

Gamson and Modigliani (1989) refer to the phenomenon in this way:

In the issue culture process, the [communication] package [of actors] fundamentally depends on a *storyline* ‘incorporating new events into its interpretive frames. (p4, original emphasis)

*IVF (In vitro fertilisation)*

A method of ART. The mother is induced to produce a large number of eggs which are then fertilised outside the womb. A successful zygote is then placed into the uterus.

*Life politics*

Anthony Giddens’s (1991) term for what he calls the ‘politics of self actualisation (p243).’ Giddens says that in high modernity, people are now in constant dialogue with the local and the global, and the ‘internal referential systems (p243)’ into which modern humanity finds itself uses this dialectic relationship to create an empowering identity that accepts risks, chance and emphasises embodiment and lifestyle. It is a politics of life decisions, and it makes the personal deeply political. Body art is a minor manifestation of this. Modern feminism and sexuality are stronger examples. I emphasise here Giddens’ argument that all aspects, all issues of NRGTS are centrally issues of life politics.

*MD (MiniDisc)*

All recording used this digital format for transcription.

*Molecular biology/ molecular technologies*

See *Cellular biology*

*NICB*

The National Institute for Cellular Biotechnology at Dublin City University, which funded this research.

*NRGTS*

New reproductive and genetic technologies. This acronym is used widely in this study to combine the following technologies: IVF, HESC, reproductive and therapeutic human cloning using embryos, and all technologies using knowledge of genetic processes, for example PGD, gene therapy, and patenting. ‘NRGT’ is a term I first came across as used in the anthropological study of reproductive technologies by Sarah Franklin. Of course, in a strict sense – and to many leading scientists – HESC is not yet a technology and may never be. I have included this in the terminology for a reason. In the film *If... cloning could cure us* it is presented centrally as a *potential* technology. Therefore it is not only the actual research carried out on an embryo that is at issue – it is also what happens to other connecting interests when the benefits, if any, of differentiating stem cells are applied for disease prevention.

*NRT*

New reproductive technologies. Those bioscience applications used exclusively for reproductive purposes eg assisted reproduction technologies, cloning etc.

*PEST*

Public Engagement with Science and Technology; a modern successor to the term Public Understanding of Science, favoured now by most science communicators and science studies researchers for its inclusivity. A marginally better pseudonym.

### *Pharmacogenetics*

The customisation and potential 'personalisation' of medicine by targeting drugs towards a specific genetic makeup.

### *PGD (Pre-implantation genetic diagnosis) / PID (pre-implantation diagnosis)*

The former acronym is more commonly used these days, although PID is used in *The Gift* film. This is a prenatal technique where some form of assisted conception technology (such as IVF or ICSI) is carried out with a specific number of embryos. An 'unwanted' genetic condition is then identified using a single-cell embryo biopsy and this embryo is screened, that is eliminated for the purposes of implantation.

### *Proteomics*

This is the study of proteins in the cell to learn more about the cells behaviour, its replication of genetic material like DNA and RNA, and the organism's reactions to disease.

### *PUS*

The Public Understanding of Science. A movement in the UK, which launched a respected long running publication of the same name dealing with how the public makes sense of science.

### *'Saviour siblings'*

The media term for the conception of a child with particular genetic traits to treat a sibling. This has been used in two cases recently in the UK where parents appealed to the Human Embryology and Fertilisation Authority (HEFA) to allow in vitro selection as a reproductive technique for the birth of a boy having an exact tissue match for his sick brother. In each case, the sibling needed to be a boy. Two recent cases in particular caught the public imagination: the Hashmi and the Whitaker families. In both cases, screening technologies were required for the birth of a baby who would have an exact tissue match to treat a seriously ill brother.

### *Socioscientific issues*

An agreed science education term for those issues particularly of media interest that are based on scientific knowledge but have wide social implications. This study argues that these media issues have a profound importance to curriculum, being as we are part of Gamson's *issue culture*. I would also argue that there are many current media issues with scientific information entangled within them. Also it is not necessary to have a good grasp of the science in order to understand the complexities of the issue, contrary to many PUS studies (Kimmel Pifer, L. 1994; Evans and Durant, 1995; Bauer and Bonfadelli, 2002.)

### *SoL (Science of Life)*

In field notes throughout this study *The Science of Life* is abbreviated to SoL. *The Science of Life* is the programme that I proposed as a menu of activities available for Leaving Certificate and Transition Year biology teachers and student that uses various media and seminar formats to explore NRGTs, scientists in action, cultures and society.

### *STAR teacher or STAR programme*

Abbreviation for Science Teacher Assistant Researchers. This is a Science Foundation Ireland (SFI) initiative where science teachers receive funding through industry to be employed for a short period, generally over the summer to build up

their knowledge and skill in the science workplace. The intention is that these skills might also be transferred to students.

*Stem cell research – embryonic and non-embryonic*

Stem cells are the ‘infant’ form of all cells which are currently being researched for their therapeutic power, as they can be ‘coaxed’ into specialised adult forms. Non-embryonic or adult stem cell research focuses on stem cells in organs only. There is a potential to ‘programme’ these into one type of functional cell only, that of the parent organ. Human embryonic stem cells (HESC) however are claimed by some to be a more powerful tool as they can be ‘programmed’ to a range of different cells. These cells, as the name suggest can only be found in the embryo.

*STS*

This can be Science-Technology-Society or Science and Technology Studies depending on the academic discipline. Unless otherwise indicated it stands for the former in this work. The latter is sometimes referred to as S&TS.

*STSE*

Derivative of Science-Technology-Society (STS) that includes Environment

*Transgenic*

See *GM/GMOs*

*TY (Transition Year)*

Transition year is the bridging year between the junior certificate and the first year of leaving certificate studies. This class is designed to encourage students to break out from usual school work and participate in project-orientated work. Irish schools are permitted some autonomy in the choice of these subjects, being encouraged to use localised subject choice. The TY framework also allows students to think about their future careers.

*Transcript codes*

ND North Dublin school

ND1 ‘Deirdre’

ND2 ‘Donal’

ND3 ‘Denise’

NDt teacher

SD South Dublin school

SD1 ‘Della’

SD2 ‘Daniel’

SD3 ‘Douglas’

SDt teacher

SK South Kildare school

SK1 ‘Kevin’

SK2 ‘Katherine’

SK3 ‘Kate’

SK4 ‘Karen’

SK5 ‘Kei’

SKt Teacher

SW South Wicklow school  
SW1 'Wayne'  
SW2 'Will'  
SW3 'Wanda'  
SWt Teacher

NDC North Dublin City Centre school  
NDC1 'Derek; [fed-up rebel]'  
NDC2 'Des' ['teacher's quiet pet, pro-embryo']  
NDC3 'Damien' ['arguing for nature']  
NDCt Teacher [female, twenty-something, first job; worked as a STAR placement at NICB]

LH Louth school  
LH1 'Lorraine'  
LH2 'Laura'  
LH3 'Lisa'  
LHt Teacher  
Speaker A NICB scientist  
Speaker B NICB scientist

|                  |  |
|------------------|--|
| PM:              | Facilitator/Researcher   |
| A, B, C etc:     | Individual responses (of either gender, unless specified)      |
| S:               | A few simultaneous voices (of either gender, unless specified) |
| S+:              | Many simultaneous voices (of either gender, unless specified)  |
| F1, F2, ...etc   | Individual female responses                                    |
| F:               | A few simultaneous female voices                               |
| F+:              | Many simultaneous female voices                                |
| M1, M2 .....etc: | Individual male responses                                      |
| M :              | A few simultaneous male voices                                 |
| M+:              | Many simultaneous male voices                                  |
| M/S:             | A few simultaneous male and female voices (SK discussion only) |
| M/S+:            | Many simultaneous male and female voices (SK discussion only)  |

|     |  |
|-----|--|
| O:  | 'Outsider,' SK1's friend, male (SK discussion only)            |
| X:  | 'Exchange student?', SK2's friend, female (SK discussion only) |
| T:  | Teacher (female)   |
| SA: | Speaker A  |
| SB: | Speaker B  |

|     |                  |
|-----|------------------|
| MD  | MiniDisc time    |
| AUD | Audacity time    |
| VW  | VoiceWalker time |



*Epigraph*

Of bodies changed to other forms I tell:  
You Gods, who have yourselves wrought every change,  
Inspire my enterprise and lead my lay  
In one continuous song from nature's first  
Remote beginnings to our modern times.

(From Ovid's (1986) *Metamorphoses*)

## Chapter 1: Introduction

'I wish biology would be closer to the body.' With this intriguing remark, a student at the pilot stages of this study described her detachment from the Leaving Certificate biology subject. Although this thesis takes a discursive approach to biology in Irish schools on one level, this young person sounds a warning. In her critique, there exists a desire for some material and tangible connection with biology.

This work proposes a discussion-based type of biology in action, yet there is also less abstraction here than a standard science class. Of relevance is how themes from various discussions between six secondary schools, at senior level, connect to wider discourses about NRGTs. These themes represent *practices* placed into normative moral contexts outside the curriculum in political and media discourse and popular culture which are often dominated by the discourses of the 'iconic' gene (Nelkin and Lindee, 2004) but which significantly also contain resistant *counter* discourses. Although biotechnology is represented by industry and the healthcare sector – and supported by government-led strategy in Ireland – as a solution to natural ills, there is concern on many levels. Ireland continues to go through a period of growth within the biotechnology sector, where human and plant life processes are the raw materials for medical and agricultural improvements. This is combined with both increased media coverage of good news stories and increased public and private funding for new biotech ventures within the state. However moral and regulatory criticisms of these technologies persist in Ireland, just as they do worldwide, that call for greater upstream deliberation, that is, public consultation prior to regulation and implementation (O'Mahony and Schäfer, 2005). Public concerns can be described as being scientific, moral, religious, even political in many ways, drawing from local or more globalised movements of concern. Objections may be culturally deep-rooted; since Shelley's (1994) classic 1818 novel *Frankenstein*, tropes and images have entered into discourses from popular culture, from literature and, in recent years, film, describing scientific wrongdoing, clones, and monsters (Nelkin and Lindee, 2004). I wish to focus here on a complex tying up of the cultural-symbolic and scientific in young people's discussions. The perspectives here are shared with their older counterparts who participate in other structured debates, often representing self-

identity and NRGTs in the guise of social movements or media commentators. Such identities also surface here either through informal conversation or formalised justification embedded in local practices of the education system and in reacting to the research practices introduced to the education field by the researcher's intervention activities.

I argue that opposition to – and discomfort with – NRGTs are part of what Giddens (1991) calls *life politics*, a project of self-identity in late modernity among individuals and collectives to re-introduce onto personal and political agendas those suppressed and taboo aspects of life and the body that were once part of the everyday in traditional society, matters of life, death, and nature. There are reasonable grounds to assume the young have a subversive affinity with this life politics.<sup>1</sup> Individuals and groups in society are constantly being asked to be aware of the choices they make, whether recycling paper or considering emerging technology policy. This introduces a moral aspect that rational instrumentalisation cannot account for. I will show how recurring themes in classroom conversations bear resemblance to media and popular culture discourses describing technological progress and perceived scientific threat against the human body and nature as well as secular and religious objections. In Giddens' life politics, these all have self/society political dimensions.

I also argue for the need to look at the response to life politics in *pedagogic practices*, the potential for power and resistance that might exist in schools. Here I draw on the performative analysis of Goffman (1959) and (structurally, to a certain extent) Bourdieu (Bourdieu and Wacquant, 1992; Bourdieu and Passeron, 1977) in describing negotiations at local level by teachers, students, researchers, and myself as ethnographic researcher to engage in the political implications of NRGTs. In biology class, when biotechnology is raised, identity is central, as existential questions about the essence of humanity are combined with future visions through genetic screening/engineering and cloning. In addition to participating in discursive activities such as film, presentations, and debate in biology classrooms, the teachers and students in the empirical study here discuss how they may negotiate their identities within the context of the activities introduced to the classroom and within normal biology class. Teachers may need to maintain the borders of biology teaching, while students request social, philosophical, or scientific guidance in biology and mixed-subject sessions in their own acts of identity construction.

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<sup>1</sup>Consider the amount of popular narratives, from anthropomorphised versions of the natural world to horror movies.

This is a time of rapid change in Irish society, culturally and economically. Biotechnology has been identified as a key economic driver in this change for the 21st century (Ireland, Department of Enterprise, Trade and Employment, 2006). Thus, the thesis falls into one small component within large-scale biotechnological projects funded by the third cycle of the Programme for Research in Third Level Institutes (PRTLII), known as ‘social,’ ‘ethics,’ or ‘education and outreach’ programmes, in this case at the National Institute for Cellular Biotechnology (NICB) at Dublin City University. A meta-argument here is how terms such as ‘ethics’ and ‘outreach’ may diminish somewhat the status of activities which allow young people to appreciate the relationship between science and technology (S&T) and society. However, in this context, I am a qualitative researcher utilising my academic vantage point within both the DCU School of Communications and the NICB. From here, I hope to interpret biotechnology communication in schools using what Wynne (2005) calls the ‘reflexive turn in social sciences and humanities’ (p67). The *emic* is presented to the fore – the social actors’<sup>2</sup> perspectives – while always being aware of the tension between description, analysis, and interpretation (Wolcott, 1994) and connections with the *etic*<sup>3</sup> of a developing theoretical framework and researcher assumptions and biases (van Maanen, 1988). The use of discursive activities in classrooms in a ‘technical’ subject requires a relationship of trust between researcher and participants. There were multiple site visits and interviews with participating schools situated across the province of Leinster in Ireland. This work helps to address how young people make sense of the world through discussion and debate on the social implications of modern biotechnology and how their perspectives on socioscientific issues can be linked to current debates in the media as well as systems of expert knowledge (Giddens, 1991) such as school or university science. The study is therefore timely and has wider implications. I hope that it will allow and facilitate discussion in classrooms about embryo research and genetic screening in the context of recent – some might say inadequate (McDonnell and Allison, 2006) – debates about these subjects. There is a wider debate, to which I hope this thesis will also in some way contribute, about how a humanities perspective of the physical sciences might respond in Irish academic culture to a background of a commercialised, technoscientific culture.<sup>4</sup>

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<sup>2</sup> ‘Actors’ are socially active members in all society, not necessarily stakeholders.

<sup>3</sup> Etic has, after all, the same etymological root as ethics.

<sup>4</sup> Arguing a case for feminist anthropology, Strathern once remarked that not only have the social and natural sciences a methodological and conceptual competitiveness but increasingly there is also financial competition across the campus (Rabinow, 1986). Strathern insisted that these differences and conflicts should remain.

## **A sociological foundation: moral and cultural perspectives on new reproductive and genetic technologies (NRGTs)**

The theoretical/methodological scaffold on which this thesis is constructed has, as its principle support, three Gs: Giddens (social and contemporary practice theory), Goffman ('performed' practices and methodology), and Gamson (sociolinguistic communication methods). Drawing from around these centre-points, I will show how contemporary social theory might inform recent work on media communication processes and their interaction with discursive action among youth identities. It is important to state here that this is neither a case study nor an example of grounded theory in the accepted sense. Theory in this study is inferred and is in a dialectical relationship with practice, as Chapter 3 demonstrates.

Before outlining how the authors above and ideas in social theory and sociolinguistics have shaped this study, it is necessary to briefly lay out the background of 'the biosciences as culture' and how sociology might approach the subject within the education sector. This is the field in which I place these three principle authors and others regarding a pedagogy of NRGTs.<sup>5</sup> It will become clearer to the reader why I have taken the sociological rather than the strict educational or ethical route to understand youth constructions of the moral in NRGTs as we progress.

To many people, humanity's relationship with the natural world has been changed either by our knowledge of biology (Dennett, 1995; Sommers and Rosenberg, 2003; Appleyard, 2004) or, in recent years, the technological application of this knowledge, biotechnology (European Commission, 1997, 1998, 2000, 2001, 2003a, 2003b, 2006; Hornig Priest, 2001; Bauer and Gaskell, 2002a; Nelkin and Lindee, 2004). Specific anxieties about NRGTs have been raised that might be considered cultural - such as the protection of the embryo - but there is speculation that some concerns may also be from a wider legacy of distrust of science or the science industry itself (Kolstø, 2001; Barr and Thompson, 2002; Hipkins, 2002). For others, deep anxieties, particularly in Europe, have caused educators to reappraise the way that biology is being taught in schools (Michael *et al*, 1997; Parker, 1998; Simmonneaux, 2000, 2001; Kolstø, 2001; Reiss and Straughan, 1995). There is a tacit knowledge here of humanity's place in the world that contributes to collective imaginings of NRGTs and these

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<sup>5</sup> Other texts were crucial here for a deeper theoretical foundation of practice theory, notably, *Modernity and Self-Identity* (Giddens, 1991), *The Practice of Everyday Life* (de Certeau, 1984), *The Practice Turn in Contemporary Theory* (Schatzki *et al* (eds.), 2001) and various texts from Thevenot and Boltanski (Thevenot, 2001; Boltanski, 1999; Boltanski and Thevenot, 1999, 2006); also *Reflexive Modernisation* by Beck (1994a, 1994b), Giddens (1994), and Lash (1994) and *Discourse in Late Modernity* (Chouliaraki and Fairclough, 1999).

often add to public concerns about biotechnology. Genetic modification and reproductive technologies such as human embryo stem cell research (HESC), cloning of embryos, and pre-implantation genetic diagnosis (PGD) are on the one hand central to the public image of scientific progress but they also invoke images of humanity 'playing God' (O'Mahony and Schäfer, 2005). They represent a threat to people on many fronts: interfering with nature or life, or threatening human dignity, rights, religious beliefs, human identity, and health as well as the environment.

The human embryo has been a particularly contentious subject in these discourses worldwide. Many bioscientists see great potential in utilising stem cells from embryos to treat diseases such as Parkinson's and Alzheimer's disease. But most technologies involving the embryo will destroy it. Because of the unique – and controversial – status of the embryo in Ireland, this thesis focuses on those types of NRGs involving the embryo and implicit or explicit moral boundaries that students (and at times teachers) draw on to describe this entity, the social and philosophical implications of wider genetic research, and most pertinently for local practices, what elements might be explored in senior level science pedagogy. The embryo is protected by Article 40.3.3° of the Irish Constitution (Bunreacht na hÉireann, 2004) where it is referred to, euphemistically and quasi-legally, as the 'unborn.'<sup>6</sup> There is a lack of regulation on NRGs in Ireland and this was exposed in 2006 when, in the Irish High Court, a case was brought against a man whom his ex-partner claimed had reneged on an IVF contract (Cassidy, 2006).<sup>7</sup> Roman Catholic doctrine refers to the 'personhood' of the embryo (Irish Bishops' Committee for Bioethics, 2005). Although Irish society, once homogenously Catholic, may largely have left these conventions behind in practice (Holden, 2007), media coverage suggests that embryo technologies remain contentious as a subject of discourse. In such a potentially emotive subject in classrooms can cultural links be traced between modern Irish society and socioscientific reasoning on genes and the embryo and how certain types of viewpoints may be *hidden away* within science education communities, if not demonstrably repressed. If it can be argued that young people themselves want this type of discourse about genes and embryos, we may then ask should discussion peripheral to science content – the moral dimension – be promoted in classrooms. Also we may ask what kind of moral toolkit is necessary for future generations – for *this* generation – to draw their own conclusions and

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<sup>6</sup> This entity has all the criteria of an identity in Latour's networks, summoned into existence at various stages as a living entity in debate. There is, as of early 2007, no explicit regulation on NRGs in Ireland, except codes of practice for the medical profession implemented by the Irish Medical Council reminding practitioners of their duty to the unborn (UCD Research Ethics Committee, 2006).

<sup>7</sup> This case may have far-reaching (bio)political ramifications. The judge ruled in favour of the ex-husband and a subsequent appeal resulted in landmark decision where the embryos at the centre of the dispute were classified as *not* being 'the unborn,' yet having the right to some human dignity nonetheless.

negotiate their way through unprecedented moral decision-making on genetic enhancement, embryo technologies, and society.

A dominant theory for pedagogic decision-making on NRGTs is that all participants in a debate should be 'well informed' of the scientific facts prior to making a decision, or entering into discourse (Evans and Durant, 1995). While informed debate may be the ideal for science education, a contemporary sociological *practice* perspective would challenge the efficacy of expecting a level playing field of 'content knowledge.' All views – and this applies specifically to the classroom as covered here in detail – are taken on their own cultural merit when *represented* in discourse. Moreover, a moral guide to NRGTs based on sociocultural understandings is elusive, whether scientific reasoning is applied or not. The field of moral philosophy is often called on to provide some guidance here. Yet this may not connect young people directly with everyday life. Whereas abstract concepts of philosophy may not appear to be relevant, the approach here challenges young people on their own terms to reflect, within the practices that they know and are comfortable with, on their moral *positioning* on NRGTs and practical evaluation.<sup>8</sup>

What is offered here draws from a critical social theoretical view of science and technology, how it becomes represented in public communication; principally those theorists who look closer at power and ideological processes by exploring the embeddedness of practices, crucially *common, everyday practices*. NRGTs are just one type of concern about 'humanity versus nature' in what many sociologists have described as a changing period of modernity. Individuals, corporations, and Governments are being called on to make big decisions regarding technology and nature. Juergen Habermas, the leading German philosopher and a critical theorist who perhaps does not explore practices in the sense used here but whose communicative action theory much of our current interpretative social science endeavour rests upon (Habermas, 1989, 1992), has in recent years made a strong statement on what he sees as a new biotechnological threat to the way humanity sees itself in the new millennium:

Today even the general public confronts questions whose moral weight exceeds the substance of ordinary matters of political dispute (Habermas, 2003, p17).

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<sup>8</sup> Teacher resources for the Roman Catholic guidance on the leaving certificate module Relationships and Sexuality Education (RSE) has little to say about IVF, cloning, or embryo research (McGowan, 2002).

Habermas writes from a critical theory position, challenging the rationality of systems over the autonomy of the individual, the *subject*, where PGD and embryo procedures are at the core of human identity and future development and the extension of the Enlightenment project are brought forth through domination and control of nature, as studied by the Frankfurt School (Honneth, 1991). However I want to draw on sociological traditions that principally go back to a founding figure, Weber, examining moral action at the micro-cultural level. I also want to acknowledge the pragmatic turn in the sociology of Mead and Dewey, the anthropological structures of Levi-Strauss, and the linguistics of Wittgenstein, where patterns and connections are identified between micro and macro orders, thus also linking to the structural sociology of Marx or Durkheim.<sup>9</sup> This study therefore makes the link between performed action in the classrooms and late modern structural processes, demonstrating Giddens *structuration* – the interaction between structure and action – and using moral discourse from a collage of media representations of biotechnology (the *moral* described here draws heavily from Thevenot's (2001) pragmatic regimes of practices and the aesthetic (Lash, 1994 citing Burger's (1980) reflections on Adorno). These representations, described in Chapter 2, are specifically about the manipulation of genes and embryos brought into the realm of identity through modern practices of – sometimes non-reasoned – argument and discussion. I place these positionings within a theory of practices, which although informed by symbolic interactionism, is neither wholly focused on the discursive, the cognitive, nor the (inter)textual, as the final section in this chapter explains.

Why study NRGs as a subject among young people? This question will be raised again in the final chapter and a pedagogical justification put forward later in this chapter. But there is also a sociocultural justification. McRobbie (1994) reflects on the relevance of using young people's views. In late modernity, young people offer a variety of social, historical, and psychological insights. According to McRobbie: 'Youth remains a site of cultural innovation' (ibid. p179).<sup>10</sup> If there are 'new ways' of looking culturally at NRGs or a modest change in old ways of knowing, the young may provide valuable insight. We need also to be aware of how the young represent themselves in such discourse. *Framing strategies*, that is making collective sense of an issue within a group, are also part of the resources of the young as I

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<sup>9</sup> The understanding of self owes more to the foundations of Simmel (1910), the person as a network of social action.

<sup>10</sup> Other authors, such as Androutsopoulos and Georgakopoulou (2003), speak of the 'juvenisation' of the West and how this phenomenon extends youth activities further into the modern lifespan. This suggests a contemporary framing of 'youth' itself as a cultural category rather than a social or physiological one, a club in which anyone can join.



demonstrate in Chapter 6, as they negotiate their own identities while contributing to the discourse of NRGs in education at a local level. These discussions are brought into pedagogy, including schools in Ireland run by religious orders, places where I expected some tension to exist when expressing these views.

### **'Issue cultures' of modern biology and 'identities' in late modernity**

Before addressing the pedagogical rationale for this study, it is necessary to reflect further on knowledge acquisition about science and nature in society, particularly to introduce more cogently the relationship between media and identities in the modern world. In the late modernity of Beck (1992), or *reflexive*<sup>11</sup> modernity (Giddens, 1994; Beck, 1994a; Lash, 1994; Wynne, 1993), although Western lives are longer and people healthier, there is increased awareness of ever-present risks and uncertainties. There are concerns that the Enlightenment project did not predict. These concerns are studied in modern theoretical readings of personal and social *identities*, constructed among the interactions between individual and collective knowledge pathways, localised and generalised descriptions of technology, topical media issues, and paths to personal empowerment or identity construction (Jasanoff, 2005; Giddens, 1991, 1994; Beck, 1994a; 1994b; Lash, 1994; Taylor, 1989; Bernstein, 1990, 1996; Chouliaraki and Fairclough, 1999; Jenkins, 1996; Strathern, 1996; Hirsch, 1998; Hughes-Freeland, 1998; Brown, 2004; Simmonneaux, 2000; Michael *et al*, 1997; Wenger, 1998; Bauman, 1976, 1997, 2000; Couldry, 2003). Giddens (1991) and Smith (1990) refer to *expert systems* which externally provide scientific knowledge and processes to modern institutions such as education and shape the way we live our lives. There are increasing levels of choice and decision-making required of individuals in this understanding of late modernity, that is, an age of increased technological change, consumption and globalisation, and these decisions involve a perspective on nature, including the nature of the environment and the new genetics while avoiding harm to the self (Giddens, 1994; Beck, 1992; Lash, 1994; Jasanoff, 2005a). In this reading of modernity, scientific rationale may be the dominant Western discourse but there are other perspectives as publics<sup>12</sup> express mixed attitudes of doubt and reverence about S&T (Giddens, 1991), placing faith in the gene yet

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<sup>11</sup> One definition of reflexivity that I prefer to use here is a *self-confrontation* within a risk society (Beck, 1994b). I draw attention in Chapter 2 to the fact that Giddens' *institutional* reflexivity – how a school or a research centre can set up its own rules and knowledge around expert systems as a consequence of late modernity – differs from *individual* reflexivity.

<sup>12</sup> Sociological and communications research recognises many different 'publics' rather than a homogenous one and any member of the scientific community itself falls within any of these.

acknowledging risk (Hayry, 1998b) and distrusting governance (Gaskell, 2003). As Beck (1994a) says of technology: 'new areas of unpredictability are created quite often by the very attempts that seek to control them (vii).' The new politics of decision-making replace the norms of tradition; this detraditionalisation by technology is evident in NRGTs. A path must be chosen; there is 'no choice but to choose' as Giddens (1991, p81) states. There are many issues that cause concern: PGD, stem cell technologies, animal-human hybrids, GMOs, and many others, all technological applications that can have a social and existential issue of concern at their centre.

In this understanding of late modernity, concepts of 'reflexivity,' 'aesthetics,' 'expert systems,' and 'social identities' will be placed under theoretical scrutiny in Chapter 2. What emerges is a dialectic of the discursive and the 'tacit embodied' in social positioning on NRGTs – how implicit rules of the social game on the micro level form part of the representation on these 'big issues' and vice versa. The most potent expression of this is abortion discourse focusing on the 'embodiment' of the embryo, as will become evident in the empirical work from Chapters 4 to 7.

A mixture of fear and fascination captures the cultural imagination, with an increase in public interest in conceptualising new frontiers in human/ animal/ machine interfaces represented in art, film, and fiction, as discussed in Chapter 2. There is a dialectical encoding of media production and decoding of media consumption (Hall, 1980) around these issues, an ambiguity in media coverage and public opinion that veers between desire for progress and fear of the unknown, captured in Beck's (1992) description of our collective mood swinging between hysteria and apathy in what he calls a *risk society*. In popular science writing, authors Richard Dawkins, E.O. Wilson, Robert Jay Gould and others have popularised understanding of genes, and nature/ nurture relationships. The interest of various publics in genes and humanity is evidenced throughout media and common discourse. However, as Chapter 2 will also show, there appears to be an insubstantial level of engagement at a formal level in Ireland with the more philosophical or cultural concepts in biotech governance and policy, in either Government policy, higher education strategies, or Irish school curricula (Ireland, Department of Education and Science, 2002a). This lack of formal engagement may well be because of the *moral* factor, sidelined in a (late) modern formalised discourse of science that does not acknowledge the multitude of views on such issues, as interpreted here later as examples of life politics 'sequestered' from official discourse. O'Mahony and Schäfer (2005) describe how the news media may step into the vacuum of discourse in everyday life about these human/nature moral uncertainties. According to the Gramscian

notion of hegemony, moral boundaries are constructed around a dominant (often national) discourse by media processes (Hall *et al.* 1978). In placing this study into a historical and cultural context (also Chapter 2), I will be identifying the dominance of bioscientific discourse in Ireland, which is generally reported in positive terms in combating disease or contributing to the economy (O'Mahony and Schäfer *op. cit.*). Some resistance can be made in news media in the guise of 'moral panics.'<sup>13</sup> It is interesting that the hegemonic moral panic that an issue such as abortion will present in the US (Joffe, 2005) will not have the same effect in Irish media (O'Mahony and Schäfer, *op.cit.*). If anything, most anti-NRGT discourses are weaker in this country (*ibid.*).

These media issue processes of modern biology outside the Irish classroom must be seen as connected to pedagogy and learning. The scope of life politics, as discussed later, addresses communication processes regarding risk and nature outside the formal learning environment. While Chapter 2 outlines the Irish policy decisions that may have an impact on science curriculum and science communication, the focus here is not strictly the ideological processes of media communication of science to young people. Although bioscience agenda-setting may be influential, the representative processes of opinion forming on NRGTs by the 'consumer/ receiver' are central. In the Gamson and Modigliani (1989) model of media discourse, media is neither controlling nor controlled, yet there is consideration in this thesis for how the less privileged in schools might react to the structures of media production. While acknowledging a media dialectic of public interest and media opinion, I will be looking here for conversational resources from both media and experience (Gamson, 1992). Young people draw from many forms of mediated information, resonances from popular culture, and salient imagery from young people's lives. It will not be necessary to distinguish the sources of concept formation, whether a computer game, a blockbuster, or a friend on Bebo. The organising processes of demarcation are more important, such as the galvanising of 'lay' and 'expert' opinions on NRGT entities of genes and embryos, and progressive or regressive claims about technologies. The approach follows ideas about the 'collage effect' of news (Chouliaraki and Fairclough, 1999, Chouliaraki, 2000) and conversations about known facts from experience and/or media (Gamson, 1992).<sup>14</sup>

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<sup>13</sup> In many other contexts, young people themselves may be the subjects of moral panic in news media (eg Cohen, 2002; McRobbie and Thornton, 1995).

<sup>14</sup> The fragmented media of TV and web spaces (Chouliaraki, 2000, citing Thompson, 1995; Gitlin, 1980) may challenge the unified public sphere of Habermas, (1989).

Giddens (1991) and Fairclough (1999) place importance on ‘mediation’ for identity construction in the individual. The ‘mediated’ in the late modern sense principally means ‘media’ but following Wittgenstein (1968) and Levi-Strauss (1963) it also refers to embodied language, social practices, and the spoken word. The modern self reconstitutes a combination of direct human contact and media information, whether expert or popular culture references to genes. They then *position* themselves in discourse. Thus both film and ‘live’ presentations, as used in this study, are tools of modern discourse and identity formation. The media process described here is one where topics take on a life of their own, are discussed intensely in media outlets, then move on to other stories. An *issue culture* can emerge from the combined collective action of interest groups proposing arguments to either protect something traditional of worth or defend technoscientific rationale and both perspectives are brought into focus with other connecting actors through episodes of media coverage (O’Mahony and Schäfer, 2005). An issue creates its own culture through a surrounding combination of public beliefs and news media management. This culture connects to wider myths that are salient in society. The self connects and constructs from these narratives. In the issue culture process, the package – the way a frame is presented with meaning from popular culture – fundamentally depends on a storyline ‘constructed over time ...[and] incorporating new events into its interpretive frames’ (Gamson and Modigliani, 1989, p4). It involves the packaging of stories with human interest economic angles in the press (Fisher, 1997).

Identities are formed by the media participating in these issues of discourse. Self-identity is organised around the patterns in the media collage, from the Umwelt, and from personal experience (Giddens, 1991). Beck and Giddens highlight how identity politics enter debates about NRGTs or ecology in late modernity. Identity ‘frames’ appear in socioscientific discourse, such as the environmental activist (Eder, 1996) or the right-wing pro-lifer (Ferree *et al.* 2002). Chapter 6 addresses the frames that emerge in young people discourses in this project. The theoretical and methodological concept of framing, although based on sociolinguistic applications (Goffman, 1975; Gamson, 1992), is now used widely across several disciplines – communication, psychology, media studies, sociology and political science among others (Kohring and Matthes, 2002), and also particularly in the growing literature on the relationships between social movements, agency, and science policy (see Joas (1996), O’Mahony and Schäfer, (2005), and McDonnell (1999) as examples). Framing analysis shows the mechanics of media cross-referencing and selective spinning that is a

feature of modern discourse.<sup>15</sup> Framing asks what is really going on in a local context (Benford and Snow, 2000), in the wider world, in and beyond scientific enterprise and medical applications, and crucially for here, what do young people think should be going on behind the performance of debate and interaction. Here I take the concept into relatively uncharted territory, education. Frame analysis here maps young people's social explanations for scientific or medical decisions, their own gendered and empowered contributions to external debates, and their identities in the practices of formal and informal education. This method of analysis links the collective and individual selection of salient images and metaphors from the classroom to wider discourse and media imagery such as the macro-political frame theories of Ferree *et al* (2002) (abortion discourse) and Jasanoff (2005a) (the politics of biotechnology).<sup>16</sup> Thus there is an important link here between Goffman's performances in pedagogy and social movement theories of late modern science issues described above.

Others have looked at how NRGTs are framed in the media (Ferree *et al.* 2002; McDonnell and Allison, 2006). In Ireland the Catholic church frames 'bioethical' issues as a type of 'pro-life' discourse about values and beliefs trapped by a legacy of the abortion debate (*ibid.*) The issues arising from NRGTs are simultaneously changing social, biological, and personal landscapes over a relatively short period of time, making regulation difficult and creating social and ethical complexities for individuals and institutions. There are new types of relationships emerging, new identities within the debates, summoned up by media terms like 'host mother,' 'genetic father,' 'designer baby,' meaning a child who has genetically selected characteristics from technological intervention, or 'saviour sibling,' a child born with a particular genetic profile to medically treat a brother or sister (see the Glossary for fuller descriptions of these terms). Jasanoff (2005a) suggests identities in health reporting of genetic disease can be discriminatory, such as 'predisposed,' or 'at risk.' These interventions raise profound questions about social norms and the instrumentalisation of identity. Young people are growing up in – and adapting to – a world complicated by an increasing need for

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<sup>15</sup> Framing has been a recent controversial topic between the Conservative US administration and the Democrats in communication analysis (Lakoff, 2003).

<sup>16</sup> In this thesis, some of these images and metaphors were coded as frames in the analysis. Identifying these became a more complex process, as described in Chapter 3; frames are often entwined in each other and descriptions here were demanded outside of frame analysis. Themes of power and performance placed an extra contextualisation on the frames, and are described as part of the account of the pilot activities in Chapter 5. The outcome of frame analysis of the ethnographic data occurs in Chapter 6.

technological decision-making involving origins and finitude in human life issues such as embryos and genes.<sup>17</sup>

In this environment, young people may appropriate or resist these ideas in a pluralist classroom set up for what are referred to in science-technology-society (STS) education as *socioscientific* discussions, where concepts of society are intrinsically linked with S&T. They may identify with consolidated political movements such as pro-life or advocacy groups in the way a debate is constructed, or framed, against NRGTs. On the other hand, young people may agree with the rationale behind NRGTs, that they treat disease, ease suffering or enhance humans. Through the use of film, discussion, and scientist presentations, this work identifies the relationships, if any, between their positioning and wider political and popular media discourses on the subject. As the fieldwork progressed in this study, I became more aware of the improvised nature of taking sides in a debate. Participating students performed in front of the researcher, in front of the group, and intersubjectively between each other. Goffman (1959) provides insight into how the social 'presents' the self in the speech act. The framing here is performed, improvised, iterative, a product of live 'embodied' discourse. Giddens' projects of the self may be problematic here as I approach both performative action and the global phenomenon of NRG T development. Is there a sense of a global or national collective responsibility that the individual self can draw on, or do young people make up 'opinion' as they go along, living in the moment?

Regardless of how much they are aware of the complexities of NRG T choices, it can be argued that young people need to be aware of risk and consequences of this emerging type of decision-making. The next section focuses on local level NRG T discourse in formal and informal education.

### **A pedagogical foundation: performative action in formal and informal education**

A sociological view on pedagogy is not new. Bourdieu and Bernstein are principle exemplars of the type of analyses this study addresses. In the context of *social influence* on science education, it has long been acknowledged that not only do young people learn science and other subjects both inside and outside the classroom, as addressed in the previous section and

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<sup>17</sup> As anthropologist Marilyn Strathern (1996) observes, there are new kinds of social relationships being created by NRG Ts that are tied up with forms of commodity that change family ties and kinship. However, these new relationships extend across all webs of society, not just the family.

in many other studies (Solomon, 1983, 1994; Aikenhead, 1996, Driver *et al.*, 1996; Cobern, 1993; Korpan *et al.*, 1997a; Jarman and McClune, 2002), but they also respond to varying levels of texts and representations (Giroux, 1994b). I thus want to clarify here the importance of defining 'pedagogy' as a combined formal /informal means of inviting learning, a self-identity through education, particularly as applied to life political matters such as NRGTs. Assuming we have this new uncertain modernity discussed in the previous sections, we have informal channels of information (and identity construction) for the young person, and a moral standard required, how might the formal education system respond? For instance, how can there be a pedagogy that teaches the 'good' if, according to more postmodern constructivist teaching approaches, grand narrative is outmoded and totalising?

Any discussion about the relationships between technological modification of humanity, nature, and society may not easily occur in classrooms (Macer, 2000; Dawson, 1999; Levinson and Turner, 2001). In biology class, when genetic or embryo technologies are raised, human identity may be a central focus as it is in various emergent technology discourses, posing existential questions about the essence of humanity combined with future visions of utopias or dystopias through genetic screening, genetic engineering, or cloning. There are other identities to consider however, such as the social identities described above and these may contribute to this lack of discussion. Can biology teachers maintain their own identities in classrooms without being restricted within their cultural borders of curriculum and teaching codes from approaching social, historical, or philosophical questions of NRGTs, particularly if student beliefs or personal values are brought into the discourse? Can teachers and students adhere to local codes of practice in schools on a daily basis consistent with their positions - or roles, although *position* will be demonstrated to be the preferred term - as 'science student' or 'science teacher?' Teachers' borders of biology teaching may need to be maintained when students request religious, moral or philosophical perspectives beyond these boundaries, to find out more in their own acts of identity construction. As social, political, or faith-based discussion of NRGTs is absent from the senior curriculum (Ireland, Department of Education and Science, 2002a),<sup>18</sup> it is pertinent to ask do young people have the opportunity to contribute directly to these discourses, even though there are many debates around them and, as Lindee and Nelkin (2004) state, the gene is such a cultural icon in the media. The biology Leaving Certificate syllabus has been updated in 2002 to include some reference to 'contemporary issues', although this is less than 8% of teaching time (Ireland,

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<sup>18</sup> Although NRGTs are absent within the content of the curriculum, aspects of Religious Education contain the potential to introduce them without 'straining' the borders of the subject, in the areas of contemporary moral decision-making and ethics.

Department of Education and Science, 2002a, 2002b). Both teachers and curriculum planners seem reluctant to include within biology education what has become known as *socioscientific* issues among the science education community worldwide.<sup>19</sup> We shall see later good reasons why this is the case for teachers. Hence, this study also looks at the educational response to this politics, the vagaries of power and resistance that exist in schools, and how a space can be created in science class that allows an intersection between science, education, and society, a space of pedagogical identity. Such a space develops on the idea of the 'progressivist' or 'constructivist' classroom (Dewey, 1963; Edwards, 1990 citing Bernstein, 1990; Chouliaraki, 1996), or a 'critical pedagogy (Freire, 1970/1989; Giroux, 1992, 1994a, 1997a, 1997b; Shor, 1996),' where 'the whole child' is educated, supported by group discussions and practical applications, and identity construction occurs from powerful ideas both within and outside the classroom.

Although there is a large amount of commentary on the decreasing interest among young people in taking up science as a school subject or career (Smyth and Hannan, 2002; Ireland, Government of Ireland Task Force on Physical Sciences, 2002; O'Hare, 2004, 2006), the concern of this thesis is the need for increased inclusiveness somewhere in the senior cycle (although in this ethnographic example, biology and Transition Year modules are the obvious outlets), a general pedagogy, to allow young people the opportunity to consider the life-planning moral issue of NRGs in the informal education terms of which they are familiar, in turn linking to the cultural norms and 'popular myths' in common with all society. In the UK, the GCSE syllabus includes an option for an introductory science subject, 21<sup>st</sup> Century Science (Nuffield Curriculum Centre, 2002), emphasising scientific concepts relevant to the lives of young people. This was successfully piloted within the last four years, and includes discursive sections on genetics and society. However, to some educators, introducing a dimension about genetics and embryos that gives leeway to 'values' and 'belief' compromises pedagogical practices - not just the perception of the biology subject as solely reliant on the objective scientific method, but also the codes and practices of science education itself.<sup>20</sup> Other commentators have been critical of the back-to-front structure of this type of STS focus, where the everyday and salient are the higher order discussion topic on which the science content hangs, for example mobile phones and global warming, accusing it of being a 'soundbyte science' that becomes removed from the epistemological and methodological discipline (Critics attack new science GCSE, 2007). In the Irish context,

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<sup>19</sup> It was notable that the 2006 Leaving Certificate honours level biology paper had *no* reference to NRGs unlike the two years previously, much less perceived negative impacts of the biosciences.

<sup>20</sup> It is noteworthy that there is no overt mention of the contentious embryo in 21<sup>st</sup> Century Science



socioscientific issues currently in science education are commonly referred to as 'ethics' or 'social issues,' a smaller, supplementary part of a subject that looks at biotechnological practices from the outside.<sup>21</sup>

### Combining the sociological and the pedagogical: choice and decision-making through film and contact with scientists

This thesis creates a link between 'inside' and 'outside' the classroom to study these distinct realms investigating the concepts discussed up to now in this chapter, while being constantly aware of the relationship between agency and structure. Drawing on Giddens' *structuration theory*, the theoretical focus is the dynamic relationship between practices, rather than 'beliefs' or 'attitudes' about NRGTs. The thesis considers how structural forms of communications processes are represented in the voices of the young; what are the grounds for personal agency, what are the constraining systems. It is an ethnography of intervention activities and a frame analysis of the communication processes in a space that represents the intersection between science, education, and society.

In this study, classrooms with students aged from 15-17 years are presented with two activities that brought social and moral relevance to NRGTs. Films are used to present reproductive decision scenarios (pre-implantation genetic diagnosis (PGD) and stem cell research) showing the moral decisions faced by individuals and families where the technologies are offered for disease prevention, while a visiting biotechnologist presents how his life and work in disease treatment relates to his audience and society. Students are asked to take characters' decision-making positions in the films that represented their views and defend this position as well as engaging directly with the visiting bioscientist. Biotechnology is represented by the presenters as a career choice leading to beneficial research, its practitioners (from the NICB) similar to the audience. Open, structured discussions follows each activity. To connect local discursive practices and perspectives on NRGTs to wider society, fieldnotes and transcripts are subjected to Gamson's (1992) frame analysis. The themes that emerged are connected to media references that students may have been aware of, stories heard, events experienced, or cultural themes of NRGTs beyond their experience.

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<sup>21</sup> A senior administrator within the Irish education system once told me in a meeting with biology teachers that he believed 'ethics' would never be part of 'biology.'

This study is not concerned with the recent initiatives to make science more interesting and more fun – although these may well be effects – but rather identifying issues of relevance and the contributions young people might make to wider discourses on these issues. It is concerned with participants' accounts, whether it is of a local cultural identity or identification with narratives, fictional characters, or larger localised structures such as the school itself; or perhaps descriptions of biological constraints, or of nation state or global concerns. It is concerned with how young people 'use' identity, that is empower themselves by incorporating strategies of performance in arguments or utilising media techniques or referencing media while communicating their views on NRGTs as activities of well-being or of lifestyle. Self-identity, group identity, identifying the 'other' – these are new identities of a modern world, each an expression from young people's understanding of NRGTs. The discourse analysis methods used here have common application in observing and giving voice to inequalities, such as studies in race, poverty, sexuality, and gender - all attributes of communication involving mediation of selfhood in late modernity - but also other concepts of the other. Emancipatory studies have a long history within sociology of power struggles, communication strategies, and notions of self. This is a qualitative, interdisciplinary approach to science and education. It is an inquiry that uses an ethnographic qualitative research tradition<sup>22</sup> in schools, informed by the classification of complexity that is the domain of science and technology studies (S&TS). It inquires into the space that young people occupy in relation to science and technology as they begin to engage with the biology subject for the first time at senior level; their experiences, how they 'make meaning,' demarcate educational and technological fields, and endorse or set agendas already prevalent in media spheres.

Perhaps even more crucially for pedagogy, this is the process of watching production, reproduction and co-production<sup>23</sup> in action through ideas about the increasingly political life sciences, using practices in meaning-making discourse rather than using a theoretical or analytical tool that accepts what participants say as revealing what is 'in their heads' about

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<sup>22</sup> We need to approach cultural anthropology in education with caution. In the 'common sense', practical focus used throughout this work, no direct comparisons can be drawn between scientists and researchers moving among schools and the observations made by Clifford Geertz (1973) at a Balinese cockfight, the famous ethnographic piece from his *Interpretation of Cultures*. Similarly, De Certeau (1984) challenges Bourdieu's (1972) generalisations when reporting the practices of the Kabyle at the expense of particularities in one of the latter's seminal ethnographic works.

<sup>23</sup> There is of course a double meaning to the word 'reproduction' in education as used here, procreation and the passing on of domination through language and use of symbolic capital. Also Jasanoff's (2004) definition of co-production is how '[people] gain explanatory power by thinking of natural and social orders as being produced together' (p2). In late modernity, it is 'the proposition that the ways in which we know and represent the world (both nature and society) are inseparable from the ways in which we choose to live in it' (ibid, p2).

biotechnology and society. NRGTs in education is a potent site of study because of the salience of the subject matter, the connectedness it has with ideas of nature, technology, and a sense of sacredness, sometimes of the future body, sometimes of a spiritual nature. Accordingly, as a humanities study of science education, this study is not primarily concerned with how the young learn science or apply it to real world circumstances or a career. Rather the study seeks to address how a field of practice such as a secondary school classroom can support, or perhaps frame a complex life issue involving biology. I argue that local pedagogy of genetics and biology as it exists today - inside or outside the curriculum - does not engage young people with a reflectivity, a discursive exposition of self-identity, or a sense of value or awareness of the scientific procedures politically endorsed for economic reasons or the practices of biosciences emerging with each new technological breakthrough that respond to very modern dilemmas.

The 'choosing identities' of the title intends to draw attention to several ambiguities of identity construction. Firstly there is a choice taken in the fertility lab, for which since 1978,<sup>24</sup> humans are the agents. A viewpoint held by many is that the 'human identity' is 'created' at the moment the zygote is formed from the combination of the sperm and the egg, whether for reproductive or therapeutic purposes. This is represented in one of the films shown to schools, *If ... Cloning Could Cure Us* (2004) but which was often raised in the other film, *The Gift* (1999). Secondly, choice is further increased by the possibilities of PGD, where it may be possible – in regulatory terms as well as scientific - to pre-select sex and physical characteristics in the future. This is then choosing of an identity in genetic terms by PGD and conditioning of a child's life after birth to further define her destiny, also represented in *The Gift* (1999). Thirdly, modern research on youth constructions often focuses on the choices that adolescents have in negotiating identities (Androutsopoulos and Georgakopoulou, 2003). Lastly, and perhaps more relevant to the action component of this study, there are the positions that young people take in relation to their views on these kinds of technologies, the identities they create for themselves borne out of social processes when reflecting on these matters. These identities include *identifications* with both fictional characters and people known to participants, as well as the concepts and identities that we as educators and researchers *create* for them, and they as students may *resist* in the context of biology education as they reflect on their own self-identity. Identity choice is seen here as a process of discursive action, identity as *voice*, following Goffmans's (1959) performative practices and framing strategies (*ibid.* 1975) and Giddens' (1991) authenticity of self that

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<sup>24</sup> Louise Brown has the public identity as the first 'test tube baby' in 1978.

creates a new flexibility – and reflexivity – for the moral self-identity in modernity. In this respect, although the ‘choosing identities’ term may allude to a postmodernist construction, the study does not fully embrace an extreme relativist position, nor side with many of the nihilistic tendencies of this position.<sup>25</sup> Rather it sets out human positionings in the late modernity of Giddens (ibid), a new situation of globalisation, technoscience and uncertainty (ibid. also Beck, 1992) out of which educators and the young must constantly redefine their space or have it defined for them (Michael *et al.* 1997, Simmonneaux, 2000) while involved in the moral decisions of the everyday. Lifestyle choices, computer games, and internet chatrooms all require an identity to be chosen, a role to be played. These are the rules of the new mediated experience.

When analysing the issue of self as identity, it may be simplistic to say the position a young person takes on an NRGT issue in the classroom debate informs us completely of her worldview regarding NRGTs and tells us the kind of person she is. There is too much contingency built into immediate experience of media consumption, not least a film just viewed, as well as regimes of power (Bourdieu, 1996; Thevenot, 2001) present in the immanent and improvised experience of debate.

### **Life politics as pedagogy in 21st century biology?**

In describing performed, argumentative action in the classroom, I argue here that a new form of politics is emerging as a result of the life decisions under discussion, what Giddens (1991) calls *life politics*, and that young people need to have access, and contribute, to this politics as part of their education. The expert knowledges brought through media can be used as a resource both for understanding and explanation in socialised, that is Western, societies. The knowledge can be constructed for generalisation or it can be contingent on the context of how and where explanation occurs. As day-to-day decision-makers - and potential future policy-makers - young people are directly involved in this politics. It is a group and individual lifestyle politics (ibid.). It is a politics of identity in the sense that it concerns relationships between self, environment, human-enhancing (or -defining) technology, and how we live our lives today in late modernity. How do young people make sense of life-planning and future diagnostics? Would they veer towards perfection, like Kant’s timber ‘less crooked?’ Could

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<sup>25</sup> Although the work does not fully align itself with late Latour, his phrase *relationist* as a substitute for *relativist* would seem to describe the non-positivist yet structured epistemological account of boundaries and practices in my approach (Latour, 2004).

struggle occur between better understanding and treatment of diseases and disabilities, yet empowerment of those who might fall under these crude categories of difference?

Giddens' (1991) formally defines life politics as that which

concerns political issues which flow from processes of self-actualisation in post-traditional contexts, where globalising influences intrude deeply into the reflexive project of the self, and conversely where processes of self-realisation influence global strategies (p214).

This is a bold claim which needs to be addressed in the context of late modernity's preoccupation with the local and the global.' It is politics in the sense that there is broad reflection, debate, argumentation, balancing, and a reflexive modernisation of nature and society (Beck, 1994b; see also Chapter 2).

There is a need to investigate if there is a justified unease in exploring issues such as embryo technologies in the curriculum. It could be argued that the only topics which currently introduce such moral and philosophical theorising about the essence of humanity and 'the good' in a mass media context are those relating to NRGTs. A report by the Commission for Assisted Human Reproduction (2005), commissioned by the Government, examined the issues surrounding the embryo which also included recommendations and defined conditions and practices of NRGTs. One of the report's recommendations was that an embryo outside the uterus, that is, one not implanted, would not have personhood status. At the time of writing, there has been little progress on CAHR implementation (Commission for Assisted Human Reproduction, 2005) but the similarities between the recommendations and the frozen 'embryo case' ruling (Cassidy, 2006) suggest this might be the future of regulation. There is however, a current view that there is a lack of enthusiasm within the (parliamentary) political process for these matters. Historically, the Irish Government has been involved in prolonged, divisive campaigns leading to referenda involving the unborn. When a Government and an education system shies away from a topic, does it rightly belong outside the normative machinations of social and civic practices? Are NRGTs too personal, too amorphous, caught up in complexities that can only have formalised boundaries and definitions at the very local level, thus not suited to the normative practices of education and civic politics?

This thesis addresses how young people might use a liberal individualism to remove reproductive and genetic choices from the (structural) regulatory to the personal, as

McDonnell and Allison (2006) suggest. Perhaps any ideas of the personal, the proximally relevant, or the spiritual disappear when the economic and scientific realities of the biosciences agenda are set in Ireland. However there is an argument that it cannot be left to individual choice alone if, for many, this choosing involves an impact on future social and biological identities or future characteristics of the species (as is the case in pre-implantation diagnosis where embryos are screened for 'disorders'), or, for others, if reproductive choice leads to the destruction of foetal life.<sup>26</sup> The sociological argument made here accepts multiple ways of knowing and appreciation of genetic ties and the embryo, and this is made all the more relevant as Ireland comes into a new stage of development with its many immigrant cultures. Although Jasanoff (2005a), among others, hopes for a new politicisation of biotechnology that allows for global democracy, in a sense the biosciences have already become politicised, as it becomes increasingly socialised (Nowotny *et al.*, 2001), as discussed in Chapters 2 and 3.

There is justification here to begin that socialisation of science in the classrooms. Science and technology may exist as product and producer of society (and other societies). The performative nature of a more formalised discursive argument beyond conversation can be recognised in classroom discussions as taking on both practices and tropes potentially learned from media debate that utilises emotion, and will sometimes get heated, yet ultimately is benign and controlled. However, because of the locations of the film shows and discussions and the charged nature of the content, facilitators and speakers had to be attentive to the emotional sensitivities of young people. Where hidden anxiety came to the surface, it was never allowed to flow. At all times, debates and discussions were kept in a safe, supportive environment where anyone could participate, demonstrating the type of 'bracketing' of existential and moral anxiety that can take place in an *institution of modernity* (Giddens, 1991) such as the practices of the school room. Another ethical consideration for the young was their age. Parental consent was a requirement, except in these schools where the policy dictated that teacher consent was sufficient for engagement with sensitive material. This study does, as the young person asks opening the chapter, bring us 'closer to the body' in how we observe and construct a meaningful discourse for young people both at the local level and globally.

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<sup>26</sup> 'Foetal life' is the term given by Ferree *et al.* (1996), in their media analysis of abortion discourse, for all perspectives of zygotes, embryos and fetuses where there is a pro-life perspective.

## The practice approach in contemporary social and cultural theory

The argument is constructed within the theoretical framework of a *practice theory* of discourses. A principal text here is Schatzki's *The Practice Turn in Contemporary Theory*, the 'theory collective' is based on the interpretive or pragmatic turn in social theory – itself a descendent of the symbolic interactionism of Mead, and before that Dewey's and James' pragmatist school – and has recent applications in science and technology studies. I have identified the following theorists within a general theory of practices, following a similar grouping by Theodore Schatzki (2001) and Andreas Reckwitz (2002): Anthony Giddens, Pierre Bourdieu, Charles Taylor, late Michel Foucault, Erving Goffman, Michel de Certeau, Luc Boltanski, Laurent Thevenot, recent Bruno Latour, and Karen Knorr-Cetina, among others. The linguistic turn since Wittgenstein is also acknowledged. The thesis draws on frame theory as a method of analysis of the conversational and debate elements of ethnographic fieldnotes. However the practice approach understands discourse and objects as linked by normative actions and having an intrinsic moral character. The theory I draw on here presents a moral dialectic in the empirical work; both the moral justifications of embodied argument and power play that takes place at the performed level (Goffman, 1959; Davies and Harre, 1997) and the entering into moral discourse to deal with wider social issues of identity. Practices here refer to social networks that include objects, technologies, and processes. This is a broader view of pedagogy, the boundary interactions between school, media, institutional technoscience, and the young citizen, that operate *around* the curriculum. The approach places me theoretically in the educational *locale* (Giddens, 1991) and *fields* of practices (Bourdieu and Wacquant, 1992) that demonstrate both agency and structure. The geography of school, classrooms, timetables, subject disciplines, school uniforms, and so on: these all contribute to structural constraint in which the student agency must negotiate when accessing bioscience information permeating other spheres of life. I am not privileging local knowledge of *scientific* content or practices, but report these as they occur as such accounts were part of the coding process (see the Methods section in Chapter 3). Although we are in an age of increased mediated talk, non-verbal embodiments in practices are also included, tacit understandings from personal experiences and media reference that do not privilege textual or verbal discourse, following the embodied practice approach of Giddens (1991), Goffman, (1959), Bourdieu (1990, 1996), Foucault (1985), Taylor (1989, 1991), Shilling (1993, 2005), Turner (1996), Schatzki (2001), and Butler (1990). Young people's descriptions here address the increased knowledge of risk and the consequences of technological decision-making required in modern life planning, particularly for issues of the body.

## Research questions

The main research theme of this thesis reflects on:

**activities that use film narrative, debate, and discussion to facilitate senior level students in exploring modern identities when discussing and arguing moral issues facing people making decisions about new reproductive and genetic technologies (NRGTs).**

The two research questions this theme addresses are:

1. *Life politics* – young people’s access to and relationship with discourses ‘outside’ the school on the controversial issues of NRGTs as part of a ‘project of self-identity’:

*Q1. How would young people in a biology classroom relate locally to the moral and socio-political questions posed by the media issues of reproductive and genetic technologies (NRGTs) as represented by pre-implantation genetic diagnosis (PGD) and human embryonic stem cell research (HESC)?*

2. *Pedagogic practices* – local performative actions of teachers and students contributing to this discourse using discussion and media:

*Q2. What can an open, ‘embodied’, performed, programme using film, bioscientist visits, and debates on the topic of reproductive and genetic decision-making tell us about the potential for a modern pedagogy at Irish senior level?*

## Chapter summaries

In interpreting and presenting this qualitative work using ethnographic techniques, I partly follow Paul Willis’ (1977) classic *Learning to Labour* as a structural guide. Willis’ work was an ethnography of working class schools. He divided his book in half, the first section



containing the main ethnographic, descriptive chapters and the second applying his interpretative analysis to wider theory. The remainder of this work uses an ethnographic/interpretive duality format which means, following de Certeau (1984), Geertz (1973), Clifford (1983), and Rabinow (1986), that no ethnographic account will stand without some interpretation and historical context. Willis' influence has contributed to a critical ethnography here, acknowledging in a certain sense social class constraint as well as other more subtle constraints to do with practices of power and discourse.

Chapter 2 sets out the research problem and rationale for study through a review of relevant literature on the cultures of the gene and biotechnology-promoting institutions of modernity, mediated framing strategies relating to biotechnology, and steps taken towards the empowerment of identities when engaging with NRGTs through media in science education. A particular critique of Giddens' *Modernity and Self-Identity* (1991) is offered by way of these literature themes.

Chapter 3 presents the philosophical and theoretical framework through the thesis methodology. A theoretical step is taken towards extending Giddens' (1991) institutional 'sequestration of experience' and 'life politics' to include how life political NRGT issues emerge within these institutions from *tacit, performed, common-sense practices* of identity formation and decision-making influenced by media. This nascent theoretical construct both informed, and was informed by, the research methods also outlined in this chapter.

In Chapter 4, the context for the research is outlined, using 'thick description' of each school and the 'intervention' activities.

Chapter 5 describes entering the field, by addressing through ethnographic fieldwork the performative and power issues that emerged when setting up the pilot study. The chapter focuses particularly on the construction of identities in participants' boundary practices when interacting with the interventionist researchers and the discussion activities, and how this mapped out the theoretical and methodological boundaries for the remainder of the study.

Chapter 6 presents the findings from a frame analysis of young people's and teachers' conversations about NRGTs, identity, and society. The dynamics of class discussion and debate are also addressed following the intervention activities of film and visiting bioscientists.

Chapter 7 ties up the unpackaged empirical work of the core chapters to present the research findings in an applied context. Framing strategies and cultural resonances of NRGT issues are the focus of the early part of the discussion. The chapter also reports on localised events in particular schools summing up in microcosm both the potential and limitations for a cross-curricular science/humanities approach to life politics and pedagogy.

Chapter 8 presents conclusions and implications of this work and potential for further research and wider discussion on NRGTs in the context of discursive identities and self-identity, science education, and society. The final chapter also positions the thesis with respect to its original contribution to knowledge.

## **Chapter 2: Defending life politics within a mediated pedagogy of reproductive and genetic technologies**

On a basic level, this thesis is concerned with how biology teachers and students engage with the discursive activities of film, debate, and presentations inside the school classroom and how the resulting conversations relate to bioscience norms and NRG T controversies on the outside. From this perspective, a literature review might address these two distinct areas and their linkages. There might be an expectation to cover some educational ground and ways of organising knowledge domains and practices from media resources on both sides of the school walls. The research problem is outlined in these terms to an extent; there is a review of science education literature that specifically addresses external and social influences on scientific worldviews and ways of describing S&T through multicultural and anthropological means using, for example, the educational constructivism of Cobern (1993), Aikenhead (1996, 2001), Driver *et al* (1996), Solomon (1994), and Jegede (1994). External to school contexts, there are the media, economic, socio-cultural, and religious perspectives on NRG Ts, and these are briefly described through the disparate socio-political positions of Jasanoff (2005a, 2005b), Wynn (1992, 1993) Ferree *et al.* (2002), and Nelkin and Lindee (2004) among others, and the ultra-scientific approach of Dawkins (1989), as well as biotechnology representations in literature and film.

However, as I emphasise throughout the thesis, the research questions are posed within a broad sociological inquiry within education, rather than an educational inquiry. The tensions between the sociological and the educational as areas of study were addressed in Chapter 1, and will continue to be throughout in defining the area of work, drawing from both but taking predominantly from the sociological. The selected reading in this chapter places this into context. The connecting link between sociology and education is a type of performed rhetoric or formal argument in pedagogy, an embodied type described by Goffman in various stages of his career, and also in recent studies by Chouliaraki and Fairclough (1999, often drawing on Billig, 1991, 1992, 1995, 1996), and Giroux (1991, 1997a, 1997b). This work may be a preliminary pedagogical step towards argument on the 'ethics of NRG Ts' based on an awareness of socioscientific issues but it is not the ultimate goal. Also, connections and

separations made in discourse take precedence over what and how genetic information is taken into the learning process. Access is central, allowing young people to engage with such discourses in ways that may be relevant to their lives and recognise and use their own discursive power.

Approaches to micro/macro relationships inform the inquiry from an ethnographic tradition based on practice elements of symbolic interactionism and the interpretive or pragmatic turn in social theory. Therefore, classic interactionist texts such as Bourdieu (1986), Bourdieu and Passeron (1977), and Willis (1981) provide some methodological guidelines.

In addition, the increasing influence of media and hybridity<sup>1</sup> on cultural settings has contributed to a turn towards *boundary work* where interdisciplinary action at the edges creates a new dynamic (Gieryn, 1995). This is occurring in ethnographic inquiry (Bourdieu, 1989; Marcus, 1998; Roth, 2003; Hirsch, 1998), in science representations in the media (Bucchi, 1998), science education research (Phelan *et al.* 1991; Costa, 1995; Aikenhead, 1996), cultural studies (Giroux, 1992, 1994a, 1994b, 1997a, 1997b), but particularly in science studies (Gieryn, 1995; Jasanoff, 2005a, 2005b; Latour, 2004; Haraway, 2000). The locus of bioscience communication in education using ethnography can utilise all these bordering areas. In common with the science education of Aikenhead and Costa, Henry Giroux (1992, 1994b) has also used the term 'border' in his work on critical pedagogy. For Giroux, the classroom becomes the site of liberation where students need to negotiate and cross cultural boundaries imposed on them by structure, such as class, gender, or formal curriculum. This places the classroom into liminal spaces (Turner, 1974) where many things are possible in discourse.

There is of course a danger in accepting such freedom in utopian terms only. Giroux (1994a) tells us also that ideologies of consumerism and neo-liberalism can constrain classroom ideas, as can the crippling power of poverty. Dewey, one of the great pragmatic educationalists, saw pedagogy as freedom, but only within the constraints of early 20<sup>th</sup> century America (Demetron, 2004, citing Dewey). Giroux's border politics occupies the same optimistic realm as Giddens' later theories on *structuration*, acknowledging a dialectic between individual agency and constraining structure. The approach in this thesis takes this view, 'somewhere between domination and resistance' (Demetron, 2004 p58), where an attempt is

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<sup>1</sup> Cultural theorists such as Stuart Hall (1992) emphasise 'mixtures' in describing identities – racial, multicultural, or otherwise – in late modernity. Practice theorists such as Latour and Knorr-Cetina introduce similar language when speaking of actor networks involving science, technology, and common practices.

made to, as Giroux says, 'make hope practical and despair unconvincing' (Critical pedagogy on the web: Henry A. Giroux, 2002). Giddens has been accused of over-simplifying class constraints (Callinicos, 2001) which I will deal with in this chapter. Using this as a foundation for education is Deweyan in that it is democratic and libertarian but it can also become a more utopian vision than Dewey's, a point which will be further teased out. Neo-utopian or not, boundary work opens up new complexities when studying the connections between school conversations on a localised topic and wider discourse. A qualitative inquiry into how young people create borders in their descriptions needs to take this into account. When we speak of 'culture' in the context of any particular issue - including, and perhaps especially, the controversial such as NRGTs - the classroom has many complex connections to normative action through the media and otherwise on the outside. It may be difficult to discern those cultural artefacts that belong only to science education.

To map out this theoretical and methodological ground, this chapter first defines those late modern elements of change in which I place the education system(s) and on which contemporary social theory might focus (Chouliaraki and Fairclough, 1999): 'discourse,' 'identity,' 'reflexive agency,' and indeed 'late modernity.' For the purposes of this study, there is a need also to define the social context for the problematic terms 'science' and 'biotechnology.' The two research themes guide the chapter, but are woven into various, yet connected, theoretical positions. The first research theme of *life politics* (Research Q1) provides the main theoretical and methodological rationale for taking an interdisciplinary sociological approach in the inquiry. It binds the educational, the cultural, the sociological, and the moral, as well as future visions of the body in life decisions. The second research theme of *pedagogic practices* (Research Q2) raises the performative and power aspects of using film and presenters in schools, taking in macro socioeconomic and local cultural factors as well as the effect of having teachers and facilitators present (Goffman, 1959, 1974).

Giddens' (1991) explanation of life politics is the struggle to create and mark out a self-identity through decision-making in a mediated, late modern, moral landscape. NRGT pedagogy here (rather than current *biology education* thinking) is placed within a specific theoretical context of the practices both constraining and leading to life politics, but also acknowledging the liberatory/democratic educational tradition of Dewey (1938), Freire (1970), and Giroux (1992, 1997a, 1997b), and studies on worldviews and culture in science education, notably Solomon (1983, 1994), Driver *et al* (1996), and Aikenhead (1996). The sociological context then is an education of social values and moral conventions. Giddens' life politics forces the issues of NRGTs - cloning humans, selecting traits, embryo-disrupting

therapies, repairing the damaged and dying body – onto the instrumentalist scientific agenda. It is subjected here and in Chapter 3 to theoretical critique from prominent ‘stable-mates’ of Giddens, in what Schatzki (2001) and Reckwitz (2002) have called a common *practice theory* approach, evolved from the symbolic interactionism school of social theory, which also includes Goffman, Bourdieu, Foucault, Taylor, Butler, Latour, Knorr-Cetina, Boltanski, and Thevenot.<sup>2</sup> Practices, in this culturalist approach, are networks, what Reckwitz (2002) calls ‘body/ knowledge/things-complexes’ (p258).

In mapping the perspectives on NRGTs of people regardless of age, gender, or context, whether reading *Brave New World* (Huxley, 1994) or listening to their biology teacher, the notion of *frames* is a powerful methodological device, taking account of the episodic nature of media coverage as well as the forming of identity and connectedness with others in discourse as outlined in this chapter and later in Chapter 6. The emphasis is on the strategies of ‘receiver’ or ‘consumer’<sup>3</sup> rather than the agenda setting of mass media. Using *frame analysis*, a form of discourse analysis, as part of the methodology (Gamson, 1992; Benford and Snow, 2000) thus informs the discussion further about how NRGTs are understood in the media, among media consumers, and in general conversation. In the sections here, I tie these in with action theories of late modernity that might provide a context for young people’s views of NRGTs with reference to Giddens, Beck, Lash, Schatzki, *et al* but particularly also pedagogy, drawing from a rich heritage provided by, for example Bourdieu and Bernstein.<sup>4</sup> Later in the thesis, Chapter 5 will address the performative context to frames following the original performative identities in framing strategies by Goffman (1959, 1974). Chapter 6 addresses the cultural framing mechanisms themselves for ‘external’ NRGT issues subsequently brought to mediated communication processes by Gamson and Modigliani (1989). Gamson’s application of frames has a somewhat different meaning to Goffman’s, as will be addressed, as it looks at the mechanics of strategising and arguing when defending a position through intensifying the centrality of an issue and ‘packaging’ arguments in terms that will have localised salience.

As prominent as media discourse is for the diffusion and engagement of ideas and concerns about NRGTs, we must also address historical, political, and economic backgrounds to the development of the education system’s current approach to biology pedagogy, and this is

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<sup>2</sup> These are Schatzki’s and Reckwitz’s own categorisations. I also include de Certeau in the practice theory collective, following *The Practice of Everyday Life* (de Certeau, 1984).

<sup>3</sup> Each of these two terms has connotations which this study will not address.

<sup>4</sup> Bernstein (1996) used the term ‘frames’ to describe controlling mechanisms over the classification of objects and processes in schools.

analysed across two sections in the chapter, 'Controlling NRGT fears..' and 'Beyond constructivism...' In the tradition of Geertz's (1973) thick description, this gives context to the structural practices of both understanding the politics of genes and embryos and introducing these topics to learning environments. What emerges prominently from this analysis is the role of Ireland's current turn to biotech as an economic imperative in supporting the exclusion of life politics from the science curriculum and implications this has for science communication generally in a new global paradigm of 'public engagement with science' rather than the outmoded 'public understanding of science.'

A life politics seen within the theoretical construct of practice theory places moral justifications for using NRGTs within the contingencies of young people's personal and media experiences when applying 'moral toolkits' in contextual decision-making (the writings of Boltanski and Thevenot (1991) and Simmonneau (2000) are particularly informative here<sup>5</sup>) and the application of these moral toolkits to issues such as PGD and stem cell cloning in the classroom. In the 'Moral decisions..' section, the concept of an empowering pedagogy is defended, whether formal or informal education, or in other words, whether internal or external to the school. In assembling and utilising these tool-kits, a clear focus for boundary work between a senior level science class and popular and elite discourse lies with informal methods of learning through media. The question is therefore asked how constructivist and 'practice' models of education sympathetic to the life politics concept has accommodated, or could accommodate, this more inclusive paradigm. As examples, the methodological detail of using film and 'live' presenters in the context of science education research and commentary on argumentation models is therefore addressed. The final section problematises the culturist view of NRGTs in education.

### **Defining late modernity: discursive, symbolic, reflexive, technological, aesthetic**

This section maps out the stage of modernity that, although contested, describes a dynamic period of the 21<sup>st</sup> century where personal and collaborative understandings of science and nature are necessary elements of 'constructing' an identity that is 'political,' meaning not necessarily parliamentary, but a political identity that can be personal, communitarian,

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<sup>5</sup> These moral justification writings are drawn on for theoretical purposes only, acknowledging a wider body of work on moral decisions in late modernity. As discussed later, Gamson, Benford, and Snow have much to say about observing these decisions empirically in discourse.

national, global, or symbolic (or all of these). Late modernity also describes the practices<sup>6</sup> on which both constraint and empowering agency exist. Most of the chapter will unpack this reading of late modernity as it applies to the connecting sociology of technoscience, biotech, the economy and the education system in Ireland. There are diverse opinions on possible pedagogic and curriculum interventions to acknowledge this 'new situation' of connecting interests affecting the way we live, and understand, our lives. Thus some terminology needs to be defined.

To begin with, let us look at *late modernity* itself. The Giddens (1991) version used here describes a contemporary Western society where time and space have contracted in mediated experience. Within this context, there is increased individualisation - although not necessarily atomism or isolation (Beck, 1994b)<sup>7</sup> - where the project of self-identity is a continuous one, 'the sustaining of a coherent yet continuously revised, biographical narrative' (Giddens, 1991, p5). Similar understandings of late modernity come from Beck (1992, 1994), Lash, Wynne, and Bauman, the latter referring to 'liquid' modernity, others to 'high modernity.' For Beck (1992), this is a risk society with greater uncertainty and individualisation, where there are new ideas of risk, but also new hysterias, and where a sub-politics emerges, a collective action from outside mainstream politics, such as the global environmental movement or trade unions. Resistance against technocratic or technoscientific forces often characterises this type of politics - the many environmental social movements, genetically modified organisms (GMOs) opponents, pro-life groups against NRGTs, and so on.

We may ask how a young person in a classroom can use resources from common and scientific discourse to apply to everyday decision-making and ultimately, their sense of identity. Identity construction may exist in a local/global dialectic by young people positioning in debate around the late modern ritual of media (Couldry, 2003; Bernstein, 1990; Scollon, 1998; Androutsopoulos and Georgakopoulou, 2003; Billig, 1991; Chouliaraki and Fairclough, 1999). Young people are becoming increasingly connected to global discourses because of mass media and ICT technologies (whether this can be equated with global-mindedness or not is another question). Writers within the practice theoretical framework from Giddens to Taylor, and also Beck, Lash, and Bauman, often speak within the context of the 'fracturing' of identities in late modernity, where old traditional nation-state, family, and ethnic notions of identity are carved up for newer, mediated means of assembling identity.

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<sup>6</sup> 'Practices' here have a defined meaning, as explained in Chapter 1.

<sup>7</sup> See also intuitive moral practices in the late modernity communitarianism of Taylor (1989).



Critiques of this postmodern perspective of identities - plural - often highlight the loss of meaning and social responsibility in these assessments. A rationale for accepting other notions of identity besides the essentialist-cultural in a technological age is offered here, centrally the practices of *discursive* identity - being involved in debate, setting self-identity boundaries and marking out the other, and positioning on issues locally and in wider discourse.

Let us look more closely at late modernists' ideas of identity in a globalised world that includes the potentiality for biotechnological enhancement, at the discursive level if not in actuality. Giddens' concept of self-identity in late modernity is one option used here, the personal identity engaged in the project of the self and the space/time compression of a mediated world. Goffman's (1959) representation of various aspects of identity through performed *social identities* adds another, group interactive dimension to this concept. Taking these views together, late modernity represents a connectedness between the micro and macro orders, between individual decision-making and the wider world. Giddens (1994a) claims this connectedness moves away from the intermediate orders such as state to proximate orders of self-identity and life-style politics and the macro orders of globalisation, a contested term which Giddens inadequately deals with. Similarly, on a structural level, we must move away also from 'holistic' or theistic explanations of identity. Identity practices in discourse will not need to resolve the centralised subject, but may represent a coherence of self, a pulling together in a performed debate, *because of* the debate or formal type of discourse. As cogently theorised by Jenkins (1996), and applied to biotechnology discourse in classrooms by Simmonneaux (2000) and Michael *et al.* (1997), collective and individual identities are constituted by self-representation and being represented by others, either explicitly in labelling or implicitly through identification and suppression. This is the discursive identity of classrooms described by Gee (2002) and Brown (2004) where entering discourse, bringing a unique cultural background, 'creates' an identity within that discourse. Although NRGT decisions may in this sense be discursive, we may also need to show ethical regard for the *real* effect on future generations (Habermas, 2003; Preimplantation genetic diagnosis: for or against humanity? 2004), perhaps the 'hidden identities' that, should they be born, would be our descendents. Giddens' (1991) ideas of authentic self-identities is very much in evidence here, just as it is when a young person decides to place a visual act of embodiment on YouTube for mass consumption. The personal becomes political and public.

The concepts of 'science' and 'nature' are problematic in this paradigm, as both are said to be 'socially constructed' (see Latour (1987), Knorr-Cetina (2001), and Wynn (1992) for the

former term and Eder (1995) for the latter). Nowotny *et al* (2001) speaks of the increased contextualisation of S&T in late modernity, social networks of 'science' creating 'sciences' that are more robust because of popularisation and the use of cultural images, more diffuse as scientific objects and concepts are placed in a common ground with other expert processes. Thompson also sees a deliberative democracy occurring through the use of media by groups and individuals displacing traditional participatory models (Chouliaraki, 2000, citing Thompson, 1995). In this context, I want to draw on Giddens' project of self-identity to further explain a democratic diffusion in terms of a personalisation of systems. Habermas (1992) may refer to this as a resistance of the lifeworld against the system; for Giddens there is a 'transformation of intimacy,' a trust in the pure relationships of humans rather than institutions, and a rather ambivalent trust in *expert systems*.<sup>8</sup>

There are *five* characteristics of late modern practices that are useful to the discussion.

(i) First, *discourse* here will have *power* implications, following the poststructuralist view of an increasingly textually mediated society studied by Foucault, and assimilated by Chouliaraki and Fairclough (1999) among many others. Discourse can be verbal or non-verbal; it can be image, text, or action. An agreed view is that discourse sets the limits to what can and cannot be said. Discourse will have dominant and recessive features within a culture, both normalisation discourse and discourses of resistance (Chouliaraki and Fairclough, 1999, citing Foucault, 1970, 1977; de Certeau, 1984). Media studies reading discourse in this way introduce ideology and hegemony, the *control* of discourse by producers or processes of media. Ideology theories are often grounded in the emancipatory social theory of the Frankfurt School of Horkheimer and Adorno. Ideology is contentious also in cultural studies, where Hall (1980) and McRobbie (1994), among others, see media consumers as constantly resisting neo-liberal and capitalist ideologies.<sup>9</sup> Discourse here is not always understood to be either an aggressive ideological force or act of consent. Subtle resistance to dominant discourses occurs and will be focused on, moving away from ideology or communication processes in the cognitive domain to one that is practice-oriented and

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<sup>8</sup> Giddens' (1991) expert systems are technical knowledge processes lifted out of local contexts and independent of practitioners or clients, compressed in space and time, and immutably part of the modern way of life. We depend on them, we trust them, yet we never think about them; the doctor's prescription, the mechanic's report, the bank statement. The symbolic token of money, similarly, is linked with expert processes as an example of an *abstract system* of modernity.

<sup>9</sup> The Althusser understanding of ideology describes nation-state ideals promulgated through the media. Gramsci's (1971) hegemony explains the domination through the closed practices of consent. The consensus among theorists of the biosciences such as Wynn and Jasanoff points towards a Gramscian hegemony of bioscience instrumentalisation (perhaps more than a reductive Althusserian ideology) against an oppositional counterhegemony.

open. Chouliaraki and Fairclough (1999) speak of how the Gramsci idea of hegemony is useful to understand power in media, signs, and messages, but can also fail in the open practices of late modernity. There is dearticulation and rearticulation of meaning among consumers, who in turn increasingly now become reproducers and co-producers. Thus knowledge of scientific systems further diffuses among scientists outside their field, among journalists, among all publics. However, issues become objectified, and argument and representation allows public notions of 'science' to play up on historical and epistemological credentials. Later in this chapter, it will be explained in more detail about the concept of 'frames' within discourse.

(ii) Second, the practices of late modernity are described here as *reflexive*. This can be defined in terms of self-reference, self-confrontation, and dialect of cause and effect in issues of identity as we move from an industrial age to a 'risk society' (Beck, 1992, 1994b). The *institutionally reflexive* view of Giddens' late modernity, which will be critiqued further below, drives the instrumental reason that might be described as a dominant discourse, but critically, is also an open system that can set parameters and include other discourses. However, emerging life politics, discussed later, will constantly be thrown out of this project to keep rational life-planning intact. Also though, the institution can, according to Giddens, be reflective and self-critical. Wynne (1993) has challenged this view of institutional reflexivity as accepting the utopian Enlightenment project of institutional science (Giddens is, let us not forget, a Frankfurt School descendent despite my championing him here as a late modern commentator). 'Biosciences' or 'school' will not entirely be examined here as institutional in the Giddensian sense. Other forms of reflexivity are more pertinent to our focus on school debates on NRGTs. *Self-reflexivity* in late modernity also exists away from the institution, a rational, instrumental reflexivity of self and society that Giddens also speaks of where young people may 'generate representations of what they do as part of what they do' (Chouliaraki and Fairclough, 1999, p22). Those that can play the game do well within the dominant discourse. Those who do not, or cannot, are outsiders. They are, as Lash (1994) calls them, 'reflexivity losers,' the internal and external outsiders that Willis (1971) and Becker (1973) respectively brought such import focus to in their work.

(iii) Third, there is a *symbolic* nature to practices in late modernity. While Reckwitz (2002) distinguishes between the composite theory of practices and a symbolic interactionist approach which analyses signs and symbols in culture, he downplays somewhat the Chicago School origins of practices. Defining networks of practices as people and things cannot have been possible without interactional grounding, at least historically. As an ethnographer in

this study, I study things, acts, even behaviours as having symbolic meaning following Geertz (1973). Later in the chapter, I describe how communication processes can occur using symbolic understandings and collective representations of nature (Eder, 1996). Also, both institutional and personal/social reflexivity practices are themselves symbolic. What the practice approach does exclude however, is a textual or cognitive emphasis on symbols. As Reckwitz says, 'acts of communication, which are understandable without any reference to psychological attributes, are the proper site of the social (p249). What then of agency in this late modernity of symbols? As discussed earlier, among other critiques of Giddens is one that considers his self-identity and reflexivity concepts as too internalised, and thus cognitive.<sup>10</sup> Perhaps Bourdieu's notion of *fields* and the *habitus* can help us here. Fields are a 'structured system of social positions' (Jenkins, 1992, p85). Bourdieu's fields are in schoolrooms, as are the fields under discussion here. Such fields can exist as domination, subordination, or equivalence. According to Bourdieu, the habitus is the human agent that is both constrained and free within this field. Bourdieu's (1977) habitus is a youth worldview that acts on habit, tacit knowledge, intuition, and previous experiences, a 'generative principle of regulated improvisations' (ibid. p78)

denying their attachment to immediate political ends, and thereby accumul[at]ing both symbolic capital and 'high' structural position (Clifford, 1983, p252).

The structures that the habitus constitutes also constitute the habitus itself. Agents within schools – both teachers and pupils – have *social capital* with which they can negotiate. Power works both ways. Agents can trade symbols that are economic, social, or cultural. They learn the rules of the game, a metaphor also used by Goffman. The field is defined by the rules and what's at stake: cultural goods (lifestyle), education, politics, land, social class, employment, or prestige (Jenkins, 1992). Giddens' *practical consciousness* and Bourdieu's habitus are similar descriptions of practices in their normative actions, day-to-day routines, bodily movements. The 'moral habitus' described later and in the next chapter focuses on how Giddens might extend this 'constrained but free' agent negotiating in a morally uncertain landscape. Late modernity has seen a 'transformation of intimacy' (Giddens, 1991, p6) where 'pure relationships' are created between individual actors or groups that isolate themselves from any links with or trust of the social world outside.' Although there is a nexus of

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<sup>10</sup> There is a psychological aspect to identity grounded in social and discursive practices of individuals, groups and networks (Giddens, 1991); however this is related to social identity theory of Tajfel and Turner, not of primary importance

practices in which the habitus exists, it can be reflexive in terms of the late modernity of Giddens, Beck *et al* without resorting to the internalisation of Giddens. Bourdieu's agent with its habitus is more restrictive than Giddens', yet there is dynamism, an ability to break from determinism (Bourdieu, 1990). Agency may also have different meanings in the context of a film, or in a performed debate. The subjectivist-interactionist approach might address agency here but has been criticised by Bourdieu. To Bourdieu, Goffman concentrates too much on the individual level of analysis (a criticism that could also be levelled at Giddens); social conditions do not register sufficiently (Mahar *et al.* 1990). The young people's reflections in this thesis must therefore be seen against this background – less on Goffman's phenomenological explanations for self in his earlier work, more on how individuals represent themselves drawing on cultural symbols in collectives as performances.<sup>11</sup> For any theory of a school system and wider connections that looks at power and identity within discourse, both interactionist micro and structuralist macro constructs need to be considered as a delicately coproducing system.

(iv) The fourth element of late modernity here is the use of emergent technologies as part of the socialisation of S&T. The principle one that currently crosses from embodied self to economic rationale is *biotechnology*, which grounds the research in a particular economic focus in Ireland. The term 'biotechnology' or 'biotech' is a catch-all phrase for a range of manufacturing and medical processes involving living organisms or biological material. Popular science, sci-fi culture, and medical foresight literature all envisage a changing of the biological self reflected on a global scale. This, according to Giddens (*ibid.*), shows another example of human agency in nature: 'Reproductive technologies and genetic engineering... are parts of more general processes of the transmutation of nature into a field of human action (p8).' However we must not here privilege instrumental readings or scientific explanations of human biological identity through nature/nurture debates, or the posthuman identities of Stock (2002). These are important areas to address in the classroom as existential/ future-planning exercise, but they cannot essentialise identity by removing a social pedagogical imperative of what it to be human. However, following Beck, biotechnology has created the conditions where boundaries between society and nature become blurred (Barnes, 1999) and this must be acknowledged in the pedagogy addressed here. According to Jasanoff (2005a), this has been extended to world-political structures; there has been a strengthening of nation-state politics around industrial biotechnology. She claims the European project itself has been built around elements of the enterprise. The literature covered later in this chapter examines

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<sup>11</sup> It is important to emphasise that the symbolic, although drawn from wider culture as Eder (1996) shows, is inherently *real* to anyone involved in discourse (Thevenot, 2001).

the 'gene talk' phenomenon of common conversational discourse as well as the genocentric nature of contradictory nation-state/ global framing of science and implications for pedagogy.

(v) Fifth and finally, another contentious aspect of late modernity I want to address here in the context of performed classroom debates on NRGTs is the notion of *aesthetics*. Lash (1994) has pondered on the paradox of aesthetic appreciation and reflexivity – one would appear impossible in the presence of the other. There appears to be a seriousness, an earnestness, in late modern conflicts anchored firmly in elements of the Frankfurt School, and Giddens for one rejects what he sees as a post-structuralist, sign-orientated reading associated with aesthetics. Yet the concept of *mimesis*, of imitation in art through the ages challenges the centrality of reasoned discourse, and presents authority through practice in any serious subject using abstract mediation, play, art, or a creative, even non-cognitive embodied action that demonstrates what Lash would argue contains a reflexivity of practices. This is the course partly taken by one Frankfurt luminary, Adorno, but also Nietzsche, and on a more wholist level, Hegel (ibid.). An aesthetic moment may well arise in improvised expressions about NRGTs in classrooms, particularly where film and media are used.

These then are the conditions in which our classroom discussion space for life politics occurs, an epoch that is symbolic, reflexive, technological, and aesthetic. As a democratic ideal, I will later position the argument here in Bernstein's (1990) classroom as site of pedagogic discourse, a place where ideas and practices are framed (Dowling, 1999) rather than where institutionalised disciplines are engrained (Chouliaraki, 1996), a space of socialisation and politicisation for young people (Buckingham, 2003, citing Chaffee and Yang, 1990) and where contextualisation and socialisation of technologies and other mediated forms is made explicit. The possibility of an emerging politics of life-style and life choices made on a collective and individual level is also addressed in response to an institutional 'sequestering' of the existential issues of NRGTs and other embodied technological concerns, and how this could be part of a *general pedagogy* beyond formal education. This next section takes a closer look at the theoretical challenges to this type of life politics.

### **Critiques of Giddens and life politics**

In this thesis, I draw primarily on the later work of Anthony Giddens, who proposes in *Modernity and Self-identity* (1991) that, in late modernity, the personal and the macro-

political or global are in a dialectic relationship. 'Life politics' is one concept I draw from this work in developing my theoretical construct and is directly addressed by the first research question. A second theoretical concept from Giddens (1991) is the *sequestration of experience*, how the creation of institutions founded on biotechnology in modernity has resulted in an *emptying out* of uncomfortable or taboo content that deals with finitude and origins of the body. The Irish education system may be one such institution (also see McGinnis and Simmons (1999) for STS and sociocultural analysis), focusing on technical skills and practices of modernity, rather than moral questions that were, and are, part of traditional day-to-day societies. Life politics then is the emerging struggle for identity by individuals and institutions of modernity to bring back into focus those moral and existential concepts once normal to Western traditional discursive practices. Giddens says this now occurs through an expression of the local/global dialectic, enhanced by media, and characterised by a turn towards life planning and lifestyle issues of the body (Bourdieu, 1977; Foucault, 1985; Giddens, 1991; Taylor, 1991; Shilling 1993; Turner, 1993; Schatzki, 2001; Butler, 1990). This turn may be evident on a global level in the words of George W. Bush on stem cells, abortion, euthanasia, and so called 'bioethics'<sup>12</sup> issues, or in 'body shock' TV programming, and those topics that contribute to a society that continuously organises discourse around 'issues' (O'Mahony and Schäfer (2005); also see later in this chapter). Young people are directly involved in this politics, and may be more so in the future, possibly faced with life planning choices involving reproductive medicine planning.

There are, however, strong contemporary theoretical and political criticisms of Giddens. It has been suggested that Giddens fails to deal adequately with structural consumerism and the commercial aspects of lifestyle (Callinicos, 2001). This criticism is perhaps justified but it will be demonstrated throughout this work how the disadvantaged will always struggle more to be involved in life politics. The structurational and practice approach focuses on late modernity reflexivity as *re-appropriation*, that is agential re-purposing, of cultural hegemonies (de Certeau, 1984), including consumerism. There is an inherent contradiction between Bourdieu's habitus, which has a strong sociological foundation for agency and structure – young people in schools in particular – and Giddens' notion of reflexive identity (Sweetman, 2003), as discussed earlier. Although the project of the self in late modernity may include consumer items, fashion, and accessories and are, in Giddens' reading, expressions of individualism rather than class, the habitus, as Bourdieu explains it, cannot

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<sup>12</sup> Bioethics as a tradition is founded on formalised moral philosophy structures applied to these matters rather than everyday late modern decision-making that is the concern of this thesis. Jasanoff (2005) has critiqued the modern 'discipline' of bioethics in *Designs on Nature*.

exclude socioeconomic or constraints based on increasing inequalities. All commodities and accessories are not original additions to the project of the self, but constructed from structures of consumerism, group behaviour, or taste (Bourdieu, 1986). Lash (1994) explains it best in acknowledging the paradox of an increasingly class-*divided* society that is – in new ways of agency – becoming less class *conscious*.

Another critique of Giddens here has an indirect connection with NRGTs. When the Human Genome Project was announced in 2000, it was to loud fanfare, which included a joint video link between President Bill Clinton and Prime Minister Tony Blair unveiling the results. Both of these leaders have been known to embrace Giddens' 'the Third Way' as a political philosophy, which foregoes traditional 'right' and 'left' politics in favour of centralisation by the promotion of social interventionism and market economy. Detractors have accused this centrist approach to global politics of allowing forces of capitalism to colonise the more left wing ideals, and this includes technoscience tied up in global economies. For some, this type of 'progressive Marxism' leaves the Frankfurt school far behind.

From Giddens' (1991) perspective, moral and existential questions are pushed away from the machinations of modernity and the normative practices of politically-driven biotechnology (Science and Technology Division, 1995; Ireland, Department of Enterprise, Trade and Employment, 2006). I will address later in the chapter how biology education (Ireland, Department of Education and Science, 2002a, 2002b), as another institution of modernity (Giddens, *ibid.*), disallows the large awkward questions from getting back in its practices, to its terms of discourse. Thus although cancer and diabetes research is relevant to all of us - most being directly affected through personal experience or family members - details of cancer suffering, following Giddens, will not take place in the classroom whereas the fight against cancer that science puts up might. Genetic technologies are represented in the education system as industrial processes that fight illness and dysfunction. Embryo technologies are rarely mentioned to avoid potential conflict among other reasons and to keep morality at distance. This is dealt with in the next section.



## Giddens' sequestration of moral perspectives applied to the biosciences

This section looks more closely at how what might be called the morality of self-identity is represented in the diminishing of cultural questions and issue engagement from the institutions of bioscience and education. Despite how Nowotny *et al.* (2001) describe the continuing socialisation and contextualisation of science, the other aspects of high modernity are slow in taking their place in the emerging agora (*ibid.*) of schools or Government. As described in the last section, Giddens' (1991) view is that existential and moral questions of existence have become removed from everyday practices by the institutions of modernity. Such institutions perhaps are institutionally reflexive, yet also belong to the modern, rather than late modern, in the sense described by Giddens, Beck, Lash, Bauman, or Fairclough. For example a difficult question to place into the context of biology education would be: 'Do you know yourself as a set of genes or as the sum of your experiences?' There is no simple, evaluation criteria for setting such a question within science education (or indeed citizenship education) practices (Levinson and Turner, 2001). Yet it is a pervading question within society and popular science discourse, from such popular science writers as Dawkins, Midgley, and Lewontin.<sup>13</sup> Although *Modernity and Self Identity* has only a brief mention of biotechnology in its analysis of human transformations of identity and life politics, Giddens' theory development throughout the work sets out the exact terrain in which understandings of 'body technology' as a phenomenon of concern occurs.<sup>14</sup> For Giddens, insanity, sickness, death, criminality, sexuality, and nature itself are taboo in modern institutions, removed from what would have been an integral part of daily human experience in a traditional environment. A *sequestration of experience* (Giddens, 1991) is the result, a remoteness from potentially disturbing concepts or events, removing humans in late modernity from the pain of experiencing them, or reflecting on them. Yet they will be raised in issues of discourse, through media, art forms and entertainment. To live our daily modern lives, we cannot reflect on these existential thoughts for fear of insanity (*ibid.*), as also highlighted by ethnomethodologists (Garfinkel, 1967). Daily practices require normative decision-making that is part of a 'practical consciousness' rather than formalised thought. But the moral keeps

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<sup>13</sup> Although the Irish context for science education may be positivist as argued here, it is not just Ireland which has suppressed Giddens' (1991) moral perspective or a more social interactionist approach to genetic education. Increasingly, genetic information is offered as an explanation for human identity (Dawkins, 1989; Wilson, 1992; Pinker 2002; Prens, 2004) and has arguably become a stronger voice since the HGP. There is now a real fear within both science and humanities academic circles that sociology is being replaced by biology as an explanation for human behaviour and human affairs (Nelkin and Lindee, 2004; Stacey, 1997; Strathern, 1997; Parsons, 1997; Lewontin, 2001; Rose, 1997). Darker fears, with greater cultural resonance are also raised as discussed later.

<sup>14</sup> In fact a reference to biotechnology appears only in his final chapter where the broad theoretical scaffold preceding it amply supports the conflicting attitudes to NRGTS as a prime example of life politics in action.

re-emerging, testing the limits of modern control of self-identity. Sequestration of experience means that

The orientation of modernity towards control... has .. connotations on the level of culture and philosophy. Positivistic thought, in one guise or another, became a central guiding thread in modernity's reflexivity. Positivism seeks to expunge moral judgements and aesthetic criteria from the transformative processes it helps set into motion and of which it also provides interpretation and analysis. (Giddens, 1991,p155)

It is a familiar theme of instrumentalisation, allowing technologies such as PGD to predict and control the future. There may be an important symbolic shift in thinking for society here. The risk society may well be replacing the idea of fate, or *fortuna*, as Giddens (1991) sees it. 'He who relies less upon Fortune has maintained his position best,' is how Machiavelli's (2005, p21) prince is described when overcoming the uncertainties of fate by whatever means necessary to sustain power. The moral and theoretical justifications for the prince's acts for the 'art of the state' (ibid. xiii) have since become symbols of political strategy. However Giddens casts Machiavelli's proto-political scheming as the opposing force to the pre-Enlightenment idea of *fortuna*, a force of God and nature that is a divine aspect of human fate (Giddens, 1991, citing Machiavelli, 1979). Where both Christianity (Giddens, 1991, citing Weber, 1963) and Enlightenment science pushed back the idea of the Divine Providence of *fortuna* in favour of free will or human agency, the institutions of late modernity have further diminished *fortuna* by, as Giddens says, 'colonising the future' (Giddens, 1991, p111), that is, shaping the uncertainty of risk and non-calculable passive futures to a manageable future that is active and that uses a social engineering of counterfactual possibilities with S&T as its driving force.<sup>15</sup> If the future is uncertain, we are afforded the opportunity to make things a little *more* certain.

Yet uncertainty persists, although there is greater trust afforded to abstract systems in personal practice. Any issues concerning nature have 'external criteria (ibid., p8, 1991/2005, p9)' such as the 'criteria of kinship, social duty, or traditional obligation (ibid., p6), and are eradicated as they disrupt the smooth abstract system operations of modern institutions with internal criteria (also see Strathern (1996) for an extension of this point in the context of NRGTS). There is also a 'transformation of intimacy (ibid., 2005, p9)' for the self, with

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<sup>15</sup> Thevenot (1984) uses a similar construct for future colonising, emphasising how certain values are lost in the standardising and coding of human/machine complexes and understandings, what he calls *investment in forms*.

greater choice available and greater connection between extreme extensionality (global issues) and extreme intentionality (personal issues), where pluralist societies open up new avenues for *pure*, or personalised, relationships. Institutions use modern systems that include science and technology to create this pure relationship. Direct contact with the base, hidden darkness of 'original' nature is not required. Yet to invest in this relationship, there is also greater *risk* to the self. This trust requires great leaps of faith in a risk society. To compensate, combined with this less limiting choice of friends, partners, and lifestyles, Giddens' systems create a 'colonisation of the future' (ibid., p111) – a leaving behind of tradition and a control of future time by dragging it to the present through risk calculation and insurance. Lifestyle and commodification have more emphasis as tradition loses its hold, even for the underprivileged. Those less well off can still be controlled by, or reject, consumerist practices. The pull of materialism or commercialism is often inherent in the term 'lifestyle' but, in Giddens' reading, also includes life decisions or a course of action taken personally or as a group. NRGT decisions are lifestyle decisions in this sense, although the commercialised meaning for lifestyle is also often argued, particularly with reference to PGD, and placed within the issue culture (see later in the chapter) process using the terms 'designer babies' (Nelkin and Lindee, 2004; Challand, 2003; Crow, 1988) or 'liberal eugenics' (Habermas, 2003).

In contrast to Taylor's (1991) attempt to try and pull back in what he perceives as fragmented, authenticity-seeking self-identities lost to mainstream politics, Giddens (1991) says that this search for intimacy and trust is not solely a reaction against an impersonal world; it can be reinforced by a two-way relationship of mediated external influence (macro) and the pure relationship (micro). Having moved into late modernity, the repressed taboos of the traditional described above have re-emerged, becoming the focus for books and TV programmes for diet, make-overs and body therapies. They have become part of the embodiment of the person in this two-way relationship. For pure relationships, a particular, contradictory type of politics is in force. For citizens in modernity interacting with expert systems, there is a 'reskilling' where

attitudes of trust, as well as pragmatic acceptance, scepticism, rejection and withdrawal, uneasily coexist in the social space linking individual activities and expert systems. Lay attitudes towards science, technology, and other forms of exoteric expertise, in the age of modernity, tend to express the same mixed attitudes of reverence and reserve, approval and disquiet, enthusiasm and antipathy ... (ibid., p7).

In the risk society then, an era of reflexive modernisation that fits with Lash and Beck, collective moods swing between hysteria and apathy (Beck, 1992). In this uncertainty, *authenticity* becomes a moral phenomenon, although a 'morally stunted one' (Giddens, 2005, p9). To be authentic is to be true to oneself. Authenticity is judged against inner criteria of pure relationships rather than a higher moral code. It involves ideas of fulfilment, a self-actualisation that does not privilege discourse alone, but also physical and more subtle expressions of identity that taps into a globalisation ethic. It encompasses lifestyle. The politics of lifestyle has emerged from the subjects of 1960s emancipation. Race, class, sexuality, personal freedom of identities have not been resolved, but the increasing tension between globalised cultural movements and local negotiation between the institutional practices of late modernity and tradition has called new injustices and expressions of freedom into focus, not least of which issues of NRGs address (ibid.). Giddens (ibid.) maintains that for people in today's world, and therefore the young within education institutions,

life politics does not primarily concern the conditions which liberate us in order to make choices: it is a politics of choice. While emancipatory politics is a politics of life chances, life politics is a politics of lifestyle (original emphasis) (ibid, p214).

Thus for Giddens, NRGs are typical processes of modernity, the 'socialising of biological mechanisms and processes (ibid., p8)' connecting personal reproductive choices to global life politics. It may no longer be an individual couple's reproductive choice once that choice becomes embedded in modern expert systems such as IVF or PGD. A choice made by an individual or pure relationship may have future global repercussions. Humanity's authenticity does not just require self-knowledge, but also self-ownership, involving reproduction as both social continuity in the Althusser/ Bourdieu<sup>16</sup> sense in terms of norms and values passed on from teacher to student and biological continuance of the species. In contrast, Taylor (1991) fears young people's modern insecurity in identity construction, turning to 'all sorts of self-appointed experts (p15).' Giddens' individuals are more reflexive, more *agential* than Taylor's or Bourdieu's. They exhibit more lifestyle and commodification, and less tradition, and this applies too to the underprivileged.

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<sup>16</sup> Bourdieu's cultural capital (cultural arbitrariness and symbolic violence) focuses on reproduction rather than production between teacher and student (Bourdieu 1967, and Passeron, 1977, 1979). The acts are acts of complicity, not violence in the traditional sense; the educators perform symbolic violence by imposing meanings as 'legitimate by concealing the power relations which are the basis of its force and at the same time communicating a logic of disinterest' (Bourdieu and Passeron, 1977, p4).

Life politics as Giddens sees it may be strong on internalised self-identity but weak on moral criteria, a point to which I will return. The late modernity as defined here draws on a reflexivity also marked out by Beck and Lash among others where information inequity draws the lines of power. However, this late modern reflexivity may also be increasing among institutions of science and education (Wynn, 1993), which may weaken any ties to other people's worldviews or external criteria. In effect, people with social disadvantage, what Lash (1994) calls the 'reflexive losers' in late modernity, could become ever more marginalised and this especially applies to economic deprivation, as I will demonstrate in Chapter 4.

So far in this chapter, we have focused on the characteristics of late modernity as described by practice theorists and that may also provide a context for moral evaluation of NRGTs particularly for young people. Later in the chapter, we will view these young people as moral decision-makers in the context of being both media audience and media producers. Next however, it is useful to link the structural of framing discourse, a characteristic of media commentary agenda-setting, with the way young people might themselves frame the relevant issues of NRGTs through discourse and tacit, embodied action.

### **Goffman and framing NRGTs**

Giddens' works draws on Goffman's performance metaphors in his structural account of how agency and structure have a symbiotic relationship. People actively framing a concept deliver their 'lines' in a structural 'front stage' of society, while privately expressing other views 'back stage.' Goffman's *Frame Analysis* (Goffman, 1974) was the precursor for several types of discourse analyses across the disciplines of psychology, communication studies, and media studies, leading to an abundance of analyses of how groups of people organise themselves in a collective action around a media issue or a cognitive concept (ibid.; Gamson 1992; Ferree *et al*, 2002; Eder, 1996; Benford and Snow, 2000; Hajer, 1995; Horning Priest, 1995; Triandafyllidou and Fotiou, 1998.). When this issue has technology as a central point - and where the conflict involves what is seen as an attack on values - the mass media in a democratic society adds to the discourse by not only providing scientific and policy information but raising the profile of competing positions (Bauer and Bonfadelli,

2002). Potentially, the most basic framing that occurs in NRGT discourse comes from the abortion debate. News media-constructed frames may be assembled in a basic reductive polarisation of ideas (O'Mahony and Schäfer, 2005), questions, and answers. The 'pro-life' frame creates an identity for the opponent as 'anti-life' whereas the 'pro-choice' frame creates the opponent's identity as an illiberal that frowns on individual freedom of choice. In relation to S&T discourse on such controversial matters, scientists sometimes opine that scientific facts get distorted in media packaging (Nisbet and Mooney, 2007). Yet this opinion too may be part of *scientific* framing, and in later, empirical chapters it will be shown how a basic frame such as 'pro-choice' can be seen more in terms of a 'position' rather than a 'frame.'

Frames emphasise certain aspects of a localised reality, shoring up some information to strengthen the frame, while other information is ignored. Jasanoff's (2005a) development of Goffman's frames above arrives at the conclusion that local communities use a type of storytelling to describe the disruption to the local cultural norms that a new technology may bring. Jasanoff uses 'local' here, as Giddens (1991) uses *locales*, to describe an institution, a nation state or even a superstate like the EU as much as social movement or protest group. A more recent applied type of discourse frames however does not necessarily have a single position but rather a range of positions from which actors with a shared frame can be in conflict (Gamson and Modigliani, 1989). Delanty and O'Mahony (1998) describe how 'discourse coalitions' can form from different positions of opinion. Certain types of intentional frames bring groups together around a cause (Gamson, 1992) or religious edict (Ferree *et al.*, 2002), such as in abortion discourse. Identity is one such frame, the tendency to refer to an all-inclusive 'we' against a malevolent 'them.' Abortion debates can follow these patterns. However frames need not be intentional or strategic. There can be a passiveness about them. Where there is interactive social grouping in 'live' discourse or debate, young people may similarly frame biotechnology and NRGTs in ways that are relevant to them, as empirical chapters here demonstrate, or engage with issues by calling on media resources. Let us consider two definitions:

To frame is to select some aspects of a perceived reality and make them more salient in a communicating context, in such a way as to promote a particular problem definition, causal interpretation, moral evaluation, and/or treatment recommendation for the item described (Entman, 1993 p52).

Frames are principles of selection, emphasis and presentation composed of little tacit theories about what exists, what happens, and what matters (Gitlin, 1980, p6).

Moscovici (2000) calls it 'anchoring', placing something foreign and unreal into presently existing categories 'anchoring as we tie our boat to one of the bouys in our social place' (p42). Entman's definition above may not be sufficient to cover the cultural frames of the 'audience,' that is those in society whose opinion media frames are designed to influence, yet also have an influencing effect on these media frames. The complex notions of ideology, discussed briefly above although further analysis will not be needed here,<sup>17</sup> is tied up with frames, yet a common ideology can interchange frames at will (Fisher, 1997, also citing Donati, 1992; Triandafyllidou and Fotiou, 1998; O'Mahony and Delahanty, 1998) and this cultural salience can be reflected back in media focus (Bauer and Bonfadelli, 2002). A definition from political and psychological discourse is thus required while remaining aware of the potency of Entman's (1993) complementary definition to the above that frames create a system of ordering, defining, evaluating, and prescribing a problematic reality. Fisher provides a much simpler definition of cultural frames which I will use as the basis of my approach:

Cultural frames provide a 'common sense' pattern that systematically shapes the way we interpret images by drawing our attention to some aspects of these images while encouraging us to ignore others (Fisher, 1997, p35).

At this point, it is important to state that there should not be confusion between a 'discourse' and a 'frame;' these are not, in the context of this thesis, analogous terms. A discourse as defined in the first section of the chapter, operates on a higher level, for example a 'biotechnological' discourse of NRGTs, where there is either implicit or explicit parameters set within which NRGTs can be meaningfully engaged (verbally or non-verbally). Within this discourse, frames are mechanisms and can be useful empirical tools to observe how scientists *and* science students might create categories of discourse (in this context, always in debate or conversation), for example a frame of *progress* or *human welfare* (see later sections and Chapter 6).

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<sup>17</sup> According to Fisher, Gamson has used cultural themes rather than the internalised concepts of ideology, beliefs, values, and *weltanschauung* (Fisher, 1997, p9, citing Gamson, 1988). This is demonstrated here where young people taking on (it is to be assumed) different ideologies use the same frame or vice versa. Although the ideology concepts of Marx, Althusser, Gramsci or Barthes are often problematic in the context of framing, as has been discussed here, note must be taken of Snow and Bedford's riposte to those who confuse frames with ideology.

## Issue frames and normalisation processes

In Giddens' (1991) late modernity, each individual person makes moral choices based on new globalised understandings of self-identity, and the media has a large role to play in this identity. Panel experts, chat shows, and celebrity life stories compete with their own personalised guidelines to lead a 'good life.' A society of interviews, confessions, and issue expositions has emerged. According to O'Mahony and Schäfer (2005), issue cultures are the media and communication processes by which a particular concern is highlighted and elevated in discourse through popular culture and mass media coverage. O'Mahony and Schaffer (2005) refer to issue cultures as

public beliefs, issue cycles, journalists' and media orientations, the interests and resources of societal actors, wider processes of inter-media and inter-textual knowledge production (p112).

They are the media codes relating to other deep cultural tropes of humanity and nature that are caught up within practices of media circulation, news episode cycles, public salience, political lobbying, and intercultural references (O'Mahony and Schäfer, 2005). In essence, an issue culture is the means by which issues are engaged with by media practitioners and audiences in episodic fashion, taking in many textual references (*ibid.*).<sup>18</sup> In the issue culture process, an issue *package*, that is how it is framed in a media context, fundamentally depends on a *storyline* 'incorporating new events into its interpretive frames' (Gamson and Modigliani, 1989 p4), and sustained by deep cultural resonance and media practices. Negative news reports will have greater resonance if that storyline has salience, meaning it contains reference to issues close to a person's life: the familiar, the convenient, the relevant, or what Gamson (1992) calls the *proximate*. For example, controversy occurs when a news story is linked to a baby's death as occurs with the framing techniques of the pro-life lobby. Modern biotechnology in academia and industry is dependent on subtler versions of these processes as institutions communicate with potential funding bodies and wider publics through media representation (Bauer and Gaskcll, 2002b), referencing treatments for cancer or heart disease.<sup>19</sup> Another important aspect of issue culture is how researchers of global

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<sup>18</sup> I wish to refer again here to Beck's hysteria as the flip-side to apathy in describing salient images of terror regarding NRGs. Another study could look at the role of ideology in the Gramsci sense and the organisation of moral panic in tabloid sensationalism, as many cultural theorists have done (McRobbie and Thornton, 1995), as well as Chomsky's agenda-setting theories and the role of the press. Cultural framing in this context looks more closely at media practices from the perspective of *audience*; expectations, salience, popular culture, and tacit knowledge.

<sup>19</sup> It is worth noting here a reference to Thevenot's (2001) pragmatic regimes of engagement, where contemporary society needs to keep shifting along a scale of lesser or greater generality in initiating moral action.



social movements observe the relationships between media practices, cultural resonances, and agency (O'Mahony and Schaffer, 2005). Studies of social movements responding to NRGTs are good examples of where strongly anti- and pro-technology cultural frames arise by a media-driven focus on controversies (Fisher, 1997). Critical media coverage on controversial technologies usually arises from lobbyists along extreme oppositional lines (O'Mahony and Schäfer, 2005). The media creates from this antagonistic field a narrative of rationality versus emotional extremists, supported by a clash of the normative and the counter-normative factions from a public perspective. Moreover, agency for or against NRGTs is integral to life politics (Giddens, 1991), as institutions of late modernity push existential and moral questions about technology to a higher agenda, as explained further below. It is therefore appropriate to look at complex and sometimes borderless relationships between 'inside' classroom discourse and 'outside' media discourse in terms of frames often used by social movements, even when this 'movement' of opinion does not have the full power and goal-orientation of anti-technological protests. Similar communication strategies may well be used by both senior level students and bioethics professors.

McDonnell (1999) describes 'discourse publics' (p70, citing Fraser, 1989) around the abortion issue in the UK from the late 70s to the turn of the millennium, where narrative scripts were identified. In the early stages of this debate, a normalising phase emerged where a particular NRGT need is identified, in this case IVF. The discourse was then naturalised as a rights frame, where feminist voices became, for a while, the countertheme, with scientific progress narratives the dominant theme. Normative judgements were made; a popular one was: is a 59 year old woman 'unworthy' to have IVF? Infertility was presented in media discourse as a plight, nature's revenge on older women for leaving the biological imperative too late. McDonnell suggests that many of these counterthemes are missing from NRGT debates in Ireland, although in this case, this was a promotion of reproductive technologies in Ireland in the early 80s as the 'next best thing to nature' (McDonnell, p76). McDonnell and Allison also identified nation-state framing of abortion discourses by the Catholic Church in Ireland during the X case, as well as a gradual move away from a discourse of ethics to one of the 'specialist expertise' of medicine, although with some traces of nationhood (ibid. p125, citing Smyth, 2005).<sup>20</sup> Both pro and anti groups claim to represent the 'people.' There are, according to Smyth, nation state images of Irishness also used in the counterargument, where abortion is used as an example of a basic *right* in a modern democratic country.

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<sup>20</sup> There was a recent controversy where the Mater hospital, it is claimed, refused to issue contraceptives to cancer patients on Irish Catholic grounds (Burns, 2005).

These examples demonstrate the organisational – and in some sense *moral* – power of frames in media discourse and the mechanisms involved. It is instructive now to show how such organised themes of NRGTs are drawn from wider cultural references when entering political discourse in a rudimentary and symbolic way among localised groups of people including students in classrooms; in other words how referential material is *grounded* as justification and evidence, some of which is based on deep cultural resonance.

### **Gamson's analysis of conversational references and 'popular wisdom'**

In conversations with young people, there are clear visible means by which 'issues' draw on a range of both media and experiential material. In *Talking Politics*, Gamson (1992) says that certain tropes resonate with a distinct heritage of cultural myths, folktales, and half-remembered facts. In his work, he engaged with adult focus groups about media issues such as nuclear power and found respondents used certain references and phrases which had more cultural resonances than others.<sup>21</sup> Gamson suggests the existence of *cultural themes* that are 'safe, conventional, and normative' (ibid. p135), taken-for-granted linkages to the wider cultural world and, in common discourse that might be considered political, there are also *counterthemes* which are 'adversarial, contentious, oppositional' (p135). An example of a dominant theme is one conceptualising science as *progress*, whereas a subordinate countertheme may emerge from an environmentalist argument, *harmony with nature*, which may suggest that science is destructive. An argument for foreign policy may take on a *local state* theme or a *global responsibility* countertheme. NRGT issues are examples of dichotomies with cultural resonances and many media arguments appeal to these: the heroic scientist versus evil clones or chimerical monsters running amok; the empowered individual versus the sense of identity corroded. Genetic science and technological innovation can be affixed to a cultural theme to demonstrate conflict, thereby gaining salience for those who empathise with a particular side – is it progress or is it destruction? Selective emphasis and deliberate omissions are common in all walks of life when selling a concept and are thus frames in media analysis (Entman 1993; Gamson and Modigliani, 1989; Eder, 1996; Hajer, 1995; Hornig Priest, 1995). Polarisation is necessary for argumentative clarity and a degree of salience. However, as will be shown in Chapter 6, this theme/countertheme complex in discourse may not be entirely incompatible, a phenomenon not explored by Gamson, but is in

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<sup>21</sup> Gamson is not within the 'practice theory family' yet his media communication and cultural frames are methodologically useful here to connect the practices of the local and the global without recourse to cognitive individualism or intersubjective transcendentalism.

Snow *et al* (1986). There are contemporary examples; current ecological framing may take on scientific *progress* themes while also using frames about *harmony with nature*. Many scientists, although criticised for their lack of engagement with publics (Wynne, 1992; Macintyre, 1995), use rhetoric on occasion. Brown and Michael (2001) in their study on 'culture switches' between scientific and popular discourses describe how certain researchers may justify the use of animals for xenotransplantation by differentiating them significantly enough to produce a moral argument.

A comprehensive look at interactive and complex framing strategies may show common and organised structural patterns. Eder (1996) argues that there are large cultural meta-themes at work in modern discourse on the relationship between nature and science, basic cognitive organisational devices that underlie all such discourse from which a collective can draw on to construct frames. He divides such organising patterns into moral responsibility, empirical objectivity, and the aesthetic. Eder's *symbolic packaging* draws on Gamson and Modigliani (1987, 1989) in describing how a frame is 'wrapped' with the 'voice' of the collective actors, the symbols and narrative structures the actors take from *cognitive devices*, the 'empirical social situations with real actors' (Eder, p168). In social movement studies, packages link arguments (and thus frames) to an action or group in the real world (*ibid.*). Although it is important to speculate on what cognitive processes may be taking place in framing strategies, within practice theory it is sufficient to describe strategies of media (and conversational) packaging drawing from this underlying tripartite cultural schema without recourse to describing cognitive processes. Chapter 7 looks closer at these packaging devices in the context of schools to consider the connections between local discourse and wider cultural patterns.

Eder (1996) elaborates further on Gamson in relation to his work on how frames are grounded:

We use and apply frames in order to sort the world, thus reducing the continuous stream of events to a limited number of significant events. Frames give to these selected events an objective meaning, thus disregarding subjective differences and idiosyncrasies ascribed to individual persons (Eder, 1996, 166).

Besides their mix of polarity and valence, Jasanoff's reading of frames as non-deterministic suggests that they take on a life of their own in public discourse, leading to consequences beyond the expectations of those framing in media contexts (Jasanoff, 2005a, citing Goffman,

1974). Whatever about public discourse, they seem to have taken on a life of their own across the academy. The lack of coherence on the subject is well documented (Entman, 1993; Kohring and Matthes, 2002; Dahinden, 2002). The context for frames in Gitlin (1980), Gamson and Modigliani (1988), and Entman (1993) is the deliberate framing in news media or motivational framing in social movements. Regarding issues, the mass media may frame events as starting points for deliberation, such as the cloning of Dolly (Jasanoff, 2005a, p24). These types of frames are actively constructed to persuade (ibid.). Snow and Benford (Koenig, 2004, citing Snow and Benford, 1988) however maintain that Goffman's original framing concept described a more subtle process, a 'conceptual scaffolding' pervasive in localised ways through all social (and in late modernity, mediated) interaction and thus less easy to control. There have been criticisms that Gamson has not considered the context dependency of frames, that he uses them too readily to explain organisation and selection of thought across all aspects of culture (Fisher, 1997). However a culturist approach needs to see patterns. It is therefore necessary to see frames as generally *cultural* (Gamson, 1992, Triandafyllidou and Fotiou, 1998; Fisher 1997). Such frames may be scientific, yet are also defined here as cultural, as they draw on the culture of technoscience outlined later in this chapter.

Frames as defined here draw from Gamson's (1992) understanding of them, collections of ideas around which an issue swirls in the actors' quest to negotiate meaning when making moral decisions, based on tacit knowledge of the past. Frames may not always use reasoned argument. The issues that are framed may be episodic, appearing in the press from time to time. Gamson sees a particular issue of concern as a 'forest' (p117) through which others have already walked and left behind signposts, the media in particular. For many people, he says, these signposts are glanced at occasionally or ignored. People carry their own maps, compasses and ways of guiding themselves through the forest. Any issue can be a 'pocketbook' one, taken and stored for future justification in another context. Although conversations with local, 'proximate' issues engage Gamson's focus group more, faraway issues will also engage (ibid.), an effect that might be considered reasonable in an age of globalisation and mediation. A global news event like the cloning of Dolly can cause people to reflect on local effects.

Gamson's focus group used *conversational resource strategies*. There were three of these: *media discourse*, references to events, known catchphrases, or public figures from the media, personal *experiential knowledge* from the speakers' past, and *popular wisdom*, which were wider, oft-repeated cultural phrases of undefined source that may also be expressed as

catchphrases or maxims. Popular wisdom is a particularly difficult category to define. It can be part of the expression of a subculture: 'We've always been discriminated against,' 'You can get killed crossing the street (ibid. p124);' or catchphrases that enter into popular culture and conversations, such as the prevailing one in this study, 'playing God.' Popular wisdom also has, according to Gamson, cultural resonance that 'condense and concretise' the themes (ibid. p143). Gamson was also involved in a comprehensive study with Ferree *et al* (2002) of how abortion discourse was framed differently in the US and Germany. Content analysis of newspapers showed four different frames advocating rights for reproductive issues, either for or against the embryo.

Care needs to be taken in directly comparing young people's NRGTT frames with news media. Although the field research reported here show signs of their being media-savvy, empirical evidence from their pre-discussion responses and teacher quotes suggest that young people are not always *news media savvy*.<sup>22</sup> However in school conversations it is not so easy to disentangle the experiential from the mediated, the individual from the collective, the internal from the cultural, or the private from the public. Gamson (op.cit.) tells the story of a friend who discovers to his dismay in adulthood that a treasured childhood memory was in fact a scene from a film. Chapters 6 and 7 discuss fluidity in the contextual positioning involved in framing, complementing Benford and Snow's frame alignment with Gamson's combination of the mediated and the experiential when discussing issues of interest.

### **Global normalisation: the dominance of genetic framing**

Before reviewing literature more specifically related to the communication of NRGTTs in schools, it is useful to look at the cultural and media phenomenon of the gene - a potential masterframe? - and its technological applications emerging from the late twentieth century and moving into the twenty-first. The announcement by Crick and Watson in 1951 of the discovery of the DNA double helix is considered the beginning of molecular biology and genetics as a major technological discipline. Bucchi (2004) demonstrated how far the biosciences have come when he described how Crick worked from a bicycle shed while his physicist friends worked in state-of-the-art laboratories investigating what were then in the 1950s the big questions of science. The balance of power has swung to another scientific

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<sup>22</sup> Gamson's (1992) methods and those of all social movement theory would not sit well with the main current of science education research. Gamson rarely speaks in terms of facts that the concerned publics need to know. His concern is the balance of power within media and cultural discourse.

discipline. Dorothy Nelkin describes the gene as a 'cultural icon' in *The DNA Mystique* (Nelkin and Lindee, 2004). Its image has permeated our conversations in recent decades, increasingly becoming associated with new imaginings of fertility, family, chimeras, and body enhancement. Nelkin and Lindee (*ibid.*) describe how genetic issues such as cloning and PGD are salient in the US because of that country's obsession with biological identity. The same could be argued of Ireland, given its long fascination with a cultural discourse of distinct Irish heritage (O'Mahony and Delanty, 1998) and nation-state discourse of the essence of 'Irishness' (Hill *et al.*, 2000). There is also, partially, a scientific discourse of 'Celticness' now emerging as part of late modernity's self identity (McKie, 2007; Battles, 2002). What is more crucial to the thesis here is the interlinking systems of institutional exclusion of the moral, existential, and social of NRGs from educational and public discourse in a genocentric society (Appleyard, 1999). Nelkin and Lindee's (2004) view is that a broader genetic essentialism still prevails across *all* cultures of modernity, where genetic explanations are offered uncritically - sometimes based on a single gene - and this phenomenon is potentially on the increase.

It could be argued that there is an implicit collective identification with genetic essentialism through a political, national, and economic rationale that supports the biosciences. Bucchi (2004) describes how scientific facts are consolidated through public discourse to the dismay of those who claim scientific authority, yet the reification of 'facts' are common to both 'scientists' and 'non-scientists.' The biosciences are important both politically – as President Bush's recent comments against stem cell research on moral and religious grounds testifies (Staunton, 2007) – and economically. Today, biopharmaceuticals and biodiagnostics are big business and biotechnology as a political phenomenon is closely allied with economics in media discourse. The announcement of the completed human genome in 2000 by President Bill Clinton and Prime Minister Tony Blair (discussed earlier in the context of Giddens' 'Third Way') exemplifies this, highlighting as it did biotech's use of an international identity with a progressive cultural image, symbolically announced on the first year of the new millennium. Although the genome had yet to be 'completed' in any practical sense, the Irish biotech industry ramped up its focus on genetic diagnostic treatments for disease around this announcement. The event coincided with an increase in media coverage of 'gene for' discoveries relating to distinct traits (Nelkin and Lindee, 2004). A common – and growing – self-referential system of nation-state/commerce<sup>23</sup> may well be part of a 'scientification' of

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<sup>23</sup> Despite the globalisation of S&T as macro-structures above nation-states - as demonstrated by the Clinton/Blair HGP announcement - Ireland, in line with other countries, may still frame science for localised political gain (Jasanoff, 2005). This is discussed further later in the chapter.

modern social life generally (O'Mahony and Schäfer, 2005), just as S&T is becoming increasingly socialised, according to Nowotny *et al* (2001) and Giddens (1991); that is the instrumental authority for expert systems is diffusing outwards (perhaps *downwards*, given the traditional prominence of science). Yet for many commentators on the sociology of science - among them Wynne (2005), Jasanoff (2005a, 2005b), Nowotny *et al* (2001), Hornig Priest (2001), and Nelkin and Lindee (2004) - there is a failure by science-industrial systems to either acknowledge an equally growing critique of the life sciences' complex relationship with mediated global forces and globalisation generally or what Giddens (1991) and Beck (1992) claim to be late modernity's turn to issues of self-identity, personal risk assessment, and decision-making.

To return to a more rigid sociological argument for a moment, we see that the agent has access to more information. Agency was discussed earlier in the chapter as a necessary way to position the young person in the complex networks of technoscience and pedagogy. There are many ways today that people might come into contact with genetic information, technologies, or actions that are perceived in some way to change or control the human body.<sup>24</sup> Publics can access 'elite' biotechnology discourse either through scientific papers or websites (National Centre for Biotechnology Information, 2005), or biosciences references in social science or bioethics literature. Yet there is also popularisation. Bioethics, or ethics applied to human biology and dignity of the self, now infiltrates TV, radio, and web resources including the blogosphere (Kaplan, 2004). Popular representations about biotechnology in media and literature, current thinking on the philosophical assumptions about nature/nurture (Dawkins, 1989; Stock, 2002; Fukuyama, 2002; What makes us different?: scientists map DNA, 2005) and the emerging phenomenon of evolutionary psychology (Rose and Rose, 2001) may also filter into public assumptions. Nelkin and Lindee (2004) have been among the clearest commentators on genocentrism, alerting us to how DNA has infiltrated all aspects of culture. They describe how it has become a religious and social metaphor capable of solving crimes, predicting behaviour and risk, diagnosing disease, and justifying social policy. The familiarity of genetics in conversations adds to its salience. As Nelkin and Lindee (*ibid.*) describe it in *The DNA Mystique*, 'gene talk' is part of our everyday discourse, going far beyond the science. We hear it said that success is in a company's 'DNA.' We hear terms like 'genetic' and 'genes' in politics, film, theatre, art, fashion, newspapers, fiction, games, graphic novels, and everyday chat. Writers such as Nelkin and Lindee, Hornig-Priest, and Stephen and Hilary Rose see values propagated by

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<sup>24</sup> In this way, biotechnology resembles Foucault's governmentality and biopolitics as examples of agency and structural control of the body.

both media and popular culture as a *scientism*, a ready acceptance of genetic explanation without question.

The writers above have a common concern for the salience of the 'gene for' frame. As Appleyard (1999) describes it, the DNA double-helical structure looms large in the background as a type of postmodern icon, and indeed is used extensively in both biotech and non-biotech branding. Yet technological applications have deeper salience in the current Irish political and industrial system, as the next section shows.

### **Local normalisation: the Irish turn to biotechnology and its public and educational salience**

Having considered the structural communication processes in which opinion-forming on NRGTs may occur generally - not just among young people - it will now be useful to further examine sociocultural processes by looking at S&T policy in Ireland's recent past. S&T has been integral to the unprecedented growth of the Irish economy over the last decade. It (for now simplifying my argument by referring to S&T in the singular) has been of major strategic importance to Ireland's development as a 21st century 'knowledge-based' or 'information' society. However, current education discourse in Ireland frames science in terms of the low proportion of students taking up science as both second-level subject and career (Smyth and Hannan, 2002; O'Hare, 2004, 2006; Ireland, Government of Ireland Task Force on Physical Sciences, 2002). Engaging young people in S&T is now a major political objective based on a common prediction that there may be insufficient workforce in future to sustain a knowledge-based economy (ibid.) The crisis of decreasing science subject take-up has precipitated urgent state intervention, such as the setting up of the Discover Science and Engineering initiative. Practical incentives for engagement are being developed to reverse this trend and foster an appreciation of S&T locally at university level and systematically through groups such as Irish Universities Promoting Science and Third Level Research Education and Outreach (TREO). At primary and secondary level, a recent Government science strategy aims to address science education in Ireland to

ensure [that] new curriculum and teaching methodologies are stimulating interest in and awareness of science at a



very young age (Ireland, Department of Enterprise, Trade and Employment, 2006).

The *Task Force on the Physical Sciences* (2002) reported a fall-off of leaving certificate students taking biology from 52% in 1988 to 44% in 2001. The principle author of the *Task Force* report, Danny O'Hare, has constantly recommended the use of humanities-based activities, among other enticements (O'Hare, 2004). O'Hare cites informal science learning methods such as science centres in other countries as examples (ibid.). A report into science subject take-up at senior level also found that young people felt that science subjects were too difficult (Smyth and Hannan, 2002). Interestingly however, those more technically proficient students were not seen to choose biology in particular. Although seen as a difficult subject because of the amount of content, biology would seem to be already placed within the esoteric realm of the arts and humanities. Given the greater emphasis on attracting the young to physics, chemistry, mathematics, and engineering, the biology subject then is the Cinderella of the sciences, being ignored on various levels.

By contrast, the 'iconic' status of the gene described in the previous section has ensured funding for biotechnology projects and their peripheries. This thesis is just such a peripheral project. It was funded by the Programme for Research in Third Level Institutions (PRTLTI), a large scale initiative from the Higher Education Authority (HEA), Ireland's public funding body for third level research. The main beneficiary of this funding was technological development research across Ireland's universities, particularly in the biosciences, all contributing to economic growth. Since the mid-1990s, the Irish Government's policy of introducing low corporation tax schemes, coupled with a commitment to increased spending on biotech R&D, created the bedrock for multinational investment into a knowledge-based economy where biotechnology was a major player. A strong feature of funded biotech projects has been their applied, diagnostic approach, with culturally resonant phrases such as 'from bench to bedside' or 'from molecules to medicine' in common usage (Higher Education Authority, 2006, p17). *Bioeconomy* is the term that the OECD uses to promote the strategic relationship between the biosciences and the economy (Organisation for Economic Co-operation and Development International Futures Programme, 2006). There is a concerted effort across the EU to combine expertise in science as a *societal phenomenon* (FP7), using emerging development such as biotechnology and nanotechnology. In the European context, ethics and social contexts are given heavy emphasis in EU funded academic projects.

Biotechnology has contributed significantly to the Irish hi-tech boom, as it has in many countries (Bauer and Gaskell, 2002b). In a wider, global context, biotechnology would be a useful test case for how commercial and academic aspects of S&T interact in late modernity. Technology that moves into the marketplace needs to have a high degree of salience – it needs to be commercial, to fulfil a market as well as human need. Whereas both in a national and global context, biotechnology is a consumer technology, its *raison d'être* to counteract society's biomedical ills, not all promoted technologies make it to public acceptance. In the last twenty years, biotech products have been withdrawn from the market because of public concerns.<sup>25</sup> This knowledge production is a feature of Nowotny *et al's* (2001) 'Mode-2 science' where, unlike the Enlightenment and technocratic Mode-1 variation, society now 'speaks back' to a science that is increasingly contextualised. This also means however that the economic, modernist idea of basic research moves closer to the applied model, where all research requires socioeconomic or practical rationale. For biomedical science, the obvious practical outcome is treatment of disease. In policy matters, science and technology have become analogous terms in this knowledge setup. For this reason, S&T will hereafter be referred to as 'science' in this chapter.

Often, public salience correlates with how Government and industry frame technology. With the reflexive nature of institutions of high modernity (Giddens, 1991; Beck, 1992)) and the rise of the active consumer (Jones and Salter, 2003), there are some reports of the acceptance of uncertainty among political discourse of biotechnology (*ibid.*). Yet in Ireland, the media coverage tends to accentuate the positive *possibilities of science* rather than the deep uncertainties about *technological* development. There is a progressive storyline inherent in this 'signal' approach, from a nation-state/economy source, that permeates into media outlets within the sphere of public engagement for young people, notably the *Science Today* articles in the *Irish Times* and the Discover Science and Engineering-funded *Scope* TV series for young people. The contentious applications described in the next section demonstrate the wide range of concerns over biotechnology requiring outlets for public discourse.

Of course the central premise here and for much of the research reported thus far in this chapter is that there is no simple predictive formula for how technology will interact with society. Science studies experts see a break-up at the edges of science where technology meets society, and linear progress is no longer a guarantee. In fact Nowotny *et al* (2001) would like to see science enter a 21<sup>st</sup> century version of the Greek *agora*, where mediations

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<sup>25</sup> See Bauer and Gaskell (2002b) for discussions on Monsanto's decision to stop research and production on the terminator gene.

and consultations occur not within the bureaucratic machinations of state or science institutions but in open public contestation.<sup>26</sup> Weingart (2002) talks of a new ‘post-normal’ science, analogous to Mode-2, that has deep political affinity and needs to extend outside its institutional and expert systems boundaries. According to Weingart the boundaries of science are shifting all the time, spreading out from notions of scientific objectivity:

[T]he more science becomes part of the governing process, the greater its role becomes in defining the problems that it is then asked to solve (Weingart, 2002).

An internal rationalisation process occurs where science, moving along the bureaucratic processes of political power, answers the questions that it itself poses. Sociologists and science historians, on the other hand, offer their own explanation as to why Ireland turned so quickly to science as a way forward without much thought to the democratic, moral, or religious objections. Indeed, moral and religious objections may form part of the reason for this Irish turn to the biosciences. There was a dominant Catholic ethos in Ireland in the 20th century which, some historians would claim, reflects a nation-state ethical code rather than the universality of Enlightenment values (Whyte, 2000; O’Mahony and Schäfer, 2005).<sup>27</sup> Following Catholicism’s dramatic decline as a reference point for day-to-day practice in the late 20<sup>th</sup> century, the opportunity to ‘replace’ these normative practices with technoscientific commerce was grasped in the last decades of the century with little dispute (ibid.).<sup>28</sup> Where there is dispute, as occurred with the Irish GMO debate of the late 90s, public opinion running counter to the prevailing scientific frame may be marginalised (Motherway, 2001). In this historic example, there were competing media positions and frames for and against the technology. However, according to Motherway (ibid.), the expert systems frame won out through the whitewashing of opinion in the final written report, a technocratic strategy of modern political practices (ibid; ibid citing Beck, 1992). In contrast, the UK consultation models include – at least notionally – regular social and religious objections on matters of science policy (Gaskell, 2003; GM nation? 2003). In effect, political discourse on new biotechnological developments in Ireland tend to have a strong scientific rationalism frame, providing technology as its own justification in medical storylines, and assuring better

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<sup>26</sup> This has implications for peer review and black box methods of scientific endeavour, but that is for another discussion.

<sup>27</sup> Whyte (2000) claims however, that the lack of intellectual engagement of Catholicism in science in the 19<sup>th</sup> Century had more to do with the legacy of the Protestant Ascendancy than any restrictive practices of Catholicism.

<sup>28</sup> Ireland’s post-colonial national identity may well be shifting in this respect towards a knowledge identity tapping into the global scientific enterprise.

treatments for the sick<sup>29</sup> with a local engagement focus. Phrases occur such as the ‘war on cancer,’ a storyline to which the NICB also contributes, and can be invoked to justify using HESC research for biomedical treatments, contrary to the counterthemes of against messing with nature or religion among devout Catholics (see Chapter 6 for further explanations of these frames as constructed in this study).

The years 1995-96 were a watershed for the strengthening of the *progress* theme through Irish science policy, with the publication of the White Paper (Ireland, Department of Commerce, Science, and Technology, 1996) and the Tierney Report (Science and Technology Division, 1995). This was followed a few years later by Technology Foresight which encouraged the jostling hi-tech agendas of the new Celtic Tiger economy to contribute to a ‘national conversation’ on biotechnology (Irish Council for Science Technology and Innovation, 1999). Although this turn to biosciences had a strongly international vision, the language of these reports was local in orientation, dynamic and business-orientated, referring to the predicted emergence of ‘highly qualified, inventive, entrepreneurial biotechnologists’ who could master

a flow of discoveries, technologies and ideas on which products, processes and services can be developed by Irish and Irish-based international industry (ibid., p1).

The report recommended that Enterprise Ireland begin a biotech start-up programme (which subsequently became the Biotechnology Commercialisation Group) to help finance the development of 50 biotechnology start-up companies up until 2004.

Further reports followed – ICSTI (Irish Council for Science Technology and Innovation, 2002), and the Inter-Departmental report on Modern Biotechnology (Ireland, Department of Enterprise, Trade and Employment, 2000) – each recommending the setup of a state-run body dealing specifically with biotech policy, which became Biotechnology Ireland. This in turn led to the launch of [www.biotechinfo.ie](http://www.biotechinfo.ie), Ireland’s first public engagement web portal on biotechnology, an educational resource where all publics could read about, and more

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<sup>29</sup> Science commentator and journalist Bryan Appleyard (1999, 2004) has remarked that new liberal democracies promote technological progress despite the presence of a few ‘party-spoilers.’ He is among those, previously discussed, who describe Giddens’ ‘Third Way’ politics negatively as diverse opinion blends into a pallid, vanilla non-solution where technology inevitably triumphs. Another description of Ireland’s turn to science might be that a more promising business return of science is really what drives the public/ media salience. I would prefer here to use Appleyard’s argument along with Giddens to explain how the turn runs deeper than that. Cultural practices include expert systems, facilitating a framing of social progress through ‘science’ and the ‘knowledge based economy.’ The financial rewards - including those proposed by economic and catalytic business rationale - might well be a bonus.

importantly interactively engage with, the latest biotechnological developments, new treatments, common controversies, and add to the discourse through web discussion. However, this web forum has since been quietly removed. This small yet significant event exemplifies how Giddens' (1991) institutions of modernity, in risk assessment, may not fully engage with the politics of the concerned. The practices of knowledge dissemination in a knowledge economy may dictate that risks only be taken when needs analyses suggest the time is right to do so among the electorate or funding bodies.

How does this relate to biology education? As this discussion moves towards an analysis of the educational implications of wider bioscientific framing, it may be worth noting how Bernstein (1996) described socio-political 'framing' in pedagogy. The 'official pedagogic discourse', as Bernstein might call it (Edwards 1991 citing Bernstein, 1990), may not challenge curriculum planners enough to move beyond easily-assessed science content to historical, political, moral, or philosophical spheres. In his classic work on pedagogic symbolic control, Bernstein (1990) described this as the dominance of regulative discourse (dominant discourse of the society) over the instructional discourse (content) (Morais, 2002). This is not to say, however, that all references to the negative or unforeseen impacts of science and technology are absent from biology classrooms. There are many teachers who actively seek resources on bioethics and social issues connected with biology, represented elsewhere in this thesis. There is also the recently changed biology curriculum to include 'contemporary issues' of biology (Ireland, Department of Education and Science, 2002b). The Department of Education and Science introduced a revised Leaving Certificate curriculum in September 2002, following ten years development by the National Council for Curriculum and Assessment (NCCA) and implemented by the National Biology Support Service (NBSS). The preamble to this syllabus gives special attention to 'a science that is concerned with issues - political, social and economic - of concern to citizens' and accompanying guidelines recommend teachers to devote at least 7.5% of their lesson plans to these issues (Ireland, Department of Education and Science, 2002b). Guidelines to teachers set out time for discussion of contemporary issues, which NRGTs fall under. It is beyond the scope of this study to pursue the exact curricular and internal institutional reasons for this official guideline from Government and the National Council for Curriculum and Assessment (NCCA). However it is pertinent to ask if it is enough to 'tag on' less than 10% of teaching time to the context of scientific decision-making. What is also pertinent to this discussion are the links between the technoscientific climate of contemporary Ireland and the pedagogy that occurs *around* the curriculum, that is, those learning *and* engagement moments that are either

formal, informal or non-formal (Smith, 2005)<sup>30</sup>, such as challenging the selling of biotechnology concepts (and now increasingly nanotechnology), reflecting on the cultural value of science in sci-fi and superhero texts, the domain of young preoccupations.

### **Controlling NRGT fears and expert communication strategies**

Despite the lack of discourse, the fears that were suppressed by Giddens' expert systems of modernity, explained earlier in the chapter have come rising to the surface. This section looks at how concerns are presented in popular culture and literature and in the public 'bioethical' discourse of the experts and regulators of NRGTs, and how young people might have options to engage with the large questions of humanity asked within these diverse discourses.

It is an important time for policy on IVF, cloning, and human embryonic stem cell (HESC) research worldwide. Many countries, including the UK, Australia, and Canada constantly review their regulatory systems concerning NRGTs as they try to deal with the seemingly unpredictable impact of these technologies and related concepts. The evaluation includes, among others things, public concerns over state involvement in regulation of personal reproductive choices (Horsey, 2005); the 'personhood' status of the embryo and religious objections (Polkinghorne; Irish Bishops' Committee on Bioethics, 2005); ethical issues concerning the perceived discriminatory nature of genetic testing or embryo selection (Sexton, 2001); philosophical questions of 'tampering' with genes, what many now consider to be the very essence of life itself (Turney, 1998; Fukuyama, 2002); the potential threat to health and the environment (Hornig Priest, 2001; European Commission, 2003); and ownership issues associated with DNA patenting. For policy-makers in Ireland then, the task of classification and drawing new boundaries around objects that were once both solid and sacrosanct becomes ever more difficult in mediated late modernity (Giddens, 1991).

There have also been appeals to scientists to be aware of the anxieties of various publics, often coming from within the discipline of genetics itself (Rose, 1997; Rose and Rose, 2001; Lewontin, 2001; Macintyre, 1995). Questions are often raised about how far genetic

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<sup>30</sup> www.infed.org defines the three types of education thus: formal education is defined as the structured, graded system guided by assessment and leading consisting of primary, secondary and tertiary and eventually for full-time technical and professional training; informal education is the lifelong process of acquisition of skills, values, knowledge of daily experience globally and locally; and non-formal education is any organised educational activity outside the formal system. I consider all three to be a part of pedagogy, and a pedagogy of biology will take from these three processes (Smith, 2005).

technologies should go in areas of both diagnostics and repair, given that huge advances are overrunning regulatory control worldwide. Given these counter-discourses, educators have also raised concerns worldwide that contemporary issues in modern biology and NRGTs are not dealt with sufficiently in schools, that citizenship and social aspects of these technologies and discourses listed in the previous paragraph are distant from education (Taylor and Dawson, 1997; Parker, 1998; Macer, 2000; Simmonneaux, 2001; Gaza and Singh, 2004). In light of evolving biotechnology industry in Ireland discussed earlier, the Irish Government commissioned a report from the Inter-Departmental Group on Modern Biotechnology (Ireland, Department of Enterprise, Trade and Employment, 2000) which recommended that social and ethical consequences of biotechnology should be considered by all, not just those wishing to pursue careers in the biosciences.

Table 2.1 lists those biotechnologies which raise peoples' fears in media reports, some of which are the subjects of literature and film. I will concentrate here on those NRGTs that have generational effects involving the embryo, particularly PGD and cloning from HESC (the subjects of each of the two films I present to young people). These NRGTs and related research involve some form of control over sexual reproduction and genetic lineage or makeup that never existed before.

Within these discourses, scientific, ethical and spiritual definitions of human identity arise. NRGTs are perhaps the most contentious of biotechnologies worldwide. The destruction of the embryo is the main reason for this but not the only one as subsequent chapters will show. Contemporaneous to the Irish policy decisions on modern biotechnology cited in the previous section, there have been new attempts in this country to publicly address the life political issues associated with blood, birth, death and embryos that have dominated Irish discourses for over twenty years (Cassidy, 2006; Bunreacht na hÉireann, 2004). Globally, the pro-life lobby defends the 'traditional status' of the embryo on the basis of its human identity from conception. Ireland has a unique history with regard to the identity of the embryo given the

Catholic ethos that once prevailed, an ethos that very clearly forbids any impact on the embryo. It has in place however, less than cogent legislation protecting the unborn from the moment of conception following an amendment to the constitution in 1983 (*ibid.*) thus prohibiting research. Subsequent attempts to amend the constitution and another referendum in 1992 have created intense media debate in Ireland over the past two decades, leading to the present situation following the 'frozen embryo' case which, as mentioned in Chapter 1, may pave the way for yet another referendum on the subject (at the time of writing, the courts are

**Table 2.1** Examples of biotechnology applications in media coverage that may cause public concern.

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| Cloning – both therapeutic and reproductive   |
| Human embryonic stem cell (HESC) research and potential treatment                       |
| In Vitro fertilisation (IVF) techniques   |
| ‘Saviour siblings’  |
| Transgenic, or genetically modified organisms   |
| Proteomics  |
| Biobanks  |
| The Human Genome Project (HGP)  |
| Gene patenting  |
| Pharmacogenetics  |
| DNA profiling   |
| Genetic screening and pre-implantation genetic diagnosis (PGD)                          |
| Gene therapy – germline (sperm, egg or embryo) or somatic (all other cells of the body) |
| Biotechnological art  |
| Chimeras (hybrid human-animals using human genes)                                       |
| Bioprospecting  |

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required to look again at the constitutional status of the embryo following the mother’s judicial appeal in this case (Cassidy, *op.cit*). Currently the definition of the ‘unborn’ is not of sufficient clarity in law to regulate for special circumstances of supernummary embryos used in research for example, as other countries have done. But, again at the time of writing, there is still no regulation for NRGTs in Ireland (although codes of practice within the medical profession prevent deliberate embryo destruction). The Commission on Assisted Human Reproduction (CAHR) (2005) was given the task by the Irish Government to prepare a report reviewing the ongoing public concerns on the social, ethical and legal issues surrounding assisted human reproduction (AHR). Yet the ‘frozen embryo’ case is the first of potentially many others that could either exploit or become entangled in the regulatory wilderness.

Other ‘bio-fears’ exist. As exemplified by Bauer and Gaskell (2002b) and Latour (2004), it is with regulation of NRGTs or other biosciences that democracy meets science head on. It is the return of the uncomfortable embodiment of experience to institutions of modernity that expert systems endeavour to suppress. Life politics issues arise in different ways across the world. In Europe, different attitudes to biotechnology has resulted in inconsistent regulation. Latour (2005) wryly comments that Europe as a political entity keeps finding itself conjuring up ‘monsters’ when trying to regulate based on public opinion on NRGTs, remarking that



Dewey once said that 'most of European political philosophy has been obsessed by the body and the state (ibid, citing Dewey (1927/1954))'.

The main exemplar of how life political concerns have become life 'Politics' is the new culture war currently waging against orthodox science in the US. It exists where the appeals for the rationality of science from the political left are strongly opposed by the Intelligent Design movement. It is also present in President Bush's appeals to a larger cultural background when he calls for a return to a 'culture of life' when supporting the pro-life perspective (Horsey, 2005; Berga, 2005). Abortion, euthanasia, stem cell research, and gay marriage are part of 'value issues' in the US, all having public salience. They also all have some biological aspect at their core, and with a fault line dividing down left / right politics. This polarised view relates to 'performed' announcements by such public figures as President Bush, placating and influencing his constituencies. This polarisation plays out in mainstream media as a political flashpoint where tradition and religion meet modernity and science. Each constituency finds its embodiment in a famous scientist's or religious (oriented) leader's proclamations.

Representations of Gamson's *progress* versus *harmony with nature* themes/counterthemes are commonplace within these discourses, playing off primordial fears. Literature and Hollywood have successfully mined the public (and cultural) concerns of the technological changing of humanity. Frankenstein's monster (Shelley, 1818/1994) forms a ghostly image over movies, whereas literary fiction feeds the public appetite for the *chimera*, the man or woman as human and animal (Turney, 1998). An exemplar in fiction is *Brave New World* (Huxley, 1932/1994) first published in 1932, whereas exponents of biotechnology in movies include *Gattaca* (1998) and *The Island* (2005). *The Island of Dr Moreau* (1996; Hornig Priest, 2001) and the cloned Hitlers of the *Boys from Brazil* (1978) bear heavily on our collective image of biotechnology, a vision of evil human nature rearranging and replicating itself, as outlined by Haynes (1994). Cloning has a particular cultural salience as it represents a direct threat to our individual identity. Box-office hits that have cloning as a theme include *Jurassic Park* (1993), *Star Wars: Episode II - Attack of the Clones* (2002), and *Multiplicity* (1996) Popular science literature with philosophical ideas about human biology and 'non-natural nature' (Bucchi, 2004, citing Haraway, 1997) fascinate as well as frighten the literary imagination. Amongst books on Renaissance code-breaking, the best sellers for 2005 on [www.ebookers.com](http://www.ebookers.com) include the truth-seeking (*The Hidden Face of God: Science Reveals the Ultimate Truth*) and the humorous (*Why Do Men Have Nipples?*). Best sellers in the popular

biology genre include Richard Dawkins, Steve Jones, and E.O. Wilson. Modern literature that looks philosophically at NRGTs is also becoming more popular. Recent works of fiction with genetic or biotechnological themes in contention for the Man Booker prize include: *Oryx and Crake* (Atwood, 2003), *Never Let Me Go* (Ishiguro, 2005), *Cloud Atlas* (Mitchell, 2004), and *Middlesex* (Eugenides, 2002). Popular culture myths emerge from many different sources. However all forms of media often enforce already existing beliefs, expectations and attitudes (Nelkin and Lindee, 2004, citing Nelkin, 1995). Hornig-Priest agrees:

Public opinion is not formed from media messages, but it is in important ways a product of the interaction of culture with these messages. ....Culture... is embedded in popular media products....This process helps to reinforce cultural values and beliefs, although it does not create them out of nothing (Hornig Priest, 2002, p69).

News reports such as the one that describes a child with 'five parents' (Utton, 2004) add to a public concern about NRGTs as 'tinkering' or 'playing God'. We can expect media and entertainment routes of science acquisition for the young, such as Discovery Channel or sci-fi. However, what about high-profile debate beyond educational reach in popular science, such as the determinism of Wilson (1992, 1999) or Dawkins' 'selfish gene' (1989) which, in popular science, is pitted against the more holistic scientific approaches to genetics in Lewontin (2001) or Rose and Rose (2001)?<sup>31</sup> Also when it comes to an applied ethics of NRGTT decision-making, how useful are the many discourses from theology and moral philosophy, as discussed later?

The GMO debate in the late nineties (Motherway, 2001) perhaps shows there is a form of life politics emerging in this country that does not necessarily involve embryos. However the embryo is the main focus for debate. PGD and HESC are two such technologies that involve some intervention on the natural processes of embryonic development. In the case of PGD, a single cell is taken from a 2-4 day old embryo derived from IVF. A genetic or chromosome test is then carried out on the cell to determine if it contains a particular genetic 'abnormality' or genetic disorder like cystic fibrosis. As IVF is the preferred method of creating embryos, often a multiple are produced, tested, and then an embryo not containing the 'defective' gene implanted in the uterus. It is believed that, in future, there will be many more genetic disease

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<sup>31</sup> Perhaps paradoxically, those scientists who are proponents of the most extreme form of scientism have been the most artful in their descriptions, using colourful metaphors and narrative to elucidate their views. Dawkins' and Wilson's use of language and imagery have added to the iconography, and to the story, of genetics in the 21st century.

identified and for which these tests will be used. PGD is also used for the screening of X-linked disorders, those that affect only boys, by selecting female embryos.<sup>32</sup>

Of all the topical issues discussed in this section, perhaps HESC research provokes the most debate. The source of the controversy generally is the method itself. To create a stem cell line, either an embryo has to be destroyed or, in the case of therapeutic cloning, a new stem line is created for the purpose of research. This technique is unacceptable to those who believe that the human person is created at the zygote stage, that is, when a sperm fertilises an egg, even if the process never intends to have a human being as the final outcome (thus the invoking of Kant's laws, as described below).

It is interesting to note the variance in moral evaluation from religious sources on ways that the embryo can be disrupted. Whereas abortion and stem cell research may be the subject of homilies, IVF is not always so. Teacher resources for the Roman Catholic guidance on the Leaving Certificate module Relationships and Sexuality Education (RSE) cites cloning and embryo research, yet only as list items in its keyword sections (McGowan, 2002). Whereas abortion is described from a Catholic perspective as an 'evil act' (ibid.), there is no such judgement on cloning. However, the Irish Catholic Bishops' Committee on Bioethics (2005) did respond to CAHR's recommendation to place legal protection on the embryo only after implantation (Commission for Assisted Human Reproduction (2005) by saying that

There is certainly no scientific or philosophical basis for distinguishing between an embryo in the womb, and one in a glass dish or in frozen storage (Irish Catholic Bishops' Committee on Bioethics, 2005, p1).

A dichotomy on NRGTs evident in US politics might have similar media representation in Ireland. To delve deeper into the question of how opinion and attitude are formed – and polarised – about a subject, that subject can be researched from the vantage point of different social forces. The news media – print, online and television – is one such social force and can be considered one of the main agenda-setters. It is now generally accepted in media theory that both agenda-setting and communication transfer is a multi-way process (Bucchi, 1998;

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<sup>32</sup> Scientifically, PGD has limitations however, as it can be difficult to identify a disorder on the basis of what sometimes can just be one gene mutation. Recently, a more powerful and cheaper method called pre-implantation genetic haplotyping (PGH) was developed at Guy's and St Thomas' Hospital in London. This technique looks for a selection of nearby genetic markers for a particular disorder, rather than individual genes or mutations. It has been claimed that this could be a way of identifying rarer diseases.

Wynn, 1993). The agenda is set by a mix of science content and journalistic development. Increasing the amount of science coverage does not necessarily mean a linear acceptance or assimilation of scientific information. However the biotechnology lobby, across Europe in particular, look to public attitudes and link negative findings to lack of *understanding* (Wynne, 1992; Allum *et al.*, 2002; Jasanoff, 2005a).

There have been many studies on how attitudes to all types of biotechnology have cultural resonance or localised specificities with regard to what type of technologies are available.<sup>33</sup> Evans and Durant's (1995) study of the nature of attitudes showed that people make distinctions between different areas of science when reflecting on whether it is worthwhile or morally justified. There is a range of different attitudes within Europe, not all negative; yet those that are negative cannot be said to be due to lack of education. Attitudinal studies by researchers looking for a unified 'knowledge gap hypothesis' (Bauer and Bonfadelli, 2002, p151) often use simplistic variables of 'educated' versus 'ignorance'. For example, a Eurobarometer in 2003 (European Commission, 2003a) concluded that although the majority of respondents found the use of GM foods unacceptable, 44% were optimistic about biotechnology in general with 17% pessimistic. However, the Eurobarometer also reported that just over half the respondents were aware that humans shared a majority of their genes with chimps but 35% responded that ordinary tomatoes have no genes. Concerns about biotechnology would seem to correlate with a lack of knowledge in this survey. But the theme of distrust mixed with misinformation in this and other Eurobarometer reports reflects just part of what 'attitudes' actually are. An EC Science Research Development report on cultural and social attitudes of the young, known as the 'BIOCULT project' points out that viewpoints expressed on biotechnology may sometimes be tied in with accepted norms and to the answers the respondents think they are expected to give (Hayry, 1998b). Jasanoff (2005a) criticises the Eurobarometers for asking questions rooted firmly within the technoscience culture of European politics. The technological skills, practices, and processes of the dominant culture reflexively reproduce these practices across media and education:

Clustered around genetic engineering in each country, we find not only celebratory institutions (mostly those of science, industry, the mainstream media, and the state), but also institutions (mostly not those of the state) that fear, doubt, question, or decidedly oppose the workings of the new technologies. Between these poles stand an array of public and private institutions whose task is neither to

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<sup>33</sup> See European Commission, (1997, 1998, 2000, 2001, 2003a, 2003b, 2006), Hornig Priest (2001), Nelkin and Lindee (2004), Bauer and Gaskell (2002a), and Barr and Thompson (2002)

praise nor to blame biotechnology but more cautiously to deliberate on its management (Jasanoff, 2005a, p28).

Concerns then are not all grounded in misinformed apprehension, but on governance and risk, themes requiring consideration for science communication activities. In fact Wynne's (1992) ground-breaking study of Cumbrian farmer's perspectives on nuclear fallout following the Chernobyl accident reveal a contingent strategy dealing with ambivalence and uncertainty that was more sophisticated and practical than expert knowledge of events at the time. In the UK, there has been a turn in the last ten to fifteen years towards public participatory models of scientific diffusion (Wynne, 1990; Solomon, 1992). The term used that encompasses activities which bring science practices into the public domain is 'public engagement.' Communication strategies moved from a *deficit model* approach – where publics were assumed by institutional scientists to be unaware of the rigours and uncertainties of the scientific enterprise (Wynne, 1992; 1993) – to a general acceptance of a two-way model of science communication (Hornig Priest, 1995; Macintyre, 1995; Sless and Shrensky, 2001; Raza and Singh, 2004). Instead of public *understanding of science*, still the name of a respected publication and with the unfortunate acronym PUS, we now have *public engagement with science and technology* with the not altogether better acronym PEST. The change of term demonstrates the change of emphasis. Clearly a deficit model built on a perceived lack of public knowledge has been replaced by an inclusive one, where all value systems are - potentially - brought into dialogue models on an equal basis. Jasanoff is strongly allied to Wynne's assessment of the problem:

The framework of 'public understanding of science' diminishes civic agency, erases history, neglects culture and privileges people's knowledge of isolated facts (or their ignorance of such facts) over their mastery of more complex frames of meaning (Jasanoff, 2005a, p270).

However, similar to the critique offered to 'postmodernist' constructivism earlier, Irish science institutions may not respond well to other worldviews. The Irish model for science communication tends to rely on each science institution developing its own strategy within their specific parameters. HEA grant application guidelines stipulate public engagement as a requirement but this policy lacks coherence across institutions in Ireland. This results in weak public engagement, where programmes of awareness and information transfer are favoured

over real engagement (the notable exception here for NRGTs is the fine ‘outreach’<sup>34</sup> work of REMEDI in Galway). The understanding of science process that science communicators and educators are looking for from young publics may often miss out on how Giddens describes it in the context of the social processes of science: ‘science depends, not on the inductive accumulation of proofs, but on the methodological principle of doubt’ (Giddens, 1991/2005, p21).

The Irish Council for Bioethics (ICB) (2007) was set up in 2002 to monitor ethical issues raised by developments in health and the biosciences. It is now beginning to grapple with public concerns. Jasanoff (2005a) has doubts about the effectiveness of the rise of bioethics as a distinct and separate concept in different countries. ‘The entry threshold for ‘speaking bioethics’’ she says ‘is lower than law or science in policy discourse’ (p173). Bioethics, she states, acts as

a filter against controversial or harmful products, but not an upstream discourse that engages with the political economy of production or questions the purposes for which we do science and develop technology (ibid., p175)

Jasanoff points out that the UK model places bioethics in the realm of committees and argumentation rather than hard moral decision-making, an open project which suits this current discussion on discursive pedagogy.

Previous sections in this chapter looked at the constraints on modern institutions like biotechnology in *addressing moral, social, and existential issues of NRGTs*, and how, according to Giddens (1991), life politics attempts to bring these issues back on the agenda within those institutions. A perhaps more difficult task currently occupying NRGTT discourse is *what morality can be applied* to such decision-making, and this is taken up in the next section.

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<sup>34</sup> The term ‘outreach’ is used more frequently within the emerging technoscience communication strategy in Ireland, particularly for bringing science to young people. It is a term I am reluctant to use, given its colonialist, deficit model connotations of ‘reaching out’ with knowledge to the ignorant. Its social work origins may be appropriate for community healthcare and awareness. The term is further evidence of a reflexivity of its own cultural nexus demonstrating Jasanoff’s (2005a) ‘civic epistemology’: science and technology as a cultural empire spreading onwards, reaching out beyond its boundaries.

## **Beyond constructivism: models of socioscientific arguments in classrooms**

An acknowledged political or social context for science does not have the same presence in the Irish education system as it does elsewhere. In the UK, the piloted subject *21st Century Science* places heavy emphasis on contextualisation and stories, as well as the affinity between the natural sciences and citizenship in education (Nuffield Curriculum Centre, 2002). Dignity, discrimination and identity, are all topics for consideration for young people as part of citizenship studies, particularly for older students than the enticement initiatives under the Discover Science and Engineering schemes. This connection finds its roots in Dewey's (1938) assertion that all education has a central role in forming social consciousness. This type of curriculum is known as *science, technology, and society or science-technology-society* (STS) in the US and Canada (and in proposed new curricula in Ireland) and 'science in a social context' in the UK (ibid., 2003).

Aikenhead (2003) defines STS as

citizenship preparation for dealing with real life [rather than]pre-professional training for future scientific careers..... seeing the world through the eyes of students and significant adults [not] seeing the world through the scientists alone .... (ibid. p24)

21<sup>st</sup> Century Science has been criticised – by high profile ethicist Baroness Warnock among others – for putting the science curriculum 'back to front,' that it is putting everyday practices and values before scientific content, and instilling a kind of cynicism in young people (Critics attack new science GSCE, 2007; Osborne and Millar, 2007).<sup>35</sup> However, globally, this may be an emergence of Giddens' (1991) life politics in a new paradigm of uncertainty against the modernist ideal of systems. In Canada, the Science-Technology-Society-Environment (STSE) movement emphasises a cross-disciplinary approach to science teaching based on student experiences in life, their social environment and the ecological environment. Many of these curricula are based on experiential learning, or using experiences and contextual decision-making as the core of learning, and the introduction of values to science has been a research objective within the formal education system since the 1970s (ibid., 2003). This is linked to the constructivist approach in science education, where the cultural background and

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<sup>35</sup> As briefly discussed in the final chapter, there may be a healthy degree of cynicism in late modernity.

past experiences of the child are crucial to the education process (from Piaget to Bernstein's 'progressivist' learning approaches (Chouliaraki, 1996) and beyond).

Where some constructivist approaches explore the student's *Weltbild*, that is underlying beliefs and cognitive processes in deconstructing mental schema and images (Cobern, 1993), this study pursues an intellectual track focusing on practices but informed by social constructivism. This view of science education recognises both prior experience of students and active social engagement are fundamental to the process of science learning, a theory that has its roots in Vygotsky (1978). It came

not from the logical processes of which science boasts, but from the 'common sense' attitude that relies on being able to interchange perspectives and meanings with others (Cobern, 1993, p4, quoting Solomon, 1987, p. 66).

However the subject here is socioscientific issues through ethnography of education and frame analysis, rather than the conceptual change of science education. There is no explicit analysis of learning here. This 'interchange' Solomon speaks of suggests a Habermasian communicative action through the learning processes of science education in the classroom or the school labs. This brings us to the boundaries of science education. The approach here is less cognitive, less psychological, less concerned with what is inside people's heads, and falls within the practice theory outlined by Schatzki (2001) later in this chapter and in Chapter 1.

However, contemporary science education research appears more concerned with science literacy. For example, the aims of the PISA research programme, a major European project to reform science teaching, is 'to encapsulate the broader concept of knowledge and skills (Programme for International Student Assessment, 2006, p7).' Similarly a Europe-wide survey also brought to the North and South of Ireland, Relevance in Science Education (ROSE) (Schreiner and Sjoberg, 2004), mapped young attitudes to scientific applications and society. However the attitudinal depth and detail required to establish culture, context and ethical worldviews may not be explored within its closed survey questions. A more informing study for biotech representations was the PARADYS project, where actor identities and social positionings were mapped out across Europe including Ireland (Bora and Hausendorf, 2004). A major finding here was the varying understandings of citizenship, whether communicated through social movements, the scientific community, or party politics, which



seemed to contest the vary durability of common citizenship, as related to an NRGT, a point raised by these authors elsewhere (Bora, 2005; Bora and Hausendorf, 2006).

The agenda of science education research follows the positivist approach of the natural sciences more fixated in the internalisation of the products of science progress. A reason for this narrow approach may be that science research and science education research are closely aligned and both filter into teaching practice. It is not relevant to the argument to further develop here on a theory of learning. However constructivism appears to be a bye-word for varying types of neo-positivist teaching approaches. The practice approaches of Bourdieu and de Certeau, and the contemporary readings from social theory (Schatzki, 2001; Barnes, 2001) might better inform the socialised constructivism championed by Solomon (1994).<sup>36</sup> Solomon (ibid.) herself saw limitations for constructivism and this was prophetic with regard to subsequent science education research. Solomon wrote her paper at the time of the Sokal affair (Ross, 1991) when there was a cultural battle between a relativist humanities approach to the sociology of science and positivist science. It created an epistemological crisis within the social sciences that still remains. Science educators may still be frightened off by models with a postmodern flavour. There is a fear of using terms such as ‘multiple realities’ and ‘identities’ and of suggesting that scientific truth and moral truth are contestable.<sup>37</sup> Yet such criticism of worldview and boundary research ignores a basic *moral* tenet of biology education set down to address the historical spectres of social Darwinism and eugenics. Articles 20 and 21 of the Universal Declaration on the Human Genome and Human Rights (UNESCO, 1997) was adopted unanimously by 186 member countries of UNESCO on November 11, 1997. They outline the ambitions for an education policy that recognised ethics in biology

through the promotion of education in bioethics, at all levels, in particular for those responsible for science policies [and] raising the awareness of society and all of its members of their responsibilities regarding the fundamental issues relating to the defence of human dignity .... raised by research in biology.... ensuring the free expression of various socio-cultural, religious and philosophical opinions (ibid., p45).

Recent studies point to an emerging multicultural view of science education where alternative viewpoints are accommodated (Cobern,1993; Solomon, 1983,1987, 1994 ; Aikenhead, 1996;

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<sup>36</sup> See also Lave and Wenger (1991) and Wenger (1998) for their works on communities of practice.

<sup>37</sup> Poststructuralism helped to absolve the need for criteria (Derrida, 1976; Peters, 2002), while sociologists and educationalist have played safer in recent decades, taking the positivist route to ‘count things’ (Sheehan, 2006).

Jegade, 1994; Costa, 1995). These studies are notable in that they often take place among indigenous cultures and reflect a non-Euro-American view of science, and should perhaps inform a new Ireland where alternative views to 'Irish science' will change as the customs of other nations take root.

These last sections show how teachers and students might deal with the social implications of pre-implantation genetic diagnosis (PGD) or human embryonic stem cell research (HESC) entering the classroom forum from outside the curriculum. The connecting models just described are part of opinion shaping on how science should be *taught*, rather than *engaged with*, in the Irish context. Analyses of public and media discussion in other countries suggest the presence of complex relationships between definitions of science, technology, identity, and society that influence the public acceptance and governance of biotechnology as well as public pedagogy. These findings emerge from cultural anthropology (Jasanoff, 2005a), science studies (Nowotny *et al*, 2001), sociology (Giddens, 1991;194; Beck, 1994b), and media theory (O'Mahony and Schäfer, 2005.) However given the cultural context outlined in this section, it is not difficult to see the problems in contributing to NRGT discourse in a formal way within the existing curriculum.

The next section looks at how young people might engage with NRGT issues through conflict awareness and arguments from moral positions in mediated classrooms.

### **Moral arguments and insider/outsider knowledge in mediated classrooms**

When there is the opportunity to discuss NRGTs openly in classroom, collective cultural understandings are brought forward. Dewey's (1938, 1963) assertion that all education has a central role in forming social consciousness is missing from the curriculum and from informal learning activities provided to young people about science. Although the pragmatism of Dewey has been one of the largest influences on current thinking on practical science, the practicalities of every-day *decision-making* in a modern liberal democracy has not (Aikenhead, 2001). The task that this thesis sets itself is locating identity and society within biology education. Later chapters will demonstrate how young people, through formal interactions with highly embodied, personalised, and media-influenced strategies of communication, attempt with the researcher/facilitators to bring back in 'social' and ethical' issues of the body that technoscientific discourse - biotechnology in education and the

economy -excludes. Bioscience issues are caught up within mediated popular culture outside the classroom; therefore when facilitating argumentation and justification of bioscience issues that are peripheral to the biology subject (Ireland, Department of Education and Science 2002a, 2002b) both curricular *and* external support for schools need to be considered (Simmonneaux, 2001). I ask questions of the system of discourse available to young people on NRGTs. What are the boundary conditions in a school system that controls or restricts how young people explore in a complex way the intertwining of NRGTs, identity, and a future society? How are those boundary conditions related to a wider discourse? What boundary conditions could be identified in classroom discourse that appears to conceal the subject of wider discourse? By developing Giddens theories further in the context of the writings of Boltanski and Thevenot (2001), I explore the justifications and decision-making in the classroom that are *immanent*, embodied in the moment of action, that are tacit and normative. When someone makes a decision to choose embryos or a method of HESC against her 'principles,' is she acting on impulse caused by surrounding conventions and expectations?

It was previously described how the learning theory of social constructivism has not been taken up by the Irish education system. The project of conceptual change has been proposed by Driver, Cobern, and Sjøberg with reference to a science that is 'situated learning', 'context-dependence', 'relevant.' (Sjøberg, 2002). Driver *et al* (2000) and Osborne *et al* (2002) have championed a move towards Toulmin's (1972) *conceptual ecology* which, in sociology found its counterpart in Niklas Luhmann's (1984) constructivist social systems based on the cybernetic model of general systems theory. These Toulmin models have attempted to introduce *argumentation* into the science classroom, where a range of values and counter-views are explored in response to social and environmental concerns about technology and waning interest in science among the young. However there is a positivist motive, insisting that young people explore other options before arriving at a 'correct answer' that science can provide. Alternatively the ecological-constructivist model works well as a starting point but what boundaries can be set on the webs of meaning arising from an open systemic discourse model? Personal meaning in decision-making suddenly becomes narcissistic, whereas controlled social decision-making isolates the outsiders in a dominant paradigm.

A research of practices looks at how various skills, know-hows and know-thats (Barnes, 2001) about NRGTs interact with local educational environments and media without

requiring internalised or cognitive meaning. The representations about identity and society that emerge are dependent on what takes place in the classroom, first and foremost, and media issue culture and moral worldviews are the resources that students draw on to support the performed speech act when called on to speak. When young people are asked their views, they 'position' themselves, and this positioning relies heavily on the 'immanentist' view (Davies and Harre, 1997), the act of the discourse itself, and how ambiguities can evolve even from multiple understandings of a single phrase. Immanent phrases are borrowed, repeated from communication practices elsewhere, other conversations, or media representations. The practice approach takes on board the discursive practices of the 'new psycho-socio-linguistics' (ibid.) in presentation and meaning. In common with modern qualitative inquiry, practice recognises how the body is tied into speech and non-verbal interaction, as Giddens' life politics also addresses. Schatzki refers to practices in their broadest sense as 'arrays of activity' (Schatzki, 2001, p2) or 'a nexus of (non-verbal and verbal) practices as body/knowledge/things-complexes (Reckwitz, p258).'

The choices taken, in discourse and in embodied action, define identity. Schatzki, in drawing wide theoretical concepts together, looks to many disciplines to construct his theory. Practice theory may be seen as an 'umbrella theory' of social constructivism drawing on the structuralist theory of Giddens, the power and habitus of Bourdieu, and the creative body-performing agency of Goffman. Young people may not realise, or may deny, that they are involved in a form of politics when they position themselves in their views on NRGTs. When a student says she is against all NRGTs she is making a political statement, as defined by the new life politics. She is positioned as someone who is against NRGTs in society. However she may be against NRGTs as they relate to a film she has just seen, or responding to peer pressure. Students, in a forced event such as the discursive activities used here, where personal opinions are fielded on an issue such as HESC research, will use their cultural capital resources of immediate classroom experience as well as life histories. There are also gender expressions brought forward by young males and females who interact differently about reproductive issues. There are certain performative aspects to these youth interactions and expressions that further research might find also address class and ethnicity (Butler, 1990). These have a profound impact on the pedagogy of NRGTs.

Argumentation plays a part within the boundaries of science pedagogy, as discussed above, but when we see 'performances', so too does professional competition among teachers, the academic status of students, the showmanship of outsider 'expert' presentations, the background of teachers (Simmonneaux, 2000), and the presence of media in the classroom.

When these are all brought together in a discourse about a particular type of morality, regardless of the subject content, values can often be internalised in the discussion, leaving the outside world behind. There are questions of cultural and social identity within NRGT debates themselves which may become isolated from the actual issues. In representing viewpoints about NRGTs, perhaps there are dichotomies created in public discourse and in debate, as described in the previous section. People may represent these dichotomies by choosing a position based on their history and background, their culture and, unwittingly or not, this social representation forms an identity within the debate (Simmonneaux, 2000, 2001; Michael *et al*, 1997). Michael (1996) has also examined actor systems where people set themselves up in a debate on a controversy involving the embryo, creating an identity for themselves and offering perspectives on the human or non-human but most importantly in a socioscientific issue, creating an opposing *outsider* identity for others.

The notion of the outsider is important in sociological and education research.<sup>38</sup> Bourdieu drew on his ethnographical studies in the Bearn district of France to consider the dynamics of 'insider knowledge' versus 'outsider knowledge' (Jenkins, 1992 p46), similar to Simmonneax's and Michael's outsiders. The critical pedagogy of Freire and Giroux addresses how outsider youths must negotiate borders in classrooms to construct identities. In STS education, Aikenhead draws on Phelan *et al* (1991) and Costa (1995) to describe outsiders who feel they are outside the scientific worldview in classrooms. The subcultures that Aikenhead describes take on a kind of collective action, a set of cultural practices. De Certeau (1984) distinguishes between the *strategies* of the strong, the experts who provide a specialised knowledge in which to place themselves and others, and the *tactics* of the 'weak', the 'other', those who do not use the dominant scientific discourse, but use ruses and wit, full of phrases with double-meaning and who are capable of manipulating and repurposing the practices of the oppressors. Indigenous peoples throughout history

often used the laws, practices, and representations that were imposed on them by force or by fascination to ends other than those of their conquerors; they made something else out of them.....They metaphorised the dominant order; they made it function in another register (ibid. p32).

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<sup>38</sup> Definitions of outsider here are demarcated through participant utterances and judgements. My own biases may prevent me from embracing completely the Nowotny *et al* (2001) view of a reflexive science and education with fully connecting networks and without outsiders. Giddens (1994) might also say such a view reifies the other. And the school, as I argue here, brings strong traditional values into a modern setting through its use of connections to rites, formulaic truths, codes of practice etc.

In our own postcolonial nation, we might recognise such tactics. Cultural, media and consumerist practices will be reconstituted back into the living culture of local values. Scientific discourse uses strategy, but I do not want to address it here as an *ideology*; it goes further as an *episteme* that controls multiple discourses (Foucault, 1970). Those who defy scientific evidence presented to them, or oppose a technology that has been presented as having enormous biomedical value, may draw from a countertheme such a 'going against nature' using de Certeau's idea of tactics to resist the majority theme that is culturally salient.

What type of reasoning processes are drawn on by young people in 'everyday practice' that informs how they respond to concepts of NRGTs? Can Bourdieu or de Certeau tell us something about young people's potential responses – for example are young people in NRGTT discourse acting with a coherent 'moral habitus?' Boltanski and Thevenot place Bourdieu's habitus into the realm of the everyday moralist, as remarked on earlier in the chapter. Performing any act requires decisions to be made that are internally 'moral' (Boltanski, 1999; Thevenot, 2001). The moral as defined by Thevenot (1984) is a crucial, contemporary theoretical application to be considered, what he calls *pragmatic regimes of engagement*. A continuum of morality can be applied to a situation based on the contextualisation of that situation, where an individual may be required to make a decision to address a crisis or settle a dispute, from cleaning one's room to appearing in court (ibid., 2001). Simmonneaux (2001) analysed young people's discourses on biotechnology by applying Boltanski and Thevenot's (1991) justification theories - pragmatist 'orders of importance' in various worlds of economics, domestic life, and inspiration.<sup>39</sup> In practice theory, like Bourdieu's habitus, the subject is neither bound nor free, but enabled to choose a path within an infinite criss-cross of temporal and spatial highways, in collective and individual nodes that Schatzki calls 'sites' but unlike Bourdieu, chooses from a local or global range of moral justifications rather than a value-neutral stance. Actors may choose a position on NRGTTs based on their history, their cultural and representational habits learned over time, and practices of mind and body to form an identity within a debate. There is a dialectic between the actions and ideas of the young in the classroom and broader global and institutional concepts of biotechnology. This is the politics of the personal, in line with Giddens. Although Giddens does not see this identity-formation – tied to personal discovery in adolescence – as necessarily subversive for actors embracing the new force of life politics, I will report throughout this work, following de Certeau's tactics, examples of where a

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<sup>39</sup> In *On Justification* Boltanski and Thévenot (1991) argue that modern societies are the interaction of multiple orders in one social space, what they call *regimes of justification*, such as orders of the civic, the market, the transcendent, the domestic, the industrial, and fame.

subversive element may be emerging within the confines of the education system. The complex constraints on the habitus, according to Bourdieu, is a power constrained not by social position necessarily (although I will demonstrate this occurs also) but a cultural power bought by the strategies – and tactics – of actors.

Giddens remains true to the critical school<sup>40</sup> in that he rejects the postmodern notion of the fragmentation of self. For him, fragmentation exists as a cover, a potential collection of false selves in which the authentic self is sheltered. Globalisation, media and the physical fragmentation of the person through time, space, and biotechnological change can create this fragmentation through sequestration and the pursuit of self-identity means acting in a chameleon-like response to the surrounding cultural pattern and the actions of others. Having aligned myself to practice theories to remove a subject/object dichotomy, as addressed further in Chapter 3, for the purposes of this study I have to relinquish the postmodern and posthuman turn in science and technology studies, as embodied by Latour (2005) (and Schatzki (2001) in philosophy) on their recognition of agency in nature and complexes, rather than exclusively in the domain of humans. Similarly, the cyborg or posthumanist methodological route of science/discourse/ identity *a la* Haraway (1997, 2000) is not an immediate concern. The subjectivity and agency debates will rage on, but for our purposes here, my first *duty* as a qualitative researcher is to the participants. For life politics, agency must centre on some notion of life, and for me, this is embodied by the students and their response to life science pedagogy in the first instance, but also teachers and bioscientist speakers. Although ‘the sites of the social’ and the nexus of ‘arrays of activity’ (Schatzki, 2001, p2) that make up human/non-human complexes of communication within and around institutions are theoretically instructive descriptions, it is the agency of young to negotiate within these networks and find moral structures that takes precedence.<sup>41</sup>

In philosophy, the moral law of Immanuel Kant’s deontology is often invoked, particularly his second formula of the categorical imperative which dictates that humanity should be treated as an end in itself, not a means to an end. European ethical thinking on biotechnology

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<sup>40</sup> The normative and practical turn in critical theory from the competing positions of Foucault (bodies and practices) and Habermas (communicative action and practices) is brilliantly recorded in its historical context by Honneth (1991).

<sup>41</sup> There are also elements of the biopolitics of Foucault and an awareness of the macro nature/non-nature complexes of Callon (1987) and Latour (1987) in these arguments, although here I side with Collins and Pinch of the Edinburgh school of SSK, removing the symmetry - humanity is the central construct; there are many other epistemological problems to be addressed by others that are beyond human knowledge. While Callon, Latour and Knorr-Cetina address the posthuman/postmodern, their work within theories of practices is ultimately grounded in, rather paradoxically, the pragmatism of George Herbert Mead and John Dewey and the later school of symbolic interactionism (Schatzki, 2001)

has been drawn from various schools (Häyry, 1998a): *deontology* ascribes to a higher moral law; *teleology* is a purpose for humanity, religious or otherwise, and biotechnology therefore improves on or interferes with a final cause; a *consequentialist* approach either condones or condemns biotechnology on the basis of how it may help or harm humanity; *utilitarianism* strives for a universal altruism, either positive - maximum happiness should be achieved - or negative, that is minimum suffering for all; *liberalism* as applied to biotech decisions emphasises personal well-being as well as social mobility; or by contrast *communitarism*, (ibid.; Taylor, 1989) which states that identity and society can only be expressed in terms of community, that community today crossing space and time (ibid.; Giddens, 1991).

Habermas' (2003) observes how normative decision-making for NRGs that cannot be seen in terms of formal moral reasoning, similar to how de Certeau (1984) explains that decision-making ruses are needed, rather than formal strategies. The ethics of Kant or Rawls may not be to hand when a couple realise that a genetic disease is prevalent in the family and they are required to make a decision. A morality of the everyday seems to suggest itself rather than formal ethical guidelines (ibid), perhaps the practical consciousness of Giddens, the pragmatic regimes of Thevenot, or the everyday practices of de Certeau.

Choice is central to the ethical models described above. If choice is central to late modernity, as Giddens acknowledges, then market forces and consumerism hold enormous power. Liberalism and neo-liberalism would seem to be in the ascent. The desire to change the body through cosmetic surgery could be translated into genetic modification, or Habermas' (2003) *negative eugenics*, where desirable traits creep into the genotype through human agency. The traditional family formed by natural procreation may seem to be receding, but Giddens is not the only commentator to see elements of tradition remaining in the way we approach decision-making. The anthropologist Marilyn Strathern has said that although 'Euro-American' culture embraces an individualist, consumerist notion of genetic welfare with increased choices available to her, she also wants more *tradition*, using genetic tests to prove biological relations, for instance. The Euro-American wants more modernity *and* more tradition. Both worldviews may influence the strong feelings of self-identity and identity for the 'other' in young people when choosing sides on controversial NRG issues. Shilling (2005) suggests the body is fetishised, packaged, and marketed in modernity but the self is not a passive entity in this because of Giddens' (op.cit.) increased reflexivity and the salience of risk. The body is just another part of the pluralisation of modern lifestyle choices and can make choices to resist over-commodification.



When we look at the practice approaches of de Certeau, Bourdieu, Boltanski, and Thevenot then, the agent, the 'moral habitus' may choose a position on NRGTs based on their history, their cultural and representational habits learned over time and practices of mind and body thus form an identity within a debate. Choices are made, not always from stabilised, discursive reason. The mass media has a strong role in this identity formation in identifying 'pro-lifers', 'scientists,' 'governments', 'foetuses,' 'the unborn', 'embryos', and 'technologies'. How many of these new identities will be represented on emerging social media, the wikis, e-portfolios, on Youtube, iTunes, or Myspace?

Despite this repression of non-normative, moral concerns for issues of genetics and the body from the everyday, affluent homes and educational lives of the 21<sup>st</sup> century, it still makes its way back in though the mass media of fiction and entertainment. The next section further examines the role of media in decision-making about NRGTs.

### **Using film in discussions about identity, society, and NRGTs**

Turney (1998) describes how some scientists dispute what the reading or viewing public believe to be true science in fiction. This is a pointless argument, he says, and may lead to the reverse of the biologists' intentions. By protesting about the factual accuracy or type of language used, it becomes further discourse, thus crystallising terms such as 'genetic engineering' or 'designer babies.'

Others prefer to make the fact/fiction distinction clear. Petersen *et al.* (2005) tell us that news media draw on science fiction imagery when describing biomedical science but warns that the use of science fiction can 'sometimes make an informed awareness of precisely what is at stake more difficult. (p337).' There is some evidence to back this up. Press coverage of the Hashmi and Whitaker cases invites us to sympathise with the families (see Chapter 8). These two families needed PGD to produce a son to cure a sick sibling. We are asked in the storyline to hope that they will get legal backing for their plight, yet terms such as 'designer baby.' (p344) 'made-to-order,' (p348) and 'perfectly matched (p349)' are still used extensively tying in to a Huxleyian world.

The concerns from the science education community relate to how science is misrepresented in the context of what can be assessed in examinations. These concerns neglect the mediation

of all information. Such blurring of boundaries of fact and fiction is the essence of drama. *Oryx and Crake* (Atwood, 2003) blurred fact with fiction to paint a dystopian future to say something about how these technologies impact on human relations.

A collection of anthropological monographs edited by Hughes-Freeland (1998) presented accounts of what the fields of performance and media studies have to say about rituals in Western society and traditional social practices of the world. The suggestion has been that a new ethnography of active media consumption can borrow from, and be compared with, ritualised agency within non-mediated cultures. Similarities are drawn between active audience participation with television and performative audiences in non-Western rituals (ibid.). The sense of the social within a community or towards a society is further facilitated by a discursive medium, of which film is a prime example. Ødegaard (2003) used film to allow young people to make wider social connections with biotechnology and NRGTs so that it may 'enhance learning, by creating a learning situation that is significant in the lives of students'. While this may not be the place to debate learning enhancement, the concept of relevance of NRGTs to student lives can be analysed. Presenting a dramatic film before a culturally-specific (and actively engaged) target audience in this age of globalisation can allow one to trace the framing strategies of cultures, creating an interpretive space where the boundaries between realism and representations are blurred (Brown, 1998), and where students talk about what and how they know, and what it means to them.

Movies play a large influencing part in popular culture (Rose, 2003; Kalbian and Shepherd, 2003). The cultural themes of runaway technology and disruption of nature discussed earlier in the chapter are evident in *Gattaca* and *The Island of Dr. Moreau*, even *X-Men*, *Spider-Man*. Such curricula as 21<sup>st</sup> Century Science and STSE as described in a previous section recognise the power of narrative in teaching science as well as mass media (Zimmerman et al, 1991). Stories from the news media or entertainment feed into young people's culture as part of their out-of-school learning experience, or informal education. Young people make their own assumptions as well as peer-informed collective judgements on biology and stories and creativity can assist them in engaging in debate (Ødegaard, 2003). Teachers also want training and resources to be able to deal with such subject matter in a creative way, informed by the humanities (Levinson and Turner, 2001). A UK report into the use of discursive and narrative activities in science subjects concluded that teachers have an urgent need for support materials for pedagogy such as video, multimedia, worksheets, visuals, slides, posters (ibid.). Yet there can be suspicions about other facets of a narrative package, not just about quality or content. Teachers – correctly – show a critical awareness of commercial single-

issue websites and video, perceived as 'propaganda' (ibid.). However, they also perceive a barrier to understanding a humanities-based approach (ibid.)

Although media can be used as 'stimulus' for discussion in the classroom (Solomon, 1992), we have a complex, intertwined relationship with all media in late modernity. As Gamson cautions us, we should not think of the media in terms of a way of initiating thought:

Rather than thinking of [the mass media] as a set of stimuli to which individuals respond, we should think of them as the site of a complex symbolic contest over which interpretation will prevail (Gamson, 1992 , (xi)-(xii))

Where Boltanski (1999) warns of the distant morality in watching media and Tester (1998) explains how TV raises an event to the social, the blasé, allowing us to talk about it but leading us to either a 'concern without action or discussion without engagement (p96),' film, narrative, and stories nonetheless link those experiencing them with a wider social world (Nisker and Daar, 2006). In education, this is a link between external issue cultures and the life political ideas in classrooms.

All fiction – all storylines – are necessary explanatory and sense-making devices. Our theoretical representative from the foundational practice literature here is de Certeau (1984) who speaks of 'spatial stories' (p115) connecting webs of 'literature' - now all media - and experiences in the application of everyday practice. Our theoretical approach here follows this view of popular culture. Qualitative researchers are *bricoleurs* - as all human beings are - making sense by assembling 'compilations' of 'previous stories,' refitted in 'makeshift fashion (ibid, all p122).' As Ødegaard (2003) notes, theatre and theory have the same Greek etymological root, *therein*, which are dramas of everyday situations. She talks of a reflexive, rather than experiential or presentational, form of theatre that allows audiences to engage in science and she facilitates extra empowerment of young people by directing plays created by students and drama teachers in the style of Ibsen on public and student attitudes to biotechnology.

Fiction offers a safe environment to explore choice and decision-making on reproductive issues. They can be abstract: Will society be negatively impacted on? Can a known life take precedence over abstract notions of the living? They can be concrete: Will NRGTS alleviate pain? Will they save lives? Participants can make identifications, identifying with characters,

their lives, their stories, their pain thereby identifying with *others*, including the underrepresented or the disadvantaged, as well as with narratives of scientific progress.

It is all the more important that young participants are in a comfort zone where they do not feel vulnerable in presenting their views, or threatened by other participants. Film drama is currently used as a tool for presenting scenarios on genetic disease, with real or fictional people, to study the control and maintenance of genetic and predictive information (Nisker and Daar, 2006). This is becoming more of a concern to those clinicians, educators, and researchers looking at the ethics of power relations in this area (ibid.).<sup>42</sup>

### **Problems with culturalist perspectives**

This study uses ethnographic methods of inquiry, examining the cultural borders of the 'field' (schools) and the 'intervention' (film and discussion activities). There are problems associated with defining what we mean by 'culture' in an ethnographic work that traces emerging demarcations in local groups. In a new ethnographic paradigm (Lincoln and Guba, 2003; Marcus, 1998; Moores, 1993; Roth, 2003, Thomas, 2003), there are methodological and ethical difficulties in creating such distinctions between the practices of a detached observer and the observed. As Strathern (1997) remarks, 'culture' is very often a synonym for 'difference' in sociological research, and in the context of science education, culture can mean a minority custom requiring barriers to be removed if they impede scientific understanding. A mediated world, Strathern tells us, heightens this crisis in understanding localised culture, even in her own field of anthropology. Information and ideas constantly stream from all media sources to all parts of the planet. She reminds us that to hear a Chinese woman's misgivings about an NRG topic such as IVF is not necessarily to hear Chinese culture's misgivings. It might be a woman's reaction to medical knowledge or clinical practice, albeit with a localised argument based on local practices. Often views expressed by such a woman are in the language and terms of reference of scientific discourse itself, from within the culture of science, not a 'minority' culture in global terms (ibid.)<sup>43</sup>. Strathern

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<sup>42</sup> The details of cancer suffering can be brought back into discourse through such powerful films as Bergman's *Cries and Whispers* (1973).

<sup>43</sup> Describing the practices of the 'other' has come a long way since the colonialist descriptions of savages by Malinowski (1922). Modern ethnographers working in the qualitative paradigm study various discursive and linguistic contours of a culture (Marcus, 1998; Kalocsai, 2000)

recognises that these terms may be a common language formed by a new culture, a pan-global media culture of high modernity described by Giddens (1991).

There is a standard definition of culture in multicultural science education literature which follows a progressive line from Aikenhead (1996), Phelan *et al* (1991), and Costa (1995). Culture is described in these anthropological studies as the 'norms, values, beliefs, expectations and conventional actions of a group' (Aikenhead, 1996, p8). These educational theorists draw on Geertz (1973). Although Geertz is the most culturalist of ethnographers, paradoxically the model applied to young actors by these theorists sometimes assumes a degree of tangible knowledge tied up in heads and too easily explained away by 'beliefs' and 'worldviews,' as I will revisit in Chapter 3, In this work, my philosophical standpoint adopts a practice theory approach. Schatzki (2001) uses another, more exalted, lineage from social and cultural theory - Bourdieu, late Foucault, Charles Taylor, to Latour and Giddens - to argue that the norms and conventional actions of practices are all that can be observed, engaged with, or reflected on. The common regimes of understanding applied to moral judgements, as described by Boltanski and Thevenot (1991), and elements of ethnomethodology (Garfinkel, 1967) also come under this composite social theory (described in detail Chapter 4, where de Certeau's practice approach is also added). This definition of culture describes how bodies and activities interact without falling into the object-subject debate. Thus, science industry culture describes methods, processes, skills, and common standards (Buxton, 2001), whereas mass media culture describes events, personalities, or identities, such as 'scientist' or 'pro-life'. Culture is seen as a set of *practices* rather than beliefs or values (Schatzki, 2001; Reckwitz, 2002). Biology class itself then is represented as codes of practice and the interventions to biology class described, such as the experience of introducing films, discussion, or scientists to school, are constitutive of how these cultures are negotiated. These processes of negotiation used by participant schools in their exchange of ideas about genes, embryos and society and in portraying themselves as forums for social discourse will be examined in later chapters.

## **Conclusions**

This chapter addressed a research problem and a range of connecting theoretical developments - that are not without their tensions - of how young people connect with moral issues of NRGTs in education. The problem addresses how and why young people should

engage with, and indeed struggle for, the global issue cultures of NRGs within the local of biology education. Issue culture here means the ebb and flow of news stories and entertainment images that contribute to the development of self-identity in late modernity. It is entirely possible that young people can contribute to the mobilisation of opinion with a potential to become a political force, in line with issues as global warming, the death penalty, opposition to GMOs, or embryo research. This type of politics is *life politics*, an agency in which individuals' self-actualisation of identity and lifestyle can impact, and be impacted, on wider cultural domains in a mediated world. The concerns about biotechnology continue to oppose the dominant commercialised paradigm. The commercialised is inseparable now to the cult of DNA (Nelkin and Lindee, 2004), where genetic explanations can also lead to genetic treatments, and are tied to cultural themes of *progress*. Within an Irish context, the turn to biotechnology and its public and educational salience has not learned from models of science communication and public engagement in other countries. I have thus set out the research problem through literature review – and how it might be addressed – in this chapter into two main areas of activity, that can also be seen as both global and local.

First we must acknowledge that genetics has become a cultural phenomenon in movies, games, literature, and in our day-to-day rationalising. Arguably Shelly's *Frankenstein* (1818/1994) created a trope of fear towards how technology can create monsters. Other connected fears about 'playing God' and interfering with nature are also prevalent. These concerns run counter to a prevailing wisdom in an Irish and global context of biotechnology as a progressive medical solution; yet Giddens' (1991) notion of life politics suggests that within this paradigm of diagnostics and treatment, the anxieties and concerns will eventually push their way onto the agenda. This is what might also occur in school biology classes, another institution of modernity. Institutions that do not address these concerns are holding on to a modernist ideal that fits into the Enlightenment era, but are struggling in the fractured world of late modernity.

Secondly, we must address the sites of education themselves: schools. The Leaving Certificate syllabus represents the *formal* curriculum, whereas film, games, family, friends, politics and external cultural references provide the *informal* curriculum, or the *hidden* curriculum. The Transition Year programme is, for many schools, a connection between these two types. The Leaving Certificate was reformed in 2002 to allow teachers to engage with media frames and popular discourse, often described as being packaged as particular issues of concern to suit media culture and containing content with a public salience, that is, a public relevance (Gamson and Modigliani, 1988). However the practices of science education

research and science education have remained with a certain positivist legacy from the natural science paradigm. Film and other media have been used in science education though as a means of 'learning science,' rather than allowing students' own sense of values and morality to align fictional modes with scientific facts. Science educational research, similarly, tends to use strategies of conceptual change to entice young people, using science as the dominant discourse, as a set of facts to be learned.

Certain issues are embedded culturally, such as 'gene talk', (or 'popular wisdom', that Gamson (1992) sees as being common to all conversations) and will have more salience and make more sense to people from their moral and epistemological perspectives than others. In not addressing a cultural aspect of biotechnology then, the education system may fail to realise the salience of NRG T issues that bioscientists and opponents of NRG Ts utilise through the media

Theoretically, the main arguments of Giddens were defended in this chapter amongst other writers within a broad practice theory of discourse such as de Certeau, Bourdieu and Foucault. Methodologically, the framing strategies of Goffman and Gamson, among others were considered, as well as boundary ethnographies of late modern institutions and spaces involving media. The following chapter addresses the theory-methodology dialectic of this thesis in more detail.

### **Chapter 3: Strategies and tactics: a practice methodology for using film and discussion in the socioscientific classroom**

Of all the things everyone does, how much gets written down?

Michel de Certeau (1984, p42)

Now that the research problem has been defined and literature mapped, let us look more closely at the research inquiry itself and the instruments used. De Certeau's quote above draws attention to a certain loss of detail and meaning en route from field to page in qualitative research. With this in mind, theory and practice are linked here. The qualitative approach taken did not require that a theory be formed and an array of methods devised to inquire about this theory. As stated before, theory and practice are in a dialectic relationship that has been termed a 'practice' approach.

This chapter addresses a critical ethnography of how meanings about NRGTs are articulated using contemporary practice theory, in this case the practices of social interaction between schools, external speakers, and media. The approach is derived from the interpretive or pragmatic turn in a symbolic interactionist type of social theory,<sup>1</sup> embracing a mid-point between structure and action, what Giddens (1984) calls structuration, and what Bourdieu might call 'constructivist structuralism' (Chouliaraki and Fairclough, 1999, p1, quoting Bourdieu and Wacquant, 1992, p11). Rather than 'beliefs' or 'attitudes' about NRGTs, the subject of many other studies, the structural here addresses how structural forms of communications processes are represented in the voices of the young. The ethnographic study is practice-based, yet addresses a contemporary form of critical theory, that is both description and emancipation of the struggle of young people in contributing to local and global discourse and some of this struggle may have class, ethnic, gender and other implications. This structural, contemporary practice approach to social theory thus also

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<sup>1</sup> Symbolic interactionism is considered to have begun with Blumer (1969) but influenced by Mead and the pragmatic school.



acknowledges the influence of cultural studies in late modernity. Giddens' life political decisions for young people are described against a backdrop of practices and resistances in 'mediated' modernity, what de Certeau (1984) calls the *strategies* of power and the *ruses* of manipulating that power through performative action. A methodology is applied here which draws from Goffman's and Gamson's contrasting notions of framing in collective and individual discourse from media representations and Goffman's performances of the self in discourse.

The 'media' here include film, discussion, debate, and presentations, the rationale of which is described in the first and last sections in this chapter. The first section also deals with the temporal development of this work, theoretically and methodologically. The second section addresses thoroughly this work's interaction with theory. The rationale for including the sample schools in the study is explained in the third section. The chapter then approaches the ethics of including young people in a study such as this. Finally, the last section of the chapter describes separately, for reasons of clarity, the methods by which data was accumulated during the ethnographic field work. It must be stressed once again that the development of media and data collection materials is also structural, in that they are linked to theory in a dialectic way, and this is described throughout chapter.

### **Theory and practice: media selection, methodological criteria, and the development of inquiry**

Giddens, Beck, Lash, Wynne, Fairclough, and Bauman, among others, view late modernity as having the accelerated experience of ICT and popular media which brings about both a compression of time and space and consequently also, a separation of these two concepts. The social world contains both past and present, both local and faraway. However, for narrative purposes, it is worth recalling here the theoretical development history and interconnecting methodological choices. Space, as described in Chapter 4, and time are crucial to ethnographic research (Fiske, 1994). The story of these research spaces begins with the gathering of background material in late 2002-2003, continues through to the pilot (run between November 2003 to April 2004) and the last empirical work in October 2005, and ends with the finished thesis in 2007.

In some ways, as a project which addresses the social and the cultural about biology education, it represents a tiny fraction of social interaction inquiry among the many natural sciences projects funded by the Higher Education Authority, more usually concerned with diagnostic and treatment processes. From this perspective, it could be argued that the thesis uses the empowering notion of qualitative inquiry. Habermas might see the institutional and cultural reflection of a study like this as essentially positivist, in the context of the recent contemporary Irish history of technoscience and commercially driven rationale of 'busnoscience' out of which the research was derived (Marshall, 1995; Bauer *et al*, 2000, citing Habermas, 1987), as addressed in Chapter 2. The argument here is from another direction however, a position consistent with science studies. After Nowotny *et al*'s (2001) Mode-1 science - categorised as the 'traditional', detached, objective search for truth - we are now in what she terms a Mode-2 society where a more socialised, reflexive, uncertain, granular process of science and technology diffuses the concept and action of 'science' throughout society while still valorising it. To look at any interaction between university science, cultural frames, and educational practices at secondary level is to accept that politics and bias is present, whether power relations between teacher and student, or the current status of Nowotny's Mode-2 science itself in its relationships with society.

The focus here, very basically, is the boundaries between science, education, and society. This focus then contributes to how the humanities in Ireland and elsewhere investigate the structures and power of science and the rest of society. As discussed in Chapter 2, in the wider debate I had become concerned about how embedding socioscientific issues within the larger institutions of modernity within the study - biotech and schools - diminishes their role to the 'social' or 'education and outreach' in biotechnology discourse. However from early in the research, I was satisfied that a potential outcome from the activities presented to teachers would serve this modest support role; for many schools contacted during this research, socioscientific discussion was previously non-existent.

The project inquiry shifted considerably from a mixed methods approach at the exploratory phase to a qualitative model in the research phase. An ethnographic inclined approach provides richer detail of meaning making about NRGTs in a school context, particularly with tools that may have been new to science students in a formal science education setting. Additionally, six schools were selected from a pool of nine that participated in the pilot (the rationale for selecting the six schools is further outlined in Chapter 4). The remaining three schools and others were intended for a wider DCU/NICB outreach strategy. This 'narrow but

deep' approach using fewer participants facilitated ethnographic inquiry in contrast to other studies such as the ROSE international study (Schreiner and Sjøberg, 2004).

The pilot study, carried out between November 2003 and April 2004, and reported in more detail in Chapter 5 in the context of entering the pedagogical research field, was a further convincing case for exploiting potential in the amount of conversation and more formal discourse that came out of classroom discussions in particular. Young people wanted to talk about the ethics and moral issues faced by NRGTS. They wanted to see this context to biology education. During the pilot phase, among resources I offered to teachers were science news analysis, ICT, articles on stem cell research, materials from the European Initiative for Biotechnology Education (EIBE), and a *Windows on Life* CD-ROM on genes and society given free with the *Sunday Times* (which was referenced by teachers at conferences over two years later). Each of these activities was supplementary in nature, offering extra socioscientific detail. A research interest however became the pedagogic interaction involved in *using* the content of these materials as a means of awareness of socioscientific decision-making and addressing young people's pre-political perspectives on NRGTS.

The lesson plan of Table 3.1 was distributed to pilot schools. The discursive nature of the film and the bioscientist visits were important factors in the decision to use them as the key methods allowing the research to trace images of science constructed by students. Driver *et al* (1996) developed this discourse of 'images of science' among young people. A common element of the evolving theory and methodology was an interest in the students' constructions of biotechnologies in society. Driver *et al's* seminal work proposed three socioscientific representations of the nature of science as young people may perceive it: (i) *science content*, that is the laws, concepts and theories (ii) the *scientific approach to enquiry* - the scientific method - and (iii) *science as a social enterprise* which is the public and private encounters between scientists, the public and policy-makers. These have since become central representations for science-and-society educators, and have been presented by Sjøberg, and a particular European view of science education, as (i) science as *product*, (ii) science as *process* and (iii) science as a social institution in society (Ødegaard, 2003 citing Sjøberg, 1998). These may be unsatisfactory categories however when accounting for young people's *experiences* at the science/lifeworld interface. However, as organising schemas about how young people *spoke about* science, these three representations were a useful first step. Recorded data was coded to differentiate schemas relating to 'informed science

**Table 3.1.** The lesson plan provided to pilot schools that included pedagogical intervention and data collection activities.

| Activities  | Class Duration                    |
|---|-----------------------------------|
| <b>ACTIVITY 1: FILM – FULL CLASS</b>  | Double class period (1hr 20 mins) |
| <ol style="list-style-type: none"> <li>1. <b>Show video (40 -60 mins)</b> - <i>The Gift</i> (1999) by Y-Touring Company or <i>If ...cloning could cure us</i> (2004) by BBC</li> <li>2. <b>Warm-up discussion</b> about the film and questions to participants about media reporting of genetics and society.</li> </ol>  |                                   |
| <b>ACTIVITY 2: FILM DISCUSSION ACTIVITY – FULL CLASS</b>  | Double class period (1hr 20 mins) |
| <ol style="list-style-type: none"> <li>1. <b>Play summary</b> of video.</li> <li>2. <b>Video discussion questionnaire.</b> Eight statements or points of view relating to the film’s characters will be handed to each participant with corresponding ‘Likert scale’ of agreement for responses (‘Strongly agree’ ‘Agree’, ‘Neutral’, ‘Disagree’ and ‘Strongly disagree.’) The students are asked to fill out the questionnaire, then position themselves along a line running across the room, corresponding to their responses. Individual students will then be picked out to explain why they hold that view. Students will be encouraged to argue their case in a fair and non-threatening environment. Students are then asked to change position on the questionnaire, if their opinion has changed given the preceding discussion.</li> </ol> |                                   |
| <b>ACTIVITY 3: BIOSCIENTIST SESSION– FULL CLASS</b>   | Double class period (1hr 20 mins) |
| Biotechnologist visits to schools   |                                   |
| <b>ACTIVITY 4: INTERVIEWS – 3 PARTICIPANTS</b>  | 30 mins each (1hr 30 mins)        |
| Three participants representing the following views will be chosen for in depth interview (see <i>Data collection</i> for selection criteria).  |                                   |

content,’ ‘technological progress,’ or ‘experts.’ Pilot data analysis contributing to the master’s-to-PhD transfer report and subsequent papers (Murphy 2004, 2005a, 2005b) drew from these representations. Part (iii) above was then developed further to include the schema *science as nature, identity, and society* (ibid.), a discourse about biology with respect to human nature and society containing many different themes. This approach brought the inquiry closer to a phenomenological study of inner experiences of NRGTs, inspired by Heidegger (1962; Kozoll and Osborne, 2004), Husserl (McCarthy, 1992) and Habermas (1992) - who described ‘lifeworld’ as a system of values and experiences that define choices and ways of acting - as well as Garfinkel’s (1967) ethnomethodology. Could phenomenology capture the experience of NRGTs in children and young adults? Personal stories about society-identity-biology is an important topic in therapy, particularly for themes such as

sexuality or adoption. However such studies require training for the researcher in dealing with personal trauma and intense experiences, which is rarely the case for NRGTs and young people. *Science as nature, identity, and society* required more refining.

The first major theoretical shift then occurred. The concept of 'identity' seemed to inspire the inquiry and open up a multitude of avenues.<sup>2</sup> I had included films such as *Gattaca* (1998) on initial lesson plans to teachers as stimuli for discussions around themes about future genetics and society. By narrowing the biotech scope to identity (social, personhood, embryo) in NRGTs represented in film and in presenter's talks, potential rich research data emerged. However it was the decision to screen to pilot participants *The Gift* (1999), a film by Y-Touring, with accompanying follow-up discussion activities involving physical movement of participants and peer interaction which became the defining step on the road to local performative actions in discourse about NRGTs and identity (for a more detailed chronological outline of *The Gift* narrative, see Appendix C and Chapter 3). Identity was a core theme in *The Gift*, and articles by Stuart Hall, Marilyn Strathern, Sarah Franklin and Kozoll and Osborne (2004) among others inspired a search for the cultural aspects of identity and the biosciences. Yet following the Pauline conversion from the more positivist notion of 'opinion' to the cultural arena of identity came the daunting realisation of how large an area this would encompass, even when applied to the biosciences. Three notions of NRGTs and identity were identified and although they were too large in scope to be considered together, they were informative to the study:

- (i) *genetics and identity*: the concern within both the natural science and the humanities that sociology is being replaced by biology as an explanation for human behaviour and human affairs (Nelkin and Lindee, 1995; Strathern, 1996; Lewontin, 2001; Rose, 1997) which also overlaps with social discourses within Bruno Latour's (1987) complex web of scientific processes around actor-network theory (ANT) (Michael, 1996, citing *ibid.*);
- (ii) the *identity status of the embryo*: how new technologies add to the debate defining not just what humans could be but what life actually is; and
- (iii) *social identity and representation*: how people choose a position on NRGTs based on their history and background, their culture, and media-created identities

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<sup>2</sup> I am grateful to interaction with staff from the School of Communications, DCU for assisting this theoretical breakthrough.

such as 'pro-lifer', 'scientist,' 'government', 'foetus,' 'unborn', 'embryo', and this representation forms an identity within a debate.<sup>3</sup>

Part (iii) set the preliminary theoretical and methodological focus for the study. Simmonneaux (2000), in particular, noted how biotechnology students and teachers use discourse to create identities (see methodological criteria below). One student response from the pilot which stood out was a desire to learn biology because it was 'closer to the body.' Although I was following this student's advice, philosophical structures were entering the inquiry – how *created identities in the classroom speak about creating identities in the lab.*

A second theoretical shift addressed a reflexive critique of theory itself. The critical theoretical approach of Giddens on self-identity (1991) provided a compelling case for grounding the research. Contemporary social theory does not tend to apply a grand narrative to data interpretations by placing them directly into the context of Marx, Durkheim, or Weber, that is the data is proof of either structure or action (see the main texts here of de Certeau (1984) and Chouliaraki and Fairclough, 1999 as well as Boltanski and Thevenot, 1999; Schatzki, 2001; Reckwitz, 2002). An alternative theoretical choice might be cultural studies. Giroux (1997a, 1997b) asks that a contemporary social theory address the cultural, particularly in pedagogy. Yet a wider structural context needs to be placed around these six schools and NRGTS decision-making.<sup>4</sup>

In developing my theoretical construct around the notion of life politics in pedagogy using media, I also draw on other aspects supporting Giddens' structuration theory such as the *sequestration of experience*, the removal of the uncomfortable from day-to-day practices as described in Chapter 2. Many other theoretical structures could have been considered for NRGTS and social identities in education including:

- cultural identities and NRGTS, bringing in cultural studies and the anthropological work of Hall and Strathern;

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<sup>3</sup> The feminist approaches of Strathern, Franklin (1995), and McDonnell, (1999) may also have been applied as well as a potentially fruitful cultural studies approach drawing on subculture and identity among young people (Hall, 1992; Becker, 1973).

<sup>4</sup> For assistance on this theoretical focus, I am indebted to Dr. Pat O'Mahony, Department of Sociology, University College Cork.

- multicultural science, a growing area globally in science education which informs most of the work here, as exemplified by Solomon (1987), Jegede (1994), Aikenhead (1996), and Cobern (1993);
- the ‘multiple worlds’ theories of Cobern (1993) and Costa (1995) in STS education and Phelan *et al* (1991);<sup>5</sup>
- actor-network theory (ANT) and the nonhuman identities of Latour, Callon, Knorr-Cetina, and Michael (Michael (1996) and Michael, *et al.* 1997) provided early central reading)
- the critical pedagogy of Paolo Freire and Henry Giroux and how a sense of citizenship and social and cultural empowerment may be brought to biology;
- the positioning analysis of Harre, van Langenhove and Davies.<sup>6</sup>

These theories, although potentially linked to practices, do not provide a robust enough combination of the sociological and socioscientific in boundary work that occurs in practice theory as advanced by Schatzki (2001) in *The Practice Turn*. In the broad family of social theory or theories that emphasises the importance of practices, Giddens’ structuration theory is principally aligned with the writings of Harold Garfinkel, Pierre Bourdieu, Charles Taylor, late Michel Foucault (as drawn together by Reckwitz (2002)) but also Erving Goffman, Michel de Certeau, the combined and individual work of Luc Boltanski and Laurent Thevenot and, to a lesser extent, Bruno Latour and Karen Knorr-Cetina). The line traced across these wide disciplinary positions also goes back to Wittgenstein and further back to Weber (1963). Many of these writers, especially Boltanski and Thevenot, look philosophically at the principles of *moral action*, a concern in sociology since Weber. In this contemporary theory, practices have a moral character, whether everyday practices, media viewing or engagement practices, or practices in formalised debate. As I heard more voices from the classroom, it was not enough that I report back a detached map of what they were saying. The action in *saying* must be recognised. I needed to side with them.

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<sup>5</sup> Costa’s typology, although formative for this thesis and has potential for high level inclusionary methods in pedagogy – it was used by Shreiner and Sjoberg (2004) for analysis of the inter-European ROSE results - might further demarcate student identities by concretising stereotypes eg ‘the outsider,’ ‘the scientist’ etc.

<sup>6</sup> Positioning theory is what Harre and van Langenhove (1999) calls ‘paying close attention to the local moral order, the local system of rights, duties and obligations, within which both public and private intentional acts are done (p1).’ Positioning places a moral order, a status, onto speakers and depends on the social force of a determinate speech act and its ‘storyline.’ A first-order speech act is ultimately performative, happening live, without recourse to previous utterances. A second-order utterance is a revision of the first-order, and a third-order may be accountative, describing previous first and second-order speech. Positioning of self in a discursive practice implies a positioning of speaker and addressee and will have an internally moral character eg ‘Have you not done that yet?’

Although this may seem a highly theoretical concept, embodied practices can be traced across classrooms. In pilot workshops using *The Gift*, I became aware of the performative nature of young people as they debated NRGTT decision-making and clashing worldviews based on the drama of the film. This film dealt with pre-implantation genetic diagnosis (PGD) and screening embryos and would form the basis for the follow-up discussion elements on a broad range of issues around the research questions: modern genetic technologies in society; nature versus nurture and young peoples' ideas of biology and the biological basis for life; social policy and the biosciences; and the use of video and discussion in biology class.

The research perspective therefore evolved from the cognitive (internal images), to the social constructivist (social constructs), to practices of discursive identities (social practices in identity-formation). A broad theoretical framework thus developed alongside a methodology involving young people's representations of NRGTTs in classroom discourse and pedagogical response.

I will now set out the criteria, both methodological and pragmatic, with which decisions were taken in choosing the two sets of activities, the film/discussion using either *The Gift* or *If...* and the bioscience sessions:

1. *Positioned bodies and argumentation*

The use of *argument* as a method driving data collection – it is how social practices define controversy and invokes passionate responses – leads to a defining of an issue within the social world of a classroom. It is an interpretive practice, used since the *agora* of ancient Greece (albeit more structured) where the classroom as a whole makes sense of an issue, sometimes exclusively to how the rest of the world perceives it. The aspirations for a 'critical pedagogy' as Giroux defines it also inspired me, a pedagogy that encourages young people to look at the background kaleidoscope of culture even when learning the seemingly detached, objective disciplines of science. Argument is also part of Nowotny *et al*'s (2001) ideals for a modern *agora*, the socialised science in an open space where publics have their say about technological development.

Chapter 2 explained how Toulmin's (1972) methods of argumentation are used in classrooms to argue socioscientific points of view. A seminal book by Toulmin, *Uses of Argument*



(1958), is often quoted as an exemplar of how students can be equipped with practical reasoning skills using argument (Simmonneaux, 2001 and Jimenez-Aleixandre, *et al.* 2000, both citing Toulmin, 1958). Kolstø's (2001) classroom model uses inductive analysis, placing emphasis on students' acceptance or rejection of accepted knowledge claims of science and of scientists as sources of information. These methods have common ground in that they tend to privilege the acquisition of scientific information, focusing more on issues of plausibility and less on the contextual information students bring into discourse. Driver *et al* (2000), describing Toulmin for genetics and society problems, criticise how the scientific subject matter of a socioscientific argument dominates, as does sequential reasoning, which can be unrealistic in real-world decision-making.

Role-play is also a common argumentation tool in classrooms. For example by Democs (2006) the UK think-tank for social and scientific issues uses a card game to role-play NRGT issues. Although there was scope here for a role-play, the concept of a 'role' itself was not adequate for the actions of young people in these discussions. In the final discussion method, a series of statements corresponding to film character's actions were called out to participants and students were asked to defend these decisions. A role-play may have asked participants to choose another character's position, thus exploring multiple perspectives. However, I took Davies and Harre's (1997) concept of *position* rather than role, following their progressive move away from Goffman's pre-scripted characterisations that people follow, to give them a more flexibility to manoeuvre their loyalties (see Chapter 5) . These were less static, more subject to immanent thought and action, yet were still inevitably tied to 'outside' discourses. Asking young people to deliberately change allegiances would have forced them into role-changes, forced them into 'play'; it was better that this occurred spontaneously as part of their performed 'beliefs.' There is merit in role-play debate; however as a forum for airing views that participants might consider personal and their own, the film discussion was a better platform.

Film became not only a discussion trigger for classrooms but provided both stimulus and 'space' for critical engagement on NRGT decision-making. The discussions following the film in particular allowed the students to work out many facets of ordered discourse on the issues but also explore some tacit contributions to discussions that were not reasoned – thus their feelings, emotions, and logic. *The Gift* is a package, a resource with an accompanying website with extra details about characters and concepts and a teacher pack (*Gift teachers' resource*, 1999). One activity from this pack, 'Activity 3: Your points of view' became the core argument tool, with certain quantitative possibilities. As described in the Methods

section later in this chapter, participants were asked to position themselves on the floor relative to their scale of agreement with a character's decision in the film. I piloted this activity, containing eight statements in a Likert scale formation of degrees of agreement, using it initially as a 'survey of positions' to be completed after discussions around each statement. Although the performative nature of the arguments became a strong theoretical foundation - the localised, gendered power of debating identities - I eventually opted to ask participants to fill out the questionnaire prior to debating, and then complete a second Likert scale row underneath for each statement, should they have changed their mind following each discussion. This provided a focusing mechanism for individuals rather than quantifying opinion-forming separate from the power play of debate where peer dynamics were inevitable as observed through note-taking and audio recordings. In addition, another BBC drama documentary about embryo stem cell research and cloning was piloted, *If ...Cloning Could Cure Us* (2004), with a discussion activity redeveloped from *The Gift* (the debate survey statements). Bioscientist presentations also proved to be a very popular activity with pilot participants, both teachers and students. The strength of the discussion activity was evident throughout the pilot, watching young people employ various 'performance' strategies as they chose positions of agreement, pre-formed, pre-political ideas. In some schools, none more so than LH, there was, to quote Latour, 'this vague word 'discussion,' borrowed from the fracas of human assembly (Latour, 2004, p62).'

## 2. *Representing young people's voices against wider cultural understandings*

A further context for both the theoretical and methodological development of my work is the practices and classifications of 'gene talk' in biology as a topic or subject co-produced<sup>7</sup> by students and teachers in secondary schools and the informal links used in knowledge strategies from a media communication culture that the biosciences are themselves involved with. An example of this is how commentators, scientists, and journalists in the media and popular discourse talk about genes and embryos using narratives and references to identity *and* social identities (Jones and Salter, 2003; Kalbian and Shepherd, 2003). Genetic explanations for behaviour, disease, intelligence, and identity itself have been argued, particularly since the most recent biotechnological paradigm, the Human Genome Project (HGP) (Dawkins, 1989; Wilson, 1992; Pinker 2002; Prens, 2004). Yet genetics and genetic technologies are ways of knowing oneself that is part of the disembedding mechanisms and global opening out in modern self-identity that Giddens (1991) describes as allowing greater control over social relations and social contexts. Ethnographic writing and frame analysis

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<sup>7</sup> See Chapter 1 on Jasanoff's idea of co-production.

were eventually chosen to interpret these cultural patterns (see Methods below). These methods were preferred over conversational analysis – which concerned more with everyday speech and the mechanics of turn-taking, as is positioning analysis (the debates here were formal and rhetorical forms of discourse and can be linked to external debates) and critical discourse analysis (CDA), a more linguistically-oriented discipline evolved from critical theory. The methodology that eventually evolved distinguished between those spaces where power exists and those where it is less important to the research question. The practices of socioscientific discourse may not always, I concluded, contain power play dynamics in the critical sense.

### 3. *Representing science as an institution to young people*

It was mentioned in Chapter 2 how I became involved in ‘education and outreach’ at the NICB by voluntarily setting up the activities described here and exploring dialogue and bioscience communication models. It was a crucial decision to introduce a ‘live presentation’ element into schools, not least because of how these young researchers took to negotiating at the interface of institutional science and pedagogy, but also, in their own unique ways, increased data collection procedures of biotechnology, identity, and life-planning in terms of career in contemporary Ireland. In addition, bioscientist presentations received a positive response from both teachers and students at the pilot stages.

### 4. *Thick description*

Although I classify this research as being within the qualitative paradigm, I needed to follow an established discipline within this paradigm. Creswell (1998) advises in qualitative research to, first of all, choose a tradition. I am privileged that I can carry out my work in the interdisciplinary School of Communications. Yet care is needed to negotiate disciplinary boundaries while carrying out ‘boundary work.’ Classic communication theory might not address the interaction between practices and institutions, that is, between the student and teacher worlds and the visitor’s disparate world of social and natural science research; education theory might focus on issues of conceptual change and pedagogic practice itself over wider social concerns (although Vygotsky, Lave, and Wenger could inform, to some degree, earlier practice theory approaches to social/educational action). From the earliest visits, I took notes and made cultural interpretations of schools. The ethnography as applied here has a strong tradition – Bourdieu, Rabinow, Clifford, Marcus, Van Maanen, and the

'thick' and 'thin' descriptions of Geertz and Willis.<sup>8</sup> Once an ethnographic methodology emerged that privileged discussion-based practices over physical objects and rituals, the wider domain of discourses needed a focal point. Two methodological branches are united here, and explained further later in the chapter – 1) the embodied, performative practices in schools, (pedagogic practices) and 2) their relationships with Gamson's issue culture in media and conversation, specifically HESC research and PGD (mediated life politics issues).

Regarding data analysis, schema analysis, semantic networks, mental maps, and folk taxonomies were considered to make sense of young constructs or 'semantic networks' (Ryan and Bernard, 2003) in the field studies. A typology in this approach would be a sense-making map of what young people understand about themselves, about genetics, and about society. For reasons that are explained in the Methods section below, I chose frame analysis to further bolster Ryan and Bernard's schemas. This is a type of discourse analysis taken from sociolinguistics as Gamson (1992), Gamson and Modigliani (1989), Benford and Snow (1988), Boltanski and Thevenot (1999), Eder (1996) and Van Dijk (1985) utilise it in their analyses, simultaneously analysing text and the discursive strategies (and ruses following de Certeau (1984)) of actors. Although commonly used for the actions of social movements such as pro-life or environmental groups, frames offer a discursive theoretical approach consistent with media communication theory and cognitive theory.<sup>9</sup> Wittgenstein looms large – in common with much discourse theory – as do Goffman's game-playing theories. Yet a study of performance needed to allow room for agency – the participants are actors rather than subjects and as Honneth also points out, 'an action is not mere carrying out of a rule' (Jenkins, 1992 p18).

There is a constant tension between reporting (ethnography) and relating synthesis back to its surroundings (social/cultural theory). The critical element of the research grew in the interplay between these spaces. The study was never going to be 'mere reporting.' A critical,

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<sup>8</sup> Ethnography has evolved from positivist social science methods where 'facts' were revealed about a local culture. Traditionally, this ethnographic process involved a 'chaining process' whereby key informants were selected for study and asked to identify other key members of the community to whom the ethnographer should turn her attention next. Contemporary ethnographic studies however tend to use multiple perspectives to produce a *Rashomon* effect (Wolcott, 1994), multiple perspectives of the same event named after Akira Kurosawa's (1950) classic film, and demonstrated to certain extent in Chapter 4. Van Maanen's (1988) impressionist tales are also evident in new ethnographic techniques; striking stories, metaphors, imagery, experience that startles, highly personalised but figurative accounts, 'not about what usually happens but about what rarely happens' (p24).

<sup>9</sup> It became evident that the presenters and myself were framing biotechnology discourse (and thus my research) in two different ways. I presented the 'social/ethics' frame, while Speakers A and B presented the occupational biotech frames.

applied, cultural ethnography emerged.<sup>10</sup> I prefer to use 'multisited ethnography,'<sup>11</sup> Jasanoff's (2005a) and Kalocsai's (2000) use of George Marcus' (1998) term 'to describe anthropologists' need to describe new cultural formations that are constituted piecemeal in many intersecting locations (p306, footnote)', a kind of critical ethnography of crossroads. For me, that junction is the place where scientists are normatively framed as experts, teachers as mind-shapers, and students as receptacles of knowledge. The critical, *moral* task I set myself is to challenge this normative set of practices.

Film, presentation, and discussion then became the central activities for data collection and critical discourse with ethnographic notes taken of these 'interventions.' The parallel development of methods and theoretical construct described here is consistent with the practice theory approach, particularly de Certeau's (1984) dialectic between theory and practice. However rhetorical writing strategies are used in line with standard academic writing. Some chapters are descriptive, following Wolcott's (1994) idea of an ethnography, using as thorough as possible Geertz's (1973) 'thick description' on the limited visits to schools. Some perspectives are Van Maanen's (1988) impressionist tales, stories, words, metaphors, imagery, experience that startles, highly personalised but figurative accounts. Some chapters get behind the descriptive events and use frame analysis and further semantic networks created by schemas of student, teacher and speaker understanding of events. There are multiple perspectives brought forward on participant multiple worlds<sup>12</sup> and there are accounts here of what may *not be said* as well as what *is* said about the school and activity interventions. Although shorter observations used in this study may only reveal glimpses, further study of behaviour in 'normal' classroom might have thrown further light.<sup>13</sup>

Part of the process of setting out theoretical and methodological boundaries rhetorically is an awareness of 'validity-as-culture' (Altheide and Johnson, 1994, p491) where my own background, my expectations for assessment, and my assumptions on the social science and education research communities are considered (both with similar contrasting conventions).

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<sup>10</sup> The proximity of power - and its influence on perspectives - is missing from Eurobarometers, the ROSE project, BIOCULT, PISA etc.

<sup>11</sup> Kalocsai (2000) says multisite ethnography should deal with 'global and local [issues] thus suggest[ing] a politics of scale and perspective - relational categories, not essentialised differences' (p2).

<sup>12</sup> The classic multiple views of a phenomena used by Geertz (1973) was the various descriptions of different types of wink, Gilbert Ryle's description of how a wink can be misinterpreted from an 'I-am-a-camera, 'phenomenalistic' observation of [it] alone (Geertz, 1976, p6-7).' A wink can also be acted out in play, in irony, or even accidentally.

<sup>13</sup> However there were some negative feelings expressed in many cases by teachers about being observed in the natural environment unless I myself was participating. The uncomfortable feeling that teachers got from my suggestions in this regard had to be respected.

The validity question is therefore localised. Instead of validity, qualitative inquiry demands credibility, transferability, dependability, confirmability, and authenticity (Creswell, 1998, p77). The idea of a 'theoretical lens' as Creswell (2003) means it is included – gender, class, race, a theory of the marginalised that in a critical study need to be empowered, whether female exclusion, the homeless, or the unemployed. Reporting should be clear in its intention of empowerment, where this is an underpinning objective in this moment of 'moral research' (Denzin and Lincoln, 2003). The acknowledgement of postmodernism has led the researcher to realise his own biases and background, and be forthright about them. Creswell is adamant that the location of theory in a study is crucial (Creswell, 2003). Wolcott's appropriate summation from William James applies, taken from Agar's *The Professional Stranger*: 'You can't even pick up rocks in a field without a theory' (Wolcott, 1985, p97, quoting Agar, 1980). The question in the early synthesis becomes – where does my theory fit in? Should it be a grounded theory approach with the purpose of generating a theoretical structure at the end of the process, an ethnography which tests theories, or an *a priori* theory case study? Lather's advice was heeded here:

..empirically grounded research requires a reciprocal relationship between data and theory [but]...keeps a particular framework from becoming a container into which data must be poured (Ryan and Bernard, 2003, p270)

The next section addresses this complex issue - how theory shapes the boundaries of this study.

### **A theory of 'making do': life politics and 'common sense' decision-making as part of biology education**

This work addresses how ideas about NRGTs could be discussed in six specific schools in urban and rural settings in Ireland. The study is multifaceted, taking in interviews, recorded debates, and observations. As Creswell (2003) says '...visual models of many facets of a process or a central phenomenon aid in establishing [a] holistic picture (p182).' This is a sociological inquiry into the educational setting of biology class and how young people's politicised discourse might draw from media, popular culture, and contact with scientists to inform them and justify decisions. It is not necessarily an educational inquiry into methodologies such as argumentation or controversial areas in science. It is also important to note that this study is not an evaluation of biology curricula. However the sociological

perspective will inform educational research. In Weberian terms, there is a combination of Weber's *verstehen*, the 'meaning' of NRGTs and discursive identity as seen by students and teachers and the *erklaren*, the connection to the macro social picture.

The approach taken here combines the two concepts above in the *structuration* of Giddens, a practice view of sociology which describes both structure and collective and individual action (Giddens, 1984). It is a form of practice theory, not too far from Giddens' (1991) idea of *praxis*, a way of looking at how various know-hows and know-thats about NRGTs in local educational environments containing media technology interact with wider cultural meanings, and the empowering or constraining systems which impact on these expressions of knowledge. The underpinning philosophy is relationist rather than relativist (Latour, 2005), in that it emphasises how practices in particular settings create individual identities that are agents within the dialectic of immanence (performed action with internal meaning) and structure. The theory allows for a 'naturalistic generalisation' (Stake, 1988) in that moral constructs of NRGTs, albeit in the contextualised environment of a mediated classroom and debate, tell us something about practices of moral action in young people and the conditions for a pedagogy of biology as discourse around value and action in genetic and reproductive matters. Simmonneaux (2001) demonstrates this in biotechnology argumentation in classrooms in her work on how young people demarcate 'orders of worth' or 'economies of worth' across multiple disciplines from the theories of Boltanski and Thevenot (1991). This mapping of orders of worth is not *tested* as such here, yet this practice theoretical framework becomes both a product of, and shaper of, the inquiry. The action of research adds to this irresolvable tension, which de Certeau (1984) identifies as the problem of how *everyday tactics*, that is experiences in the field, is transformed into *strategic elucidation*, or what remains of authentic descriptions of practices after analysis.

This structurational approach is one of two major theoretical tensions identified in this work, the other discussed below. It is a concern in an ethnographic study such as this, particularly in the context of the practice cultural turn in social theory, which sees practices as those sites of actions that can best be observed. A broad group of practice-oriented work contributes to this view from various disciplines: Goffman, Bourdieu, late Foucault, Taylor, Butler, Latour, Knorr-Cetina, Boltanski and Thevenot, de Certeau, Freire, Harre, Wittgenstein, and of course Giddens. Schatzki (2001) and Reckwitz (2002) have drawn this practice approach together, a legacy of some of these writers, into a coherent contemporary theory.

It is within this theoretical context that the research themes of *life politics* and *pedagogic practices* emerged. To invoke de Certeau's descriptions once more, use (consumption) of media and discourse sets out a place of subversion, where dominant themes associated with instrumentalisation through scientific and rational discourse are re-characterised. Thus the language and 'cultural products' (de Certeau, 1984, p31) of the political, commercial, and popular representations of the biosciences in society derive from the strategies of dominant media packages of Government bodies' and institutions' positioning within a storyline of progressive health and educational benefit *and* the resistant actions of those in a politically weaker position within society. These latter actions might include young people, whose re-purposing tactics or ruses change the language and emphases of these tropes (perhaps over time) to suit themselves, a description similar to Foucault's resistance against normalisation discourse (Chouliaraki and Fairclough, 1999, citing Foucault, 1977). This might tell us how young people use a modified version of what they have seen, heard, and understood about the morality of NRGT applications and how they might use them, allowing for Giddens' (1984) 'double hermeneutic' of social practices where describing such practices is part of the practices. Giddens' term might also describe the dialectic of the two processes described by strategies and tactics – the researcher's transformation of data and the pedagogical resistance to dominant discourse.<sup>14</sup>

Erving Goffman is the theoretical link between the two methodological approaches, performative action and frames, in studying NRGT decision-making as a discursive practice in schools (see Methods section below). It is a sociolinguistic approach, in that it is a social and communicative study of school practices when raising NRGT issues.

Cultural frames - taken from what Gamson (1992) calls conversational resources from 'common sense' mixtures of experience and media references - are constructed from the combined phenomenon of intentional frames of media discourse around issue cultures, the episodic and galvanising effect of meaning making in popular culture influenced by mass media production of news, and public concerns (ibid.; Gamson and Modigliani, 1989; O'Mahony and Schäfer, 2005).

These issue cultures, represented in all media, and particularly when representing the moral and philosophical aspects of NRGTs, are sequestered from schools, to use Giddens' (1991)

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<sup>14</sup> Giddens' double hermeneutic as understood by Lash (1994) is a reflexive action in late modernity as determined by interpreting both social agent and expert systems. I understand this to mean a participant in a study can re-use researcher concepts; here the notion of 'bioethics' for example, the meaning of which may become co-produced in discussions. De Certeau's strategies and ruses are thus part of a double hermeneutic.



term, as they are seen to be institutionally external to the normalisation processes of science pedagogy even within the modern context of Irish science. Yet both engagement with NRGTs and media are fundamental to identity formation (Chouliaraki and Fairclough, 1999; Scollon, 1998).<sup>15</sup> The methodologies of Goffman and Gamson and methods such as ethnography of argument and debate triggered by film and presenters makes visible the moral decisions, performative identities, and framing and resource strategies (ruses) of participants entering the discourse of NRGT and biology education, thereby ‘choosing identities.’

Now to the *second tension* created by the practice theory approach. Where Giddens sees the moral being *re-introduced* by life politics, having been removed from common discourse by institutions of modernity, the idea of the ‘moral’ might also be mapped across other locales in the form of everyday, real-world justifications or routine actions according to Thevenot (1984) and Boltanski and Thevenot (1999, 2001). While for Giddens, there is a removal of moral judgements from instrumental practices, I bridge the practice approach by laying Boltanski’s and Thevenot’s work as part of the foundations of moral, pragmatic judgements or decisions regarding the use of the reproductive technologies. The temporal context for this ‘re-moralisation’ is the late modernity of Giddens, Beck and Lash, among others, where practices may be reflexive, aesthetic, and/or symbolic as well as rational, as discussed in the previous Chapter.

A theoretical boundary then for this thesis is the ‘practice turn in contemporary theory.’ This theoretical approach emphasises the nodes of practices in ‘body/ knowledge/things-complexes’ (ibid p258) and theoretically supports the disembedding nature of life politics and the sequestration of experience by the abstract systems of late modernity, that is, how these issues lift out of local contexts and are compressed in space and time by global administration and media, with human and non-human affairs in the same complexes of activity. A spatial context for both the theoretical and practical development of my work is the practices and classifications of biology as a topic or subjects made by students and teachers in secondary schools and the informal links used in knowledge strategies or cultural resonances with which the biosciences are themselves involved. Thus another – connected – context is the media and commercial discourse of biotech and genetic described in Chapter 2. Schatzki’s practice theory is an account of a field of practices within a domain, such as science education, not a predictive account or a hypothesis to be proven (in contrast to Moscovici (1976)). Practices are rarely seen, so embedded are they in local and embodied

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<sup>15</sup> See Chouliaraki and Fairclough (1999) for a discussion of the related field of critical discourse analysis (CDA); CDA is textual while frame analysis is intertextual and less focused on technical linguistic data.

action as described by Giddens' (1991) practical consciousness, Polanyi's (1958) tacit knowledge, or Solomon's (1994) common sense educational context for science conflicts.<sup>16</sup> The moral basis comes from Boltanski's and Thevenot's 'continuum' of morality, where moral justification moves along a scale, from personal house-keeping to an external formal discourse of morality such as expert systems justification and evaluation. Thevenot (2001) calls these practices 'habits without reflection,' the body actions of Bourdieu's habitus perhaps (ibid. p56) making for 'local convenience' or a 'familiarised environment' where a 'regime' of familiarity is expressed (ibid. p62). It is a way of dealing with reality that orients towards some idea of the good whatever the context. Bourdieu and Goffman might say this is the social actor playing the game by the rules but creating new circumstances for morality. De Certeau simply defines this as 'making do' (de Certeau, 1984, p29), using the moral tools that one has at one's disposal.

### **The ethics of engaging with young people on sensitive topics**

Having defined a theoretical context that exists as part of everyday practices surrounding the school sessions and their references to an 'outside,' it is important that we now focus our attention on the study participants. In the first instance, close attention was paid to the ethical considerations of interviewing and recording young people and reporting their findings. Discussions and interviews could potentially be highly emotive, dealing with sensitive issues around personal experiences of disease, fertility, and the destruction of the embryo. The facilitator and presenters, in line with teacher practices, remained objective in debate in that their views on NRGTs were not revealed to students. Consent documents were carefully drafted in accordance with the DCU Research Ethics Committee to suit the circumstances of 1) the participants being young people, requiring to be informed of the overall process at every stage of participation and 2) the nature of discussions, which could cover difficult material for some participants (see Appendix A and B). In the introductory session in each school, participants were presented with DCU policy with regard to informed and parental consent, at that time being implemented with more rigour following the appointment of a new Research Ethics Committee, and thus requiring more detailed documentation that required consent. However I needed also to be aware of the specific relationship developing

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<sup>16</sup> De Certeau's common practices are at odds with Gramsci's (1971) common sense – student and teacher practices are not in acceptance of the cultural hegemony of the biosciences, but use ruses that interact with the structural and repurpose it.

within each school, and the balancing act of pushing forward a research agenda in tandem with the expectations and realistic goals of each school. Many schools had their own external research policy and its protocol for interaction between students and external speakers. As I describe in Chapter 4, to preserve anonymity, each participant and location was assigned a code (for brevity and to identify with place) and false name (for a personal connection for the author and reader) which were used throughout the text.

### **Methods and analysis: transformation of data**

Wolcott (1994) identifies three ways of gathering qualitative data: participation observation, interviewing, and studying material, of which the former two I have used here. He then suggests three ways of 'doing something' with the data: *description*, which reports as closely as possible to the original data; *analysis*, which is a way of organising and identifying key relationships within the data; and *interpretation*, which is making sense beyond the limits of what is explained, beyond the researcher's own self-disciplined yet limited sense of certainty. In this structure, within the core empirical chapters that follow, Chapters 4 and 5 follow a more descriptive approach, while Chapters 5 and 6 are more analytical, and Chapter 7 interpretive. However, Wolcott stresses that interpretation can take precedence in qualitative research and the chapter descriptions just outlined are too simplistic to account for the reflexivity and subjective interpretation that is a feature of modern ethnography. Wolcott suggests the term 'transformed data' rather than analysis, an ongoing process from the time the ethnographer enters the field rather than a set analytical phase which follows data collection, in line with de Certeau's (1984) theory/practice dialectic.

The process of fieldwork and analysis places an uneasy alliance between theory and practice, between the abstract and the pragmatic. de Certeau's (1984) brilliant *The Practice of Everyday Life* was reassuring in this respect. The final list of methods used in this study involved applying data collection methods around two particular activities intended to go towards a proposed supplementary programme for biology teachers. The two activities used in the field were 1) film and debate and 2) a visit from an NICB scientist. To create an identity for the programme as a representation of the NICB and DCU, the proposed programme of activities, of which this research was part, was called *The Science of Life*. The data collection included:

- (i) a completed Likert scale questionnaire of young people's positions of agreement on characters' points of views and actions in either film;
- (ii) audio recording of rationale and argument of each Likert response within while the discussion activity was in process;
- (iii) audio recordings of interviews from three selected students from each school using semi-structured equal status conversations ('ethnomethodological' interviews describing typical events from school and biology class and 'active interviews' (Holstein and Gubrium, 2003), where there is less structured coproduction of meaning);
- (iv) audio recordings of the 'bioscientist sessions', the visits from the NICB biotech researchers to schools;
- (v) ethnographic notes from all schools and personal reflections throughout the study recorded in a schools journal (transferred from fieldnotes) and occasionally in a personal journal which synthesised much larger concepts and those extrinsic to the fieldwork and sometimes the project itself.

The following headings categorise the instruments of inquiry used at various stages of empirical work.

#### *Pre-programme questionnaire for participant science teachers*

When entering each school during the pilot stages, the teacher was interviewed face-to-face with a pre-programme questionnaire. This included broad questions about implementing the contemporary issues strand of the biology curriculum (Ireland, Department of Education and Science, 2002a) and identifying parts of the curriculum as well identifying practical obstacles for my programme, and available times, and ICT infrastructure (an online complement as planned for media delivery). This questionnaire functioned as a needs analysis tool rather than contributing to data collection although, as my qualitative technique advanced all inputs from teachers at each stage were considered data.

#### *Pilot activities*

In the early stages of activity development of *The Science of Life*, a 'menu' of options was offered to participants, most of which were piloted, including newspaper analysis exercises - an approach also investigated by Jarman and McClune (2002) - and some ICT. Students were provided with a selection of biology-related newspaper articles. They were asked to

select one each and write a report in class based on categories based on taxonomy supplied to them devised by Korpan *et al* (1997b) on science media reading sophistication. Guidelines and categories for this taxonomy were provided during the session. Based on this exercise, students were then asked to synopsis science newspaper stories and list out questions that reflected missing information from short news briefs on scientific or pseudo-scientific topics.

#### *Research phase intervention activities*

The six schools, ND, SD, LH, SK, and SW were the final research phase schools used for recorded discussions, interviews, and fieldnotes going towards the corpus. Fifth and Transition Year students participated, aged from about 15-17, participating in a senior cycle biology class or module. The lesson plan shown in Table 3.1 was distributed to each teacher as part of a proposal package. Following the pilot, I decided that a deeper ethnographic and discourse analysis of talk using fewer activities would serve the inquiry better, providing thicker descriptions. Fewer schools were also used. The amount of recorded material, both audio and fieldnotes, contributed to quite a large corpus. Classroom materials such as the film, background material, and project specifications were sent to teachers when they accepted the letter proposal, and following various meetings. Consent documentation was handed off at this point also. Due to a lack of communication recounted in Chapter 4, the same LH class did not participate in the bioscientist and video sessions.

#### *Film and film discussion activity*

This activity generally spanned four classes in schools, divided over two days. This activity became central to the programme. The lesson plan was as follows:

*Session 1: Show film.* Either a forty-minute film by Y-Touring Company called *The Gift* (1999) or a one-hour drama documentary, *If Cloning Could Cure Us* (2004), was played for the first part of the class period. The rest of the period consisted of a warm-up discussion to begin engaging the class with the science and the issues in the film.

*Session 2: Film discussion activity and survey.* A summary trailer at the end of *The Gift* was played for each class to refresh memories. Students participated in *The Gift* resource pack activity (*Gift* teachers' resource, 1999, p20), 'Activity 3: Your point of view.' The students were asked to complete a questionnaire with eight statements or points of view relating to decisions made by characters in the film (Tables 3.2 and 3.3) and a corresponding 5-point Likert scale of agreement for each statement: 'Strongly agree,' 'Agree,' 'Neutral' ,

'Disagree' and 'Strongly disagree.' The group was then asked to imagine a line running across the room, one end being 'Strongly agree' and the other end being 'Strongly disagree', with the three intermediate points of agreement in between. The eight statements were read out throughout the session and the class asked to stand anywhere across the line, corresponding to their questionnaire responses. Recording responses prior to taking up physical positions was a method of collecting individual responses and reduce peer influence. However, it was of lesser importance than the physical movements and interactions themselves if participants took up a different position than the one they recorded on the questionnaire. Individual positions and gender were marked out on a print version of each statement's Agree/ Disagree line and clustering of participants who stayed together identified. Individual students were then picked out to explain their perspective to the group. Follow-up probe questions were asked if necessary. Students were encouraged to argue their case in a fair and non-threatening environment. Students were asked to shift position if their opinion had changed given the preceding discussion, and to record this change of position on a second Likert scale row. However, this may have occurred anyway, but not recorded on paper. The discussions were recorded on Sony MiniDisc Player. MiniDiscs provide good sound quality, easy storage and an accessible track numbering system. Some pre-programme questionnaires were also recorded this way.

The film and discussion that followed each showing became the central activities for data collection and critical discourse. The strength of the discussion activity was evident throughout the pilot, watching young people employ various 'performance' strategies as they chose positions of agreement. I would be deemed guilty of reductionism in a qualitative study had I placed too much emphasis on the results of the Likert scale survey guiding the film discussions. This quantitative tool functioned as a guide to the positioning of participants, physically and symbolically. Concepts of power play of debate and performative action were the key data indicators. It must be stress that methodologically, the numbers of young people who 'strongly agree,' 'agree,' 'disagree,' 'strongly disagree,' or remain neutral are reliable only within the context of the film and discussion (Chapter 5 covers the mechanics involved in forming these collective positions).

#### *Bioscientist sessions*

Two male researchers from the NICB presented their work to the programme schools. These were self-selecting. An email was circulated around the NICB requesting participants and these were the only two respondents. Both were given the brief to talk in terms that would

interest the average 15-17 year old and also discuss how their work might impact society. PowerPoint presentations were developed with some guidance from me on content and delivery. The structure of the sessions were as follows:

- The bioscientist gives presentation to the class (20 -30 minutes).
- Questions and answers session (20 minutes)
- Group discussions: the class breaks into groups and discusses informally what they might ask the bioscientist. The bioscientist and science and society researcher go around to each group and begin informal discussions (30 minutes).

**Table 3.2.** The eight statements called out to discussion participants after the showing of *The Gift*

|     |  |
|-----|--|
| (1) | JENNIFER is right to argue that even though she knows that there is a risk of her child inheriting Friedreich's ataxia, she wants 'nature' to take its course. |
| (2) | ANNIE is right, RYAN has a right to be tested because he has a right to know what's going to happen to him.  |
| (3) | JENNIFER'S doctor is right to argue that Jennifer must do something now that she knows the risk.   |
| (4) | RYAN'S doctor is right to argue that Ryan shouldn't be tested if there is no treatment available.  |
| (5) | In selecting MARK, RYAN and JENNIFER were only doing what was best for him.  |
| (6) | RYAN and JENNIFER were right to select MARK to be free of Friedreich's ataxia.   |
| (7) | RYAN was right to select the sex of his child.   |
| (8) | RYAN was right to select MARK to have the best qualities.  |

NOTE: Source: *The Gift* teachers' resource (1999).

**Table 3.3.** The eight statements called out to discussion participants after the showing of *If...cloning could cure us*

|     |   |
|-----|---|
| (1) | DR. McVEIGH, the main witness for the prosecution, was right to argue that a 19 day old embryo should not be used for stem cell research because a legal limit needs to be applied somewhere. |
| (2) | ANDREW has less right to treatment from such controversial technologies than the young girl on the videodisk that had diabetes.   |
| (3) | ALEX'S LAWYER is right to argue for the 'defence of necessity', that is, ALEX acted in good faith to protect the life of her patient.   |
| (4) | ALEX should have told ANDREW before proceeding with the research that there might be health risks after treatment.  |
| (5) | In treating ANDREW, ALEX was only doing what was best for him.  |
| (6) | ALEX was right to go ahead, despite the illegality of the procedure.  |
| (7) | ALEX should have checked where the eggs came from.  |
| (8) | DR. YAMA, for the prosecution, was right to say that the technology that ALEX is advocating is bad for humankind.   |

NOTE: These statements were modified from *The Gift* teachers' resource (1999).

### *Fieldnotes and journals*

For a deeper ethnomethodological enquiry and presentation of the research ‘story,’ and following the advice of Stake (1995), classroom observations were recorded in a *fieldnotes* book and developed electronically as a *schools journal*, to be used as a resource for the final PhD report. These took the form of *short observations* (observation outside session activities such as normal biology classes and other subjects, breaks, school environment) and *participant observation* (observation during session activities).

All aspects of my work are continually recorded in a personal diary. Often if a thought occurred to me about some methodological aspect, I would jot it down. Sometimes concepts which were outside the project, or historical or news details related to NRGTs were included. This journal has become an invaluable plotting device for the synthesis of ideas, data and the temporal development of my thesis. Written notes began as broad observations, focusing in as the research progressed.

### *Participant interviews*

Three students from each school were generally interviewed after the film discussion and bioscientist session activities. The purpose of these interviews was, first to tie the activities together and secondly, to get conversational discourse into the data set. Interviews bring teenagers within a comfort zone. TV and media culture shows us we are currently an ‘interview society’ (Gubrium and Holstein, 2003, p21). The primary criteria for selection of interviewees were gender balance and overall positioning in relation to NRGTs. I hoped to get one student who passionately disagreed with NRGt intervention as it was presented in the films, one who was very much in favour of these technologies, and one who was neutral. In practice, as I describe elsewhere, there were rare extreme views. Other concerns such as the inclusion of outsiders and those who preferred not to speak in front of the group also crept into my criteria. Interesting anomalies emerged. For example Des from NDC was selected for interview after consultation with NDCt on the basis of his ‘quietness’ and perceived neutrality on NRGTs. Des turned out to be less in favour of the technologies than the chosen ‘anti’ interviewee, Damien. I interviewed both because they had two distinct justifications of resistance to NRGTs that had implicit religious inflections (see Chapter 6).

Early interview guides were ethnomethodological in approach, asking numerous questions – consistent with the practice ‘family’ identified by Schatzki and Reckwitz - but these did not



allow adequate room for participants' expressions. Questions were posed that identified epiphanies, emotion, and reflexivity, influenced by the phenomenological tendency of early data collection. It was important that reflections were located *away from* the scientific world of biology class. These reflections are 'the experiential, the embodied, the emotive qualities of human experience that contribute the narrative quality to a life (Lincoln and Guba, 2003, p275)' and not immediately associated with the biology subject. The application of Moustakas' (1994) phenomenological interview technique allowed interviewer and participant ('co-researcher' in Moustakas' words) to share meanings independent of other participants. This meant similar questions on norms and conventional actions of school culture were asked of each participant and recorded as though it were the first time I heard it. Atkinson and Coffey (2003) have cited studies such as Gilbert and Mulkay's (1984) accounts of scientists whose interview narratives demonstrate how 'informants' construct themselves and others as moral agents' (p116). Gilbert and Mulkay use no prior conclusions about the sociological context of the scientists' talk. They contend that belief systems and codes are created from interviews providing their own internal consistency. I followed participants down whatever path they took me in describing everyday life or in the understanding of a phenomenon, then swiftly got them back on track with a pre-scripted question (see 'Ethnomethodological questions,' Appendix E). I shared the experience with them and verbalised this if I felt it. If a typical school day was described as boring, I would identify on equal terms: 'Yes, I can see how that would be boring.'

Although interviews were structured, there was probing for further information to get, as Kozoll and Osborne (2004) said, 'intentions, motives, meanings, contexts, and circumstances embedded in the participants' stories (p161).' An interview protocol was followed for the later form of 'active interviews'(Gubrium and Holstein, 2003) (see Appendix F) which gave participants more scope to talk. There were ice-breakers 'easy background', main semi-closed and main open questions, probes, and reflective notes. I used Kozoll and Osborne's (2004) method of eliciting stories from interview questions to see how participants made sense of their own set of experiences. A tacit, embodied, discursive understanding was approached when a phenomenological shared world was created between interviewer and interviewee using questions that adopted the language of the interviewee; that is semi-formal, friendly. However, at times I did stray outside their experiences out of necessity. This might have resulted in a vague explorative question leading to multiple opportunities for meaning making in the answer rather than one direct or distinct meaning. Examples of such questions were: 'Could you describe what you think biology is?' However these questions were rare as

it reached out to more externalised concepts. 'Active' interviews dealing with common experiences were used in favour of the original 'ethnomethodological' interviews.

#### *Data analysis methods*

I played close attention to each syllable, each utterance in transcribing interviews and film and bioscientist sessions. Although at the beginning of data collection I was still unsure of how much analysis would be applied to the text, I wanted to capture the essence of each conversation and create as much linguistic detail as possible. As it turned out – as described below – I applied the sociolinguistic device of frame analysis which benefited greatly from thorough transcription. I transcribed all text myself. There were many long months of painstaking transcription when I often questioned the wisdom of this, given the scale of the corpus. Yet at the end of the process, I was happy that this decision was in keeping with my methodological approach. There was an awareness of the textual turn, following poststructuralism, as well as Moustakas' (1994) phenomenological interview, and Silverman's (2001) and Gubrium and Holstein's (2003) 'active' interview. The utterances themselves were text, separate to the transcripts. Yet I take Schieffelin's (1998) stance on this; *performance* is not text and the closer I could place myself in the immanent, co-constructed meaning of the original interactions, the better I felt I could describe these processes. Having a third party transcribe the sessions, particularly the near-chaos of some class discussions, would have placed a further textual distance from the performances in which I shared the stage. It would have been like an actor reporting his experiences of a play from the point of view of the audience rather than the character he plays. Similarly, I felt that computer-assisted qualitative data analysis software (CAQDAS) might have taken away from the performative actions, relying only on text. Denzin and Lincoln (2003) elucidate the concerns I have with over-reliance on CAQDAS for the production of coding (taken here within the context of grounded theory):

[CAQDAS systems] allow researchers to consolidate and establish patterns of consistency in their materials. However they can also create negative effects, including the false hope that such programs can actually write a theory (or a case) for researchers. ... Coding and retrieval schemes can lead to an over-emphasis on the discovery of categories and indicators, with a corresponding under-emphasis on the multiple meanings of experience in concrete situations. The search for grounded theory can shift attention away from the

theories of interpretation that operate in the social world  
(Denzin and Lincoln, 2003, p54).

Two software applications proved to be invaluable however in the transcribing and coding process. I recorded all spoken word on MiniDisc for ease of storage, ease of access of audio segments, audio clarity, and electronic storage, should it be needed. However this latter reason proved elusive. As I used older MD equipment that did not have USB connections, I needed some device that treated the audio to facilitate transcribing (I am slow on the keyboard), and to do this I needed to transfer the digital audio from MD to computer. I used Audacity (2007) software to record the audio from MD to PC. With VoiceWalker (University of California Department of Linguistics, 2005) I then created 'steps' within the recordings allowing, for example, four steps of audio to be played, then looped so that the last three steps are replayed with an additional step from the next segment of audio, and so on. This process significantly slowed up the recordings allowing me to transcribe.

Transcripts of interviews were sent to each student to amend, remove, or add extra material. This method ensured that each student had a chance to participate in face-to-face-interviews and then write further comments, drawing on the strengths of each method and include material that occurred to them later, or crucially, to ensure agreement to what should be contributed to the discourse following a recorded event. It was also a fair way to give an opportunity for those participants to contribute who had stronger writing than speaking skills.<sup>17</sup> Teachers and presenters also received drafts of their perspectives in written-up form. As a way of further democratising the research, a summary report of the final work will be sent to teachers.

In the initial qualitative coding process, Ryan and Bernard's (2003) *schema analysis* was applied. This is a system of line-by-line searches for metaphors, repetition of words, shifts in content, or the organisation of words and concepts that people will do in a situation from linguistic and sociological traditions (Ryan and Bernard, 2003). They also construct shared cognitive meanings - what people must have in mind to say the things they do. They are also, according to Ryan and Bernard, 'personal semantic networks' (ibid. p281). 'People [frequently] circle through the same network of ideas' (ibid. 2003 p281). Schemas or schemata can be read as 'scripts....enabling culturally skilled people to fill in details of a

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<sup>17</sup> An interesting exposition of the active interview came about when I read the amended transcripts; 'ems' and 'ams' were included with the written word, as if spoken, in some cases continuing the direct transcripts' style. This suggest the transcripts influenced the way the respondents wrote (most evident in Katherine and Kate's amended transcripts).

story or event' (ibid. 2003, p280). These schemas can also identify what is *not* said, the text that is assumed 'everyone knows' in a cultural context (ibid. p281). From these, cognitive and mental maps, componential units, or folk taxonomies may be constructed (based on qualitative analysis of critical theory for emancipatory action (Creswell, 1998)). Yet I was concerned that this was not rigorous enough for social interaction and discursive practices. Some form of discourse analysis<sup>18</sup> was required. The 'schemas' which emerged from my analysis of transcripts - both text and performances - seemed to suggest a relationship to 'frames,' ways of excluding descriptions and setting normative - sometimes intrinsically moral - arguments (see Chapters 2 and 6 ). Although all schemas are not frames, as explained below, the identification of frames throughout the coded schema were useful to observe how young people construct their meanings around the two NRGT issues, pre-implantation genetic diagnosis and human embryonic stem cell research.

In this first analytical step, observations and descriptions were seen as solitary ethnographic 'data units' of performances, utterances, and symbols outside of frame analysis. Once schemas and meta-schemas began to emerge in transcripts and journals, a methodologically sound way of linking these to the core questions and theoretical construct was required. It is here that I followed two methodological strands that emerged from Goffman on the performance of the self (Goffman, 1959) and framing (Goffman, 1974). In this second analytical step I subjected the emergent schemas to frame analysis. For this, the question I asked was: how are the schemas organising themselves around a central worldview that can tap into other collective opinions, but more importantly, that use a process of enhancement and omission to sell an idea or enforce an argument? Themes of power and performance placed an extra contextualisation on the frames, and are described in Chapter 5. The outcome of my frame analysis spans Chapters 6 and part of Chapter 7.

Frame analysis is a tool from the sociolinguistics and discourse analysis fields. For this, I used the techniques of Gamson (1992; Gamsson and Modigliani, 1989) (frames, symbolic packaging, engagement/proximity, cultural resonance, all discussed in the previous chapter) and Benford and Snow (2000) (frame alignment). As I became more aware of the immanence of taking sides in a debate, the discursive practices of identity began to emerge. Early frame and performative constructs fed back into the theoretical construct and research questions causing a constant cycling back and forth between problem, theory, and interpretation. This follows Wolcott's (1994) description of this triad relationship and de Certeau's (1984)

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<sup>18</sup> Interdisciplinary in its approach, critical discourse analysis (CDA) is a method which could have tracked similar territories of mediated identities. However, it is deeply embedded in the linguistic tradition (see Chouliaraki and Fairclough, 1999).

descriptions of theory and practice, with an awareness of the mechanics of ‘cutting out’ and ‘turning over’ of theory in the manner of Foucault and Bourdieu from the distant field where the notes were taken (ibid. 1984, p62). There is a problematic relationship between schemas, the categories which emerged by clustering themes, and frames, categories which emerged that exclude, demarcate, collectivise and tap into wider cultural tropes. Benford and Snow (2000) partially address this in their distinction between them:

A crucial feature that distinguishes collective action frames from schema and other related cognitive constructs is that ‘[c]ollective action frames are not merely aggregations of individual attitudes and perceptions but also the outcome of negotiating shared meaning (Bedford and Snow, 2000 p614 quoting Gamson, 1992 p111).’

They further elaborate:

The implied distinction between schemas and frames can be stated more concretely by thinking of schemas as ‘participants’ expectations about people, objects, events, and settings in the world, as distinguished from alignments being negotiated in particular interaction,’ which is what frames do. Frames and schemas interact during the course of interaction between two or more individuals, with frames providing an interpretive ‘footing’ that aligns schemas that participants to the interaction bring with them. Thus, frames and schemas are not different concepts for the same phenomena but are highly interactive, with frames constituting a broader, interpretive answer or definition to ‘what is going on’ or ‘should be going on’ (Bedford and Snow, 2000, footnote, p614).

There are operationalising difficulties here when young worldviews are read as discourse (or discourse as practices). Bedford’s and Snow’s (ibid) reading suggests schemas are cognitive processes whereas frames are discursive. However many schemas I identified from coding analysis were intersubjective in nature. Class discussions, for example, constructed shared meanings which I may have grouped into schemas such as *tendency towards genetic determinism/ reductionism* or *reflection on activities*. These are not necessarily frames but a means of semiotic clustering during the coding process and thus are *coding schemas*.

To recap again then on definitions: ‘schemas’ are emerging themes from the research corpus, as defined above, from regular occurrences of phrases or gestures that are connected in some way. A ‘frame’ is a means of organising discourse that, according to Fisher (1997), creates ‘common sense’ patterns of images that will emphasise and omit information and, within the

framing theories of Gamson (1992) and Benford and Snow (2000), will attempt to add credence to these patterns by drawing on what others may believe, constructing a collective identity. 'Themes' are identified by Gamson (op.cit) as culturally embedded frames in discourse. They are high level orders of frames – for example there are many scientific or health frames that can be categorised under the *progress* theme; a *countertheme of harmony with nature* may also have a number of frames. A 'position' is a recognised stance for or against a technology, for instance 'anti-NRGTs' 'rights of the mother' in the context of this thesis. Positioning is described in an ethnographic way in Chapter 5 and theoretically against wider viewpoints as part of the applied analysis of Chapter 7. Finally in order not to confuse the 'restrictions on talk' that is a frame with a similar reading of discourse: 'discourse,' as defined in Chapter 2, is a higher level boundary for what can and cannot be said. While frames are mechanisms of arrangements within discourse and, in this study, always rely on rhetorical devices in speech, discourse can be either be verbal or non-verbal. However, it is clear that frames operate at a deeper level regarding power in discourse and can be identified across, and sometimes in a representative away, underneath, schemas.

An example of a frame is *against messing with nature*, a schema with an organising power, with which others can identify and shape their positions. It supports an argument, while ignoring other conflicting aspects. The *genetic determinism* schema quoted above did not emerge a strong enough contender to be a frame, more an attribute or trace item within conversations. In other words, no one really framed humans as collections of genes only, or a disease as being caused by one gene, although there may have been some figures of speech which alluded to this, perhaps unintentionally, in natural talk. Table 3.5 shows a simplified typology of the analytical decision-making involved in grouping schemas and their relationship with frames and themes.

## **Conclusions**

A theoretical framework and methodology for the relationship between 'social/ethical' and identity discourse on NRGTs and formal and informal pedagogies needs to address the connections between 'outside' the classroom and 'inside' that allows for the blurring of boundaries that a mediated society creates. According to Giddens (1991), modernity requires 'the sequestration of experience' in the everyday to get by, an exclusion of moral and existentially challenging aspects of daily life. The end of nature caused by the internal

**Table 3.4.** An example of the analytical typology constructed during analysis showing whether or not emerging schemas were 'frames' within the definition used in this thesis.

| Category                                 | Emerging 'sub-schemas'<br>→   | Emerging schemas<br>→  | Frame definition<br>→  | Themes/<br>Counterthemes<br>(Gamson, 1992)  |
|--|---|--|--|---|
| <i>Description /criteria</i>             | Relevant (and sometimes regular) patterned occurrences of discourse and action (utterances, words, phrases, gestures) in the classroom from discourse text, ethnographic notes  | Semantic groupings/connections of utterances, words, phrases, gestures   | Does the schema match the Fisher (1997) definition of a frame (see page 46)? Does the schema organise, attempt to persuade, have patterns of omissions and promotions of viewpoints on an <i>issue</i> ? | Organisation of frames into oppositional cultural themes ie drawing on dichotomy of wider cultural understandings |
| <i>Schema examples 1 &amp; 2 (frame)</i> | <p><u>'there's always somebody who goes to extreme'; 'you don't know where to stop'</u> ND STMT 1</p> <p><u>time limit on stem cell research will keep on going</u> LH STMT 1</p> <p>'picking out... blonde hair, blue eyes'</p> <p>Looking for perfection [lifestyle] ND STMT 1, 6</p> <p>The 'perfect child' would be the inevitable result of allowing parents to use PGD without limits. ND STMT 1, 3 [Link to <i>Everyone will be the same</i> Impulse against the idea of embryo 'tampering' ND STMT 6</p> <p>'Sometimes going against nature isn't bad, like taking a tablet. But when it comes to genes....' [contra] ND STMT 6</p> | <p>1. Lack of trust in future humanity</p> <p>2. Looking for perfection [lifestyle] [Link with 'Consumerism' schema]</p> | Runaway  | Progress v harmony with nature  |
| <i>Schema example 3 (non-frame)</i>      | <p><u>There would be 'superchildren' of genetically modifieds and an underclass who are 'naturally' born</u></p> <p>Echo: participants gang up and repeat 'why not?'</p> <p>Disease a legitimate reason for PGD, but not 'attributes' NDC, SW, ND STMT 5</p> <p>Parents are biased – have 'one-sided view' – [don't consider society] NDC STMT 5</p> <p>Continues speaking un-phased despite riotous laughter at a perceived gaffe NDC 1 STMT 5</p> <p>'Everyone would be the same' if parents could use PGD without limits.</p> <p>Counter: everyone will still be different even after PGD NDC, ND STMT 5</p>                             | <p>3. Threat to diversity: <u>genetic engineering = generic engineering</u></p>  | —  | —   |
| <b>Power context</b>                     | Boys v girls Peer pressure & habitus  | Film audience activity ( <i>The Gift</i> )   | Statements 1, 3, 6, 7  | School location   |

workings of institutions of modernity and abstract systems - day-to-day technical 'black boxes (Latour, 1987)' of modern operations at a remove from everyday concerns - demand this. Giddens' view is that life politics tries to get these repressed existential and moral issues back into the frame, both in the everyday decision-making and in collective formal discourse of public debate and abstract systems themselves. We are seeing, in emergent environmental and anti-NRGT social movements, the embodiment of this resistance, which is evidence of the limits of instrumental reason and moral-defying abstract systems of the everyday. In this chapter, following the theoretical challenges to life politics and my defence against various authors in the previous chapter, the evolution of the inquiry was outlined, as well as a summary of the theoretical framework underpinning the thesis argument.

Theory and practice in this thesis are closely linked and present the continuing (and contested) landscape of moral action, the good life, as applied to NRGTs. While moral philosophy may not be grounded enough for young people to confide in for these NRGT judgements, neither are theories of liberal individualism, explaining an 'anything goes' style of decision-making, necessarily suited. A *structurational* approach requires that I link the agency of immediate reproductive decision-making with the structure of shared values. In this, I draw on theoretical assumptions here from several authors. First, identities and everyday moralities are shaped by media (Gamson, 1992; de Certeau, 1984; Boltanski, 1999; Smith, 1990; Fairclough, 1999) in late modernity described as reflexive, symbolic (1992, 1994; Giddens, 1991, 1994) and at times aesthetic Lash (1994). 'Science,' in this late modernity, has become fragmented, socialised. Young people entering the classroom have more and more interaction with many types of media, through which combinations of experience, issues, and narratives are shared and in which local performative practices will cause them to play the outsider, to use ruses and tactics (to use de Certeau's (1984) terminology for resistive, repurposing types of usage of the dominant discourse ), and frame specific socioscientific issues such as those of NRGTs making them more salient to their local or cultural milieus (Gamson, 1992; Nisker and Daar, 2006; Ødegaard, 2003). With these tactics, 'sequestered' moral and existential questions of the body, as described by Giddens in late modernity, are 'brought back.' Giddens' life politics and Goffman's performative expressions of self are expressed here in framing strategies and tactics of young people and explained as the pragmatic ethic of the everyday (de Certeau, 1984), a common sense of the *moral* rather than the ethical.

As the interpretation of frame construction in conversations is a methodological device used here, it is useful to divulge my own framing strategies, which I identified during the process.



Both films framed the representation process of raising questions and presenting problems as '*science and technology has social and ethical consequences.*' The other activity included a biotech researcher from the NICB presenting his work and engaging with small groups of students within schools. This activity framed the research as '*bioscientists have a specialised job to do in the treatment of disease.*' The development of, and recognition of, framing strategies and tactics of researcher, teacher, and student were all described in this Chapter, in the refinement of methodological tools.

To place myself further into the research frame, I would say that I am engaged in a form of science communication and therefore part of the scientific worldview. The study presents discursive practices that are reflective and reflexive about NRGTs with media savvy young people with technological choice and a globalised connectivity. Biotechnology communication between third level researchers (from the physical and social sciences) and schools can be seen in the context of a contemporary social theory of practices in a particular era in modern Ireland. These are all brought into the biology classroom and are in conflict with standard science teaching as they are part of a pedagogy of moral choices relating to the everyday. Film and argument sets up the narrative of people's experiences and how one person's choice affects the life of another, even in the next generation. More importantly the critical aspect of the research endeavours to give voice to youth on controversial issues, particularly the disadvantaged or those who may be considered outsiders within a technology-driven education system, as they resist an identity already created for them by modern institutional practices in education (while also considering the ethical dimension of facilitating debate with young people on moral and emotive issues such as embryo research and cancer).

The chapters that follow this are empirical, describing the demarcations and interpretations brought from the field.

#### **Chapter 4: The research locales**

The main empirical data of this project spanned six schools and within each were distinct spaces where the activities and data collection procedures occurred. The film showing and

the debate activity that followed it took place in one room. In most cases, the bioscientist presenter also used this same room when he discussed his work. Because both sets of activities required a different method of utilising the space in the room, they may be considered separate research spaces. In fact, several spaces opened up: for the film activity, the film itself presented a separate place, incorporating the setting and action of the film; the discussion activity required bodies to move around the room occupying yet another research space; the presenter gave a presentation on another day, giving it a lecture hall feel; then he and I moved around groups of participants, relaxing the atmosphere in the room again to a 'chatting space;' in another location, the post-activity one-to-one interviews with students were conducted; and finally, the teacher was often interviewed in the a separate room or sometimes over the phone.

To present a context to the research, this chapter then describes these research spaces. Although Giddens' (1991) abstract systems may lift out of a local environment, the pedagogic process and the management of expert systems that takes place in school settings have, as this study will show, unique and localised complexions, and the physical environment as well as the socio-economic conditions contributes to the local culture. Giddens (1984) refers to the *locale*, a regionalised place of discourse that can have a physical or temporal boundary, such as a political locale, a school, or an online chatroom (Kidd, 2002, p205).

I addressed in the previous chapter – and will do so again in the next methodological chapter – the challenges for ethnographic work in a world of advanced mediation, globalisation, and increasing diversity of cultural representations. Hirsh (1998), Brown (1998), and Hughes-Freeland (1998) acknowledge this in the volume edited by the latter which looks at how the traditional, the modern, and elements of the postmodern effect how we see the qualitative research field and our sense of place and space. The sense of space is becoming more conceptual in anthropological studies. As de Certeau (1984) says 'space is a practiced place (p117),' meaning it needs human networks of activity to make a geographic location a particular space within society. The multisited ethnography of Marcus (1998) also extends this space to include local and global connections and cultural understandings, following Anderson's (1983) imagined communities, without generalising all that is unique about one setting. The research locales describe present spaces that can be either conceptual, geometric, or anthropological (de Certeau 1984, citing Merleau-Ponty, 1973). It must be noted that the vignettes below are snapshots of the locales only, not full descriptions, which are filled in as the text progresses.

## **School recruitment**

The primary selection criteria for schools were: at least one mixed-gender and one single-sex school, schools of varying socio-economic backgrounds, and at least one with a Roman Catholic ethos. Secondary criteria included schools where wider relationships with DCU existed or could be developed as a result of this research and proximity to the Dublin hinterland, although schools were spread over the province of Leinster, in Dublin, Kildare, Carlow and Louth. The high international attendance at one wealthier school was a deciding factor in using this for comparative purposes. Initial expressions of interest in the programme were slow during 2003, but Dublin schools began to take up in winter 2003 following the finalisation of programme activities and support materials for teachers (including Appendices A-D). Once the first schools became involved, word of mouth also allowed further uptake. The intention was to use fifth year, sixth year and/or transition years (TY) in the programme, as students in these classes would already have selected biology as a separate option or would be about to take it as a Leaving Certificate subject.<sup>1</sup> The TY framework also allows students to think about their future careers. Fifth and sixth year were preferable as participants as *The Science of Life* was proposed to be an active resource for the current Leaving Certificate syllabus. Initial inquiries to schools offered TY only, due to lack of timetable pressure. Nine schools from around Leinster were used in the pilot. From these, six were chosen as the main research fields for ethnographic notes and discourse analysis maintaining the selection criteria as above, although with some contingencies along the way that influenced recruitment decisions, as reported below and in other chapters.

## **A summary of participants and settings**

The six schools participating in the core analytical phase of this study were located in North Dublin, South Dublin, North Dublin city centre, South Kildare, South Wicklow, and Louth (Table 4.1). They were selected to represent a wide demographic: urban (ND, NDC); rural (SK, SW); isolated from the local community (NDC, SD); high number of international

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<sup>1</sup> Transition Year is the bridging year between the first year of leaving certificate studies and the final year. This programme is designed to encourage students to break out from usual school work and participate in project-orientated work.

students (SD); affluent background (SD); disadvantaged (ND); all male (NDC); all female (LH); religious ethos (NDC, LH); and a wide geographic spread (LH to SW). There were other schools involved in the pilot, as described in Chapter 5. The participant ages from the research schools ranged from fifteen to seventeen years, from Transition Year and Leaving Certificate classes. The film activity was also used in a youth service group in the South East of the country to demonstrate how a pedagogy of life politics might exist for those outsiders beyond the formal education system.

The task of linking the cast of characters who participated in this study with locations might seem daunting to the reader. To facilitate the identification process – while still retaining anonymity – schools are referred to by two or three letter codes that reflect their location, while students are referred to by false names beginning with the first letter of the place name from where they came. ND’ then is North Dublin, ‘SW’ is South Wicklow, ‘SK’ is South Kildare, ‘NDC’ is North Dublin city centre, ‘LH’ is Louth, and ‘SD’ is South Dublin. Deirdre and Della are from Dublin (north and south respectively), Kevin is from Kildare, Lorraine from Louth, and so on. Each student also has an abbreviated code name such as ND1 or SK3 for brevity but the false names will more often be used when referring to them in the text to personalise them.

The codes further serves to connect participants to a place eg SK = *South* Kildare, ND = *North* Dublin. This system also greatly aided my own memory, although there is a complexity about using a real name, false name, and code. To further aid my memory and draw attention

**Table 4.1.** The participants during the recorded sessions in this study.

|   |
|---|
| <b>ND</b> North Dublin; disadvantaged area; fifth year                                      |
| ND1 ‘Deirdre’ [‘mother’]  |
| ND2 ‘Donal’ [‘joker’]   |
| ND3 ‘Denise’ [‘outsider’]   |
| ND teacher [female, early middle-aged]  |
| <b>SD</b> South Dublin; boarding school; affluent; mostly non-national students; fifth year |
| SD1 ‘Della’ [from Germany]  |
| SD2 ‘Daniel’ [ from Bahrain]  |
| SD3 ‘Douglas’ [from Kuala Lumpur]   |
| SD teacher [male, British boarder, thirty-something]  |
| <b>SK</b> South Kildare; village school; farming community; Transition Year                 |

SK1 'Kevin' ['Outsider' or 'Inside Outsider? (Costa et al, 1995)']  
 SK2 'Katherine' ['rebel']  
 SK3 'Kate' ['Potential Scientist (Costa et al, 1995)'] / 'teacher's pet' / 'rebel'  
 SK4 'Karen' ['Other Smart Kid (Costa et al, 1995)']  
 SK5 'Kei' ['Japanese exchange student']  
 SKt Teacher [male, middle-aged 'farmer']

**SW** South Wicklow; village school; farming community; my alma mater; fifth year

SW1 'Wayne' ['sensible']  
 SW2 'Will' ['troublemaker']  
 SW3 'Wanda' ['Other Smart Kid (Costa et al, 1995)']  
 SWt Teacher [female, early middle-aged]

**NDC** North Dublin City Centre; all male; affluent; Catholic ethos; fifth year

NDC1 'Derek' ['fed-up rebel']  
 NDC2 'Des' ['teacher's pet, pro-embryo']  
 NDC3 'Damien' ['arguing for nature']  
 NDCt Teacher [female, twenty-something, first job; work placement at NICB]

**LH** Louth; all female; Catholic ethos; Transition Years

LH1 'Lorraine' ['religious']  
 LH2 'Laura' ['rational']  
 LH3 'Lisa' ['easy-going']  
 LHt Teacher [female, middle-aged]

**Bioscientists** from NICB

Presenter A at ND, NDC, and SK.  
 Presenter B at SD, LH, and SW

NOTE: Where these names and codes appear in the text, please refer back to this section.

to the process of creating an identity of the 'other,' some participants brought a description to mind, such as 'joker' or 'easy-going.'<sup>2</sup> Teachers and bioscientist presenters are referred to by code only; Presenter A and Presenter B were the bioscientists and LHt, SWt, NDCt, NDt, SKt and SDt the teachers.

The first two sections below examine the film and the bioscientist presenters. The remaining sections describe particular events and daily practices from the cultural surroundings of the

<sup>2</sup> By selecting aliases for each young participant I myself was involved in the act of identifying within a school bioscience context as Michael *et al* (1997) and Simmonneaux (1997) would recognise it. I was employing a social stereotype when giving a North Dublin girl the more common (in English-speaking world) name 'Denise' whereas giving the German girl from a boarding school the relatively more exotic name 'Della' (exotic for Dublin, although that too, is changing). My experience of these individuals created impressions to which I attached identities such as 'joker' or 'mother'. These identifiers were often taken from other modes of identification such as Costa (1995) or Aikenhead (2001).

participants, such as history of a school or its acknowledged ethos, often told in the words of the participants themselves.

### **The films: *The Gift* and *If ...cloning could cure us***

Later sections in this section present stories from some of the inhabitants who inhabit the research locales. Following de Certeau's (1984) spatial stories and considerations in current anthropology for spaces traced out between media and local cultures (Hughes-Freeland, 1998; Brown, 1998; Hirsh, 1998), this describes the dramatic discursive space presented by the films that were common to schools. Before entering the physical spaces of the schools, I wish to outline two other 'spaces' the films and the bioscientist sessions. This section deals with the films; the next section introduces the bioscientist presenters. Although each of the films had their flaws both in style and content, they both successfully created this research space for linking media themes (and frames – see Chapter 6) with local classroom discourse.

*The Gift* follows three generations of a family who have a genetic predisposition towards Friedreich's ataxia, a rare disease that causes progressive deterioration of the nervous system. The onset of this disease usually begins between 5 and 20 years old. Using flashback techniques and parallel narrative, the story intertwines the years 1998, 2012 and 2028. Annie Kay, a 16-year-old football enthusiast, begins to develop the symptoms of the disease in 1998. When she is diagnosed, each of her family members reacts in different ways. Her mother, Barbara, who has already lost her husband, is devastated and over-protective of Annie's brother, Ryan. The years 2012 and 2028 deal with the implications for Mark, Ryan's son, following his discovery that embryo screening was used in his case, not just for the absence of Friedreich's ataxia, but also for genetic markers for sporting abilities. Ryan has become a geneticist following the presence the genetic disease in the family. It becomes clear that his family background was a major influence on his decision to select Mark for his own interpretation of 'best traits,' a decision he takes without the consent of Mark's mother Jennifer, and with which neither Mark nor Jennifer are happy with. The film raises issues such as: eugenics, failing health, individual identity, children's rights to independence and genetic testing as well as traditional dramatic themes like jealousy, betrayal, and sibling rivalry (for a more detailed synopsis, see Appendix C.)

*If ...Cloning Could Cure Us* (2004) is set in the year 2014 where a 'maverick scientist,' Alex Douglas, attempts to harvest stem cells from a 19 day old embryo to develop treatment for

the victim of a climbing accident, Andrew Holland, who is paralysed from the waist down and in danger of dying. In doing this, she is defying UK legal restrictions on using greater than 14 day embryos. This film explores Alex's professional and personal motivations for doing this through a courtroom drama and includes 'real' testimonies from 'talking heads' such as leading scientists, bioethics legal expert Professor John Harris and Dr. Suzi Leather, head of the Human Fertilisation and Embryology Authority (for a further synopsis of *If... Cloning Could Cure Us*, see Appendix D). *If* ....throws up further questions about gender, sex and bio-determinism.

*If*... has the slicker production of the two. It caters more for 21<sup>st</sup> century sensibilities; fast cutting, expansive outdoor scenes, sharp dialogue, drama-documentary design. *The Gift* aims at the level of a soap opera. It has dated in many ways, a point made by many participants. Yet it works better as an exposition of the NRGT issues. This is not surprising as *The Gift* was developed as an educational tool (*Gift* teachers' resource, 1999), and its short duration fits neatly into a forty minute lesson. Yet both are inescapably educational tools, perhaps falling outside the issue culture process in that they are not caught up in a timely issue, nor are they entertainment by today's standards. The actors in *The Gift* and *If*. have neither the star power to invoke the kind of transcendence, aspiration, or adoration of mainstream cinema nor the familiarity and personal involvement of television series and soap actors. The conflicts between art, entertainment, and pedagogy are for another discussion however. In this context, both films succeeded in providing a space for decision-making in NRGTs for young people that challenged their conventional notions of biology class.

### **The bioscientist presenters**

The intention of the bioscientist sessions was to provide a tangible link to the outside world vis-à-vis third level biotechnology research. As framing is a subject of my discourse analysis later, it might be appropriate to say that this activity was framed to audiences as *a glimpse into the world of the scientist or bioscientists have a specialised job to do in the treatment of disease*. To participating teachers, the activity could also be framed as a career option for young people, and be aligned further with other activities in Ireland designed to entice young people into the sciences. For the objective of this project however, it was more important that it was a discursive forum where young people might gain access to third level science, and *challenge* these practitioners. It was an exercise in issue engagement with young people. In communications, business, and politics, people present their work to be received critically.

For the presenters themselves, it was a communication exercise, having more importance in Nowotny's (2001) Mode-2 science and Giddens' (1991) expert systems. The researchers who gave their time to this project are referred to here as Presenter A and Presenter B. Recruitment was a simple process. They were the only respondents to an email at the time, and were given the go-ahead by the Institute's director to participate. The format for the bioscientist sessions was developed during the pilot stages, partly from improvised initiatives put forward by Presenter A. The session followed a set structure: in the first twenty minutes, the bioscientist presented. They talked about their motivations, their day-to-day work as university entry points and academic paths. Speaker A often took a wider view than Speaker B, sometimes veering into ethical issues. The presenters were asked to focus on their own work, but to relate it as much as possible to their audience and to society. Both presenters used references to genetics in news media or science fiction. The next ten minutes were given over to a questions and answer session, which was usually quiet. The final part was a more informal focus group structure where I and the researcher moved around clusters of participants and talked about anything relating to NRGTs, society, and careers. Four school groups were fifth years and two were Transition Years.

Each speaker had a different style. Presenter A, authoritative and demanding, got attention very easily with tales of Australia or his concerns for cancer treatment. He was inclined to link his work more to society and possible outcomes of research leading to cures. He could be preachy about avoiding cancer, including in his presentation a 'good living guide.' In the early days, he appeared a little arrogant, which worked in his favour when getting student attention, and winning over teachers.

Presenter B was more relaxed, presenting in a soft 'cultured rural' accent. He preferred to focus more on college life, travel during work, and experimental problems than other aspects of wider society. He would make no great claims about outcomes except to say he was a link in the chain and his main focus was getting a PhD. While Presenter A's 'day-job' was research assistant at the NICB working on computer modelling systems for genetic markers that might reveal the presence of cancer. Speaker B was reading for a PhD on the application of genetic markers for cancer and diabetes. Where Presenter A was the manager, Presenter B was the charmer. Presenter B plays in a band and he had this experience to draw from in his talk. His general amiability and approach made him well liked in some schools. Presenter A was instrumental in making the session structure a success as this is an entry from my pilot fieldnotes demonstrates:



Once [the teacher] left, Presenter A suggested the 'break-out' session as per yesterday at ND-1. Here is where the remaining TY students finally relaxed and talked to us, so this could be a worthy data collection tool. The magic words were: 'Talk away yourselves.' The class divided into natural groups of friends, to which Presenter A circulated...In the car back to Dublin, Presenter A hoped that some of the class were inspired to take up science. He was confident he had done so (Pilot fieldnotes).

However another important factor in the success of this set of activities was the relationship between each presenter and their 'audiences.' Both were early twenty-somethings, not far ahead of their students in life. Connections were therefore developed from early on.

### **ND, North Dublin**

ND was one of the very first schools I visited at the pilot stages. ND is considered by the Department of Education and Science as a socially disadvantaged school. The surrounding area of ND has for the past decade been involved in a social redevelopment plan with the aim of renewing its identity and overcoming negative perceptions on the outside that have traditionally been prevalent about the area. This renewal of self-identity has physical, economic, and social dimensions. New shopping centres, art centres, and leisure centres, as well as green spaces, are part of this development. Local authorities and social inclusion network-supported initiatives have encouraged young people to regain a sense of pride in place, and to represent this artistically. These same artistic imaginations are on display in the SK foyer. Large posters decorate the main atrium, representing fun aspects of New Year's resolutions. In among scientific themed posters leading from the atrium to the biology lab, NDt has placed an Irish Times article on the discovery of *Homo floresiensis* (Welcome to the family, Mr Flores, 2004.).

Deirdre and Donal, two student interviewees from ND, described the negative self-identity of the community. Deirdre is fed up with what she calls the 'stereotypical' views of people outside the ND area - particularly in the country - who, when they think of her home, see only crime.

I: They're kind of afraid of you. They kind of like go 'Oh you're from.....*that* area . We ... won't

mess with you' like.....Even in jobs or whatever, they're always keeping an eye on you and stuff. So I think it's kind of hard to get a job like anywhere else if you're from this type of a school.

PM: What do you think yourself?

I: I think it's brilliant. I think the school does a lot for the surrounding area. Like it gives you lot of hope for our future like. Better education and stuff.

(Deirdre, ND1, interview)

Donal also thinks that people from outside the ND area have a narrow view of it. 'There's bad apples everywhere,' he told me. 'There's just a few of those that give the place a bad name.' Part of my early analysis of the cultural placement of the young within controversial NRGTT issues had been to identify Costa's (1995) outsiders to science, which as I described in Chapter 2, has affinities with Bourdieu's ethnographer having outsider knowledge within cultural capital. In this case Deirdre and Donal present the surrounding environment of ND as an outsider *area*. This in no way means they would define themselves as outsiders to science. Denise, on the other hand, is an outsider within an outsider area, or a marginalised area as perceived by the inhabitants. NDt tells me that Denise is one of the weaker students and thus, in her view, might not be suitable to participate in the study.

Denise, in common with Derek and Des from NDC, describes 'going out' as a hobby or interest outside of school. Denise however makes interesting references to the 'small details' that come up in biology class, such as drink and drugs, and these shine a chink of light on her peer culture. A particular sort of relevance emerged with emotive references to home life that connected with the film or bioscientist sessions. Deirdre said: 'Mam had breast cancer....Dad coughs a lot. A heavy smoker' (Deirdre had been interested in Presenter A's description of smoke entering lungs and causing tumours).

The young people from this area sometimes have to juggle school work with paid work outside of school hours. NDt remarked to me that they might often resent having to come to school when they are not getting paid for it. Deirdre works in the half term break for a pharmaceutical company – that also employs her father – 'scanning stuff and tak[ing] orders for hospitals and stuff like that'.

All three interviewees give answers which are slightly more flexible than their rigid positioning in debates. In interviews, they were inclined to stay close to the centre of agreement - that is, undecided - on whether to use NRGTTs or not. My identifications and selection processes for interviews were not so defined as to create 'solid' identities of opinion

in this case. Moreover closer examination of the NRGT issues on a one-to-one basis may reveal more common ground between participants than in the forum of debate, as will be discussed further in Chapters 5 and 6.

Deirdre is a 16-year-old mother who described herself as 'stupidly funny.' She enjoys 'hanging out with... friends' and 'drawing.' She is a quiet, reserved person. It emerged during discussions that she has a niece with a cleft lip, with whom she identifies ('because of the teasing'). She also identifies with her sister, the child's mother, who might use PGD for future pregnancies. She was open and honest about the child's condition and her struggles in school. She is mature beyond her years and in her responses expressed a deep sense of protection towards anyone considered physically 'different.' Deirdre expressed a view in class that parents have to make tough decisions, including embryo selection if this becomes a form of 'protection' against disease. She uses deadpan humour in interviews, and although her answers are generally short, they are full of information. She refers a lot to the film and tells me she is interested in pursuing film studies.

Donal is one of the (quiet) jokers of the class but school has no real interest for him. He has dreams of being a journalist or working in television and is seriously looking at media courses at DCU. Donal fell asleep during one of the sessions. He identifies with Ryan's use of PGD technology, perhaps even for sex selection.

As with the pilot field study the previous year, the ND class is a small group of fifth years. The group responded well to the introductory video session. (I regretted not recording the 'warm-up' conversation). Students were very forthcoming about their private lives and people within their outside worlds who have experienced health issues and tied it in to the genetic screening theme.

During the period of this study, two neighbouring secondary schools in this North Dublin area were amalgamated and housed inside the buildings where I carried out the study. The energy and sense of urgency required to implement this was evident from the haste with which all teachers worked here, and sometimes there was a real sense that the two contact teachers with which I worked with were overwhelmed.

The area has close links with DCU's outreach programmes. This was reflected in the positive attitude teachers had towards Presenter A and myself, and in students' response during discussions. However it took a little persuasion in initial conversations with NDt before the

pilot even began for her to introduce discursive techniques about ethics in science if such activities would not be assessed as part of the curriculum. NDt felt that the 'weak students' in her class would not relate to such content. She was also resistant to written materials (used in the pilot) and felt there could be little merit in. Yet by the end of the programme she favoured this kind of approach to be introduced to the curriculum. Her comments were perhaps more a reflection on the malaise as she saw it then, a points-driven, syllabus-heavy system, where it would be difficult to accommodate these activities. NDt expressed the opinion that the Department of Education might not respond well to such teaching initiatives.

### **SD, South Dublin**

SD was selected because it was a co-ed boarding school of over three hundred students in an affluent area of Dublin. More than that, the study group of fifth years was unique in having mostly non-national students from more financially well off families around the world. SD has three hundred students, one hundred of which are non-national. The international flavour of this class was exceptional even by their averages. In a class of fifteen, just one or two were Irish nationals. Students who we spoke to throughout the sessions came from Germany, South Africa, Belgium, Kuala Lumpur and Bahrain.

Della is German. She told me she was unsure what her dad did for a living and her mother was a 'house woman.' She is careful not to reveal too much in interviews and finds it difficult to self-analyse. Douglas from Kuala Lumpur describes himself as 'moody.' I was interested to see how different his Catholic upbringing might be in comparison to many Irish boys of his age. His father works for a large multinational company in the UK where his family now live temporarily while Douglas boards in SD. He is technically minded. His interest in biology stems from it being a 'very precise' subject to him, but our activities are challenging these common practices: '[Biology is] black and white...yet there's grey areas as well so it's quite... interesting.... sort of.'

SDt had a background in neuroscience before turning to teaching, as well as also being from outside Ireland. SDt, in his early thirties, is from the UK. SD was also selected as it was one of the few schools to use the online platform which was intended to be part of data collection in the original pedagogical plan (see Chapter 3).

On my first visit to SD, I was immediately struck by its surroundings. I first visited the campus on a beautiful June day in 2003. The Victorian campus rolls among the picturesque hills and woods at the foot of the Dublin Mountains. It is surrounded by farmland and the smells and the sounds of the countryside.

Students assemble at chapel first thing every morning for 'meditation.' 'You sing a psalm and a hymn and one of the prefects reads the lesson,' Della tells me. According to the prospectus, the chapel is at the centre of its existence, both metaphorically and geographically. SD identifies itself as having an ethos that is 'informed by the Christian values of tolerance, kindness and selflessness that are so important within a close-knit community (SDt prospectus).' The pastoral ethos is reflected in its emphasis on communal singing and choral participation. 'But,' the prospectus adds, 'we welcome members of all Christian denominations and all faiths (SDt prospectus).' There was no direct Christian influence in any session. But the chapel is seen by some as a kind of oasis. Boarders are divided into separate Houses, each with their own identity. There is a hierarchical 'house system' comprising the Housemaster or Housemistress, an assistant House tutor and students elect a Head of House and House Captain. There are also College Prefects, representatives of the general student body.

The prospectus also boasts good student-teacher relations, and a 1:8 teacher-student ratio. Many of the teachers are boarders, as was SDt at the time of the study. SDt has a friendly relationship with the students; he is cheery yet authoritative. On one occasion, a group of boys bring a sick pigeon chick to SDt, and he offers advice. There is a progressivism about SDt and the two other science teachers who greeted me on my first arrival, particularly the head science teacher, who contributed to the bioscientist discussions. SDt was enthusiastic at every visit and was proactive in showing to the head science teacher the extent to which he was inviting researchers such as myself and Presenter B to the school. SDt uses newspaper, video, and discussion as pedagogical devices in his classroom so our activities would not have been new to the students. However he is careful to maintain an objective, scientific distance, presenting 'hard scientific facts' if there is a debate on social or ethical implications of S&T. He personally feels that NRGTs do need to be regulated however, to counteract the legal void that has occurred, unlike his own area of animal behavioural science. He uses a popular wisdom type of phrase (see Chapter 6) - 'slippery slope'. Media coverage of NRGTs is a particular bugbear, and he says his class sees this as well. They often have discussions separating 'the wheat from the chaff in journalism.' SDt tells me his class have decided 'tabloid journalism' stokes the fires of debate. He feels the new biology syllabus is useful for

'justifying' social elements that he would bring up anyway, but thinks the content now suffers as there is no connection between topics.

The outsiders described in ND are rare in SD. SDt will spot them early on, as has happened 'in the past,' realising they have made a 'wrong choice of subject.' Audience responses in SD showed a general confidence in film and bioscientist sessions that was sometimes lacking in other schools. The three interviewees though, Della, Douglas, and Daniel revealed a kind of isolationism in their responses such as 'We don't get out much' or 'We haven't seen the area.' At times this isolation does not seem to bother them. They do not express any need to feel a part of Dublin or Ireland. What emerged from the three interviewees however was the restrictive nature of boarding life. Although neither complain directly about the workload, there were couched references to evening and Saturday work and the short periods of tranquillity they might get in chapel, in their room listening to music, socialising at breaks, or playing sports. SDt tries to organise outside trips, rather than invite in speakers. However one benefit of living in a boarding school for activity organisers (or the downside for students, depending on the perspective) is that evening 'luncheons' can be arranged for external speakers.

#### **NDC, North Dublin city centre**

NDC is another well funded, 'oasis' school. This institution is all male, and might seem to have a hint of siege identity from the outside. The school is hidden away from a more socially disadvantaged part of the inner city, with large steel and glass doors that barricade itself from the outside world.

[The]area is nice. The people are great and there's lots of things to do , but there are a lot of places near where I live that are rough. The school, as you know, is expensive, but good. Its [not]rough at all but is located in a rough area. (Derek, NDC1, written later on amended transcripts)

I like the area that I live. It is slightly dodgy but the school is great. (Des, NDC2, written later on amended transcripts)

The school presents a strong Catholic ethos to the outside. The school is involved in many charity initiatives such as collections and 'sleep outs' for Vincent de Paul, voluntary work to disadvantages areas of the world, and Saturday soup runs for the homeless. Derek, whom I

regularly identified in my notes as 'class rebel,' said that he would like to do charity work when he leaves school and before starting college.

The study group were fifth years. In contrast to many schools, NDC labs were new and clean with state-of-the-art lab and multimedia equipment. The room used for all discussions also had spaces for lab work.

NDC was recruited to the study because there were interesting links emerging between the NICB and this school. First of all it was Presenter A's *alma mater*. NDCt was part of the Science Foundation Ireland STAR<sup>3</sup> programme, which funds science teachers to go into industry during the summer period to acquire technical skills from the workplace. She did her placement at the NICB during the summer of 2005. Presenter A and NDCt connected on their common backgrounds and interests. Presenter A inquired about his past teachers. (NDCt did not participate in the bioscientist session, using this time to catch up on other work). I initially approached NDCt while she was on placement to continue the intended *Science of Life* programme (see Chapter 3), thus extending the NICB reach of schools. NDCt was developing a website of her experiences at the NICB, updates of which she would show prior to each session. It was her first term at NDC; already the principal was supportive of her using our activities in some of her classes. Derek (NDC1) later told me that a new teacher maintains student interest because she herself is interested. These factors made me decide to replace another all-male school with a Catholic ethos in a large town in the south east of the country with NDC. The school fit the criteria, it was more convenient for travel, and contained these added relationships that could be explored within the context of tertiary/secondary co-operation.

Derek (NDC1) is somewhat of a fed-up rebel. His attitude in the film discussion was at times confrontational, with bored expressions, as if bothered by the setup and with other people's opinions. On the short evidence of the film discussion, I could identify him as one of Phelan *et al*'s (1991) 'Different Worlds/Boundary Crossings Managed', a student who does not feel fully a part of the school setting, yet whom one could imagine performing well in exams. A follow-up 'active' interview, however, revealed a more content individual in school, who was grateful for the experience of education, and who explored a complex range of issues relating to sex selection, character trait selection, and genetic determinism in NRGTs. These were all

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<sup>3</sup> Science Teacher Assistant Researchers, or STARS, are part of a Science Foundation Ireland initiative to second teachers into laboratory environment to 'disseminate new skills and knowledge to teachers which can be passed on to their students - the scientists and engineers of the future' (Science Foundation Ireland, p1).

issues that concerned him. Derek has a relatively large family, although this is the result of a parent's second marriage a distance from Dublin, where he spends a lot of time.

Des (NDC2) is a quieter individual. The teacher also identified him as quiet and suggested him as interviewee for his 'neutral position.' My memory of him from film discussions was on the pro-technology side of neutral but he did seem to consider both sides of each argument. In interviews however, Des could unambiguously be identified as pro-life. He defends the human status of the embryo. An interesting feature of our active interview was that he asked *me* a lot of questions. Rather than the expert role in which speakers and myself found ourselves in discussions (see Chapter 5), Des seemed to use questions as a way of negotiating his way around the disruption of the embryo:

- I: .... implanting for fertility? No I mean I wouldn't. That .. that wouldn't involve actually destroying an embryo would it?
- PM: Well there are different techniques. There are some which would be, depending on of course, there's so many different ah, problems, that could exist in an infertile couple. But in some cases they may have to produce a few embryos.
- I: OK.
- PM: Now that's not in all of them but in some cases. And....
- I: Yeah yeah, Mm.
- PM: ..what's left there are generally called, they're literally called, 'spare embryos' because some will take and some won't.
- I: Mmm
- PM: Or maybe they'll overproduce a few so they can have...
- I: And would they.. like implant them one at a time or would they...?

Des, like Denise from ND, describes 'socialising' as a hobby or interest. 'Socialising would be a big part – a huge part of my life really.' Des considers himself good with computers, and may even consider them as a career.

One student at the front fell asleep during the initial introductions, picked out by NDCt at the end of the film discussion as a 'troublemaker'. I had initially chosen this student to be NDC2, using the identifier 'wise-guy.' He was quick to produce wisecracks when he was focused. Besides being NDCt's public enemy number one he had demonstrated an appreciation for



social and ethical issues of bioscience in his comments and questions to Presenter A. Later, this situation changed when he told NDCt that he did not want to be interviewed.

In group discussions, Damien (NDC3) argued the most strongly on behalf of protecting the embryo but not for overtly religious reasons:

I: Yeah. I think nature has a certain balance like. .. you can see it like in all species. But when we start interfering with that it does kind of create a kind of lopsided then. And its like the right gene pool or whatever isn't there any longer. Nature put us here like, we can't really dictate then.. what's going on.

For Damien, nature has a balance and human intervention can upset this balance. Humanity is definitely part of nature, but just one species of animal that can get carried away with its own arrogance. Damien also offers a scientific explanation for not using PGD: the gene pool could be upset. This was a unique feature of Damien's responses. He would keep conversations loosely within the philosophical scientific realm even when attempts were made in interviews to guide him towards his own personal interests or school. He may have made this demarcation himself – discussions could wander into the arena of philosophy at times and this is how he saw the content of film discussions. However Damien would seem to have an interest in science that goes beyond science class. Biology is his main interest. Without prompting, he would identify a controversy about science versus religion in evolution. He categorically said that he was not influenced by anyone else on the issue of evolution. Again and again he would return to this subject:

PM: Just a little bit of background information. What other interests do you have outside of school?

I: I love biology and living things and that'd definitely be an interest. I love the area of.. ..evolution and that. I'm really interested in that like. Its very interesting. You kind of... come to conclusions yourself like which I know some people share some people don't like. You kind of just take what you believe in and that but yeah, above all it would be biology out of the three sciences.

PM: I suppose you're following with interest the 'Hobbit Man' as they call it? The find [in] that. What do you think of that?

I: Oh yeah I.. I think it was share [?].... I think evolution.. like it has it .. in my eyes it has to have happened. There's so much evidence

there. And sure why wouldn't it have happened? You can see it with other animals as well. Y'know..We're just another species on the planet.

PM: Yeah. Do you think there is some kind of resistance? I mean you're saying there's definitely evidence. I mean possibly in this country few dispute it. But do you think there is y'know a need for a kind of [??] there are people who don't believe in it?

I: Well yeah I think religion is.... Has such an influence on people.

Later I attempted to guide him towards talking about interests besides biology or philosophy. After he talks about his favourite films, he brings the subject yet again back to the philosophy of biology. Clearly Damien used this opportunity as a platform for talking about those philosophical issues of biology that interested him.

NDC, similar to ND, revealed my simplifications in the compromised choosing of identities in debate. I had selected interviewees on the basis of where they positioned themselves with NRGTs – 'anti-, 'pro-, or 'neutral.' The three selected interviewees seemed to change position from where they had originally appeared in film discussions. Damien did not agree with interference with the embryo but not because of any 'essence' or personhood of the embryo. NRGT 'interfered with nature.' Des, relatively neutral in debates, did indeed see a strong need to think of beneficiaries of NRGT treatment, but was resolutely against any impact this might have on the personhood and integrity of the embryo. Derek, a rationalist, and staunchly pro-technology during each statement in film discussions, produced a case in interviews for not using PGD for any reason but essential health ones. Peer pressure in the public forum might be used as an explanation for the partial shift in position here – he wanted to portray himself as detached, confident, cool – but the complexity of each of their views reveals other facets of 'performing' in a debate which can occur publicly and in private, as described in Chapters 5 and 6. My own judgement in selecting three interviewees from the pro-technology, neutral and pro-embryo/nature sides of the debate was justified in terms of investigating further into cultural assumptions and the creation of frames regarding NRGTs. However what is most interesting – and has repercussions for survey research into these kinds of discursive opinions – is that participants used the film discussion and the interviews as separate *locales* with *separate perspectives*.

Presenter A's return to NDC as a career biotechnologist also meant that he had a different identity. There is an instant change in behaviour when Presenter A appears, in comparison with their interaction with NDCt or myself, as if another novelty had arrived.

### **LH, Louth**

LH was another Catholic ethos school, this one being all female. The building is a large Victorian school with many cavernous rooms. Louth is a border county and is the most northerly of the study areas. Unlike teachers at the three Dublin schools and South Kildare, LHt did not participate in sessions in any way. Also, like staff at ND, LHt was in perpetual motion, with just enough time for introductions before leaving me with the class. A communication breakdown, or mix-up, meant that this was the only school where the film discussions and bioscientist session were with two separate groups. Due to unavoidable schedule problems, the intention was to have the summer break in between each activity. The test group would attend the film discussions as Transition Years (TYs), then the bioscientist session as fifth years. The three interviews were due to take place the same day as the bioscientist sessions after the holidays. However LHt felt that there was limited time for interviews after the presentation, thus setting up the three interviews to run co-currently with Presenter B's bioscientist session presented to *current* TYs. Given time constraints on both sides, there was a decision made to run with this. This impacted on the study in that the three interviewees did not experience the bioscientist sessions and I could just partially observe Presenter B's session.<sup>4</sup>

There was one other constraint which made the LH activities difficult to manage. TY is divided into two large classes of forty students each. As with the pilot, LHt was concerned about using just one of these classes for the study, preferring to include both if possible. This made for an overwhelming number of participants in discussion. At various points during the film discussion, arguments descended into unmanageable, chaotic shouting over other viewpoints of multiple participants. The pilot had a similarly large class however – although not quite so – and Presenter B's TY group also numbered about forty. Presenter B did not seem to have discipline problems. The nature of the film discussion activity - the structured physical movement and expression of views - leaves sessions open for emotive, and as I describe later, *performed*, arguments. Presenter B may have controlled and 'worked' his

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<sup>4</sup> Presenter B was instructed to take notes of proceedings himself until I arrived, and I interviewed him afterwards.

audience much better than I did. Then again, there is a marked difference between presentation and debate. I noted however that responses to film statements from a larger class did not explore the films themes in the same depth. The students were very enthusiastic. The pedagogical format here did not do their enthusiasm justice. However from the accounts given by the three interviewees, the themes from the discussion resonated with the students and they talked about them for some time afterwards.

At the time of the film discussions, two major NRGT news stories broke. On the same day, scientists in Newcastle, UK announced that they had cloned a human embryo and South Korean scientists had announced the differentiating stem cell lines derived from a human embryo, the first time this had been done successfully.<sup>5</sup> In film discussions, I mention these types of major media events, and science news stories tied in with the film, *If...Cloning Could Cure Us*. However, very few claimed to have heard of either cloning breakthroughs.

Cacophonous debates aside, this school was a good example of strong types of framing strategies both in open forums and in one-to-one conversations. This first interviewee was unique to the study, a rarity in the study. Lorraine (LH1) professed strong convictions on the subject of NRGTs. She *believed strongly* that destroying an embryo at any stage was wrong. She told me of her deep religious belief and she insisted this had nothing to do with her parents (who are less religious), but was informed by a faith she had found for herself. 'Well I *am* a Catholic,' she said in response to my initial questions about her views on the technology discussed in the classroom.

There was a calm, graceful demeanour about Lorraine's interview responses. She likes 'folk music, ballads, songs with stories and morals.' She dislikes 'pointless songs', sci-fi, autobiographies. Lorraine doesn't watch TV She organises practice for a children's choir:

Its just that...they're so excited, the young kids that we have. It's great just to see that (Lorraine, LH1, interview).

Lorraine appears well read and has a strong academic interest in both English and religion. It seems these subjects are the influence for her to go to college rather than the career outcome, which she expects, might be teaching.

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<sup>5</sup> An interesting sub-plot developed to this story when the South Korean team led by Woo Suk Hwang was charged with scientific fraud involving this breakthrough. Question marks were also raised over another scientific claim made by this team – Snuppy, the world's first cloned dog. Woo has since been suspended from Seoul National University.

Laura (LH2) was selected for interview because she found herself undecided on many of the statements in the film discussion. Laura brought up an interesting genetic duality in her family that might, she believed, contribute to her and her sister's different approaches to life – her parents. Laura's father is 'good at art,' her mother 'good with computers.' Laura herself has an interesting and varied list of hobbies but seems drawn towards arts and drama whereas her sister is currently doing biomedical science. Laura tells me these home worlds may influence her, but the ethos of the school certainly would not in terms of views on NRGTs. She is critical of the Catholic Church's authoritarian position on NRGTs.

Lisa (LH3), who was strongly in favour of using HESC research, appeared to be a good friend of Laura's. In discourse analysis discussed later, there were some shared schema constructs between the two. They had debates with other students after the film discussion. History is a big interest of Lisa's. We also had interesting discussions about make-over and plastic surgery shows on TV which she cannot resist, and feels a certain shame in this. 'I'm kind of girly,' she feels she needs to say, in justification. Lisa decided not to take biology, but she began liking it through the science elements of the TY programme. Lisa, like the rest of the LH class, hadn't been involved with the bioscientist sessions.

LH opened up a particular structural element reported by many educational ethnographies, none more so than Bourdieu and Passeron (1977), about non-verbal and tacit modes of power. When I was leaving after the film discussion session, the principal reminded me – with cries of argument still ringing in my ears – that the ethos in the school does not lend itself to question abortion. This was in response to a question I asked about my work here, rather than a warning. However she did not question me further about classroom activities. Although LHt was driving this, the principal was the first point of contact at the recruitment stages. She would have been informed of the subject matter at the pilot stages. However, the abortion arguments would not necessarily have been a detail we discussed – and it is possible neither did the principal and LHt. It could be argued that the official ethos advocated in literature and verbally from schools such as LH or NDC does not reflect the day-to-day decision-making processes of teachers and principals who see immediate benefit from allowing open discussions and challenging orthodoxy. Is it an example of passive enforcement, much like the Catholic Church's stance on IVF? Do these critical events that are anathema to the ethos occur regularly, slipping beneath the radar? Perhaps the principal gave me the benefit of the doubt.

## **SK, South Kildare**

The SK village lies close to the Kildare/Wicklow border. It is a farming community and SKt, as he says himself, 'keeps a few sheep.' Our study group were Transition Years with third and fifth years brought in for one session. SK formed the strongest connection with the research project and, by extension, with the university. This was in no small part due to SKt's enthusiasm for using the university as a resource and his professed desire to allow a more meaningful way of teaching science enter the classroom than was heretofore available to his classes. He feels media, old and new, has a strong part to play in this. Ultimately though, each student is responsible for his or her own education. SKt's mission is one of encouragement for those with a glimmer of interest in science, to help them pursue this path and excel. He was born and educated in the SW town, which is not far geographically or socioeconomically from SK. He graduated as a teacher from Crawford College, Cork. SKt says he drifted into science education. He could have been in the army. His inspiration for taking up science was the influence of his old science teacher from SW, which is in close proximity to SK.<sup>6</sup> He tells me he has taught in this, what he calls, 'mixed ability school, a vocational school-cum-community college' for thirty years, teaching two generations of students, and building a community rapport. He is saddened that there is not 'a tradition of education' in the area.

Since being involved with the research programme, SKt has had two years of work placement for TY students in the NICB and is constantly approaching the university for Young Scientist Exhibition projects to assist his students. He insists on an organised learning plan. He also wants this project to have a very definite learning outcome. SKt gives me available dates for the programme and times, as well as his email address and requests updates such as guidelines for the programme. He mentions 'the problem-solving method' and sees ways I could help him with this. His organisation benefits the Department of Education and Science, where he contributes to the development of Junior Certificate science and Leaving Certificate physics and chemistry.

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<sup>6</sup> This teacher was the grand old man and patriarch of SW school. He was my first science teacher and also contributed to my interest because of his enthusiasm, but also because of the smell and feel of the large lab, or so it seemed to me as a first year secondary student. This old man was teaching in an older style in a setting that was unfamiliar to me. This first experience of science education had a Victorian feel to it. I was both fascinated and a little unsettled by it all.

The closer relationship with the teacher and school provides me with an opportunity to view the cultural perspectives of the educator in a more enriching way than with other schools. This relationship is a construct that we both have created, and does not diminish other relationships. The teachers from the other study schools are content that we DCU researchers are a distant resource to which they could respond to annually or twice annually to complement a particular part of the syllabus, whereas SKt pushes for more activities.

Two students I want to pick out for special mention here are Kei (SK5) and Katherine (SK2). Kei was a Japanese exchange student who appeared lost in debates. She had little English and it was clear that it was difficult for SK to support her needs. I selected her for interview, with Katherine as her interpreter. This was not very successful; she indicated she would be agreeable to writing her responses on a longer questionnaire. Kei returned to Japan before her questionnaire was collected. It was with some regret that this obvious outsider to the Irish system could not be aided in her contribution. Katherine on the other hand was, by SKt's admission, unusually quiet in one particular open session. She had just pierced her tongue; her parents were as yet unaware. The topic never emerged in interviews, but Katherine's statement embodies life politics in more ways than her taste for body jewellery, connecting as it does to an undercurrent of political action against curriculum and teachers, as recounted in Chapter 7

### **SW, South Wicklow**

SW is my old secondary school. I had a personal motivation to return here, to study how an institution from my formative years might respond to issues of life politics and media-influenced pedagogy. Also I wanted to 'give something back.'

SWt, similar to Lht, did not participate in sessions. She talks enthusiastically about using discussion activities to talk about NRGts, however. Where they are raised, it is not in the context of a social, citizenship, or philosophical reading of identity, but wider Irish society only, such as the monoculture of Ireland compared with other countries. She is somewhat disappointed with the curriculum change. It is not because of the contemporary issues strand – she talks about encouraging students to explore AIDs, global warming, genetic testing, topics that do arise from time to time – but because it has become a 'more vague, less tangible biology for kids.' She picks enzymes, photosynthesis, transport, and osmosis as examples. She expects an exam question about the pros and cons of biotechnology soon. SWt, not unlike SDt, is concerned where NRGts might be leading us. She feels an

international decision needs to be reached so there is guidance. With regard to the current curriculum, she wonders how could a topic like bioenergetics be relevant to today's young people, particularly those who are never going to be in the industry. It is 'hard to connect with them.' She herself feels far removed from biopharma and cancer research. SW is located close to SK and has a similar rural setting. In some ways, it is even more isolated, as there is no hi-tech industry nearby. 'Manufacturing and industry is not big around here.' Agriculture is the main local economy.

SWt is motivated by working within the education system. It provides a good home-work balance, and is conducive to family. She finds SW very supportive of her. However, something is amiss. When we talk about classroom outsiders, there appears to be a few students each year that she cannot reach. But it is not just the number of 'weaker students' - this story is similar to NDt and SKt. It is something else. Although she praises her current final years for their enthusiasm, the fifth years (the participants of this study) are less engaged. The more SWt talks about this disengagement, the more it seems to be a general trend from first to final year:

As they get older, they get less inclined for chit chat, more withdrawn. Something is happening here in the system...It might be a problem with our school. Pressure is put on them from 3<sup>rd</sup> year on. (SWt, female, interview).

Presenter B told me after his session that SW stood out for him as the one school where the teacher said there was practically no interest in science among the students. This was reflected in classroom discussions, which were muted. At first I was disappointed that my old school should feel this lack of enthusiasm for NRGTs, identity, and society. It impacted somewhat on my theoretical assumptions about an emerging life politics beyond the curriculum. However, close analysis of transcripts characterised SW as another type of reaction to our activities, not least one stifled by the pressures of senior cycle. The low-key dynamic of classrooms threw up phrases like 'of course he should do the best for his child' or 'of course you shouldn't select for sex or sporting abilities.' The tone implies that there could be no other option in each case, and that perhaps argument is futile. Could this 'common-sense' attitude – identified in other science education contexts by Solomon (1994) – a one-sided, rational approach, be peculiar to the locality? I shall return to this aspect of SW disengagement later.



## Conclusions

The six participating schools from across the country each had a unique involvement with the activities – film, discussion, and presentations – and accordingly affected change to the programme of activities, causing it to adapt to local conditions. Within each school I identify here locales similar to Giddens' concept of a sociological setting for interaction. I extend the locale to include the discursive forum for each activity, such as the film and the presentation. The context for the research project is mapped out through distinct spaces, from the actions of character in the film – to whom students had to identify with, as reported in the next chapter – to the physical spaces occupied by teacher and students and their local customs and practices. By traversing these locales with vignettes from the field, it is possible to see how local practices incorporated the intervention activities to look at topics and concepts relating to NRGTs in society. It was possible to see oppositions and rejections, as well as different beliefs about identities and their place in the world. Each site was unique, and at times the socioeconomic realities of the school was quite visible. This had an impact on the how the discussions played out, such as the level of engagement from students and the types of constructs that came from students' responses, as will be seen in Chapters 5 and 6.

To place the findings of this chapter within the two research themes, it is helpful to summarise how life politics and pedagogic practices emerge in the accounts given. First life politics; empirically, 'sequestration' and separations exist between school and wider discourse on NRGTs and between many students and their teachers on the relevance of biology education in general, and NRGTs in particular. A theme of separation from the outside world emerges, as though the school exists as a self-contained system, which follows Giddens' (ibid.) definition of institutions of modernity. A gulf exists between teachers and their student at times on views on wider issues of a general pedagogy, such as life planning using NRGTs, and sometimes between individual students and the world. However it the outsiders, or 'reflexivity losers' as Lash (1994, p120) calls them, who may find it most difficult to access and be involved with any NRGT information, and these people are strikingly obvious to see. The ND participants and Kevin from SK may not possess the tools to play the game that others possess, those others being the rest of society regarding the former, and his classmates in the case of the latter.

In Giddens (1991) late modernity, reflexivity through mediation of information is crucial in constructing the self-identity that creates the conditions for a life political agency to occur.

Yet the participants are operating in an increasingly class-polarised but decreasingly class-conscious society (op.cit.). There was, however, no evidence of low teacher support for students in disadvantaged areas. Less funded schools were more chaotic and impacted on teacher workloads. Also, class-related differences related to the articulation of constructs and schemas, not to the sophistication of constructs. Of more concern was the feeling of isolation and powerlessness students from ND experienced. These barriers can be identified with class constraints reported by other authors, notably Bourdieu (1984) and Bernstein (1990) (particularly this author's talk of reproducing socio-political constraints and class modalities), and which do not have a high profile in Giddens' work.

Later chapters will analyse the theoretical basis for formal education system operating as an institution of modernity, utilising a scientific rationalism frame that removes issues concerned with identity, morality, and societal values from biology education, thus making it difficult to bring NRGTs into science pedagogy. In the vignettes presented here, there are some levels of discomfort among teachers and students regarding the use of NRGTs, particularly those involving the embryo. Those students who have most conviction in their responses are at pains to emphasise that their responses are their own, that there is no peer or parental influence on their opinions. Their perspectives are *authentic* in the Giddens (1991) sense of being true to themselves and loved ones without external criteria.

Regarding pedagogic practices, the first observation relates directly to authenticity in classroom situations. There was apparent inconsistency between views expressed by participants in interviews and the same students in the larger forum of the classroom. One student expressed views that were more pro-life in interviews than in class sessions. In general, NRGTT issues discussed on a one-to-one basis sometimes provided more common ground between participants on the issues than in the forum of debate. It is important to stress here that both representations would be authentic in the Giddensian sense for that locale – the personal of the interview and the social of the debate.

Teachers are generally enthusiastic about addressing the social implications of biotechnology and show a willingness to use film and discursive formats in classroom. Some teachers however felt constrained by their conditions, for example, time, curriculum, and professional difficulties related to the crossing of borders into the domain of values and beliefs. The change in the Leaving Certificate biology curriculum has not been met with widespread satisfaction. This criticism extends to the diffuse and at times irrelevant nature that has remained from the previous curriculum, rather than the contemporary issues strand.

These then are the sites to which the research activities were introduced. The next chapter will explore how theoretical and methodological frameworks developed from the pilot phase of the project and the various borders of performed – one might say *improvised* – negotiations between researcher, teacher, and student in various practices.

## Chapter 5: Power, performance, and pedagogy: describing the research fields

As discussed in Chapter 3, a critical element developed in the inquiry between the pilot test study and the implementation of activities as part of the core research phase in schools. This was largely in response to students' concerns during discussion activities. A feeling of containment emerged, trapped by the structures enforced by the education system and overseen by their teacher. The critical theoretical focus of life politics and students' views shaped the rest of the inquiry. This chapter addresses the problem of access to the social-political, cultural, and ethical discourse of biotechnology. For all students in the classroom, there are structural restraints on the pedagogy of NRGTs, as identified by the teachers themselves here. These constraints of power and pedagogy are mapped across Bourdieu's *fields* where there are contact struggles for recognition and defining and refining what is at stake. The dynamism of fields contrasts with Giddens' less power-conscious and more geographical/spatial locales or institutions of the previous chapter. This power extends from teacher to student and is reciprocated. But an emerging concern was the classroom outsiders from within, that is, *student* outsiders. Although my main question inquires into what connects classroom concepts and dynamics to wider discourse, I needed also to locate theoretically and personally – two perspectives that were becoming less discernible – the disenfranchised in debates as well as the performers in every sense of the word. Could the politics of an issue that concerns – indeed *offends* – many through media and society be played out similarly in the classroom? The classroom outsider may hold as much of a key to how biology and life political issues such as PGD or HESC may connect to youth in formal education as either teacher or performer, if not more so.

It is clear from the ethnographic descriptions of Chapter 4 that gulfs exist between those who *can* contribute to this type of discourse in biology class, those who feel they *cannot*, and those who *do not want to*. Being an outsider to the discussions might be of a student's own choosing, yet there are important relationships to be identified between how a student might

'perform' the actions of an outsider identity and how the teacher-facilitator-student power dynamic responds to these actions. A student's right not to be involved must be respected; equally students should have a right to be presented with subject matter that interests them and that is relevant to their lives. Theoretically, in science education research, the 'worldview' and 'border' inquiries of Solomon (1992), Cobern (1993), Aikenhead (1996), and Jegede (1994) identify these outsiders. However, these studies tend to be typological in nature, creating labels and further divisions on the students themselves.

The theoretical underpinning of the emergence of Giddens' (1991) life politics discourse can be applied and indeed is seen in the demarcations made in this chapter. The sense of the moral can be weak in the life politics concept, as discussed in previous chapters, and the common sense moral framework such as common worlds created in the manner of Boltanski and Thevenot's (1991) 'economies of worth' – used by Simmonneaux (2001) for biotechnology discourse in classrooms – will be more in evidence in Chapter 6. Here the strategies of the dominant structure, the common strategies of pedagogy (reproduction) act against the life political tactics of the weak. These are the resistant tactics of rhetoric and drama occurring outside the film which supported young peoples' constructs about NRGTs and more local educational issues in the classroom. The theoretical basis for this chapter draws principally from Goffman's performative theories, outlined in Chapters 2 and 3, which provide greater interactional context to his macro view of discourse, or framing, covered in the next chapter. Here Goffman's performative acts are placed within the broader practice theories of Giddens. The development of research methods from the initial pilot study arising from these theoretical intersections is also recalled here.

### **Identity themes emerging from the pilot study**

The pilot study was carried out with nine schools throughout Leinster between November 2003 and April 2004. The selection procedure, as described in Chapter 4, considered social criteria – gender, religious and socioeconomic background – and pragmatic criteria – proximity to the college and strategic links between the college and the school. However in the early stages, I was unsure how the social criteria might apply, except to believe that good qualitative research would address how varying cultural settings would understand NRGTs – and initially other biotechnologies also – in society. Chapter 3 described how Driver *et al's* (1996) work on children's images of science was an early methodological pointer. That work categorised the images into science content, science process, and science as a social activity.

These categories were loosely used as the basis of coding for the initial transfer report from master's track to PhD but other codes emerged. The readings, the emerging constructivist-structuralist theoretical framework, my own intellectual development, and most especially my considerations for what pilot respondents were saying, suggested that Driver's latter category superseded, yet was intrinsically linked, to the other two. There was an influence from science studies also, the phenomenon of how science and technology becomes known and assimilated into social explanations when reflecting on identity and society. The science was secondary, although present in responses. For example stem cell research:

You take cells from an embryo and you try to grow other cells  
.....and you try to grow organs out of it (Female, pilot study)

Themes emerged from the early recorded discussions which included many sophisticated renderings of nature, nurture, the elusiveness of personal identity in a scientific worldview, and the social implications of technologies such as PGD and the applications of HESC (Murphy, 2005). I was also aware of Giddens' double hermeneutic, where young people's views of the world actually contribute in creating the world in which we, as co-researchers, interacted. I was therefore interested in reflexivity but also reflectivity, what they thought of the film – 'I was confused,' 'it explained the science clearly' – and the presenters. Persistent phrases about NRGTs caught the attention. They resembled catchphrases, defining how subsequent recordings were coded in the context of wider cultural knowledge through normative discourse as action. They may have been phrases taken from the film itself, from other media, overheard conversations, or from parents:

'Let nature take its course.'

'Nature shouldn't be messed with.'

'Things happen for a reason and it's natural.'

'That's just playing God.'

'What's meant to be is meant to be.'

'Every parent wants what's best for their child'

'When does life begin?'

‘What he did was wrong!’

‘That child would have been teased at school.’

This is a common-sense, colloquial discourse, to which I will return in Chapter 6. Attempting to find out *where* these ideas came from was not a primary concern. The interactional process of knowledge construction takes from all parts of culture, creating a *bricolage* (de Certeau, 1984).

Peer-pressure contributed a lot to where students positioned themselves on the imaginary line of agreement in the video discussion activity, particularly in male-only classes.

I liked the reality of [*The Gift*]. It was something that could happen and showed the consequences of the choices. I was surprised how much I was interested in genetics. It showed the effects on the people that got the disease and what happened the people and their families (Male, pilot study).

Because it was dramatic, and put into a family situation it was easier to understand and come to terms with. (Female, pilot study)

A bit too dramatic for an informative video (Female, pilot study).

The notion of *identities in performative action* shaped the rest of the inquiry. Gamson’s view of identity supports Giddens’ *discursive* identity, being brought into being by discourse, not unlike Jenkins’ (1996) social identities. *The Gift* had identity as a central theme, and the relationships young Mark had in coming to terms with instrumentalising his own identity. This is also a theme in *Gattaca* (1998).

My destiny was mapped out before me – all my flaws, predispositions and susceptibilities – most untreatable to this day. Only minutes old, the date and cause of my death was already known.

Jerome, *Gattaca* (1998)

Sophisticated notions of identity poured out of pilot discussions:

..it’s not his right to say ‘this is exactly what I want you to be’ cos it’s just like you can’t say ‘I know you – your destiny – before you were even born. I *know* it.’ He’s trying to make him what he wants [him] to be. I don’t think that’s right (Female, pilot study).

I think Mark thinks his abilities might be fake. [That ] it's not really him that's doing it, its his genes.(Male, pilot study)

It wouldn't be *you*. ' (Female, pilot study)

The last quote refers to a what-if situation where, like Mark in *The Gift*, one of the class discovered she had been pre-selected on the basis of genetic make-up. Background cultural assumptions about progress and nature also appeared:

People ...say you should follow ...nature. Most of the time, nowadays you don't follow it. Different things that we do are not natural, but we do it because it's beneficial to our health and our whole general state of being. (Female, pilot study)

I don't think it's right. People are not going to stop at just disease. They'll keep pushing it until you can pick hair colour and eye colour. (Female, pilot study)

I wouldn't wish my child to have a disease but I'd still let nature take its course (Female, pilot study).

I don't think that doctors are always right. I was told I'd never walk again. I don't agree with what doctors say ....but when the scientific part comes in, they do know.... [but] they can't say what nature will do, or even willpower or whatever will do (Female, pilot study).

I needed to delve deeper into local identity issues to find connections between schools.

### **Internal power play: initial visitor/school negotiations**

The early stages of contact with the 'other in the field' is fraught with uncertainties; meeting teachers, identifying their needs and co-developing activities with the teacher, the discussion facilitator (myself), and presenter. Through the process, our identities are carefully defined. In exploratory visits to schools, I had not yet an evolved sense of being a qualitative researcher and indeed was keeping options open for experimental methods involving social or humanities presentation of the biosciences. I was not as comfortable with my alien status in the early days as I became later, wanting 'participant-observer' to mean an assimilated member of each group. However, I became accustomed to the outsider status. Becker's *Whose side are we on?* and Gouldner's (1968) *The sociologist as partisan* deals with these early exploratory identities in the field. Yet though I did not become 'one of them', there was a familiarity, particularly in SK. Dress sense became important. I dressed smart casual, like a



teacher, for discussions and presentations. For interviews I was more casual, reducing the distance between us and moving from a teacher-student relationship (although there were initial identification problems because I did not wish to know names of students; this approach changed to increase expediency and reduce the risk of error). There was nervousness in school settings at first, even given the activities had been piloted. Technology, such as videos and laptops set up to show the films, often did not work. There were marked differences between schools in how these negotiations impacted on teacher activity. SKt was supportive, but demanding, in that he required extra pedagogical support for his classes; LHt and SWt preferred to 'let me get on with it'; SDt, NDct, and NDt were more actively involved.

Power play extended out in time as well as space. For the SW bioscientist session, there was a stand-in teacher/supervisor, who was clearly not prepared for the visit. SWt could not participate due to a family bereavement. This stand-in turned out to be an old teacher of mine from twenty years previously. It was evident from our relationship after I reintroduced myself 20 years later – as we frantically searched for a room with a data projector equipment or a portable projector – that he was attempting to retain that student-teacher relationship, coarsely guiding and advising me prior to the session as he would a student. Power relations first created in schools may well remain.

This bioscientist session was as successful here as they were in all schools however in that they created both a formal and informal social dynamic between the outsider and the students when discussing NRGTs in the abstract or as a career. As the bioscientist session was the second activity in schools, the bioscientist was then the second person involved with the project from DCU that both teachers and students met. These initial meetings also differed from one school to the next for each presenter. In Chapter 4, I mentioned Presenter A's attachment to NDC, *his alma mater*. Presenter A was also well received in SK and ND. Teachers from both these schools responded to his commanding style over students. Presenter B's persona and presentation style perhaps endeared itself more to the students, with presentation content more practical for their interests and needs. Presenter B was fortunate in having SD as his school, given the dinner reception we were offered with science teachers on his first visit. This was – naturally – unique to a boarding school's approach to welcoming outsiders.

I have recorded elsewhere about the teachers' wariness at first: the sensitive nature of the discussion content, the concern about the place of reproductive decision-making in biology

class. What was surprising was on no occasion did any of the participant school teachers say that biology class was not the place for discussions on reproductive decision-making. The signing of parent consent forms, where required, was a necessary first step for those schools that attended most to the contingency of outsider intervention. There will be demonstrative accounts of this; how 'live pedagogy' still needs to be negotiated very carefully with each passing second of class time to simultaneously protect the student while allowing them as much freedom as is possible in biology class/TY module. Teachers are gatekeepers and must make moral decisions daily in their work. Yet guarding and controlling the contingency of external pedagogy is difficult. Two examples highlight this.

The opening scene in *The Gift* begins with a shower scene of 16 year old boys after a tennis match, shown naked from the waist up. This, predictably, almost always drew a laugh, or jeers, from students.<sup>7</sup> Interestingly, the only two teachers to have concerns about this shower scene were two STAR teachers on work experience with the NICB. One became part of the research (NDCt) while the other was unsure of the nature of this scene. NDCt referred to the early part of the film as 'cheesy,' a comment that cropped up often with students. Having initially piloted *If...Cloning* (2004), I wanted an equal division of schools watching each film. However four of the six ended up viewing *The Gift*, as I felt it had an appropriate exposition of ideas for identity-society decision-making. Despite her critique, NDCt was willing to use it anyway based on how it explored the issues, rather than style. The other STAR teacher however, from a Dublin commuter belt town, was not willing to allow *The Gift* to be shown because of the opening scene, describing the partial nudity as 'inappropriate.' (This problem was not highlighted in the Wellcome Trust's evaluation (Wellcome Trust, 2000)). This second STAR teacher showed less interest showing a film than other activities such as the biotechnologist visit, a talk on ethics, or some resource graphics, and text of the lab materials, suitable for PowerPoint presentations.

When piloting *The Gift*, NDt expressed concern that one of her class had cerebral palsy, and so the issues concerning the screening of embryos for genetic diseases might be too sensitive for the girl. I left the decision to her whether to show the film to the class or not but mentioned that arguments were constructive and would be facilitated in a safe environment. I sought advice on this from the DCU Ethics Committee, and came to the conclusion that it may be discriminatory not to show the film to all as long as comments were fair and non-

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<sup>7</sup> The more emotional scenes, or badly acted scenes, brought some mirth in some schools, as also referenced by the qualitative evaluation of the film by *The Gift* funding body, the Wellcome Trust (2000). Another indication of how this film has dated was the laughter at one character's boot-sized 'mobile' video phone.

abusive. The ND teacher agreed and during discussions, the girl impressively argued her case for not screening embryos through PGD. These are just two examples of teacher uncertainty of how external activities will be received.

SKt's usual 'pep-talk' before sessions (we also carried out extra media analysis sessions with SK) revealed a view of external speakers that could be common to all participant teachers. He often told students the syllabus cannot meet all their interests and needs. 'The syllabus might be wrong,' he once said. Thus the use of external speakers allows a different 'real world' perspective. Although SKt didn't join in with film discussion,<sup>8</sup> he was proactive in shaping lesson structures. SKt's participation was limited to those activities which suited his pedagogical approach, such as explaining scientific facts about everyday occurrences or events or classifying subjective opinions on media coverage of science from the group. SKt attempted to drive sessions, always suggesting written work. He was keen to show to outsiders what resources he uses and has attempted to integrate some of these into our programme of activities, such as projects going towards the annual Young Scientist competition or a new mould-growing kit. He used us well as a resource.

### **Outsiders as experts and explainers of facts**

Despite SKt's efforts to instil a critical faculty in students when faced with new information, Giddens' (1991) expert systems are still sought out by actors to reify and to ascertain. For students, there was a transferral of expert status from the teacher, as he suggested, to the outsiders. We outsiders were complicit in this. Certainly a common (accidental) phrase of mine was: 'Next week you will meet someone who knows much more about biotechnology than me.' However on occasion I myself might be called upon by a student to explain, for example, HESC. The bioscientists, for their part, presented laboratory techniques, genetic concepts, conditions of disease.<sup>9</sup> Even when bioscientist sessions broke into debates about relative values and judgements, what was more often sought from students were *facts*; finding answers rather than posing questions. The format of the session may contribute to this, in terms of audience expectation, and our reference to them as 'audience' here is revealing in itself; here, certainly we have an audience who need

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<sup>8</sup> It is interesting to note here what teachers actually sat in on film discussions to watch the video with students. The only teacher who participated fully in each session was SDt.

<sup>9</sup> The clinicians in *The Gift* were represented as professionals who could not communicate science to their patients adequately, nor the consequences of reproductive decision-making.

to be informed and, perhaps, entertained. The first two sections of the session drew on the audience expectations of a master-novice transfer, thus questions and answers dominate. This model is prevalent in our (formal) interview society where an expert is called upon on TV. Ultimately though, this activity was about giving voice, not demystifying. We required 'audience participation.' Presenter A was always careful not to be the general science expert, qualifying his remarks and responding that he was not qualified to answer certain questions.<sup>10</sup> The master-novice expectations extended to interviews where students were cautious about having the 'wrong' answer. Alternatively though, a 'humanising identity' was one that could be *trusted more* by students, particularly if the expert declares his ignorance:

....the way he was saying like he didn't know everything got to do with [biotechnology]..... See the way people would be asking him questions? Then he was saying 'I don't know everything' like 'I only know some things.' (Denise, ND3, interview).

### **Locating internal informants and classroom outsiders**

A 'chaining' process of participant selection – identifying key informants who would lead me to others – was considered to identify roles and practices within a school science structure. However from the earliest pilot sessions, it was evident that teachers tended to select the students they wanted to participate, and these students would invariably be at the top end academically. By the same token, those students selected by me and that a teacher identified as weaker were often recommended *not* to be included. Had this process relied solely on key informants' selection of other community members within the classroom, it would have missed out on vital perspectives from outsiders within the community of students, 'deviants' that were invariably deemed not suitable by teachers. These outsider students' contributions were not only intriguing but essential to the research process. Kevin and Denise were two such students (see Chapter 4 for Denise and 'The clash of pedagogies' section below for Kevin).

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<sup>10</sup> However, I tried on occasion to demystify certain Geertzian symbols – symbols of a culture as represented in Geertz's (1973) thick descriptions - from bioscientist culture that may have been unfamiliar to the students as they emerged, such as 'published science' or 'postgrads.'

This has worrying implications for science education (and indeed research) among disenfranchised youth. Is this a cultural characteristic of science education or education in general? Based on these selective actions, this kind of discourse would be open to the academically 'bright,' not those outside the elite. Would an exam questions about ethics or social elements of science more likely appear in an honours Leaving Cert paper than a pass paper? The attempt to isolate these students based on classroom behaviour made me more determined to keep track of these students, reminiscent of Costa's (1995) 'outsiders.'

Yet our understanding of these teacher admissions needs to be placed in context. Teachers bond with 'external outsiders' often to the detriment of 'internal outsiders.' One teacher relished Presenter A's sometimes harsh control of his audience when the three of us reflected after a bioscientist session: 'I loved what you said to [X]. He deserved it.' At other times I felt a teacher may have compromised the negotiated space of his/her role within the research setup. Some had a habit of 'stage whispering' about class members in full view of the class. One or two inquired about student responses after an interview. Teachers cry out for someone to be on their side against the workplace 'tormentors', the students. I often recorded in notes my fear of betraying this teacher trust. To whom do I afford most confidentiality and emancipation of ideas? Student or teacher? Can we outsiders criticise when we visit briefly without appreciating the constraints for discourse in biology class and the teachers desire to know about what their students want?

### **Discursive constraints on biology teaching practices**

NDt and SWt often raise the issue of time constraints on facilitating discussion activities in biology class. Many teachers see Transition Year as the natural home for a module of these types of activities. SWt was reluctant to commit activities to 6<sup>th</sup> years. However, another recurring theme among teachers was the need to remain objective at all times. This may have been a straightforward task with 'normal science content,' but keeping their objectivity when entering the realm of discourse and morality became a bigger challenge. The private views of teachers are not part of pedagogy and need to be kept private – particularly, it would seem, science pedagogy – regardless of the level of exchange of values in discussions. To teachers, pedagogical practices facilitate students to be *informed* of science and other viewpoints, to see the complexities and, if possible, draw conclusions. A right or wrong answer supplied by the teacher is not part of their understanding of this pedagogy. One religion teacher was

cautious about over-emphasising or highlighting a pro- or anti-abortion ideology to her class, but requested to be given more science content to be in a position to answer queries for students about stem cell research, which I gave to her.

Objectivity is a particular concern for SKt. He is the most enthusiastic participating teacher. He requires an organised learning plan. He also wants this project to have a very definite learning outcome. SKt is very active in reporting and contributing to the Department of Education and Science. New policy documents are being reviewed and assimilated in the staffroom on one occasion. SKt might interrupt senior colleague's work in the staff room to talk up our project. His efforts are tireless to promote our work. It is *our* work.

Teachers feel they need to be aware of their boundaries. SKt describes the demarcations and interdisciplinary practices between, for example, science and religion:

If you're doing say fertilisation; *in vitro* fertilisation is an interest, contraception is an interest. If you are prepared to give that information. But now you also have to be conscious that you may be crossing over on somebody else's subject first of all, like religion. And number two then, you must be conscious that the information you are giving, is it accurate, is it up-to-date? And number three then, are you in a position to give them information on contraceptives and you know where [they] are available? And, you know, you're sort of, are always of the opinion like .... If I was doing, in particular, evolution, I would never take a stance on say the difference between spontaneous generation and the fact that... it involved down along from one to the other. Y'know that you start off simple with a flash of lightning and the[n comes] protein and then you move down along (SKt , interview).

SKt appeared to be constantly drawing back from the controversy of these issues himself in conversations with me. Once he has defined that a border exists between the religion subject and the biology subject, he seems to hesitate, even in recollection, from discourse on sexuality (as opposed to sexual reproduction), abortion, or availability of contraceptives. While he is concerned about crossing boundaries into religion, likewise a participating religious teacher had concerns about science, but significantly she *would be willing to make that border crossing if she had the information.*

When I mention to the SD head science teacher that research has shown (Levinson and Turner, 2001) teachers in the UK were uncomfortable dealing with humanities issues, therefore setting exams and training were big issues, he defended science teachers, saying it

may not be an unwillingness or inability on the part of science teachers as much as a reluctance to mix up different subjects, each with its own set of practices. He is a biology teacher and a drama teacher. He has used drama techniques in the past in science class but only in exceptional circumstances. The SD head likes to keep them as separate disciplines. Teaching scientific thinking, he says is teaching a different way of thinking. The SD teacher also said cross-disciplines require a great deal of teacher collaboration.

SKt explained to me how he would go about setting up a discussion on a controversial issue in class. First, he would start the scientific topic, 'setting the scene' as he calls it. Then he would try to include as much practical lab work as possible under restrictive circumstances. He might then refer to recent news items that relate to this particular experiment or lesson. He gives me an example: the news reported a man who was caught involved in fraud in Germany using DNA profiling. He says he might refer to religion to 'stir things up.' The scientific method is still his main focus, though. He says he will discuss anything but: 'Background info for some of these topics is non-existent in these students' lives. They get their science from *The Simpsons*, *CSI*... Children don't read newspapers.'

Relevance is another factor for teachers entering the discursive realm.

The difficulty is, students cannot follow instructions. It's very difficult. If you are going to say to them 'You're doing the following' you nearly have to do it for them as a demonstration and then let them at it (SKt, interview).

This idea of having to deal with pragmatic situations of student disinterest combined with teacher constraints was echoed in something a pilot teacher said: 'It would be nice to learn qualitative skills but there is a real world out there.' In terms of bringing in discursive activities to the biology classroom, SWt advises that external information needs to be kept to a basic level. 'Students wouldn't know the difference between 'biochemist' and biotechnologist.' She herself feels far away from biopharma or cancer research, as there is no such research occurring in the area. To SKt, school science is removed from the experience of young people. Experiential knowledge only will cause young people to ask questions about media science in class, such as someone with Down's Syndrome in the family. Students do not, he insists, get science from newspapers or current affairs coverage. That said, large scale media coverage like Dolly or a natural disaster will 'capture imaginations.' Perhaps, despite the constraints on pedagogy for this type of life politics, media brings closer

those faraway issues that are salient to young people. SKt suggests that media and pedagogy may converge for art and science subjects and may be of particular benefit to fringe students.

Many teachers use multimedia techniques. The use of media by NDCt and SDt have already been described. Some teachers demonstrated this on our visits, although an account in Chapter 7 addresses what one student called the 'cosmetic' exercise that occurs when outsiders arrive.

SKt explains the constraints on NRGt discourse in normal biology class, principally time:

There are constraints in the classroom situation and..... it might be something that only comes with experience as a teacher, that ... you need to prompt the following area as a ten minuter to sort of get back, get people back on track (SKt, interview).

For SKt, there is a constant requirement to follow the lesson plan. Addressing students' ethical questions are problematic:

As a teacher you have to be conscious of [the]people in front of you. You may have somebody who has an inherited [disease]. Like for example the other day there we had the person with a lung [problem]..... But you may be conscious that people. ....you're talking [to have] insulin deficiency, you may be conscious of that. So you have to be conscious of the group that's in front of you now. People are well aware that if you make any sort of a statement and it was in any way inaccurate... You know. People now can access information from the internet, from at home, so you have to be very careful that you don't give out [inaccuracies]. You almost stick to a prescribed script. And that is something coming more and more into play. So y'know the cohort of people in front of you, different backgrounds, people have different values now and you don't .. and you don't give your values to the group. So you have to be open to that (SKt, interview).

In this passage, SKt has, through a range of concepts, identified the core issue of power and performance in classrooms – the fear of competition for facts. He feels he needs to be a performer to deliver these facts. He needs to 'stick to the script,' a script that is objective, accurate, scientifically sound, and neutralised of personal values to compete with external 'experts' delivered through increasing media imagery.



We the outsiders, the teachers, and the students rely on these expert systems. In SKt's educational vision, choice is important. To him, students can and should select from his curricular content, the films they see, the books they read, the outsiders they come in contact with talking about their work. He uses the terms 'goal-orientated' or 'problem-based learning', recent concepts in science education. As I recorded in my notes: 'Adults are expected to have personalised learning goals so little adults should have them as well, contemporary wisdom has it' (fieldnotes, SK film discussion). One school in particular shared this vision of teaching practices, yet mounted a collective challenge, because this vision was *lacking*, as discussed in Chapter 7.

### **The performative nature of NRGt debates and bioscientist visits**

In the remaining sections, there will be a closer examination of the notion of performance when engaging with NRGt's during the activities – the film discussion debate (the centrepiece method for the study) and the bioscientist session, and ways that teacher-facilitator-researcher-student interactions are performed through embodied practices. Generally, the introduction of 'external experts' was received positively across all schools. Many students stated that, in bioscientist sessions, they found out for the first time what scientists actually do in labs. They appreciated how a real life researcher opened up a world of biotechnology to them rather than the 'chalk and talk' of the teacher. More importantly, the informality of the last part of the session – where myself and the researcher moved among the clustered groups as they constructed group questions – were particularly well received, allowing barriers to break down between 'expert' and 'novice.' In SD, students began asking the teachers present about their backgrounds, suggesting that the session structure opened up a wider interests and personalised the teachers. There is, of course, novelty value in having a new authoritative voice in the classroom. These grouped sessions served as 'ice-breakers', in Presenter A's words. The small group structure may have allowed those people to contribute who otherwise might have been embarrassed or intimidated by the larger group. Yet as I demonstrate further later there are limits to how open the sessions can be. For instance, personal medical issues may appear in this forum, but there was reluctance on the part of Presenter A to answer these.

There was no doubting the merits of being able to perform in front of a forty-strong class, as Presenter B did, clearly utilising his stage experience (see section below, 'Power play in

bioscientist sessions’). The class identified with Presenter B, on his terms and in terms of their own lifeworlds. In contrast I thought that my session covered higher order concepts that would have been outside their experience – fertility, genetic disease and parenthood – so they allowed themselves freedom to release other feelings. In LH, I had thought on that first day I had unleashed something uncontrollable that might have repercussions for my relationship with the school.

### **The clash of pedagogies when ‘reaching out’ to students**

Students’ feelings of general powerlessness took two forms: from a sociological perspective, the more serious type of powerlessness reflects their place in the world and inability to engage with the issue culture of life politics and shall be described later in this section and using specific examples in Chapter 7. A second type is a more mundane structural type that is more acceptable in normative terms: the curriculum exists and there is nothing students can do about it. Some exceptions to this containment are reported below. Many had a set understanding of biology as a school subject. While most wanted films in class all the time, a few appreciated media and discussion but wanted to get on with the science. Real science to them was not this discursive or performative.

As reported in Chapter 4, the spatial arrangements and the different interaction of students that discussions and presentations offered created a new pedagogic dynamic for the subject; the change of classrooms to view the film, or, for those schools that had a dedicated room, the location of the TV in the school. This change of situation and tools of work – new media replacing traditional media or labs – meant a change of language, a different way of dealing with science outside the lab than in a science classroom. They were going ‘to see a film.’ Although every class had its sulkier elements whom did not anticipate this would be a *good* film (and there was some consensus on this afterwards – see Chapter 7), there was generally a lighter mood than can be expected for other biology classes.

The pedagogical style of the outsiders needed to be negotiated by the teacher. We outsiders perceived ourselves at times to be a minor threat to normative practices in schools particularly where there was a barely-controlled pedagogy derived from a sometimes unpopular teacher. My approach and a teacher’s were very markedly different on specific occasions, and a tension would certainly have been visible to students. We may have had

distinct goals. Where a teacher participated, even briefly, s/he may have considered him/herself a co-researcher in our combined lessons. But where s/he looked for easily quantifiable outcomes to class responses, I wanted the class to just talk, to form ideas around the general topics. A student once said of a teacher: 'People don't listen to [X] but *they* want [X] to ask their opinions.' During sessions when this teacher spoke, some students looked bored, often throwing their eyes over to me, with expressions that seemed to suggest: 'You see what we have to put up with?' One such session took place on Darwin Day. There was an oratorical style from the teacher, soundbytes, and rhetoric. In front of me, noisier individuals were challenged (the internal outsiders identified by these students themselves and their classmates) to come up with answers to the teacher's agitated one-word questions. 'Genetics? Media? Yourself? Interested?' To describe the contingency of science, Darwin was used as an example: 'Darwin had technical ability and knowledge enough to make choices. Natural selection was not part of his plan.' Yet introducing Darwin suddenly brought forth an unlikely scenario of power relations over a group of disinterested students. When this teacher says 'Today is Darwin's birthday', a student replies, 'It's mine too.' It may not have been important to our study whether or not it was indeed the student's birthday. Perhaps the student often fibs about things like this. What was important was that this connection was met with a short response from the teacher: 'Good [man/woman].' Later in this open discussion, the teacher asks the class what they know about mutations. The following field entry recalls the event:

[Teacher] talks about mutations. 'Like *X-Men*,' [Outsider student] shouts up. Laughter. [Teacher] is rattled. [S/h]e wants [the student] to contribute. 'Explain yourself,' [s/he] says. [Teacher] genuinely wants him to engage. [S/he] uses a stern voice but I think [s/he] had to be curious if nothing else. [Student] says '*X-Men* were funny looking but had special powers and no-one liked them.' Then: 'They stuck together and became superheroes. It's cool cos they killed people and blew things up.' He plays to the gallery – and it works – before withdrawing into a place he seems to visit sometimes – careful, tentative, unconfident. [Teacher] demands more answers but the burrow is being dug deeper. 'I really want to know,' says [teacher]. 'I need to know what's in that head of yours. Look, you and I are in different worlds. I don't know anything about yours and you don't know anything about mine.' (Fieldnotes, SK newspaper analysis session)

The 'outsider's' friend, a fellow outsider, then comes to the rescue: 'Mutants. Like.... people who have genetic mutations.' The rest of the discussion turned to life, its meaning and

its origins, guided by the teacher, but with strong contributions from the class. This event demonstrates the power of culture and relevance in science and this can be used positively or negatively. In many ways, the teacher and I had similar intentions. However I wanted to see how students deal with the life politics of NRGs that is happening 'on the outside.' The teacher's perceived goal is to get them to access the 'true science' on the outside so enriching their lives. I needed to balance teacher requirements with my own concern that I may be leaving many participants behind.

Yet this teacher was only too aware of the desperation of young people who become disenfranchised. Here is another excerpt from my fieldnotes around this time:

Creates a bell curve of class engagement (partially a Geertz symbol?) but doesn't differentiate between intellectual capabilities and interest; (I think it weighs heaviest towards interest )

'Feet-draggers' are about 10%

'Exceptional students' are about 10%

'Everyone else 80%

Begins this typology by describing college-going young people [s/he is related to] – 'out from the crowd', religious, miss out on social interactions [Is [s/he] suggesting they are in the 'outstanding' category?] Describes [participant in this study] as being in this 'outstanding' category.

How can we align objectivity and neutrality with empowerment? Where students are left with unlimited choice without moral guidance, is there increased reproduction, thus non-critical pedagogy, thus sequestration of experience and a stepping away from life politics?

### **Developing data collection procedures**

If there were conflicting pedagogical techniques, it was evident also from discussions with particular teachers that the *data measurement* aspect of this research was not shared by all. The development of the film discussion sometimes created a crisis in confidence in how the research questions could be addressed using pre-developed statements.<sup>11</sup> Teachers are often

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<sup>11</sup> Presenter A was also somewhat critical of my initial decision to include Kei (SK5) in the study believing this would skew the ethnic representation of SK. This perhaps demonstrates his positivist method of representative sampling.

confused about what information can be gleaned from ethnographic techniques. There is mistrust in validity techniques. 'Is this the word according to Padraig Murphy?' SKt says at one stage. 'So what did we learn from that?' another teacher would say. Sometimes deep analysis was encouraged by the teachers themselves. What about parents, friends? What sources of science had I considered? 'They're swimming in a lake but they're only on the surface,' was one observation.

Yet as a way of viewing embodiment, power, and performance in classrooms, the discussion activity was an invaluable tool. The qualitative approach demands that activities are tried and failures reflected on. There is always a contingency when filling in the detail to address the research inquiry; new participants are taken on board while some drop out, new methods conceived, others discarded. Active interviews replaced the staid 'ethnomethodological' interview plan on the supervisor's advice, and from these, themes from literature served as 'ties' holding interviewee responses into an ecology or web of discourse, flowing out of general cultural folds of consensus (if it exists) on reproductive and genetic technologies. SKt understood this, being the first to bring up the terms 'different worlds' and 'culture' in our conversations.

Today's youth are used to digital recording equipment, both video and audio. Many 'performed' better in front of a mic. It was helpful that the first sessions were introductory, 'opening up' a world of science and decision-making. The novelty factor disappears on the second meeting leaving the 'old world' sealed up and the previous situation that once had interventions moves on towards a new reality for participants, a new normal, having researchers and facilitators in the classroom.

Each method of data collection had its own identity. When analysing each method of talk – film debate, bioscientist chat after each presentation, 'active' interview, or 'ethnomethodological' interview – it was clear that each conversation was grounded in its context. I needed to remember situations, seemingly unrelated events that may have proved important or in-the-moment linkages when coding the transcript text. Context not only meant structure and format of the recorded sessions; it was also dependent on location, time of day, and whether the teacher was involved or not. A strong example of this is the difference between video discussion and bioscientist session transcripts. The flow of talk may not appear as coherent in the former as the latter, which was generally a more focused group

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responding to a presentation from one central performer rather than interactively between themselves as with the video discussions. I needed to attach significance to connections between remembered and recorded details about people, places, events, action, objects, but most of all practices. Human interaction also presents advantages over written questionnaires within the context of the embodiment aspect of the study:

With [discussion] you're like...you're looking for reasons, more reasons... and you're thinking about it a lot more than.. it just kind of comes off the top of your head what you really think when its [part of a discussion]...(Karen, SK4, interview)

Of course interviews often provided less insight than I had hoped. When piloting active interviews I was surprised that the two interviewing approaches provided little variance with the same correspondents in one particular school. Also there were occasionally communication breakdowns between teachers and/or myself or technology problems which necessitated a change in direction or improvisation in lesson plan and participation.

### **Strategies and ruses: describing power play in films**

Chapter 2 refers to Hughes-Freeland's (1998) comparisons between active media consumption and ritualised agency within non-mediated cultures. Similarities are drawn between active audience participation with television and performative audiences in non-Western rituals (ibid.). A tension is created between the dramatised and the real, following the essence of how Goffman described the important relationship between the real and the fake: 'what is sovereign is relationship, not substance' (Goffman, 1974, pp560-561 ), and where students talk about what and how they know, and what it means to them. Yet the contradiction is that film keeps these life political issues sequestered from their lives, at a safe distance (Giddens, 1991). Engagement and participation with a film can manifest itself in retelling the story in discussions afterwards, using creative forms to re-present, or even 're-perform', the text, such as synopsising, turn-taking, or repeating lines from the film, as the examples below show, referring to the scene where doctor tells Annie she has ataxia.:

H:           No, she [Annie] knew what was going on and yer man [the doctor] didn't and he was kinda sitting there...

I: He just wasn't very good at explaining.... He was afraid to say anything! (*laughs*)

H: ....and he didn't know what to say... he was just afraid to say anything to her.

I: And she was real like, 'There's no cure, there's no nothing' and he was like...

H: .... 'Yeah. No there's no cure'

I: She was like 'I'm gonna get much worse aren't I'

H: And he was, 'Yeah you are.'

\*\*\*\*\*

C: [The disease] could creep up on him the way it did his sister.  
(ND, *The Gift* film discussion, all female)

'I'm gonna get much worse, aren't I?' and 'creep up on him' are direct quotes from *The Gift*. Ødegaard's (2003) work follows Solomon's (1994) social constructivist idea that science needs to make connections to stories and scientists' experiences to avoid uncritical, positivistic explanation.<sup>12</sup> However to move away once more from science learning and focus on the power of pedagogic interaction, it might be suggested that film uses mythical ideas and popular stories to open up to young people a socioscientific (biotechnological) concept into the real of life politics. Both *The Gift* and *If...Cloning Could Cure Us* are within the boundaries of credibility in the range of events and characters they portray, because they follow contemporary dramatic rules. In this regard, however, tropes and characterisations are taken from stereotypes. The narrative codes of characterisation and story contribute to decisions within each film. For example Alex is portrayed as a woman operating in a man's world, as well as in the world of science, fighting for recognition, power, fame, a lifestyle some might consider incompatible with the scientific world.<sup>13</sup> However, there are sexist undertones to Alex's characterisation. Her sexual relationship with the main prosecution witness, who also worked in her lab, brings her professional integrity into disrepute; in one scene she obsesses over a pair of Jimmy Choo's. In *The Gift*, we are asked to view Ryan's actions in terms of his experiences seeing his sister Annie suffer, yet events in Jennifer's past that might have informed her decision to 'let nature take its course' are never clarified. This implies that a moral decision within the narrative to use NRGs for sex- and trait selection

<sup>12</sup> Stories about science are also a major element of Nuffield Curriculum Centre's (2002) 21<sup>st</sup> Century Science.

<sup>13</sup> Celebrity scientists certainly exist, although it is debateable what levels one has to reach to attain this; fame within a particular community – always a part of science process - or a transformative fame? Such celebrities may not be represented as experts in *If...* but one might label Richard Dawkins, Robert Winston, or Susan Greenfield as British celebrities. Some important work is currently underway in DCU in this area.

require explanation, yet siding with nature, principle, or beliefs do not. There is a simplistic rationale behind Ryan's actions, which sets him up as the 'villain,' demarcating the actions between acceptable (removal of disease) and unacceptable (selection of sex and traits).

Heavy-handed representations may successfully use the characters' identities as representatives of public opinion about NRGs in both films. ND is a social disadvantaged school and educational sociology of power *a la* Althusser's ideology and Gramsci's hegemony might focus on the values being promulgated and absorbed by a particular socioeconomic group using such stereotypes. When the ND participants recall the story by quoting lines, are they, as de Certeau might imagine, resisting a media strategy through a ruse of reconstruction? Semi-Proppian storylines and characterisations fulfil expectations, and the interpretation of these can now be reflexively appreciated by a very active media audience. Students may well read the codes, and know the pantomime villain and screen hero as cyphers. The second prosecution witness in *If...* is a fertility doctor who unsuccessfully tried to clone himself, thus causing birth defects in the process. He says at one stage there is a tendency for mutations to occur in all cells after cloning. The lighting and his manic stare present him as a mad scientist. 'This technology' he says, darkly, of embryo cloning in the witness stand, 'will be the undoing of us all.' Andrew is the reckless one in *If..* with key characteristics of, by his own testimony in his defence speech, 'stupidity,' 'undeserving,' 'spirit,' and 'fighter.'

As the activity pack for Wellcome's *The Gift* used character's points of view as triggers, the plot introduces various power relations (as any drama would) to allow conflict. There were obvious signals in both films that Alex in *If...* or Jennifer or Ryan in *The Gift* were acting in their own best interests by making reproductive technology decisions. There was Ryan's power over Jennifer in forcing her to make a decision; his power over Mark and future generations by selecting characteristics; Jennifer's avoidance of responsibility by not making a decision herself; Ryan's motivations for becoming a geneticist and taking the actions he did because he saw his sister die from a dreadful disease; Alex's career ambitions; the (life political) struggle of Jennifer, Mark, and Andrew to have control of their own bodies and lives.

The high degree of uncertainty and indecisions during the film discussion activity can be attributed to the quality of exposition of character's points of view. Yet the very act of not taking a stand for or against a character's position was often seen as a sign of weakness by a student's peers during debate.



- V: Kelly. You disagree with everything.  
 L: No. I'm undecided.  
 PM: You're undecided. Why?  
 L: Em. Because I can see why they would. Again they want the best for their child. But then there is the argument of whether you should be able to choose your child's... y'know the whole [inaud] thing  
 S; [groans]  
 PM: Shh  
 L: whether you should be able to eradicate [inaud] it's a natural thing or whatever so. Like I don't know. I see both arguments.

(NDC, males, *The Gift* film discussion)

Another interesting phenomenon relating to the internal structure of the film was the way that, once we enter the discourse of decision-making, the film as represented onscreen sometimes becomes left behind, with loose ends tied up, and offscreen actions and events filled in. Participants begin to ponder on what characters might have done and motivations that exist beyond the depth of this limited forty-minute drama.<sup>14</sup>

### **Power play in film discussions**

Now we turn to the immanent practices of classroom debate itself. It is crucial to the thesis that there is an acceptance of the improvisatory nature of 'pre-opinion' forming as classroom power and gender relationships added to the performance of debate. There was a flow of drama and rhetoric from screen to classroom interaction. Students carried the concepts from the film to the class by reclaiming some of the lines, as described earlier, or strongly taking character opinions. I have drawn on, in this chapter and elsewhere, Fairclough's (1999) textual mediation, Couldry's (2003) media rituals, and Tobin's (2000) citationality to trace this interaction between the 'real' and the 'performed' and oscillating between character identifications, but it is Gamson's (1992) conversational resources that are methodologically most useful in operationalising shared media/self meaning with performed physical or speech act, as demonstrated in the next chapter.

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<sup>14</sup> There are perhaps inferences to be drawn here to the work of Couldry (2003) and Turner (1974); ritual as a process of making defined boundaries in media, 'framing the social,' or media events and people *presented* in a media ritual but *representing* society.

The central argumentation device used in classrooms to bring these combined media/self representations forward was simply asking young people to choose from a five-point scale of agreement on eight statements represented by a physical space on the classroom floor. These statements were characters' justifications or explanations for their actions, generally asking for a moral evaluation. There were five groupings along the imaginary line during each statement. It was requested of each participant to represent the reactions to each statement visually on the floor based on a questionnaire completed moments before. Despite having already filled in the Likert scale questionnaires individually, often students followed each other across the line when the statements were read out again, depending on whether or not they were motivated by friends, enemies, or love interests (the object of the exercise was not to catch people out doing this, but it did occur). The uniqueness of the method, the opportunity to perform in debate, and physical movement brought an extra dimension missing from a 'static' debate or text.

From the muffled communications heard on MiniDisc, it was possible to identify sub-plots unfolding in each school, all ignited by the freedom that argumentation structure provided. In SW and ND for example, some students registered their protest at having to participate by remaining seated. In LH, as described elsewhere, arguments became overheated and out of control. I remarked to Lisa from LH at how, after vehement arguments, students diametrically opposed to each other cordially had lunch together afterwards. Despite sometimes heated exchanges, and having raised fraught issues such as abortion, debate was part of the 'play' of the exercise. Likewise Damien and Derek from NDC were constantly antagonistic towards each other and took opposite sides, showing evidence that the politics and rhetoric of debate was intentional. The group seemed to enjoy the joust between NDC1 and NDC3, but in keeping with the shared performance, fulfilled their audience role by groaning or tutting in mock disapproval as each opponent spoke. It was also possible to see changes in attitude in ND participants between film discussion and interviews. All three interviewees were surprisingly neutral on their support for NRGs, belying their strong positioning in debates.

In other performed examples, as each session progressed, participants could anticipate other positions before they were taken. Thus, peer power was a major factor in how people responded to film characters justifications (although in all schools for Statements 2 and 4 of *The Gift* (see Chapter 3 Table 3.2) there was generally unanimous agreement without peer power).

As with other studies which take note of performativity (Butler, 1990), peer power relations were often gendered. Where there was a majority of girls in class, as in ND, boys took the role of rebels, uninterested in a 'woman's topic' such as NRGTs. Male discomfort was evident in some schools (ND, NDC, and SK in particular) when the topics such as rape, abortion, or the morning after pill were raised by females (including NDct). In both SK and ND, girls harassed the boys when they were slow to answer facilitator questions about NRGTs as demonstrated here (Ms are male, the Fs female, Ss are multiple voices):

PM: What do you guys think?  
M2: [inaud]  
PM: You stron.. you agree with the statement anyway.  
ND2: I agree with the last point.  
PM: Why do you agree with the last point?  
G(female): Cos he didn't even hear it  
H(female)(sym:) Cos its easier answered [inaud]  
S+: (laughs)  
M1: Of course he did.  
(ND, *The Gift* film discussion)

Note how M1, the other male in the predominantly female class, leaps to M2's defence. In this next example, the males voice are faint in comparison to the females:

PM: What do you think over there..... on the far side..yourself?  
M10: I agree  
[titters]  
PM: You agree?  
F11:(adopts M10's accent) We-ell..  
[laughs]  
PM: Well what would you have done in the situation. If you were..say you were Ryan?  
F12: (adopts M10's accent) 'Oh, I don't know that one'.  
M10: [inaud]  
PM: Shh  
M10: Don't choose the embryo. Just...[inaud] whatever.  
F12: [whisper]  
PM: That's kind of ... that's kind of disa...greeing in a sort of a way is it... or..?  
M13; [inaud]  
[laughs]  
(SK, *The Gift* film discussion)

Males also tended to goad – or ‘slag’ – each other if their positions deviated from the accepted norm, that is, what other males decided, or, when given the option, if a male participant changed position.

Having the teacher participate in class discussions was both beneficial to the process and rewarding. It would have been a positive development had teachers shown signs that they would continue these types of activities in my absence; moreover the teachers’ presence in the class became that of a disciplinary role, particularly in ND, NDC (Derek receiving most checks), and SK. It was notable that in SD, where arguably the teacher was most active in class discussions, there were no disciplinary verbal warnings on behaviour. By contrast, SKt interrupted the film discussion to scold students that were chatting without participating in the discussion.

Two female teachers, NDt and NDCt provoked strong (exaggerated) reactions for their brief inputs. This seemed most pronounced when NDCt introduced the morning after pill as abortion to her all-male class (for the sake of argument). Power relations are not exclusive to the gendered interaction between a female teacher and male students however. In ND, teacher input to film debates sometimes provoked a passionate response. The (mostly female) students became energised when NDt participated in the discussion, reacting strongly and negatively to her challenge:

- NDt : Can I ask a question of the disagrees over there?  
Do you not think Jennifer is being rather selfish  
standing on her principles.. thinking that she might  
be having a child who’s going to die a horrible  
death?
- X; But she wouldn’t be having a child....
- U: No!
- V: No!
- U: No!
- Z; Definitely not.
- ND1: But would you take that risk?
- F: You couldn’t....
- A: You know what I mean. It’s her baby and.....
- NDt: But that baby is an individual.
- A: Yeah.
- ND1: It’s a person.
- NDt: And isn’t the baby going to be delighted [ inaud]?
- A: That’s like saying.. that’s like saying ‘is [X] right  
to turn around and say after she got raped..
- MI: *Shuttup!*
- A: ....that she can’t have an abortion.....cos that’s  
principles

(ND, *The Gift* film discussion)

The boy (M1), in the minority, shouts 'Shuttup' to the girls, using a high moral tone in speech and meaning. The implication is this is not the forum for a discussion on rape.

To what extent can we see teachers' input influencing the flow of young people's conversations? Here is Deirdre (ND1), at Statement 6:

I don't think they should be have havin the baby because she was more on principles and she didn't have any experience in the subject and *he* did. But he was also greedy. And she was kind of selfish so I don't think they should have had the baby. (Deirdre, ND1, *The Gift* film discussion)

The female student A in the next to last extract uses the subjects of abortion and rape in opposition to NDt. Note the male discomfort at the end (M1) when the subject of rape is raised ('Shuttup!'). In the last extract above, Deirdre talks about principles in similar terms to NDt a short time earlier.

Regarding where young people take resources for moral decisions, even those that are from the mundane and the everyday are informed by cultural norms that are increasingly media-influenced (Boltanski, 1999; Couldry, 2003). How the morality (or conversely, the ordinariness) of NRGTs are discussed in class will depend very much on the medium of discourse, in this case film. There are code of practices from courtroom dramas (*If...*) and studio debates in film discussions that influence the way the discourse is shaped, for example a media audience or Q&A in the bioscientist session.

The word 'shill' comes from Goffman (1959) who used the term to describe a performer who cons audiences and other performers into action. Derek from NDC was one such performer, arguing for the sake of it and creating straw men of opposing arguments. However his high status was taken from him when he seemed to make a gaffe by implying that abortion referred to a foetus close to birth only and not the destruction of an embryo. Thereafter, more participants turned against him in arguments as he had lost his authority. Karen from SK also provoked strong reactions for her pro-life views. Very often she stood alone in protecting the embryo's voice. I felt the need to help with her defence and to control animosity rising against her, as for her, it seemed to go beyond a 'game.' Karen may have been someone for whom the debate infringed on personal beliefs and so, as teachers have done before in socioscientific argument, I tried to protect her from a life political issue. Des from NDC, by

contrast, was also pro-life, but was quieter in debate. As Karen was provocative, Des was sheepish when putting forward his views. Karen drew criticism, while Des had sympathisers.

### **A living Likert: choosing positions of agreement on film characters' decisions**

When students were asked to choose their position in relation to decisions made by film characters, their responses can be seen as moving into the discursive, presenting their opinions on the use of PGD, their views on science, religion, identity, or society. These performative, role-playing activities have a particular context though. Participants were responding to film characters and to pedagogic power plays in the classroom. The analysis in this chapter contributed to their motivations for choosing positions on the statements, shown in Chapter 3, Tables 3.2 and 3.3. Chapter 6 will tease out more comprehensively their frame constructions about NRGs and how they relate to a background of discourse in Gamson's (1992) terms. The positions taken are a form of role-play. The local, performative strand taken in this chapter derives from Goffman's more dramaturgical work (*ibid.* 1959) (which can also be seen in the positioning analysis of Harre, Davies, and van Langenhove (Davies and Harre, 1997; van Langenhove and Harre, 1999) and Bakhtin's explorations of spatial subjectivity and physical positioning (Kazan, 2005 citing Bakhtin, 1981)).

Positions are more dynamic, according to Harre and van Langenhove (1999)

paying close attention to the local moral order, the local system of rights, duties and obligations, within which both public and private intentional acts are done (*ibid.*, p1).

Polarities of character lead to a reinterpretation of social act or Wittgensteinian speech act – a voice from a dominant or submissive position. The authors explain: 'Conversations have storylines and the position people take in conversation will be linked to these storylines (*ibid.*, p17).' That storyline might be conversation or media reference, or the storyline of instruction if someone is playing the part of the teacher. Positions are also less static, more subject to action that Davies and Harre call (*op. cit.*) immanent, the 'divine,' in the moment, following constantly emerging rules of first-order, 'live' discourse (see footnote on positioning theory in Chapter 3) and storylines from other conversations, yet also allowing more flexibility to manoeuvre their loyalties.

Physically, the students stand in position along an invisible five-point Likert scale of agreement in relation to others, a 'living Likert,' or a 'moving debate' as a youth services facilitator in the pilot phase called it from previous encounters he had with this method. It is important to note once more that this Likert scale was not meant in the final analysis to represent absolute views on the particular technological application that was the subject of discussion. As has been addressed throughout this chapter, the dynamics of performing opinions themselves shed some light on social interaction and peer grouping around issues.

While considering the context, it is still instructive to take a closer look at the common agreements and disagreements across the schools on issues that are part of common discourse (see Appendices J-O for a full results breakdown of the debate survey). The most common agreement on statements were those relating to:

- (i) the rights of young people to be tested (without an arbitrary age limit, but on the basis of maturity and whether or not someone is already suffering from a genetic disease in the family);
- (ii) preventing a child from getting a disease even if that means stopping an embryo from being implanted;
- (iii) disclosure of sensitive information to patents known to scientists and clinicians;
- (iv) being uncomfortable with sex selection and selection for traits other than those that are life-threatening in PGD;
- (v) the need for boundaries for bioscientists' practices (moral and legal);
- (vi) the need for boundaries for everyone regarding what is or is not acceptable in NRGTS;
- (vii) the belief that people's best intentions are generally at work while making decisions about NRGTS, but that does not make it morally right.

There are many contradictions among these agreements, reflecting the complexity of the moral arguments facing people having to make decisions about these technologies. Personal motivations were presented in both dramas. Particular disagreement also seemed to exist about regulation, in terms of where responsibility lies, and much of this is evident in the *rights* frames discussed in the next chapter. There was also ambiguity regarding the idea that the protagonists were 'doing their best' for the 'beneficiary' of the technology. While many saw the best intentions in characters' actions there was still uncertainty among others whether Jennifer and Ryan were doing their best for Mark in *The Gift* when they selected an embryo by PGD or whether Alex was doing her best for Andrew in *If...In* arguments, the most degree

of certainty came from, perhaps not surprisingly, those who rejected the use of the embryo in any technologies. These arguments were largely in the minority.

There were some interesting local specificities, although in general there were no schools that were defined by their acceptance or rejection of the technologies. Each had complex shades of grey. There was a large number of undecideds in SK, particularly for the first question on Jennifer's right to argue for 'nature to take its course,' although many schools were confused by the vagueness of this statement. However having teased out the question, uncertainty remained. Also in SK, the final statement on Ryan's decision to select Mark with the 'best' qualities was split down gender lines. While there was still a large number of undecideds even this close to the end of the discussion, where many sides to the debate were already on show – reflecting the dilemma of the personal conflict of deciding what could be *best* for Mark – it was notable how many males agreed with the use of PGD for Mark's benefit here. Although in discussions many males, in common with other schools, thought Ryan may have crossed a line with sex and characteristics selection, it was still interesting that a notion of 'best qualities' was considered an acceptable goal for males in the school. Whitelegg (1998) cites studies that show young males are more likely to accept biotechnological intervention, although gender divide was not significant in other schools. There were no changes of mind in SW and few strongly disagrees in SW (the most was four for Statement 7 on sex selection). This may well reflect the decisive nature of SW that I comment on elsewhere; the 'common sense' that requires little debate. I would be reluctant to place too much emphasis on this being a unique aspect of this school. It may have been a school where I did not focus as much on changes of position. Yet this finding may also point to less patience with the process, less interest in reflection. In general though, it must also be accepted that students' change of mind could also have been down to not understanding or misunderstanding the statement in the beginning; indeed the modified statements from *If* (see Chapter 3) were confusing to some students.

### **Power play in bioscientist sessions**

The physical act of delivering a presentation was a major part of the bioscientist speakers' considerations of a defined set of practices. It was interesting to see the contrasting style of both speakers – Presenter 1, strong and demanding, grabbing attention very easily with tales of Australia, and Presenter 2 with a soft accent quietly promoting his band.



Neither Presenter A nor Presenter B did much public presentation prior to this, certainly not to young audiences. There was performativity in how Presenter A spoke of 'reading faces' to gauge their reactions. A later session that followed the data phase caused Presenter A to seriously think about the power that he had over students' personal perspectives. Sensing a participant was about to cry once he began talking about cancer, he changes track; the sensitivities of the performer were clear to him. He was genuinely concerned that he may have upset her. Presenter A had been reminded by SKt prior to the presentation to give a warning in advance about the sensitive nature of the material, which he did. Yet how much did the warning itself contribute to the girl being upset? Cancer is a taboo subject, part of the sequestration of experience from institutions of modernity (Giddens, 1991), but so too is PGD, if it is directly related to someone's personal life history. The presenters, teachers, and I have wrestled with the difficulty in determining what are acceptable levels of emotion to allow into a class. We are not trained counsellors. Despite how I may have an instinct not to reproduce pedagogy, students needed to feel safe to 'act out' the emotional intensity in controlled debate only, without allowing emotion to overcome them. Presenter A knows 'its not a bad thing sometimes to upset people' but not young people. He also stresses that we are in positions of power and need to balance protection with empowerment. The teacher's role is clear to Presenter A, and both of us knew his input was crucial. 'See, he's an experienced teacher and I'm not.'

Presenters A and B used different performative tricks. Presenter A's approach was more authoritative, sometimes attacking, while Presenter B used a more informal method, as though one of their peers.<sup>15</sup> I was initially concerned at the abruptness of Presenter A but realised that these are habits of reproduction that I too use. We copy teacher tricks we remember from our school days. Presenter A told me when he had started our school visits, he was 'cocky.' Yet I felt that as the sessions progressed he was willing to share more science and pay less attention to the ambiguities of socioscientific debate, while constantly referring to ethics. He once said in a session that he believed his lab work to be 'ethically neutral,' that ethics was the concern of other scientists. 'Practical science happens at the NICB, not the crazy stuff.' He might present his own views more, perhaps, than he realised: 'Using PGD for serious disease is a no-brainer'

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<sup>15</sup> During the pilot Presenter B stopped the whole school in its tracks with a rousing version of *Raglan Road* when asked by participants to sing.

Presenter B sang in a band, and was comfortable speaking to a large group. During his session with LH, which I only heard from another room, I noted how he seemed to have more control over his class than I did:

Presenter B seems to have the forty students in the palm of his hands. They cheer, they laugh, then they become deathly silent again. They ask questions in a controlled manner. I hear it and witness it for myself when I go in at the end. I was expecting chaos but all questions are asked individually, politely with an element of fun. They ask him about how many points he got. There is a question about reporting and accountability. There is a real identification with him. They're impressed with the number of good points he has. When he closes the session the screams and claps would have equalled a Robbie Williams gig (Fieldnotes, LH bioscientist session).

Yet the novelty factor may have made it easier for the presenters and myself to have a degree of control over students than teachers. We arrive for sessions over a period no less than five days, use a new approach, and then we are gone again. External speakers are less restricted in what they can develop in a lesson than teachers.

Presenter B enjoyed the challenge that his presence offers to what he sees as the stereotype of the scientist. He surprises himself; he is an early career researcher but he still does not consider himself The Biotechnologist. Although there are overlapping identities and some pedagogical methods may be reproduced, identities are essentially bounded for Presenter B. We are 'not in the same place as a teacher.' He says we are 'guests.' He is more comfortable 'answering questions' and interacting and he sees that our outsider status effectively means we have less disciplinary problems to be concerned with than a teacher. Presenter B uses humour well. He understands the power play needed to be balanced – there was no 'cutting down' during the trading of identity stereotypes – he as the 'scientist', they as the 'disinterested science students.' 'No one felt stupid' when asking questions, there was a 'comfort zone.' He, too, identifies himself as part of the expert system but there are limitations: it is difficult to get across in presentations the idea that the daily grind of science is monotonous with the bigger picture of discoveries and progress making it worthwhile. Presenter B understands the need for an expert. 'The reason [students] were asking so many question about points, college etc was because it's so close to their thoughts in senior cycle.' He enjoyed free-flowing Q&A, 'pushing' to see what 'caught their interest.' Generally, student expectations needed to be managed carefully when they realised someone is talking

about genetics in cancer research. Besides the extreme and (very common) possibility of being in contact with someone who has been touched by tragedy, there were many questions throughout schools on where science is currently positioned regarding 'a cure.'

## Conclusions

Three themes which dominate the reflections on local pedagogic practices are: the presence of power and performance, the immanence of methods, and the structuration of practices. Regarding power and performance, first of all, students performed their positions in debate about statements relating to the film. The performative nature of NRGT debates and bioscientist visits also meant that specific approaches to pedagogy here highlighted difficulties in science teaching. Teachers talked about competition with media, of the need to 'stick to a script' in order to present themselves without ambiguity, and with objectivity against the complexities of life. The use of media is therefore vital, allowing the more discursive to enter the biology classroom and present scenarios within the NRGT debate.

Time is a large constraint for teachers however, particularly for socioscientific discussion. Further discussion/content tensions arise where teachers deal with social interactions that are not rigidly aligned with content. Many teachers see Transition Year as the natural home for a module of such activities, where students are allowed time to explore their interests. Yet no student or teacher who contributed to classroom discourses saw the activities as *not* belonging to the subject, once they had been carried out. Bernstein (1990) warns that discussion activities, although removing the discipline of the traditional didactic classroom, may still allow authoritarian control, or Bourdieu's pedagogic normalisation of students reproduction, or indeed Foucault's (1977) *dressage*, a *soft violence*, of timetables and group practices.

Further performative actions were shown in the main focusing activity – the film – where the complexity of reproductive decision-making for families, individuals, and society was demonstrated. Following Gamson (1992), identity constructs that draw on media was given emphasis. Although gender and personal relationships between participants contributed to debate, the dynamics of 'role-play' and dramatic debate were also influences on young peoples' decisions on wider issues of NRGTs. Students had strong identifications with narrative and characterisations as they recalled possible life choices and possible

consequences, and many changed their positions or saw different sides to arguments. The internal power structures of the films were easily visible yet interestingly, young people brought this forward, suggesting alternatives to what was seen on screen (or represented poorly in places) such as 'Ryan might have..' or 'Maybe Alex...' In addition to the film drama however, power play dynamics were very evident in film discussions and bioscientist sessions. Performed actions and negotiations of gender were evident, and between outsider expert/student, teacher/student, and expert/teacher, often reflexively described by students themselves. Often Bourdieu and Passeron's (1977) notion of reproduction appeared, as speakers – and myself as facilitator and researcher – lapsed into our own expectations of teacher practices in front of the class. However, we as outsiders were aware of our special status and how we might deal with emotive issues of NRGTs and disease in a different way to that of the teacher, as we were in a separate 'place,' although also in a place of pedagogy. There are some differences between schools and locales based on socioeconomics with this regard (some modest, others more challenging) and thus in students' power to change their environment and redefine borders.

The second theme of the immanence, and improvisation, in developing data collection procedures places emphasis on researcher assimilation and experiencing the constraints of biology education, while placing some standardisation on data collection. The process of entering the field and setting up relationships with teachers and students allows the opportunity to observe identities and status relationships. Third level visitors in all schools were seen as outsider experts, and fulfilled a pedagogic role as 'explainer of facts' even when the activity was open and discursive, such as the film discussion. Student expectations of 'outreach' visitors describe a power dynamic that creates identities of 'expert' 'giving information' to the 'unknowledgeable student.' Despite my intentions to play down our expert identities, all outsiders were treated as such. Care needs to be taken in the negotiation of power relations between teachers and these external perceived 'knowledge providers.' Teachers also often tried to self-select participants. However the informal setting of chatting with groups swung the power dynamic back to the students, making it more accessible, in contrast to a speaker presentation.

Most students saw the merit of presenting a 'human' view to NRGTs; they want to address the wider socio-political and philosophical issues of NRGTs. Film and presentations were almost unanimously approved of in biology education, to see how 'real life' work processes and decision-making associated with biotechnology take place outside the school. Bioscientist sessions, in particular, provided a dual role for teachers of stimulating interest in

biotechnology and providing career options. Yet some teachers admit that most students show little interest in news media coverage of biotechnology or NRGTs.

In the third theme of the structuration of practices, the chapter demonstrated how the wider discourses of education that shape the school pedagogy are traced, yet the action at the performed micro level adds to structural power, and in return, restrains action. Both are in a dialectic relationship. The structure-action dialectic is also reflected in my inquiry. The journey into classrooms and the process of locating 'internal informants' and classroom outsiders shaped the methodological approach, which in turn shaped the theoretical construct. However, where young people did not reflexively look at how they themselves might contribute to the discourses – education or NRGTs – there was a lack of engagement, and this seemed to occur more in disadvantaged areas, both rural and urban. In particular, engagement issues occurred in a rural and a North Dublin City school during discussions. Yet there was not less teacher support for students in disadvantaged areas.

Generally though, young people have a strong opinion on wider discourse about NRGTs, and perhaps in some way, take on life politics for education/pedagogy beyond the formal structures of conventional politics and schools in a forum such as this. For example, there is strong agreement among young participants that they should have more involvement with the dissemination of genetic test results and that an arbitrary age limit (e.g. 16 years) threatens their empowerment. Also, as described in more detail elsewhere, most young participants disagree with selecting an embryo for non-life threatening diseases or sex selection (a general point raised for society, rather than contextually for film characters and role-play). Selecting an embryo to screen for disease is acceptable to most, but with reservations.

Where this chapter covered the embodied, interactive power and relations between the intervention activities and pedagogic practices, the next chapter applies frame analysis to recorded discourse to connect the performed actions and discourse of the classroom thus far with wider cultural understandings of NRGTs. Chapter 7, in the applied analysis, will address the overall resistance to systems of power that young people – in one school in particular – raised in a clear example of life political action.

## **Chapter 6: Framing new reproductive and genetic technologies using cultural themes**

Frame analysis as applied here (Gamson, 1992) is an important method of observing discourse strategies (and tactics following de Certeau (1984)) of young people engaged with the social issues of NRGTs in the classroom. It links the improvised power play of young bodies in action – engagement with the film and presentation activities – with the wider map of discourses that are sometimes emotive on the issues surrounding the subjects of stem cell research and PGD. It may also demonstrate commonalities between the immanence of classroom politics and wider political rhetoric for, and against, NRGTs in normative media practices, as expanded on in the next chapter.

For Bedford and Snow (2000), such units of discourse are not easily reducible to anti- or pro-positions without complexity or ambiguity; subtle acts of frame communication exist, where the core argumentative frames can be transformed, used and re-used, or bolstered by corresponding frames. Frames are further embedded in ideas and popular cultural myths to give more cultural resonance. Frames take from salient cultural tropes that popular culture and media play on (Gamson and Modigliani, 1989; Benford and Snow, 2000), as demonstrated here and in the next chapter. Resource strategies will also be discussed in this chapter, that is, examples where participants in arguments draw on media discourse, experiential knowledge, popular wisdom, or a combination of these sources.

### **The fluidity of classroom positioning in NRG T talk**

Three very basic ‘frames’ identified during data collection among young people’s conversations and debates on NRG Ts might be ‘pro-life’ or ‘pro-embryo,’ ‘neutral,’ and ‘pro-technology.’ However, these are simplified analysis of frames, given that there is more complexity between these divisions of organised communication. They do not fit the criteria

of frame presented in Chapter 2, of selection and omission tied up with issue cultures of news and popular culture media production. I define these as *positions* rather than frames, sometimes linked to how media coverage might frame an abortion or NRGT issue. Looking closer at this discourse reveals a greater complexity.

An overview of the schemas and their relationships with identified frames, shown in Table 6.1., shows this complexity, as discussed in the description of analysis in Chapter 3. For example, in the first category, either the *scientific rationalism* frame (from Gamson's (1992) *progress* theme) or *against messing with nature* frame (taking Gamson's (ibid.) *harmony with nature* countertheme) may be used in arguments drawing on the participant schemas shown. This means a participant might draw on a *progress* cultural theme when using 'misinformed science' by framing it in a scientific rationalistic way. An operationalised example would be when one NDC student believed that all eight embryos produced by IVF are implanted in the PGD procedure and sees this as a benefit of such a technology given that there are, in this student's explanation, eight potential babies that can be born.<sup>1</sup> The complexity of the schema/frame relationship is further increased by the fact that a *scientific rationalism* frame can be used to argue for the *against messing with nature* schema even though the latter is a frame in itself by the definition given here, that is, that the schema organises support around it and is involved in processes of political omissions and emphases. Damien from NDC offers an example here when he uses the potential impact on human evolution as a reason *not* to use PGD. This demonstrates that each of these schemas can use either frames, or perhaps even a combination of both. This is why the schemas are not neatly divided into theme and countertheme, as Gamson may have done. The demarcation occurs in how the frame appeals to a cultural background story, in other words whether a *progress* or a *harmony with nature* theme is dominating the argument. This flexibility or 'fluidity' of positioning contrasts with the static nature of pro- and anti- frame analysis on technological subjects presented in Gamson's (1992) research.

More distinct frames are present in the *risk/fate*, *autonomy/social responsibility*, and *sacred* categories of schemas. The former two categories generally presented more exclusive dichotomies than the *progress/ harmony with nature* relationship. Also, although there is interplay between the *risk* and *fate* frames as shown throughout the chapter, ideas of the sanctity of the embryo tend to be solid and immovable. That is not to say that other frames cannot *join with* or *bolster* the sacred frames and make an argument more salient. What is

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<sup>1</sup> The accurate description here is that the eight embryos are fertilised and allowed to grow *in vitro* before *one* usually is implanted. There were some misrepresentations such as this of the science as portrayed in the films.

important here is that the *position* of protecting the embryo remains solid, albeit with ‘stickier’ frames, in that many different frames may be aligned to protect the position. The core position will remain the same, yet argued from various angles. The phenomenon of frame alignment demonstrates a political reality for such emotive discourse, as revisited in Chapter 7. A full explanation of the framing strategies within each theme in table 6.1 follows in the remainder of this chapter.

**Table 6.1.** Cultural schemas and frames in classroom discussions, interviews, and fieldnotes constructed around the issues pre-implantation genetic diagnosis (PGD) and human embryonic stem cell research (HESC), and the work of biotechnologists in the lab .

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Schemas using *progress* theme and/or *harmony with nature* countertheme (Gamson, 1992):

*Science content: ‘misinformed’ science*

*Science content: ‘informed’ science*

*Science process/ the nature of science*

*Technological progress*

*Genetic determinism/ reductionism*

*Nature/nurture*

*Against messing with nature* eg secular rationalism [frame]

[Either the *scientific rationalism* or *against messing with nature* frames were used when constructing (mainly in debates) the above participant schemas]

Schemas using *fate* theme or *risk* countertheme

*Risk* [frame]

*Fate* [frame]

Schemas using *sacred* theme

*Embryo not person: physical human essence* [frame]

*Embryo as person: spiritual human essence* [frame]

*Religious* eg Catholic view [frame]

Schemas using *liberal individualism/autonomy* theme (Gamson, 1992) or *social responsibility* countertheme

*Power play: external* [frame]

*Rights*

*Patient/parent* [frame]

*Human embryo* [frame]

*Future child* [frame]

*Future humanity* [frame]

*Commodification* [frame]

*Runaway* (Gamson and Modigliani, 1989) eg lack of trust in future humanity [frame]

*Threat to diversity* eg genetic engineering = generic engineering

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NOTE: The schemas are organised here into emergent cultural themes (and their corresponding counterthemes), which are resonant with common discourse (Gamson, 1992; Ferree *et al* 2002). Where an individual frame was identified in the schema, this is indicated in square parentheses. There is a complex relationship between schemas emerging from data analyses and resulting frames; frames are generally organising structures where collective opinion can be formed in processes of emphases and omissions in discourse.



## Scientific progress versus nature

The *scientific rationalism* frame identified in young people's conversations connects to the cultural theme Gamson (1992) identified as *progress*. The opposing *against messing with nature* frame connects with his *harmony with nature* countertheme (ibid, 1992). A participant who uses the *scientific rationalism* frame for an identity – human or non-human, collective or individual, factual or fictional – may refer to a need for technology to remove a disease; or describe the process and connecting issues in terms of scientific practices only; or refer to the entity in de-humanised language, the exemplar here being 'embryo.' It is a form of 'instrumental reason' (Giddens, 1991/2004, 145). It may also be seen as a normalising frame in line with the dominant scientific/economic discourse in Ireland (see Chapter 2). Those participants who use the *against messing with nature* frame may not necessarily reject a scientific rationale but will reject any attempt by a pro-technology frame to downplay the negative impact of technology on their concept of nature or natural practices. Scientific schemas were common, which is not surprising given the activities generally took place as part of a science class. Following the application of Driver *et al's* (1996) images of science, these representations were teased out into distinct schemas on science and technology for further analysis. I have argued elsewhere (Murphy, 2005a, 2005b) that Driver *et al's* third representation, *science as a social enterprise* is fundamentally integrated within the other two and all schemas here may well reflect young awareness of the pervasiveness of social practices and discourse. Eder's (1996) cognitive devices might, in practice, be drawn on in young people's frame constructions about embryos or genes when the facilitator himself begins to frame the topic as an issue to reflect and be commented on, rather than as science. Such devices demand cognitive explanations however; the discursive practices here require only that we acknowledge cultural themes with popular usage.

Other schemas emerged which took on either a *scientific progress* or *against messing with nature* frame. For example, a distinction is made here between the *science process* schema in which young people describe and make sense of the practices of science and technology and the *technological progress* schema which draws on an evolutionary trope, a narrative of betterment. Damien from NDC provided a sophisticated version of science, remarking that there was a 'God replacement' in action, not entirely different to Midgley's (1992) thesis in *Science as Salvation*.<sup>2</sup> 'It's like....fixing people's lives,' one girl said of NRGTS in ND. 'You

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<sup>2</sup> The civic and institutional epistemology of biotechnology in the Irish context is largely progressive and goal-oriented. Diagnostic and preventative technologies are such common goals. For Strathern (1996) and Edwards (1999), this trend towards future progress is also a feature of NRGTS.

know – you can have normal babies.’ When participants in the bioscientist sessions were invited to ask questions, their first questions tended to be: ‘when will they find a cure?’ (Both speakers dealt in some way with cancer research). Most participants across all schools saw PGD as preventative medical intervention above everything else, although there may have been a moral issue in using the technology. In defending its use, many referred to how biotechnology would change lifestyles and how PGD in particular could provide a ‘full life’ by selecting for ‘important diseases’. This idea of a ‘full life’ I will come back to again throughout the chapter, being as it was used extensively, demonstrating the prevalent use of the term as a possible example of Gamson’s (1992) ‘popular wisdom.’

Fundamental discursive concepts such as ‘science’ and ‘nature’ were placed, in the analytical approach taken here, into the context of framing power and moral practices. Douglas from SD – who often demonstrated an acute awareness of the nature of science and technology – saw biotechnology as ‘controlling’ biology. In certain schools, notably participants from ND and SW, the application of PGD was a black and white issue. ‘Have the disease, or not have the disease. End of story’ (ND, female, *The Gift* film discussions). As noted elsewhere, I observed in SW responses a certain lack of impatience with the line of questioning on impact to society or identity that added to the complexity of the issue. The ‘common sense’ applied here was disease prevention. There was often a clear moral distinction between technology with the power of prevention and technology as controlling nature, human identity, or human affairs. In ‘selecting a child’, using PGD did not have the goal of ‘mapping out its life’, as one participant from the all-male NDC discussions said. It was preventing him from having a ‘horrible life.’ In all schools however, students advocating the technology without moral constraint were in the minority.

It is now instructive to categorise strong scientific schemas (rather than necessarily frames, although connections are made) with identity implications that emerged, often demonstrating tendencies towards the organising *power* and *moral imperative* of science and technology for identity construction.

#### *Genetic determinism/ reductionism*

Regardless of which of the two opposing frames were used, there was rarely a dispute about the inherent essentialism of our *Gift* conversations identifying the disease as being of genetic origin. Our conversations focused on one gene that was presented as being the cause of Friedreich’s ataxia. Screening an embryo meant screening for a gene. There was a certain

amount of enculturation by the film here. Annie changes her lifestyle to accommodate the physical effects of ataxia because of 'this wretched gene' (Y-Touring, 1999). In natural conversation, we cannot help using a single gene to represent a condition or trait. It appears to be another type of cultural resonance. This was demonstrated as we continuously referred to 'the gene for sporting ability' or 'the gene for Friedreich's ataxia', perhaps prompted by the simplistic nature by which the film portrayed genetic predisposition. It was natural that participants did not generally have enough information to argue if genes have that much influence on disease. They were never aware of any wider nature/nurture or systems biology debate. Yet nature/ nurture ruminations occurred, as shown in this next categorisation, and the topic was touched on in *The Gift*.

#### *Nature/nurture and identity confusion*

Mark is upset at the end of the film when he realises that an attempt was made to pre-select his destiny by selecting an embryo. This may well have presented a new phenomenon to most students – a distinction made between genetic make-up and a person's own feeling of identity. Although many professed to understanding why identity would be threatened by PGD, others did not always see Mark's problem. This was the general feeling, until a distinction was made between nature and identity, a realisation of an individual intrinsic essence present *outside* the genes. For boys, particularly, this still appeared to be ingratitude – why would Mark complain, if he was given this 'gift?' This observation demonstrates a certain consequentialism (Hayry, 1998a) and correlates with males' likelihood of accepting genetic technologies as described by Hoban *et al* (Whitelegg, 1998 citing Hendley *et al*, 1995 and Hoban *et al*, 1992).

The film – and therefore our co-constructed reality of nature, disease, and intervention in film discussions afterwards – also focused on the either/or scenario of leaving nature take its course or take some action to prevent a disease. In so doing, as we will explore in another way in our account of the *fortuna/fate* frame below, this disease was seen as almost inevitable once an embryo was implanted which contained two recessives genes for Friedreich's ataxia (to once more use a monogenetic reductionism). There was however, a confused relationship between this genetic essentialism and the identity that was to become 'Mark' even in the film itself. Ryan tells his PGD-selected son Mark: 'You probably would have been in a wheelchair by now if your mother had anything to do with it' (Y-Touring, 1999). This was a common 'misinformed' idea of how the PGD technology works. In the pilot, I

identified three different concepts of embryo selection as represented by participants (Murphy, 2005):

- as a means of preventing disease in the same, pre-destined person. Mark would have been born anyway, just with different traits;
- equivalent to the removal of genes from the same, pre-destined person;
- as a means of preventing disease leading to the birth of any one of a number of individual people.

The last interpretation is the scientifically-accepted version. Fundamentally, this is the only way PGD works. It was curious how the first two understandings above emerged among these participants. To at least three participants who voiced an opinion from ND and NDC, Mark would have been unhappy if he had the disease and then found out that the technology was available but had not been used to 'remove' the Friedreich's ataxia. It may be a natural instinct for some to apply the normal rules of pregnancy to PGD even when there is a basic understanding of the technological process. The old reproductive modes of thought may be difficult to modify.

At one point, another student says 'He's gonna kill his parents' when he finds out they could have done something. An NDC participant corrects the student in this school with a similar view.

C:                   Wouldn't have been him though. Wouldn't have been him without the disease. Would have been a new kid. (Male, NDC, *If...* film discussion)

In the language of clinical science, as the fertility doctor utilised in *The Gift* when supplying Jennifer with her genetic test results, prevention diminishes as a matter of choice for the future parents and where the *scientific rationalism* frame is invoked, very often this is augmented by a *social responsibility* theme (see later in the chapter) or welfare argument focusing on the future child. The parents have the facts in their possession, now it is time to act. In the diagnosis scene, both Ryan and the doctor are involved in a gentle act of persuasion with Jennifer to get her to see the logic of PGD. However the embryo that eventually became Mark was selected as a result of the action of this one person; Ryan, a geneticist who could 'read genes' (ND, female, film discussion) acts alone, and clandestinely, against Jennifer's wishes. In the words of one ND respondent, he may well be 'into genetics so he knows what the story is' yet in a deceitful way, his knowledge becomes part of the

expert systems that become Jennifer's aggressor. Some SK participants, defending Ryan's actions up to a point – they agreed he should have chosen a disease-free embryo but not on the basis of other traits – opined that human nature being what it is, Ryan would want to do what he could for his future child and thus go further in selecting the 'best traits.' Therefore in this case scientific knowledge militates against *the right thing to do*. Scientific knowledge carries a heavy responsibility. There were often participant statements like 'I suppose it's wrong but I'd do it anyway.' This notion breaks from a normative moral decision.

Later in the chapter I will look closely at Des's refutation of the concept of offering the 'best' for the child using the 'best' genes, the subject of Statements 5 and 8 of *The Gift*. For those who argued that Ryan was only doing the best – and the amount of these respondents was considerable – scientific knowledge is the defence offered for the decision and action. Even in acknowledging the performative nature of the following exchange, it is interesting to see how far the *scientific rationalism* frame can be carried. This is from the male NDC group with Derek, the laid-back rebel:

- PM: OK, so for yourself there, would you have done what ... Ryan did?  
L: Yeah if I had the chance.  
NDC1: Do what?  
B: I wouldn't.  
PM: Select a boy.. OK select a girl sometimes.. but select somebody to their best, what you think would be the best in the genes.  
S: Yeah/Yes  
PM: And if you could read genes.. OK what would be the person you'd pick?  
NDC1: Ahhhh, it'd be someone not conventional sport but good at...  
PM: Good at what?  
NDC1: Good at academics like... intelligent like.  
PM: So an intelligent person who's good at sport.

There is a performed genetic determinism active here, as the boys get carried away, many accepting the 'best genes' argument when presented as a question on the kind of person they would like to 'create.' This is a contradictory position for those who otherwise would not set themselves other deterministic opinions, such as Derek, above, as previous quotes show.

The objectifying of embryos and genes as sites of disease brings an instrumental effect to identity – remove the gene means remove the embryo means remove the person. The application of *scientific rationalism*, particularly when incorporating elements of *risk* rather

than *fate*, reduces human identity discourse to genes. The lottery of birth, whether explained in 'natural' terms or by a new technology, denies the existence of a 'future child' that was not likely to be born in the first place. These explanations are becoming more prevalent in the role of family and relationships generally in modernity. Franklin (2003), in her anthropological work, sees that the ties of kinship and responses to natural facts-social facts distinction are being changed by NRGTs.

However, in general terms, young people's perceptions of science in this study challenges accepted notions of a lack of awareness of the philosophical implications within this science-identity blurred boundary. That said, this could have been responses to the researcher frame of 'social and ethical considerations of science.' As an example, here Damien's interest in the big questions of science prompted him to consider the epistemology at the heart of science, biology in particular:

I think when you're going through life.. you're going to come across these philosophical issues yourself. And I think any help you can get in that whether it be through biology or religion class or whatever to help you cope with that is well needed. And also facts in a subject can only get you so far. But until you start putting something into the class and you can see how it's affecting like life.. everyday life.. .. really then the subject starts to .....come across strong in it. (Damien, NDC, interview)

When one student was asked what she thought biotechnology was, she replied 'the moral side of biology.' The confusion may be justified; these activities may represent their first time to register biotechnology and this may well be indicative of presenting this frame without defining the terminology clearly. Douglas from SD had a clearer idea of where difficulties lay in applied science and technology:

You've got the laws and theories and stuff that everyone knows is true.. and you've got all the research which... no-one knows what they're doing really (Douglas, SD, interview).

This messiness of application and process results in what he calls a 'grey area' of scientific endeavour outside the 'black and white' distinctions of science content.<sup>3</sup> 'Grey area' was also a term used by Des from NDC in a specific bioscience application: the treatment of disease. It

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<sup>3</sup> Douglas, from this affluent school with students of many nationalities, was truthfully the only student to make some clear definition between science and technology.

is here that science becomes associated with human embodiment. It touches the sacred and there will inevitably be clashes of views, according to Des.

The fact that controversy exists within a discipline like the biosciences at all was raised by Kate from SK. Kate was considered a high achiever in all subjects, but opposed the form and structure of her education. In an example of the conversational resources that students had at their disposal, she contrasted the conservatism in biology education, with her other passion, art.

You couldn't talk a hundred years ago about the nakedness of art and stuff like that. That was controversial. But there's nothing much anymore. (Kate, SK, interview)

Kate's rationality is absent from the frames created by many others however. She explores her worldview on the question of religion:

I don't know... I don't know what's out there but I don't believe....well . I'd like to think that there was something else out there rather than just the Earth, being that.... It's not logical I don't think (Kate, SK, interview)

In *If...cloning could cure us*, the central controversy revolves around the use of a 19-day old embryo for stem cell research, exceeding the 14-day limit permitted by British law.<sup>4</sup> Participants from LH challenge the futility of an arbitrary date of 14 days based on science:

Y: I think like I don't..I disagree with the 14 day. I think they broaden it out to maybe 19 days. ...Essentially it's the same as a 14 day old embryo. The only difference is differentiation (Female, LH, *If...* film discussion).

Using the process of science to decide when human life begins or differences between the embryo as human and the embryo as artefact is currently a live one in Ireland. Jasanoff (2005a) has criticised the Warnock Report's instrumentalisation of the embryo by fixing the 14-day threshold, as though this temporal distinction could decide between human and object (Jasanoff 2005, citing Warnock, 1985). 'Y' above shows herself to have at least been informed by the film's representations of science regarding differentiated cells and draws her own conclusions about how useful this is in dealing with the issue. However in the next

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<sup>4</sup> Of course the larger issue in an Irish context, as described later, is why the embryo should be used at all, and the film presents this case as well.

sentence, Y contradicts herself by saying perhaps 19 day embryos would be more suitable after all.

*Explanations of messing with nature*

Let us look again at the *against messing with nature* schema, identified as a frame. In this example the responses are to *The Gift* Statement 1 at ND:<sup>5</sup>

- PM: Yeah, but if you thought that about everything....  
L: Yeah but if all that stuff is going to happen you might as well just like, stop it.  
O: Prevent it.  
P: That's messing with nature though.  
L: [You can prevent it from happening..]  
N: That *is* messing with nature.  
PM: So it's the argument you'd have(*stammer*)....  
M1: So?  
L: Obviously it is.

(ND, *The Gift* film discussion)

The phrase 'messing with nature' is used constantly in this ND discussion. The prominence of the term 'messing' in responses suggested the naming of this frame. Once students latched on to this frame, other considerations – either the rights of the future child to a healthy life, or easing suffering, or the case for the extraordinary life-planning measures of Ryan for his child – were often forsaken for a common impulse against the idea of 'tampering,' either in the destruction of a living entity for research or the idea that a parent could be 'picking all your embryos and all.' On other occasions, other frames were aligned with it to support it. At times young people used secular arguments against the use of NRGT, or other biotechnologies, that extended beyond any sacred understandings of the embryo. In discussions, the concept of nature was introduced by the words of Statement 1, yet it has a powerful salience by drawing on a *disruption of normal practices*, appealing to a higher law that does not require theistic explanations. Participants who responded that Jennifer 'wanted a natural child' meant a child not selected by PGD, thus bestowing implicitly a kind of artificiality upon a child that would have been born using this procedure.

Of the interviewed participants, Des from NDC, Karen from SK, and Lorraine from LH had the strongest negative reactions to using the embryo in either research or for screening

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<sup>5</sup> Statement 1 again: 'Jennifer is right to argue that even though she knows that there is a risk of her child inheriting Friedreich's ataxia, she wants 'nature' to take its course.'



purposes. (At this point I cannot place too much emphasis on the fact that NDC and LH were Catholic schools, although it must be noted). Other reactions were evident against using stem cell technology or, more commonly, using PGD to select characteristics such as sex, physical prowess, and hair colour.

Distinct lines are drawn by actors, which correlates with Jasanoff's (2005a) suggestion that controversies at the interfaces are highlighted to prevent boundaries becoming blurred by the structural intersection of disparate normative processes. Across the eight statements in *The Gift*, as Chapter 5 shows, we can conclude that most young people in the six schools do not think sex selection should be permitted, nor selecting particular physical attributes not related to serious disease. However for many others, the mere fact that an element of autonomous selection is available at all draws a kind of nervousness. For others again, the use of the embryo goes beyond concern to a type of revulsion, the 'yuk factor,' as the term, attributed to Leon Kass, describes it. It is tacit, instinctual, perhaps at times beyond words, but the yuk factor nonetheless may explain why certain practices in any given field are almost self-guided within their normative pathway. The arguments against tampering were often settled at 'it's just wrong' or 'no, that's not right.' Although one ND student (jokingly?) made a reference to babies in test tubes to create an image of the non-natural, the females from this school made a distinction which suggested being unnatural was not in itself the issue. 'Sometimes going against nature isn't bad,' said one. 'Like taking a tablet. But when it comes to genes.....' (ND female, *The Gift* film discussion). Participants reacted strongly when one person suggested taking an antibiotic could be analogous to using PGD if the nature argument were to be used.<sup>6</sup> The more analytically minded who framed NRGs as meddling searched for logical framing. 'Balance' was Damien's example of an attribute of nature that was normative and normalising and one of those 'species of animal' in the kingdom of nature – 'man' – can 'upset this balance' through technological intervention. Lisa from LH presented another hypothetical scenario that had ramifications for the natural: if stem cell research was used to save someone from dying, as in the case of Andrew's in *If...*, then the extension of this would be the prolonging of a person's natural end. Could this be seen as contravening natural law, she wondered?

Damien's unusual combinations of the two frames, *scientific rationalism* and *against messing with nature* was further called upon to argue that intervention as prevention was the lesser

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<sup>6</sup> I was interested to find out what young people meant by 'natural.' Della invoked dietary and animal welfare images: 'natural food, fruit and vegetables ..[not] chips and ..sausages. [After prompting about processing] the way you...the way you keep animals.'

evil, but warned that ‘there’s prevention and then there’s.. getting too much involved like’ (Damien, NDC, interview).

Damien does not favour PG, however. He uses a *scientific rationalism* frame to explain this: the ‘gene pool’ may be ‘upset’ if we humans tamper with our own processes of natural selection. In external debates, it is common to have scientific arguments against NRGs. We can see a value system working here in the language of science.

Some scientific rationalism was represented in a tactical, rebellious way, as opposed to the dominant strategy (de Certeau, 1984). The subsequent court case in *If...* transpires as Alex’s colleague informs the authorities of her illegal procedure. Yet she has some support from the audience here, some of whom feel that normative practices of science were not enough in this case and whistle-blowing – or ‘grassing’ – prevented a cure. Science needs rebels in this consensus. It seems peculiar that a consequentialist *risk* frame also emerges here in the argument: whatever risk there may be from selecting an older embryo eventually ‘balances out’ in the moral scheme if a cure is to be found. Is this a scientific risk or a moral risk? What was further questioned about Alex’s act was the immanent nature of her own desires: did she really do it to help (or save) Andrew or did she do it to further her own career? Lisa from LH, reflecting on this discussion, presented the mixed motivations as acceptable for Alex – fame and fortune are appropriate goals if the good intentions of life-saving therapy is also the outcome.

By and far the most utilised popular wisdom term that might exemplify the *against messing* frame’s appeal to higher moral law is the phrase ‘playing God’. The perspective is well covered in literature (Goodfield, 1977; Kass, 1985; European Commission, 1997; Bauer and Gaskell, 2002a; Verhey, 2003). This metaphor alone would be the subject of a thesis such is its cultural resonance. While once or twice I introduced this term myself to watch it ‘take off’ there were other occasions where it emerged spontaneously from student discourse.

It has been mentioned already in this section that schemas which drew on ideas of science and nature to explain NRGs related discursively to risk, mostly taking the scientific rationalism frame, and fate, generally where a participant invoked identity and nature. These were two oppositional, yet oddly connected, complex frames, which warrant further discussion, particularly given that these two concepts are strongly tied to how Giddens explains late modern self-identity in the context of technological change.

### Fortuna versus risk

In Chapters 1 and 2, notions of increased awareness of risk in late modernity from Giddens, Beck, and Lash were discussed as a formative part of identity, what Beck (1992) calls the risk society. From *The Gift*, the risk has already been assessed; the percentages given for being carrier/potential victim supports *risk* frame. When an expert system – in this case a PGD clinic – presents this risk to Jennifer, according to this argument it is the power of facts that is persuasive, not the doctor herself. As with other participants who construct solid frames, there is a common sense here allowing the potential parent to colonise her future, a common sense that precludes argument. It should also be noted that those who argued their case here often focused on the core premise of statement itself, the *right* to argue.

Yet in young people's arguments, *fortuna* remains.

- F: ...like if they're meant to be born that way they'll be born that way and she'll still love the child.  
M1: Yeah but then they'll only live to a couple years. You might as well have a full life.  
F: You can live to forty, fifty, you can.  
M1: But that's just not going to happen.  
I: But you can be downed by the back of a bus at two.  
(ND, *The Gift* film discussions)

The phrase often used here, particularly by ND participants, is 'meant to be.'

I think ...just let nature take it's course cos some people are meant to be good at sports, some people are meant to be good at academics

(Male, ND, *The Gift* film discussions)

These arguments about a child's destiny are particularly pertinent when confronting parents' future life planning for their child, as will be clearer in the *liberal individualism* and *commodification* section below. There is a direct link here to a *rights* frame, where parents are perceived to break with normative practices by controlling fate. Derek, in his earlier nature/nurture ruminations, seemed to invoke a *risk* frame in contrast to *fortuna/fate* when talking about control of the next generation, also bringing in crude manipulation descriptions of masculine identity and personality change:

- NDC1: The whole thing right. If you pick someone with attributes, they can still fail at life, they might

not always gonna fail. It's still an accident that you're good at sports. And someone with a high temperament you can still fix it. (Derek, NDC1, *The Gift* film discussions)

Yet while Derek was alone in a later interview, he decided that Ryan should have selected an embryo randomly once it was clear that it did not contain any genetic markers for ataxia, thus introducing *fortuna* back into the process.

While the inevitability of disease when present 'in the genes' suggests genetic determinism as mentioned earlier, the element of surprise is crucial to appreciating a child for many who frame childbirth in terms of chance, but with elements of *fortuna*. The action of PGD acknowledges risk but resists *fortuna*.

- K: And there's no surprise like. You know what way they're going to be born. You're not going to see which way they grow. He already knows which way.  
PM: He knows.. the way..  
K: He's not going to get any surprises like.  
J: That's the best thing about having like .... a child grow up. Is seeing how they develop. And what way they take to things.  
K: Yeah and he's already going to know  
F: And deciding *what* they're going to do in the future.

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- L: Yeah but if all that stuff is going to happen you might as well just like, stop it.  
O: Prevent it.  
(ND, *The Gift* film discussions)

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- ND3: (*Denise*) It'd probably go wrong.  
C: Yeah, there is a risk that it could go wrong. Cos everything carries risks like so.. You could end up picking your child not to have Friedreich's ataxia but there could be something they don't know about, that it would have, that you don't know about either.  
(Females, NDC, *The Gift* film discussion)

The counterargument goes that, rather than *fortuna*, risk and the uncertainty of the future alone was enough to allow 'nature take its course.' To paraphrase a few participants, it would be pointless to get rid of the disease since something else could happen.

Living in a risk culture does not mean previous eras have enjoyed less risk of harm or discomfort to the body on a day-to-day level. However what is unprecedented about late modernity is the integration of statistical risk into life planning even in rudimentary terms (Giddens, 1991; Beck, 1992). The individual throughout Western societies has a greater *idea* of risk (ibid.). The ND participant cited above may be defeatist and pessimistic in her attitude to PGD on the face of it, but in the context of her defence against ‘letting nature take its course’ in discussions, this framing shows awareness of the risk of the unknown. It may also show what Giddens described as

the anxieties generated by risk calculations themselves, plus the problem of screening out ‘unlikely’ contingencies, thus reducing life-planning to manageable proportions (Giddens, 1991, p182)

In *The Gift*, the risk of the future child, Mark, getting Friedreich’s ataxia was one in four, which is statistically high, and therefore more than an ‘unlikely contingency’.

Wynne (2005) joins a growing chorus of commentators who see the concept of risk itself as framed scientifically in modern institutions, at odds with the ontologies and local definitions of problem issues that arise globally away from the boardrooms of technoscience. Detraditionalisation is how Anthony Giddens (1994), Ulrich Beck (1994) and Scott Lash (1994) describe a similar phenomenon, meaning the individualisation of efforts to deal with increased uncertainty and contingency through a parallel increase in reflexivity and agency to counter *fortuna*. A *risk discourse* has mushroomed in the last ten years (ibid.) from which has emerged a civic epistemology of risk assessment (Jasanoff, 2005) that owes more to a definition of uncertainty from science institutions themselves than other cultural definitions. The film *If...* (2004) demonstrates this scientific understanding of risk: the main character witness believes that an exact timing of differentiation of the embryo is the concept at issue, ‘the main major challenge in this field.’ He claims adult stem cells are safer, with ‘no risk’ of tumours; another witness who once initiated cloning experiments for humans tells the jury that ‘the risk of mutation is possible’ for every cloned cell’ and ‘is not a risk worth taking.’

Yet reframing of risk is also possible within the scientific community. As examples: Dr. Stephen Minger, a ‘real life scientist’ who offers opinion as part of the dramadoc’s sequences of talking heads (ibid.), says the risk of tumours (from using stem cells) should be ‘nil’; Speaker A diverts away from accepted notions of risk, cause and effect in his own scientific community when he tells one group ‘If you don’t smoke you won’t get lung cancer.’ Speaker B on the other hand, talks about risk in the area of cancer, rather than straight forward

predictions. Accordingly, my defined *risk* frame here needs to be labelled carefully as open, hybrid, and ambiguous. Although I identify the participants and the frame interpreted from their constructs, I am also aware that their representations of what I call their ‘risk’ concepts may have a different meaning for them.

### **Framing the sacred**

In this section we metaphorically enter the hallowed grounds for a certain minority of students in all schools. Debates that constructed these frames began at times to get heated and required strong facilitation to allow participants to air their views if they wished, and to allow others to do so without intimidation. I must also accept that the deepest expressions of feeling for the issue at hand may have been kept private. As with media debates, the embryo became the central, passionate framing issue, albeit here in a performative sense as participants brought a taboo subject into a formal discursive practice within science class (see Chapter 5). While positions that use other frames described in this chapter have an element of *fluidity* in them – the student may seem to move away from that position or it becomes diluted completely – as we will see in the final section of this chapter *sacred* frames tend to have *solid* position at the core resisting a complete change. Yet those who use them were quite capable, and sometimes more than willing to align, or join, other frames to support this position.

There is a strong link here between *embryo* and *against messing with nature* frame, with the former being better articulated and more objectified. *Against messing with nature* generalises a secular ‘yuk factor’ (Kass, 1985, 2002) in opposition to any form of technological change through NRGTs while a *sacred* frame will focus particularly on the embryo and the ‘shoring up’ of cultural resonance and symbolic packaging is all the more intense to protect this identity. I use ‘sacred’ here in a science studies sense in that there can be a ‘secular sacredness’ attributed to a practice or object, something untouchable, deserving of utmost respect, beyond reproach, but can ultimately be either a humanist or religious worldview.

I distinguish between three types of sacredness (Table 6.2). The non-religious *sacred* framing itself had two varieties.

(i) The *embryo not person: physical human essence* frame was constructed with embodied descriptions, such as physical features where the embryo in human form attained sacredness. This argument often came down to an acceptance of whether or not foetal life was a baby, or fundamentally human without recognisable human form (the ‘outside’ discourse term ‘personhood’ was not within their vocabulary). Phrases emerged such as: ‘When it starts to get little eyes and nose and stuff’ (Lisa, LH *If...* film discussion); ‘It’s not in your arms’; ‘But they’re not breathing’ (to which the counterargument was ‘But they’re still alive’) or ‘You’re not going to have a funeral for it’ (all male, SK *The Gift* film discussion). These suggest a similarity to other religious perspectives on pregnancy besides the Catholic faith, such as physical continuity, epigenesis, quickening and ensoulment (Maienschein, 2003). Much of modern framing techniques by pro-life movements tend to emphasise the enhanced human form of the foetus as seen in new 3D and 4D scanning techniques.<sup>7</sup>

(ii) The second non-religious, but sacred, category, *embryo as human: spiritual human essence* uses the ‘potentiality’ of the embryo as justification for its personhood. The sanctity of the body and the social or cultural totemism we have built up around life origins are enough to protect it. Karen from SK and Des from NDC proposed personhood from conception. There are comparisons here with German theoretical ‘dignity’ framings or Habermas’ (2003) *inviability*.

(iii) In a third category – for a small minority of participants – the embryo was framed in a *religious* sense as fully human, and thus sacred, from conception. In the case of Lorraine from LH, references to the Catholic doctrine were used. Note from these frames listed in Table 6.2 that Frame 1 may construct the embryo as utilised in PGD or HESC as non-human, at least until it resembles one, whereas Frames 2 and 3 will frame it as human, or partly human, from conception. Karen from SK might however have utilised the religious frame also without explicitly mentioning her religious perspective. It seemed to be reflected in her descriptions:

... like the making of the world and all this stuff, the scientific view of it, like evolution and then the ah, Adam And Eve [in] religion and how scientists have a different view on life than people who have really deep religion and how you bring the two of them together is really your own... I don’t know.. experience or whatever. (Karen, SK4, interview)

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<sup>7</sup> It might also be worth investigating how these utterances about embodiment of the foetus might be tied to a wider body masterframe.

Sometimes. ..yeah when you think a lot about religion and then ...you kind of have to mature your views on religion. Like the whole Adam and Eve thing like....(Karen, SK4, interview)

**Table 6.2.** The three frames in young people's constructs that reflect a sacredness of the embryo.

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*Sacred theme*

1. *Embryo not person: physical human essence* [frame]
  2. *Embryo as person: spiritual human essence* [frame]
  3. *Religious eg Catholic view* [frame]
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Lisa gave a tentative judgement when interviewed on whether embryos were human or not, needing the justification of a cure for serious disease although she used the understated, sequestered experience term 'off-putting' if it was going to be a 'person.' Other views expressed during the LH debate also showed the 'sanctity' of a fertilised egg for reproduction as distinct from an embryo for therapeutic purposes. Furthermore, there was clear discomfort with using embryos of any kind unless really necessary, for instance resisting their use for cosmetic therapy. It is intriguing that there is an apparent contradiction here – embryos can be used to help sick people if they are not going to be implanted but not necessarily for cosmetic reasons. By drawing on embodied features to describe the personhood of the embryo as Lisa does, she draws a boundary to human sacredness. Yet she has not been convinced that the embryo should be used for all purposes. This collective identifying of a strong position followed by more tentative musing afterwards on using embryos was also evident in SD, a school that was strongly pro-technology.

'Potential' was a word used by participants in SK and NDC with different frames to describe the personhood of the embryo. While Damien from NDC saw 'potential' as effectively 'humanness,' his classmate Derek and other respondents from SK used potentiality as pre-human, thus non-human. Potentiality for Des is enough to be considered human. To him, a cell can in a way be human, or part of human essence.<sup>8</sup> He gives no distinction between an embryo in a lab, cloned or otherwise, and an embryo in the uterus destined to be a person. His reasoning for sanctification at fertilisation was because of the 'vagueness' of an arbitrary

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<sup>8</sup> In contrast to ANT and recent Latour, is this humanising nature rather than downgrading humanity and getting rid of a human/nature divide?



scientific decision on when life begins (not unlike Jasanoff's criticism of Warnock (Jasanoff 2005, citing Warnock, 1985)). But it remains to some extent a quasi-religious description of the embryo: it must get 'spirit' at some stage along its development. His wording is interesting, bringing to mind the contingency of human constructs: conception is the best 'choice' for 'deciding' on personhood because anything else would be too 'vague.' The act of 'screening' of embryos is interpreted as 'testing' only for informational purposes. This is acceptable – the act of then *getting rid* of the embryo if there is a positive result for disease is *not* acceptable. The core humanising frame of Des becomes shorn of argumentative strategies or symbolic packaging when he finally draws on the emotive image of media pro-life framing – embryo selection is abortion and abortion is murder.

Religious frames often drew on particular mythic themes. The cultural theory word on this goes to Damien, who described religion stories such as Adam and Eve as a method of control through metaphor, a metaphor humans have 'dug themselves into a hole' by using, piling explanations upon explanations through stories. The prominence of origin myths can be traced across any conversations about conception or birth itself. And as Damien says, 'origins need a creator.' While Lorraine draws on the biblical term 'creator', Damien does not rule a deity out of this analysis, with his word for God being analogous to *risk* rather than *fortuna*.

Because like y'know the universe was there always. Like there had to be something that started, I think. Whether you call that God or chance or whatever. But there definitely was something in the beginning.

(Damien, NDC3, interview)

We have thus far in this chapter considered understandings of power, identity, and non-cultural/non-social nature about NRGTs that might be said to be on the structural level – biotechnology applications, late modern ideas of risk and fate, a common sense of morality and sanctity afforded to the embryo. Now we turn to perhaps a more micro, individual-level of both description and action – the issue of rights and how this should relate to the individual in the context of NRGT practices. There is macro level analysis also by describing NRGTs and the rights of society. This next section may therefore deal with politics proper.

## Liberal individualism versus social responsibility

The possible emergence of a liberal individualism is another theme considered by Gamson (1992). The tendency towards liberal individualism is characterised as a rational subject shaped by personal will. Although it is often placed in the context of market influence – and a consumerist frame is dealt with in the next section – here it is important to reflect on how young people identify and measure other external forces at work that may empower or restrict them. Often there are references to *lifestyle*, in the Giddensian sense, and society in general in the hypothetical (and fictional) positions they have taken in NRGT discourse. However I also want to draw attention to the discourse struggle, as Gamson has done, between defending the rights of the individual (person or even embryo) and the social responsibility towards the many (Table 6.3).

**Table 6.3.** Frames that utilised the *liberal individualism/autonomy* cultural theme and *social responsibility* countertheme (Gamson, 1992).

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*Liberal individualism/autonomy* theme (Gamson, 1992) and *social responsibility* countertheme

*Power play: external* [frame]

*Rights*

*Patient/parent* [frame]

*Human embryo* [frame]

*Future child* [frame]

*Future humanity* [frame]

*Commodification* [frame]

*Runaway* (Gamson and Modigliani, 1989) eg lack of trust in future humanity [frame]

*Threat to diversity* eg genetic engineering = generic engineering

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NOTE: As with the *progress/ harmony with nature* themes, the frames here can draw on either theme for symbolic and cognitive support, although there are limits. For example *rights: future humanity* is largely a frame. From the *social responsibility* theme. The difference between the theme and countertheme is the locus of power – should future technologies address personal needs or needs of others/ society? These frames suggest an agency either for ‘humans’ that exist now or will at some stage in the future. Relations are seen here in terms of power, rights, commodity, and human recklessness.

The concept of rights, of course, was introduced in many statements called out in film discussions. There was the ‘right to argue,’ ‘Ryan’s right to be tested,’ ‘Ryan’s right as a father to give his child the best.’ Yet I allowed students to make what they wished of the democratic and libertarian nature of the statements. The first statement in the *Gift* activity is perhaps less obviously revealing a democratic slant: ‘Jennifer is right to argue that even though she knows that there is a risk of her child inheriting Friedreich’s ataxia, she wants

'nature' to take its course.'<sup>9</sup> Students might interpret this in two possible ways: *what should Jennifer do that is for the good, or is it for the good that Jennifer should argue her case, regardless of the final decision.* My own research framing of the question as socioscientific deliberation might well suggest to young people that they must now ponder on what they think is *right or wrong*, so the former interpretation is taken. Perhaps once in each session, a student might suddenly see the latter interpretation and cause the other participants to pause and reflect on what the statement is asking.

Have a natural born child like, she's right to argue it, not saying that she *should* do it (ND, *The Gift* discussion)

NDC1:(Derek) Yeah but she has a right to a child that [inaud]

NDC3:(Damien) The question is the right to argue though, not lead to a child....

S: [raised arguments]

NDC1: If you can't lead your life fully though

NDC3: That's not the question. The question is the right to argue though

(NDC, *The Gift* discussion)

Is it not asking like her right? Like if I was doing it.. if it was talking about myself I would say that I should get it screened but it's her *right*...(Kate, SK3, *The Gift* film discussion)

As a riposte to Kate above, her classmates were quick to invoke the former interpretation again, implying that perhaps, Jennifer does *not* have the right to argue if there is no moral obligation to do so. The counterargument produced in this example appears to have a gendered element:

F10: But does she not have the right to listen to her husband as well?

Her husband's ... knows what

PM: Yeah.

F10: will happen like. It's not just her decision.

F11: Yeah that's true.

PM: OK so but...she had a right to argue it but you're saying she

F10: but she still has.. she still has to listen to her husband because he knows what happened already.

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<sup>9</sup> This first statement in *The Gift* activity is rather ambiguous and caused some confusion in schools. What did it mean to 'do something?' By challenging participants to ask themselves would they carry out an alternative action to Ryan to prevent Friedreich's ataxia in an offspring, as opposed to 'doing nothing' *except continuing with your natural plans to have a baby*, I was opening up to more 'positive options', to use a phrase borrowed from anti-abortion discourse. Initiating a response here might have contributed to the poor support for Jennifer's wish to have the baby naturally, as referenced below.

PM: Yeah  
F10 And he knows what the mother will go through with the child...

(SK, *The Gift* film discussion)

There was some rich framing devices within the *autonomy v social responsibility* theme that were gendered and also place an authority on the embryo in certain cases. It would be useful to explore these separately now.

*'Autonomy' frames and gender power play*

As seen with our earlier performative methodological approach, gender was a differentiating schema when reflecting on Ryan or Jennifer's life choices. Chapter 5 demonstrated how males were sometimes unengaged in the perceived female topic of NRGTs. Yet many males and females who adopted the *patient/parent* frame while invoking a *liberal individualism/autonomy* theme defended Jennifer's actions, agreeing with this ND participant's emotive pronouncement: 'It's her baby and it's her body and she should decide what she wants to do with it' (ND, *The Gift* discussion). In stark contrast, Derek – whether or not he was using his aggressive argument approach to performative effect – invoked sexist, derogatory language against Jennifer for not accepting PGD (this was responding to one male's proposed scenario where Jennifer might regret not using PGD, potentially returning passively to the doctor, who might be justified, according to this student, in saying 'I told you so').

This gendered aspect of the frame was a variation on *patient/parent* frames, markedly in opposition to *future child* or *future humanity* frames. While a *patient/parent* frame sided with the rights of either the mother, the father, or a patient waiting for treatment with HESC technology rather than foetal life or the wellbeing and identity of future generations, the *embryo*, *future child*, or *future humanity* frames focused on these groups at the expense of the parent undergoing PGD tests or the patient with a life-threatening disease (again see Table 6.3). These frames were coded in this way to make a distinction between how participants used a process of emphasis and selective exclusion for the agency and rights extending to:

- 1) the immediate recipient of the technology;
- 2) the embryo;
- 3) the future child; and
- 4) future generations or the future of the species (the latter two applying to PGD in *The Gift* only).

Each of these four drew on a common sense ‘moral obligation’ (to use Karen’s words) for that frame. In a situation where Jennifer was called on to make a decision about having a baby, there was general agreement across schools that she should ‘do something’ – even, it would appear, Karen – and that ‘something’ could include IVF using non-carrier gametes or adoption. In fact for Karen and Des, adoption was the moral solution.<sup>10</sup> The morality of decision-making also surfaced in the *patient* frame in *If...* discussions. Even when Andrew’s patient’s rights are being invoked, an added dilemma materialises in the narrative when his fight to allow stem cell research is supported by the mother of a very ill young girl with diabetes.

A debate ensued in LH to my question about degrees of deservedness of treatment. Although many agreed that everyone has equal right to medical treatment, there were others who felt treatment should favour the diabetes patient. A reason emerged for this in LH: the diabetes patient was born with the condition whereas Andrew knew the risk he was taking as an untrained mountaineer. ‘Stupidity got Andrew into this situation,’ said one. ‘He had more control over his condition than she had over her’s’ said another. Taking a risk means the risk-taker must take the ‘blame’, thus suffer the consequences, an example here of how risk experience of this kind is sequestered, taboo, allowing room only for fate to intervene with tragedy. Yet some – Lisa in particular – identified with Andrew not just because of his injury but also the lifestyle associated with it. Thus a person’s lifestyle should *not* be considered in preferential practice for life-saving treatment. ‘Andrew happens to be adventurous,’ Lisa told me in interview. These are classic medical ethics debates which suited the content of *If*.

#### *The solidity of embryo positioning*

The solidity of the positions taking an *embryo rights* frame – I use the term *solidity* here cognisant of Bauman’s (2000) ‘liquid modernity’ – is also recognisable from media discourse on abortion. For PGD, the issue of supernumerary embryos – so contentious and politically boundary-defining in Irish media discourse following the ‘frozen embryo’ case (Cassidy, 2006) – is not dealt with in *The Gift*. Even for those who might be considered pro-

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<sup>10</sup> In classrooms, we did not have recourse to moral philosophy to investigate how Kohlberg (1981) or Beauchamp and Childress (1994) might have tackled these dilemmas. I do not have a background in applied ethics or moral philosophy, from which so many media ‘bioethical debates’ draw their store of knowledge. All we, as a discussion group, had to draw from was common sense and some way of following a route of practices that leads to the good life (Habermas, 2003). This good life often took the flavour of what anyone might do in any given situation, taking on their normative practice solutions rather than formal moral philosophical arguments. This is key to my argument about exploring practices in education, both for content and reflexively for pedagogy.

choice, there was an intriguing battle to be performed here, but there was no doubting Karen's position:

But why should there be three others who aren't picked and are just left there to *die*?.....They're potential babies, they're living things like. So why should they be ... left to *die*? ....Should the parents have the right to choose which child they want in the first place? Should they have four *children* and he gets to pick which one he can have?

(Karen, SK 1, *The Gift* discussion, emphases added)

The language is emotive, and at once stage Des uses the word 'murder.' Yet rarely is this word used in private one-to-one conversations about NRGTS or abortion. Karen comes under pressure in debate, fighting a lonely corner, and has taken on a duty to defend the unborn. As we have seen in Chapter 5, emotion in counterattack may be used sometimes in provocation, a ruse (or strategy?) in de Certeau's (1984) terms:

M5:                   There could have been two more [babies]  
SK4: (*Karen*)       [Even] if they did have the disease, they still  
                          have the right to like not let the....  
M12:                   *They don't have any rights.* That's  
                          what it is. They're potential babies, not babies.  
                          (*The Gift* discussion, emphases added)

As we also have seen above, the opposing debating frame to *rights: human embryo* allows patients or parents to have a degree of choice. For Karen, Des, and Lorraine, embryos do not have this choice, and the perceived oppression brings out their anger. Lorraine told me in her interview that the unborn are 'powerless.' She tells me about (power) 'play' between embryos used for research and the enabled choosers such as Andrew:

Well its plain, y'know. One life played against another.  
Somebody who has lived for a while, you know, however short  
it's been, and then someone who hasn't lived at all.  
(Lorraine, LH, interview)

The embryo was alive but had not *lived*.

*Oppositional 'rights' frames around the embryo: embryo, patient/parent, future child, future society*

Des objected to my use of the word 'best' to describe embryos, as we will see in the last section, and Karen pondered how embryo rights might politically be defended by human rights groups. In the SK debate, when Karen reacts angrily to suggestions that the embryo

could be used in such an exploitative way, the perceived moral differences between destructive techniques of the embryo come into the frame. PGD is morally compared to other embryo procedures within their domains of experience. Known regulatory structures are called in to back up arguments. For those using *patient/parent* framing, the perceived acceptance of IVF and the morning-after pill are used to downgrade the embryo's status. For those framing the *embryo*, the Irish question is asked: 'Why is abortion banned then?' (SK1, *The Gift* discussion).

The statements and thus our conversations focused a good deal on further power relations between the clinicians/ scientists (in *The Gift* particularly) and the patient/parent, the intended 'beneficiary' of the technology. In *If.....* there was a sense that Andrew might have been given false hope. There was no guarantee he could ever be cured, yet Alex excitedly promoted this new technology. There were several instances in *The Gift* where the human face of technoscientific institutions was lacking when dealing with patient sensitivities. Offering a perspective on how doctors in the film handled information provided our debates with an opportunity to discuss power relations between the young and medical institutions.

For some, the transcendent power of technological application alone can be its own justification. This further takes on the *progress* theme (Gamson, 1992), technology as saviour. While many felt the doctor was right to inform Jennifer of options available to her once a positive diagnosis was made, there were lengthy discussions about the nature of this advice. What I call the *power play: external* frame refers to the way *scientific information itself was recognisably used by personnel*, not necessarily using *scientific rationalism* to explain an objective fact *per se*. The locus of power in conversations swung from Jennifer to Ryan to the doctor. An example of how power could be framed externally was when a group agreed with this participant's summation: 'It's [Jennifer's] life and [the doctor] has to try and organise it' (Male, NDC, *The Gift* discussion). This statement implies that, although Jennifer has autonomy in her life, the biomedical profession needs to be somehow involved in its shaping. Once other participants organise themselves around this type of frame, the structural authority of scientific practice takes precedence in this conversation. The two- or three-way channels of power become all that there is to see about the issue. Many were more persuaded that these choices should be made by parents, not governments or the legislature. However classroom opinion was often divided on the power concept of doctor as advisor which is at the heart of medical ethics: should she actively advise what to do in a kind of 'soft arguing' approach or should she just present the objective facts without opinion? 'The doctor is there to provide information' Derek says, 'she's not exactly pushing her into it like' (Derek, NDC

1, *The Gift* discussion). Yet there is a gentle force, making her 'strongly aware,' as Kate from SK puts it.

Current media controversies provided a way for some to introduce other examples of issue culture into the debate. These reflections and agreed understandings of world structures as represented through the media initiated in many a linking of events within the issue culture of NRGTs, and this in turn provided the basis of a type of activism from their positions towards school, church, or state. Laura from LH was critical of the Catholic Church's teaching about embryo research and related technologies and emphasising the ethos of her school (Catholic) was not an influence on her views. For the purposes of my study, the cross-links students made themselves between cultural references and NRGTs were sometimes weak, but the desire to actively find out more, and contribute to its change through knowledge, was strong. One participant in particular joined the general rebellious nature of this school's participants (covered in Chapter 7) by exclaiming she resented any government input into decision-making on IVF / HESC regulation and matters around when life begins.

This critical streak links many of the schools, from Deirdre (ND1), Katherine (SK2) and Kate's (SK3) aversion to stereotyping of their age and subcultures, to Lorraine (LH) who, though a practicing Catholic, recognises the importance of having an opinion in religion class. Youth is the age of rebellion and it is a necessary part of identity-formation. Statement 2 on Ryan's right to information about his genetic makeup became the most unanimously agreed statement throughout all schools: Ryan has a right to know he is carrying the gene for Friedreich's ataxia. In the film, the 14-year old Ryan is told that he is too young to get a test; he needs to wait until he is sixteen. A courts case ensues initiated by his mother, which he eventually wins. There is no doubt this 'youth power' aspect of the film caught the imagination, particularly in ND.

The responses suggested a life-planning approach, in the midst of disease. By 'knowing' Ryan had the 'gene' or the 'disease', he could plan his future. *Fortuna* would appear to be missing from the arguments. Or is it? Are there traces of determinism and fatalism mixed with *scientific rationalism* and *risk* within the logic that he has the gene, he will get the disease, he needs to deal with it? The high chances of getting the disease translate into inevitability, fate. There are also suggestions that when a severe physical disability appears to be imminent, your life chances are diminished. This is not, however, a traditionalism that leaves people to their places and accepts fate. This is autonomy for young people, a life politics that empowers them to change it. The phrase 'full life' recurs again and again. One



NDC participant used the embodied Jennifer argument: Ryan has a right to know about his body. Knowing this information is a further part of knowing your identity. A very small minority in schools preferred not to know at fourteen, although there were some disputes about what age a person *can* deal with this life-changing information. A general consensus left it at various levels of maturity, rather than a specific age, which correlates with a recent study by Duncan (2005) who proposes greater access to genetic testing for 'mature' young people based on clinician assessment. This follows a realisation that young people are distanced from decisions about predictive genetic testing. It is the emerging confidence of a sixteen or seventeen year old that causes them to want to know, have a *right* to know *everything*; and perhaps, to some extent, they feel they do. As one ND participant observes: '... at sixteen, you know what you're going to do with your life and anyway (ND *The Gift* discussion).'

Most who framed the debate in this way recalled to the discussion how Annie suffered and, for many, it would be inhumane to allow this suffering to carry on to the planned child. There was however a counterargument position in ND that framed the *future child* another way: it is wrong for parents to control the fate of their child. PGD here becomes, as Habermas (2003) says, 'an invasion in the deontologically protected core of a human person' (p87). This was a solid position in debates, partly influenced no doubt by Mark's rejection of his genetic makeup at the end of *The Gift* to pursue the life he wanted without any more interference from his parents. PGD becomes a threat to individual identity: 'He isn't an individual' or 'They're meant to be who they want themselves' (ND, *The Gift* discussion).

To the statements in the *Gift* activity that refer to the welfare of the child, participants offered this criticism to a parent using PGD: 'It's what *you* want. It's not what the *child* wants' (ND, *The Gift* discussion). Although possibly unaware of any wider nature/nurture discourse, another respondent in ND explains 'Its how you bring up the child wins over.' Many talked about the selfishness of the parents, denying the right to life of a child with disability. It was difficult not to see in ND responses glimpses into their home worlds, whether it was mimicking their parents, references to parental conditioning, or a crisis in their lives generally sequestered from biology class.

And so it is not, in this frame, just a grand idea about *genetic determinism*, *technological progress*, or science's control over humanity that is the problem. It is human agency controlling human life. And for some there is a strong urge to leave this to *fortuna/fate*. 'He's making his child,' an ND girl says. 'He's not letting his child be made. *He's* doing it.'

What often was difficult to do in these debates was establish a boundary for types of disease that should be screened. This is where the contentious area of eugenics rears its head. For those who look at future society as a whole rather than this one pre-selected child, the concept unfolds out to a broader social programming canvas, and here we can tread on yet more dangerous social ground. A large majority across schools drew a line at life-threatening disease only. Yet when other conditions are mentioned:

Like if you're going to see your child bullied for the rest of their life.. or being discriminated against... I don't think you'd want that for your child.

(ND, *The Gift* discussion)

Both *future child* and *future humanity* frames demonstrate a theme of *responsibility* towards society, although diagonally opposite in some respects and might push the limits of 'practices of the good' in their extreme application by the criteria of most participants: a eugenicist might use a *future humanity* frame while a narcissistic parent might use a *future child* frame. It is beyond our scope here to further seek out degrees of communitarianism or deontology or socialism in responses. However the emergence of a politically-inclined caring for others in a world village would not be overstretching the mark in these concerns. Contradictions though, as ever, remain: in beginning the process of PGD, although it may have been initiated to remove an embryo that would have lead to untold suffering of a future child, how can there be an argument for random selection of remaining embryos thereafter (as Jennifer wanted in *The Gift*) as opposed to more selective procedures without reintroducing *fortuna* having already begun to 'play God?' And how could these four centres of power in discourse (*patient/parent, embryo, future child, future humanity*) resolve their differences without the almost whimsical 'parliament of things' devised by fellow 'practice theorist' Bruno Latour (2005)?

In addition to linking with *fortuna* and *risk*, either of the *autonomy* frames of Table 6.3 could align with *scientific rationalism* or *against messing with nature*. For example *scientific rationalism* could support Ryan's right to rid the next generation of Friedreich's ataxia or more democratically, the future generations' *right to be born free of the disease* or it could, as Damien did above, support Jennifer's decision not to use a form of NRGT on the grounds that such technological meddling could have a detrimental effect on natural selection. Likewise there might be a scientific basis for the personhood of the embryo offered, just as there could be an argument that the embryo is defenceless against the onslaught of either technological individualism or a collective social acceptance of a technology. A few

participants highlighted the danger of removing 'a gene' without fully knowing the consequences. What if this same 'gene' also had a beneficial effect on some other biological process?

### **Commodification**

For those who placed PGD into a *commodification* frame however, there appeared to be no such direct link with *scientific rationalism* or *against messing with nature*. This was the process of using product- or lifestyle-orientated descriptions for embryos or future children to frame NRGTS. There were linguistic clues here to negative framing of the technologies as participants spoke of 'shopping for eye colour', 'shopping for children' 'whatever child you want you can have,' 'picking characteristics', 'picking out...blonde hair, blue eyes,' 'he was used', 'the perfect child' and so on. The effect of increased reproductive choice, as Strathern (1996) is aware, is increased exposure to market forces. Whereas *If.* dealt with commercial interests as a major theme of the human egg/womb trafficking industry, *The Gift* had just very slight reference to a commodification society when Mark says to his father Ryan near the end 'I'm just another dream your money can buy.' (*The Gift*, 1999).

I looked here for Giddens' (1991) lifestyles of authenticity still emerging from de Certeau's (1984) 'make do' merchants – young adults who were knowledgeable of the market forces around them and who drew practical boundaries that were not exclusive to commerce in these life political matters. Lisa provided such a view. I already alluded to Lisa's identification with 'adventurous Andrew' in *If* and her reluctance to blame him for his mountaineering accident because he knew the risk involved. She supported his quest for a cure using HESC. Her classmate Laura too thought hard about not being able to take part in active sports again. For Lisa, confidence was the most important attribute. Hers may have been a Celtic Tiger view with the pragmatism of consumer needs. We spoke about the TV show *The Swan* where individuals are brought on as 'ugly ducklings' to undergo plastic surgery and redeem themselves as beauty queens at the end of the programme. Lisa loves this show, applying another gendered reason: 'I'm kind of girly.' We have already mentioned her acceptance of Alex's possible motivations of financial or publicity reward for scientific endeavours. However to simplistically label Lisa as following a pattern of neoliberal capitalism for embodied improvement is to ignore Giddens' lifestyle politics: 'a time/space 'slice' of an individual's overall activities, within which a fairly consistent set of social practices is

followed' (Giddens, 2004, p243). Mediated culture's representations of confidence and appearance is taken in to her lifeworld with many other representations. We must though, with Giddens, accept the central role of the capitalist institution in our society. Yet it is the authenticity of the individual's reaction to consumerism that counts, and this may be for another discussion. Inevitably, in contemporary Ireland, practices of consumerism are constructed through the languages of consumerism.

We have already seen how individual or collective parental choices might also affect this pure relationship, this sacred familial bond which the expert systems have certain control over through PGD or scientific research. Commodification and consumerism invade this cocoon of intimacy, allowing in horrors from our past:

Like.. as I was saying it evolves.. Science always is evolving every single day. And if they do find out the genetic code – the code for the genetics like – they could actually like... but then again its like shopping for your baby. 'I want my baby to....' It's like fascist or Hitler. German people are portrayed as blond hair, blue eyes... which is really just stupid. So if it comes to that in the future.. will there be another dictator? Will he make everybody have blond hair blue eyes? Like so on... like that's a whole other race of people. So I think that's kind of scary.

(Deirdre, ND1, interview)

## Runaway

There was a feeling among many that the technology would run out of control, that humanity cannot be trusted with its stewardship. This was not necessarily an opposition to *scientific rationalism* but, again, to humanity's technological applications, a fear of its innate prejudices and selfishness.

'There's always somebody who goes to extreme'

'You don't know where to stop'

(Deirdre, ND, interview)

'The time limit on stem cell research [on embryos] will keep on increasing.'

(Lorraine LH1, interview)

Interesting future scenarios arose. Although few participants I asked had seen *Gattaca* (1998) or read *Brave New World* (1994), the landscape of rich 'perfect' people ('super-people' according to an NDC contributor) and a genetically-inferior underclass was painted. Recurrent phrases like 'looking for perfection' or 'the perfect child' appeal to how humanity's baser instincts would abuse science. Damien's references to science as a structure – 'humanity hasn't learned to respect science' – or the popular wisdom of 'stood on the shoulders of [other ] people' might have elements of the very 'God replacement' he critiqued in our earlier account. Here, science is independent of human agency. Damien saw a natural evolutionary change for the better might occur without genetic engineering.

I just think that ah.. we.. we've gone so fast with all the technology we had like.. we've kind of just stood on the shoulders of the people that did, we didn't really kind of earn it ourselves. So I think because of that we haven't really earned the respect needed for such technology as that. We kind of just.... we don't really see the consequences of using this technology. We just see it just as a new kind of invention, lets give it a go. I think there's much deeper consequences of it than is first seen.

(Damien, NDC , interview)

'Parents are one-sided,' said his classmate. 'They don't consider society.'

All who used this *runaway* frame wanted clear boundaries. Without these boundaries, there was a strong feeling in *runaway* that things would melt into one, threatening diversity. An intriguing recurrent phrase was 'everyone will be the same.' Habermas' 'dedifferentiation' (2003, p44), a new shaking up of 'grown and the made' (ibid. p42) would appear to resemble this popular wisdom of everyone becoming the same. There was a visual imagery here of how the natural endpoint of the combination of human desires, rampant consumerism, and new technologies would lead to a *generic* engineering of the human race, summed up by Wanda from SW as a race with 'no failings.' On sex-selection options, very few students in any school could give justifications for this.<sup>11</sup> China's birth policies are used as current examples. Although people like Kevin from SK had trust in powers-that be to regulate ('Anyone can't just walk in and pick their child like...there has to be some sort of .... Way of doing it.'), dystopian imagery darkened many reflections, which would certainly have been shaped by both film's premises, and sci-fi generally. Deirdre from ND articulates young people's fears best:

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<sup>11</sup> Here, I usually raised the plight of the Whitakers (Charlie Whitaker cured by 'saviour sibling,' 2005) and the Hashmis (Law Lords back 'saviour siblings,' 2005) in discussions.

*Anything* could happen really . Like there's not really anything that couldn't happen. The things that could.. like to read the genetic code.. I don't think many people would be able to do that. Cos I think they'd want to keep it kinda secret. Like all Governments do! (*laughs*)

(Deirdre, ND1, interview)

### **Framing tactics and conversational resources**

This section looks closer at the dynamics of framing, following the work on communication strategies of Snow and Benford (2000) and conversational resource strategies by Gamson (1992). These modes of analysis assume deep (popular) cultural stores of tacit knowledge about issues such as NRGs and are used in social movement studies to track how issue frames change course over an argument. Previous sections demonstrated many instances where conversational frames were interchanged and transformed at will and similar or even competing frames linked with each other to support an issue in conversation. To further support a frame, conversational resources were used in classroom discourse, references in speech to either cultural resources – media or popular wisdom – or an integration of both combined with personal experience.

First, it is useful to take a closer look at frame alignment strategies. Despite his firm opinion of the sacredness of the embryo, there is potential flexibility in Des's (NDC2) responses. He concedes this himself and *aligns* frames. It must be made clear that frame alignment does not always mean fluidity of his position – this can remain solid. Frames transform and change shape, but ultimately there is solidity to the argument. Alignment *repackages* the frame (Snow and Benford, 1988). Sometimes this alignment takes the form of collective action, a 'them and us.' His opinion is shared by 'someone else' who might back him up. Other people, he says, have an opposing view. Des's framing of the embryo was strengthened by the performative nature of the debate, how it evolved within the discourse. In the extended extract below, he sets himself up as an enemy to Damien, saying he was 'not as extreme as him.' He also chooses an opposing position to Derek, the other interviewee from NDC, as we will see.

Initially, Des had never thought about the possibility that the destruction of embryos might be an outcome of some IVF procedures. I explain to him that there is no regulation as yet in

Ireland but in the UK there is the option to donate to infertile couples, or to research or allow them to 'perish.' Des suggests gamete donation or sharing as solutions to infertility. Des's strong frame is the protection of the embryo at all costs. When it is put to him that people may want to have their own biological children, he offers a further, desperate solution, laughing at times nervously, showing discomfort:

- I: But am maybe they'd want to select like ...people to donate. D y'know what I mean? They wouldn't want to just select some random one cos you wouldn't have a clue.....really.
- PM: So you see .... where there could be this potential .. in IVF where there are spare embryos, maybe nobody wants them
- I: Yeah yeah I know what you mean yeah
- PM: What do you think could happen there? What should be done?
- I: What should be done? What should be done with the embryos or what should be done to prevent sperm.....?
- PM: Well maybe prevent, yeah prevention [slight laugh] or.. or..
- I: Could you not.. if someone wanted that, could they not .. let's say if they wanted a random one then. Could they not wait until they ask for one and then fuse them and then implant them? Like eh, does it .. or else could... more like people would want, if they could, select friends. Which is a bit weird maybe but (*laughs*). I now its very....
- PM: Yeah
- But.. there's still a problem of... supposing the first thing a couple might want is their own, so if, if there's this.. only technique that can be done .... the medical procedure will tell them 'Look we've got to make eight and see which is the best. That's all we can do, because some of those, they won't...'[*notices expression, laughs slightly*]
- I: I know. It's definitely grey..... Always in life I think when it comes to those problems it might be a bit, I don't know.... and .. and what would be ..and what do you mean by 'choosing the best?' I mean would some not use properly and some...?

The term 'best' was perhaps carelessly chosen in this instance, meaning an embryo that was more likely to implant and develop. This utterance allows Des to bridge from an *embryo as person* frame to a *rights: future humanity* frame opposing an implicit eugenics by a discursive technique of challenging the term 'best' embryo. A *rights* frame for the embryo did not have the same strength and defined border in discussions as a *sacred* frame did. In

order to argue against using NRGTs, the personhood rights of the individual embryo can be appealed to, followed by a shift to a wider frame about the affects the technology might have on the next generation or future society. Des offers more solutions to shore up his original frame, that is a sacredness of the embryo.

I: ...I obviously don't know much about it but am just this could be a suggestion. I mean would they not try one and if that fails then that's fair enough, that's failed I wouldn't have a problem with that and then they try one at a time until one fuses. And then try that and let's say of that fails, that's failed naturally, so I don't see a problem with that . D'you know what I mean? But anyway, right.

PM: So  
you ....  
You're saying that they should be ah... .. the ethics as far as you're concerned they should actually be thinking about each individual.. each time they , they decide to do this?

I: Yeah just preventing....

PM: ... and be thinking about what.....is this going to be used, is this not going to be used

I: Yeah. That's it (*laughs*)

This is *frame amplification* (Bedford and Snow, 2000), a solidifying of his position. Science will not offer him an answer here as he concedes he knows too little about it. During the film discussion with the group, he employs a similar bridging strategy, from *embryo as human* – ‘I think it stinks anyway. I mean you're just killing an embryo’ – to what might either be a *runaway* or *rights* frame following another student's comment about how ‘everyone will be the same’ once unlimited PGD is allowed. He continues:

H: I don't really believe in ...that like you should be able to select embryos before they are born. I think it should happen naturally, so .... Like I can see where they're coming from, like why they'd want their child to be born without disease and what the intentions that were behind what they did. But I don't agree with what he did. Like I know they were only trying to do the best for their child. But I don't agree with being able, to actually being able to y'know down to being able to pick whether it's a son or a daughter or whether its [*inaud*] or

O: Cos if you are making someone good at sports you want him to be good at sports. And a lot of people are going to make people good at sports.



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 NDC2; .... I mean there wouldn't be enough variety. I don't... I just think it's definitely wrong to start putting certain attributes to certain people.

Even within these two last sentences, Des has bridged from *runaway* ('there wouldn't be enough variety') to *rights: future child* (it is wrong to give people 'attributes'). Despite bridging a frame, he sticks to his core position:

NDC2; ..... I mean if you're going to decide like that.  
 PM: So you think that overshadows everything else  
 NDC2; It overshadows a lot of these little things about whatever attributes and everything [inaud]. And then again when it comes to disease, I'd still [inaud] about that, y'know.  
 PM: Yeah But you  
 NDC2: I just think it is wrong  
 PM: But you think the main thing here is what about the other...  
 NDC2; Yeah cos its basically abortion.

It was interesting to observe Des's frame transformation at the end of the interview when relating to *The Gift* video. In this transcript I ask Des about a collective understanding about this sacredness.

Like for instance I remember Derek making out - Derek SECOND NAME - saying that the embryo isn't a person, like definitely isn't. I mean he mightn't have thought of it as much. I mean, I don't know. I mean, that's his view. I do think other people .. for instance we've had, we'd have conversations about abortion. And then people were all against abortion, y'know? But then when it came to this it was a completely different [inaud] everyone was all for that..... So abortion.....A lot of them were against it but with this.....So I dunno. And then they were all kinda saying 'well I don't think we should ever' and 'that's murder' and all that. And then when it came to that, just cos it's just a cell its different. So that was the only thi.. the only thing I'd have a view doubts there. About people putting actual thought into it [laughs]

(Des, NDC1, interview)

This is Des identifying a collective position; most haven't thought seriously about it. Derek is then singled out as the opposition - as well as other student's conflicting distinction between stages of foetal life - giving Des the higher moral order. He then demonstrates flexibility,

that he might change opinion himself. This time Damien is the 'enemy' because of the solidity of his position. Des has a controversial opinion here and uses the conversational resources of media and personal experience to justify his opinion as the following extended extract shows:

- PM: Do you think people might change a bit when it comes to.. a particular situation or..?
- I: Yeah I know. But even myself, when, when it comes to things like disease I would .. I .. I.. wouldn't.. I'm not that like I may.. I might kinda give the impression that I'm really, really solidly against it but I think there are some situations that I would think about like. ...

This is a preparation for what might seem like a u-turn:

- I: For instance I think as far as I could see, Damien he was really, really solidly against it in any kinda.. and just some so.. I disagreed with him. But I found that am.. yeah like uh with some diseases..and if it was inevitable that someone was going to have a horrible life or was completely mentally and physically handicapped then I think it would be right.. it *could* be right to select cos I don't know if .. if they're going to live a life of pain and aren't going to be properly conscious and they're going to be really like basically wrecking the lives of parents and things. I reckon, I don't know..cos I know a friend of mine has a sister who is a... as actually..as it happens there she's a twin....
- PM: Mm
- I: The twin.. one of the twins is completely normal and healthy and one is completely mentally and physically handicapped.
- PM: Really?
- I: She's just am.. and I don't even know the name of the condition or anything, but she's mentally and physically handicapped so I've had a bit of experience .... I mean in that kind of thing as well. Cos my sister's best friends.. one of my sisters best friends had ah – is it cerebral palsy I think when...
- PM: Yeah
- I: ..you're mentally OK is that right?
- PM: Not necess...
- I: Well then maybe not. Well basically it was a condition where she couldn't talk or speak. She couldn't... and she couldn't move. She was in a wheelchair. And she couldn't... her voice... but she was perfectly normal in the head. And em, its well known anyway, I'm not sure. But she ended up... and she had a good job and that's why, no-one could understand and she got so much

hassle and stuff. And she ended up actually killing herself.

Des uses experiential knowledge from another's tragic life story to back up his NRGT argument. To continue this passage, it is evident that he begins to foreshadow an altogether more controversial angle, and then quickly draws back to use a media conversational resource in his argument:

- I: But em. So there's a bit of like.. some diseases are hard to – I don't know [laughs] but especially when it comes to mental things am, I think that maybe that before birth.... and when we saw that video [laughs] ....I don't know if you've ever seen that video about that woman – or was it a man – that had the skin disease
- PM: The man.. *The boy whose skin fell off*. I saw parts of it.
- I: And he said himself – and his mother said – if there was some way – like they even said about abortion, they would have aborted. Like he said it, he wished he was, and his mother said that. So y'know, I don't know [laughs].

After talking a little about the 'identity confusion' mentioned earlier when selecting embryos, Des returns to a view of rights and consciousness:

- PM: Do you think those kind of experiences – you were thinking of those as you're watching this kind of film?
- I: Yeah. And definitely with the diseases there's going to be a line drawn If they find out they have asthma or something like that. I mean I have asthma like. I don't think then that would be justified if someone has some sort of diseases that isn't going to be life changing especially.. I don't know why I have a thing about mental diseases because I just think that's kinda just the worst. No matter how physically disabled you are I think when you're mentally disable that's kinda when. I don't know.
- PM: Although there are .. people would say who have mentally handicapped kids and all who would say they're .. they're people as well
- I: Oh yeah definitely.
- PM: And I know there's a whole school of thought who say they aren't but do you think there is maybe an implicit or even a small bit of discrimination if you were to say these people shouldn't be born at all?
- I: Well, well I wouldn't say they shouldn't be, be born. I just.. I think that....I don't know really.. and especially with just the people.. it'd just be the fact that they're not conscious. And again I'd say

severe.. severe mentally handicapped....I mean if they're not mentally conscious. I think there might be circumstances in really, really severe cases they're. ..they should be allowed.. well maybe should be allowed select [*laughs*] and again I'm not even sure myself on that one [*laughs*]

In this long passage of conversation, Des has transformed from:

- 1) drawing on a frame where the embryo is the immovable object, the central actor in the discourse; to
- 2) bridging the frame from a sacredness of the embryo to a frame about the ethics of how it would be possible to select the *best* embryo - what *is* the best embryo; to
- 3) moving back and amplifying the original frame by offering solutions for infertile couples that maintains the integrity of every embryo used in IVF when this becomes the subject; to
- 4) introducing a certain flexibility into his frame again, and when reflecting on experiential knowledge through other people's stories and media instances, which suddenly caused him to transform the frame into one that is a central position in discussions – perhaps PGD should be used for disease but, his own experience of asthma tells him a line should be drawn.

This is quite a shifting around of frames for Des, a staunch pro-embryo defender in discussions. His position remains strong until the end when he gives way to some flexibility. To media analysts who observe arguments, particularly in NRGT discourse, these switches are not new. Our understandings of NRGTs and the embryo in interviews were, of course, co-constructed. There was no element of tricking him into an opinion. Yet Des also showed awareness of the flexibility of other positions. He placed Derek as an enemy for changing his position from other experiences he has of him expressing different opinions outside our *agora*. The film discussion seemed to bring out a different opinion from Derek, which irritated Des. In his last frame alignment in the conversation above, Des introduces the notion of negative eugenics, the possibility that some embryos could be screened for undesirable traits, and curiously, and perhaps contentiously, considers the possibility of consciousness as one deciding factor, a notion that has been advanced by Peter Singer (1993), among others. Ultimately though, for Des, treating disease 'before birth' is not the issue – the impact on the embryo is central. 'The main point that overrides all this is,' he says on more than one occasion, 'PGD is abortion.'

Karen from SK and Lorraine from LH, as has been shown, held a very solid position in protecting the embryo, both in one-to-one conversations with myself and in debate. While Lorraine remains stoic in her opinion, Karen employs a defensive approach:

SK4 (*Karen*): It shouldn't be to the extent that you're making life. We don't have the right to make life.  
 [mumbles]  
 PM; Mmm, yeah  
 F3; Yeah we do.  
 F11; We do.  
 F5; Not in that way.  
 F; [complaints]  
 SK4; We don't have the right to make life and then destroy it.  
 S; [complaints]  
 M4; But they're not talking about destroying it  
 SK3; No, no-yeah, they're not talking about destroying life  
 SK4; I mean just like make life the way they are ...Like in IVF and then storing it away.  
 PM; Yeah  
 SK3 (*Kate*): If its storing to like... if it can make life better for other people.  
 F3; Yeah  
 SK3: And if it's in regulations and stuff.  
 (SK *The Gift* film discussion)

Karen's argument shifts, under interrogation, from the right to make life, to the right to make then *destroy* life. It is not so much the act of making life, an appeal for *against messing with nature*, than the implied murderous act of taking life (sacred *embryo as person* frame). Kate, in defending HESC, appeals to both the good that can be created for people and authority through regulations. This may be a strategy to legitimise through majority, through collective legislative planning (a slight contradiction for Kate, who renounced authority in interviews). Frames involving the embryo show most alignment strategies, for example criticism of NRGTS on the grounds it destroys foetal life to a bridged frame about the impact this may have on future society.

Collective frames can be very performative, as we saw in Chapter 4, particularly in large groups. For embryo frames, one strategy is getting other debaters to feel the powerlessness of the embryo. Here a large collective agree that all embryos should be protected; there are loud answers of 'yes' and 'no' in unison. Immediately this creates two positions and stirs debate, which came close to getting out of hand on this occasion.

What resources are drawn from to construct these frames? What links are there to the outside? While discussing the sanctity of the embryo might not form part of normal biology or TY science class, some respondents said they considered these issues later after our debate, or the next day, and would consider these issues again in light of what they later saw on TV. Lisa and Laura were interviewed shortly after LH discussions and clearly arrived at collective answers with others about the use of either a cloned embryo or supernummary embryos from IVF for stem cell research.

As seen with Des above however, various framing of the same position can utilise a combination of media resources and the experiential. I invoke Gamson (1992) once again here for an analytical tool that connects the coded frames to background and media culture, those potential areas of discourse that went into shaping the frames. As mentioned earlier, we can only speculate on how intertwined personal anecdotes, life histories and intense experiences are tied up with media. Moral judgements may also be formed by mediated issue culture and dramatic representations. These judgements were made on grounds of being proximate (experience and media) or distant (media references only, 'I read' or 'I saw'). Sometimes 'bioethical' storylines in soaps such as *Fair City* or *Coronation Street* were brought into focus. There were some – though not many – references to sci-fi TV, film, the human effects of biology, people they know who were required to use PGD (*CSI* was by far the most cited TV programme).

Few participants reflected on anecdotes from experience however, but many were willing to use a popular phrase about experience, particularly Deirdre from ND: 'No-one knows until they're in that situation themselves.' Some experiential quotes presented specificity for gender and age group: 'If you're on the pill, you need a smear test every six months.' Although some participant teachers stated that experiential knowledge of genetic disease would be prominent in discussion, these were not usually brought directly raised (with the exception of Deirdre for ND) and due to the nature of this type of debate, there was no probing. Further investigation might have shown indirect references to genetic disease in families.

Having referred many times to these popular wisdom phrases, I will now summarise these in table form. Table 6.4 demonstrates the main instances of *popular wisdom*, phrases with storylines that add credence to speech acts in positioning and context. Tobin (2000) calls this type of discourse *citationality*, sometimes involving re-speaking of lines belonging to others. By replaying a line that is heard before, citationality is a close crossover between copying a

line from some media memory or popular wisdom. It may be unclear how such a line became replayed again and again as part of the cultural roundabout of words in the constant deference of meaning (Tobin, 2000 citing Derrida, 1976), whether it was media derived or overheard in the past during a conversation.

**Table 6.4.** Recurring phrases throughout the study that suggested a popular wisdom (Gamson, 1992).

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**Nature**

- 'Messing with nature' [ND discussion only]
- 'Playing God'
- 'Let nature take its course' [possibly taken from research frame]
- 'Everyone would be the same'
- 'It's not natural'
- 'That's just wrong'
- 'You are what you are'

**Science**

- 'Standing on their shoulders'
- 'Might as well [use PGD]'

**Life-planning**

- 'You might as well have a full life'
  - 'Give him the best life they can'
  - 'Give him a full life'
  - 'It's not fair on the child'
  - 'Turning childbirth into shopping'
  - 'What's meant to be is meant to be'
  - 'Looking for perfection'
- 

NOTE I have here divided the phrases into three categories that reflect deeper cultural resonance of science and nature.

**Conclusions**

To further analyse how life-political topics may be constructed among young people in schools in relation to wider discourses of NRGTs, identity and society, their conversations

were analysed for meanings that suggested a collective or self-identity. In relation to how NRGTs could be used in society through a fictional, hypothetical scenario, 'frames' emerged that drew on often opposing cultural themes such as *(scientific) progress v harmony with nature, risk v fate, rights, a sense of the sacred*, and *liberal individualism v social responsibility*, as well as references to commodification and out-of-control technology. These frames could loosely be categorised on a higher level, following Gamson (1992), into frames that have at their centre either technology, nature, or power. However, there is a complex connection between these frames and the further 'banding' might simplify this.

The readiness of young people to accept the outsider speakers and facilitators as experts (also shown in Chapter 5) demonstrates Giddens' (1991) theory of modernity's reliance on the specialisations of abstract systems. This also fits within the theoretical confines presented here of how ideas of life politics are sequestered from critical rigour in classroom experiences. It is an acceptance of the scientific rationalism frame of a film like *The Gift*, where ultimately the technology worked and Mark was born free from Friedreich's ataxia and with superior physical stamina. It may be pondered on how easy it would be to convince young people of the redeeming power of science, given both film's outcomes and the visiting scientist's experiences.

For many commentators on NRGT debates, belief systems are at the core of the issues. However it is clear from discussions and interviews that a type of sanctity is afforded to the embryo that is tied to beliefs *as practices* - particularly in the case of the religious framing, although it was notable how rare religious practices were used as justification - and this type of framing may be central to the sequestration of NRGT experiences from normative classroom discourse. My methodological approach does not, as I have stated before, concentrate on what people believe in a mentalist or phenomenological sense, but more the sense of what is brought into discourse through the practices they describe. We have seen in Chapters 5 that these practices include the immediacy of performed debate.

The analysis of how frames emerge and evolve in 'live' discourse among young people show similarities with how media frames operate in issue culture and also how commentators utilise immanent power play in, for example, live studio debates. Frames were often changed or bridged or aligned with another frame to suit their position in an argument. In effect, frames are not always polarised. For example, it was quite possible for a student to use a *scientific rationalism* frame to argue against the use of PGD, on the grounds that it would affect evolution. In addition, when framing issues such as PGD and HESC research, students



often used conversational resources to justify decisions based on personal experience, 'popular wisdom,' or media references which included TV and film. There was a wide acknowledgement by teachers – and rare acknowledgement by students – that personal experience counted the most when engaging on a topic to aid its 'proximity.' There were paradoxes in solutions offered for regulation: experiential knowledge will cause a person to do something that was in a general situation wrong, but morally right for a given situation (based on the science). Also regulation might be ignored for a personal life decision that was morally right for that person.

There are three ways that the embryo is framed regarding personhood: the embryo considered not to be a person, embryo as person (secular), and a traditional Catholic view of sanctity. The first one is the most used. Issues which have the embryo as the core positioning are the more 'solid', are most politically contentious, and more emotive. Frames are easily shaped around them to protect the position. However this type of positioning and framing is rare. Issues of identity and genetic control have the more 'fluid' positionings. Yet there is a discomfort with the 'meddling' effects of NRGTs in general (on the embryo, on identity, or on society). Some of this is justified on secular or humanitarian grounds, as well as religious justifications.

Regarding how such framing devices and structures may aid pedagogic practices, media and discursive activities such as debate and presentations offer multiple perspectives on decision-making in NRGTs. Although such discursive tactics of conversation are used extensively for social movement research (Bedford and Snow, 2000; Gamson, 1992), it is important to view the practices of discourse should such activities be used in the classroom. By addressing these understandings of NRGTs in such a salient political context in Ireland, the next chapter asks: can young people take on life politics as a forum for pedagogy beyond the formal structures of conventional politics and schools?

## Chapter 7: Connections between classroom politics and media debates

To demonstrate that an anecdote or two - if descriptive enough - can reveal more than several studies, I have included further snapshots in this chapter to pull the themes of the thesis together. Before describing a TV debate and the central session in schools which initiated my critical stance, the concepts of cultural resonance and symbolic packaging as applied to frames are addressed. This chapter ends with reflections from young people on the activities and an analysis of how students might be supported within the formal education system and externally by third level institutions.

### Cultural resonances in framing tactics

Some constructs can be described as having a narrative fidelity (Gamson, 1992, p 135 citing Snow and Benford 1988), that is, images and utterances that resonate with people who hear the utterances either from experiential knowledge, folk stories or a relaying of what has been said before or the familiar. Such discursive constructs can also be described as *immanent*, taking meaning from and repeating past conversations, discussed earlier in the context of classroom speech acts and performance (Davies and Harre, 1997). Of the themes and counterthemes described in the typology of schemas and frames from the previous chapter, some will have more cultural resonance than others (Gamson, 1992). Popular wisdom in the form of catchphrases and sayings is one way of providing strong cultural resonance (*ibid.*)<sup>1</sup> An actor may draw from a story, or something that she feels she *just knows*. Cultural practice theory suggests that, for a teacher to challenge this with another worldview, is to expect a constellation of social processes to accommodate the worldview which they may do in time (Aikenhead's (1996) acculturation). Common wisdom of the kind described here comes with the practice of constant communication. As Strathern says, 'Habitual images and familiar

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<sup>1</sup> The complexity between the various terms here, of 'resonance', 'fidelity' and 'wisdom' can be daunting, although Gamson himself does not try too hard to prize the terms away from a general explanation that all these are further means in which actors strategise frames

metaphors provide the cultural forms that make ideas communicable (Nelkin and Lindee, 1995, p12 quoting Strathern, 1992, p5).’

To recap again on the four cultural themes (and counterthemes, where appropriate) identified from fieldnotes and transcripts in the previous chapter: the *progress* theme and *harmony with nature* countertheme following Gamson (1992); the *fate* theme and *risk* countertheme; the *sacred* theme; and the *liberal individualism/autonomy* theme (similar to Gamson’s (ibid.) *dependence* theme). The *scientific progress* and *against messing with nature* frames were identified within Gamson’s constructed cultural themes of *progress* or the countertheme of *harmony with nature* (Gamson, 1992). These themes and counterthemes suggest a link with Eder’s (1996) argument that there are common cultural meta-themes at work in modern discourse on the relationship between nature and science, a basic human understanding that underlies all such discourse from which a collective can draw on to construct frames. These are, he says, *cognitive devices*. As with many such theoretical schemata, it forms a triad of human judgement: for him, actors will draw on moral responsibility (the social), empirical objectivity (the factual), and the aesthetic (the subjective). Eder (ibid.) sees these framing foundations as echoing Habermas’ practical, theoretical and aesthetic triad, which in turn is based on Kantian and Weberian ‘value sphere’ differentiations<sup>2</sup> (he takes Gamson (1992) to task for not providing ‘a systemic ground for distinguishing different frames’ (ibid. p167) without these devices). In science education, it is significant that a similar triad has emerged. Driver *et al.* (1996) proposed three socioscientific representations of the nature of science as young people may perceive it, described in Chapter 3: science content, scientific method, and science as a social enterprise. It is notable that the aesthetic is missing and science content becomes the moral or normative force, the adherence to laws. These representations have since become central representations of cognitive frameworks and lifeworlds (used interchangeably as either) for science educators and have been presented by Sjøberg as (i) science as *product*, (ii) science as *process* and (iii) science as a social institution in society<sup>3</sup> (Ødegaard, 2003). For that reason, and to recognise the importance of acknowledging the scientific content that would undoubtedly be discussed in class debates and interviews, I teased out these first two representations into distinct schemas on science and technology as part of the coding for further analysis (see Chapter 6). I have argued elsewhere (Murphy,

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<sup>2</sup> Eder’s (1996) ‘social construction of nature’ uses orders of the cognitive (mental schemas linked with natural processes), normative (appeals to nature now take a moral dimension), and symbolic (with deeper cultural meanings, nature as feminine, divine, or consumer resource). See also Adorno’s aesthetic critique, the aesthetic radicalism of the particular against the universal (Lash, 1994, citing Burger, 1980).

<sup>3</sup> It is intriguing that Sjøberg modified the typology to represent science as an ‘institutional’ social activity, perhaps removing public involvement from the inner workings of science, but nonetheless acknowledging the reflexivity of the institutions of modernity, as described by Giddens (1991).

2005) that Driver *et al*'s third representation, *science as a social enterprise* is fundamentally integrated within the other two and that all schemas here may well reflect young awareness of the pervasiveness of social practices and discourse. The other two of Eder's (1996) cognitive devices outside the traditional scientific domain, the *socially* moral (as opposed to the normative moral of science content) and the aesthetic, might, in practice, be drawn on in young people's frame constructions about embryos or genes as the facilitator frames the topic as an issue to be *commented on*, rather than as science. Examples here were references to biotechnology as the 'moral side of biology' or genetics 'tied into the moral side' (both quotes from SK) which may have been associations students made with the content of the film debates. Discussed later in the chapter is the potential existence of metaframes, or *masterframes* linking frames to larger structures of meaning across cultures.

Another device to employ cultural resonances may be the use of phrases of popular wisdom, described in the previous chapter, such as 'Playing God' or 'You might as well have a full life.' They are part of a media regulation strategy, cultural hooks on which to hang a story within issue culture, giving it a common bond of credibility (O'Mahony and Schafer, 2005), and which are now being repeated by young respondents. Some phrases, such as 'You might as well give him a full life' suggest a deeper, more local sociolinguistic rationale, discussed later in the chapter. Then there is the rhetoric of performed debate itself, borrowed from media representations of such debates, playing on the controversy. Some of this resonance spilled out of the field of activities and into a more critical space, creating a resonance for the outsiders of the disempowered within, trapped by teacher and curriculum rules and needing help to break free. All these expressions of resonances will be further discussed below.

However what emerges from conversations, debates, and interviews is how strongly talk about the embryo provides cultural resonance, stories and ideas that have strong salience. Words such as 'killing' or 'oppression' provided the imagery for embryo research or PGD, much as they do in social movement discourse. For those who professed strong beliefs in a sanctity of the embryo (and those were in the minority; I refer here to those in the *sacred* frame who took a strong position in debates using strong quasi-religious objections to PGD or HESC embodied by Karen of SK or Des from NDC, rather than the more tacit shared sanctity frame who did not have such conviction or those who used explicitly religious packaging (in interviews, Lorraine from LH only)), there is a very real and tangible wrong being committed. Embryos created the most passion in debates, partly because of the public controversy – and thus the inevitable baiting by those who constructed the embryo as non-living – and partly because of the emotions brought up by a murderous act of PGD/HESC

where there was a *rights: human embryo* frame expressed. Other aspects of NRGTs then, such as generational control, violation of natural or common law, human rights etc may be considered more peripheral in frames than those associated with the embryo (although as we saw in the last chapter, these frames are also used). It is likely a teacher will shy away from NRGTs because of a perceptions of student resistance based on belief systems regarding the embryo rather than the subject of genetic manipulation. It did not occur to a few teachers extolling the wonders of biotechnology throughout the entire project that the social issues of *genetic* social issues were particularly salient

As participants offered solutions for the good of society, whether it was regulating NRGTs or using them, salient life political issues emerged, some from jokes, local conversations, maybe even local issues which families have had to deal with. In one case, a teacher intervention about using PGD for prevention of other disease sparks off a debate about proximate, relevant issues connected with life politics, such as casual sex, pregnancy, aids, Down Syndrome, leukaemia, adoption and the ethics of using a defenceless future child in NRGTs. 'No point taking crap decisions out on an innocent,' said one girl from ND. There would be consequences for having unprotected sex in the first place - you could end up with a child with a disorder. You have to live with that original decision to have sex. It had to be wondered sometimes about the structures at the heart of these resonant statements – were they really resonant, in the sense that these agents were trying to sell an idea, or were they from parents or an undefined experiential/mediated flux of popular wisdom?

### **Symbolic packaging in embryo debates**

For collective action groups who interact with media resources to promote their part of the debate – whether it is the pro-embryo lobby or fertility specialists – the connected concepts of rights and power can be seen as organising structures underneath the practices of discourse (Benford and Snow, 2000). To describe the identities 'pro-life' or 'pro-choice' is to frame their actions with their very utterance, suggesting opposition to forces that prevent the living from existing in the former, or opposition to an attack on civil liberties in the latter. These have been powerful binary media positions, rather than frames, identifying opposing actors for and against an NRGT issue. It can only be speculated on how influential they have been in contributing to constructs in young people's responses.

When these collective action positions are analysed in the media however, frames emerge that create a more complex picture of other conflicts within the debate relating to local or wider political struggles rather than positioning on the main issue (Ferree *et al.* 1996; Kohring and Matthes, 2002; O'Mahony and Delanty, 1998). To Ferree *et al.* (1996), reporting on abortion discourse in the US and Germany, there were not only appeals to the rights of embryos and parents in media framing, but articles also focused on individual versus state, social morality, or took feminist, humanitarian or pragmatic positions as well as frames of social justice. These are similar to the participants' frames in the previous chapter. When the debate opens out to wider issues of NRGTs, capitalist ideologies and institutional or cultural hegemony may also be brought into focus. We can trace a line connecting many of these perspectives when *choice* is a central issue. The central questions become: who chooses? Who decides who chooses? What do individual or collective choices mean for others when acted upon? Our theoretical confines of Giddens' (1991) life politics and the de Certeau/Thevenot hybrid of the *moral habitus* in education is reflected here within these *embryo* frames perhaps more than any other frame groups. The wider descriptions of increased choice for individuals in modernity challenges group (or structural) power (*ibid.*). As we are talking about socioscientific issues of NRGTs, personal and local lifestyle and life-planning choices emerge as drivers, mapped out to (and against) connecting practices of institutions of health, (bio)science, and commerce.

There were four categories of response identified based on classroom debates and interviews on the frames and positions used for describing the embryo. Again it must be stressed, frames should not be confused with positions. Competing frames can be used in arguments to defend one position, thus 'shoring up' the argument. Young people on each extreme of the debate, like their older counterparts in media debates, frame the embryo in two distinct ways: as a person, therefore with human rights, or as a potential person with lesser or no rights.<sup>4</sup> A third frame emerges which overlaps this latter frame: experience. The shock of potentially having a child with a severe genetic disease will cause you, as clustered responses inform us here, to reevaluate your moral and ethical guidelines and move you into a new frame that puts prominence on your needs and those of your family (current and future) over society's needs. This frame, naturally, is present in a very small number of young people unless they have first hand experience of trauma caused by genetic disease and experience in using a technique like PGD.

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<sup>4</sup> Within the framing strategies of the embryo as human there were, as described in Chapter 6, three distinct frames.

The fourth category may not fit easily into a frame, taking in the majority of students in the debate. Are these the framing tactics of the tentative, the confused and the uncertain perhaps, a consequence of late modernity, part of the 'sequestered experience' to paraphrase Giddens (1991)? These may well represent a prevailing view for modern and future Ireland: they will choose their identity from *either* contexts of frames A (*embryo as person*), B (*scientific rationalism*) or C (drawing on *experience*). If starting a family is priority, an A frame is chosen as a representation of the embryo. If they realise they have reproductive choices to make in the event of risk of serious disease, the C frames run up against this. C frames may override B frames if a decision to terminate has been taken and indeed B frames may be used to justify termination. The options available here are not easily placed into any one frame because life experience, religious conviction, or committed intellectual opposition one way or the other may not be drawn on in the decision-making process. There is no direct experience of NRGTs to create a solid position with solid frames. Participants in these 'floating' positions never seriously had to think about these life political issues but were willing to express an opinion about it that could not be dismissed as uninformed or flippant ('floating' denotes a capability to change rather than referring to participants who wandered around from position to position, which very rarely occurred). They are valid views about NRGTs and life politics. This fourth area, running across the full 'pro-life' to pro-choice spectrum is a positioning option – a choice that will be taken relative to a spatial, cognitive, or ethical locale.

As Chapter 5 has shown, the local dynamics of small group politics and power play are instrumental in taking these positions and frames. Yet on a structural level, 'us' v 'them' dichotomised identities are also created, consistent with the respondents to the PARADYS project (Bora and Hausendorf, 2004) who constructed in responses stereotype administrators, politicians, scientists, organised protestor, a 'local we,' concerned citizens and industrial actors. Benford and Snow (2000) and Gamson and Modigliani (1989) speak of *packaging* frames to further increase their cultural resonance and 'fit in' with a prevailing culture of a local social movement or peers. There are distinctions between packaging in these two seminal papers but there is general consensus on the symbolic nature of packaging. They are made real by reference to people and events that are part of a culture or sub-culture as an intentional device for salience. Gamson and Modigliani emphasise the use of the narrative package, a storyline that draws on plots and characters to sustain the frame. For ethnographically inclined researchers, it can be difficult to see organising structures among the dynamic of everyday discourse; however formal discourse of debate allows certain relationships to be observed that cause de Certeau's (1984) panoptic social scientist to make

generalisations. To add clarity to these generalisations, I have drawn on Gamson and Modigliani's (ibid.) packaging devices for nuclear power, creating here personal storied opinions for the amalgamated opinions of groups of participants in discussions on embryo research, as shown in Table 7.1.

What these amalgamated views tell us is that extreme views are not prevalent within these classroom discursive communities. A type of pragmatism can be seen even from the more committed decision that recognises other worldviews. There is a moral dimension running through practically all discourse on what 'ought' to be done, and for those that are undecided (with some exceptions discussed below) the views need to be aired. Without over-generalising the rich variety of views that there are on the many dimensions of NRGTs, we can still recognise in these packages typical perspectives in NRGT media debates. These young people may not have professional collective action motives, yet there are signs of packaging as lobbyists and journalists would use it, and also TV commentators in such debates, as the next section shows.

### **Positioning and framing in TV debates: an example**

Are debates in the classroom comparable to those outside? Some educators might say it is not 'informed debate' in such as setting where a video is shown before a presentation followed by a presentation with different content to the video (Evans and Durant, 1995.) But how informed of an opposing perspective are protagonists in any heated debate? Pro-life or pro-choice extremists are well aware of their rhetorical, as well as their symbolic, power. The scientist has the symbolic power of science. The NGO has the symbolic power of friendly and healthy nature. Part of the ethnographic approach involved looking for clues to outside influences that show young people have some awareness, if not well informed, of both the science and the issues. This awareness of 'genes in the ether' feeds into identification with a young person's struggle with genetic disease, an embryo's humanness destroyed, a character's plight in a film.

The screen - TV, cinema and now the computer - is a space of socialisation and politicisation for young people, as has already been discussed (Buckingham, 2003, citing Chaffee and



**Table 7.1.** Some amalgams of perspectives showing examples of symbolic packaging (Gamson and Modigliani, 1989) for embryo frames in classroom discourse..

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Amalgam of views for *embryo as person* frame (A frames)

The embryo should not be used under any circumstances for reproductive screening or research. The embryo is a human person therefore should have human rights.

Amalgam of views for *scientific rationalism* frame (B frames)

The embryo has the potential to be a person but is not yet human. Scientifically, the embryo is just a ball of cells. There is a moral obligation on scientists and humanity to exploit these cells if it means preventing or curing disease. By the same token, by not allowing an embryo with an identified genetic disease to be implanted, future generations will be less at risk.

[The screening of embryos for characteristics other than serious disease is morally suspect and needs consideration case by case.]

or

[The screening of embryos for characteristics other than serious disease is morally suspect and needs Government regulation.]

Amalgams of views for frames drawing on experiential knowledge (C frames)

There is a genetic disease in my/ my friend's family. A relation/friend of mine had to make a reproductive choice with her husband – whether to have a child or use PGD to screen out this disease. I understand that it is a very difficult decision to make. No one wants to prevent a life from being born. I would normally be against 'tampering.' But you don't know what you'd do until you're in that position yourself. My relative/friend is opting for PGD and I support her.

A relative/friend has a serious disease in which the only potential for cure seems to be in new research on stem cells. I understand that it is a very difficult decision to make. No one wants to prevent a life from being born. I would normally be against 'tampering.' But you don't know what you'd do until you're in that position yourself. My relative/friend feels she would use therapy derived from stem cells if it was available and I support her.

Amalgam of views for all 'equestered experience' frames (ABC frames in Fig 7.1)

I don't know much about these issues. I have just watched a film and I found myself undecided at first because the issue is complex. I see the point of view of the person who uses reproductive technologies to remove/treat a genetic disease. But I also see that there are certain things that are not acceptable, like choosing the sex of your baby or selecting for physical prowess or using stem cells from a suspect black market. I really don't know what I'd do if I were in that situation and had the option to select an embryo.

[However I'm sure I would use therapy from stem cells if it prevented me from dying.]

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NOTE: Statements in parentheses are alternatives, not necessarily shared by everyone in that 'package.'

Yang, 1990). The film in this study created one of the primary spaces for debate. It is informative at this point to briefly look at another mediated example to show the performance dynamic of televised 'experts.' In 2005, following the publication of the CAHR report (Commission for Assisted Human Reproduction, 2005), the RTE flagship current affairs show *Prime Time* (2005) had three high profile guests debating NRGs that destroy the embryo: Maureen Junker-Kenny, Associate Professor of Theology at TCD, arguing against, Prof David McConnell, the 'Geneticist' arguing for, and Carol Coulter, Legal Affairs

Correspondent with the Irish Times, the neutral legal representative. Professor Junker-Kenny's frames were *medico-legal* (McDonnell and Allison, 2006), but she also attempted to present the argument through the eyes of a future child, should PGD be legalised, and endowed such children with a sense of life politics: 'If I am not good enough for my parents then they're not good enough for me' or 'certain lives not worth living.' She aligned her position with a *commodification* frame borrowed from a European critical theory foundation once Professor McConnell also began using a *future child* frame. It could be imagined that Junker-Kenny began to cede moral victory in the eyes of the viewer as she simplified her 'dignity' argument to the 'reduction of person to body and from body to genes.' Her visual technique may have been conceptually effective but may have been just that, too conceptual, too academic while McConnell went for a more culturally resonant set of principles, speaking of the 'tragedy of infertility eased by IVF' and the 'humane' choice of easing a future child's suffering.<sup>5</sup> McConnell, as well as using science as the moral authority – here Coulter's legal advice was the objective voice - embodied the impatient, deficit-model scientist, almost arrogantly dismissing Junker-Kenny's suggestions as inferior. However, by saying 'very few people get into this complicated discussion,' he may have seemed a little patronising, but he was correct. At least, in the common sense world that young people in discussions were inhabiting, whether they agreed with McConnell or not on his NRGTT stance, they were not as willing to use the terminology of 'the nature of parenthood' or 'future vision of how we want to live' that were the core of Professor Junker-Kenny's discourse and, it must be admitted, of mine in this text.

The dynamic from the classrooms was all here. McConnell was the protagonist, as school participants such as Derek and Kate were, bossing, aggressive, sending in arguments from scientific as well as personal frames and using body language of the moral victor. It was an aspect that revealed a curiously Irish response in young people's almost detached mantra of 'you might as well lead a full life' or 'you might as well prevent it,' perhaps allowing the very existence, the very *power*, of the technology itself to be its own justification for using it. However in McConnell's reasoning, could there be a further resonance that takes me back to the non-engagement of SW? I had previously asked were the kind of verbal dismissals and 'closedowns' that came from SW peculiar to that area – 'Of course he should do the best for his child, "Of course you shouldn't select for sex or sporting abilities.' But here now was one of the most respected geneticists in Ireland saying just that in similar strong discursive tones.

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<sup>5</sup> There are few *Prime Time* topics where biology, religion, the law, and ethics meet head to head and where discussions feature in the abstract about 'future humanity,' 'life' and 'theology.'

This is open to challenge, but I take this form of debate to be a type of pragmatism counteracting the 'over-discussed' nature of late modernity. Giddens may say that tacit knowledge pushes its way through in deed. Modernity has been increasingly discursive but late modernity, even beyond the socialised Mode-2 scientific fields of Nowotny *et al* (2001), has its non-verbal under-represented quietly rising to the surface. While the modernist is busy talking about the moral, the late modern pragmatist is *being* moral. In the uniquely Irish, non-discursive expression 'Sure you might as well, like' perhaps the SW students are uttering the go-ahead life politics of the *zeitgeist*.

### **The life political struggle of a classroom in action: combining a transition year biology and religion class lesson**

A session which took place on a Friday morning in January 2005 represents for me in snapshot the possibilities of sharing educational spaces outside the school curriculum for a type of life politics pedagogy. It was a true border crossing event. What was key to the success of this was that both teachers and students reconstructed this 'biology class' with a deliberately open space for exchange of ideas. The session and the focus group following it were also remarkable data-gathering exercises showing young people's power relations with teachers and their isolation from external biosciences. Although this session was intended to be a bioscientist presentation by a particular speaker to Transition Year only, a decision was taken between the science and religion teachers to bring religion class into the bioscientist session. 3<sup>rd</sup> year science and 5<sup>th</sup> year religion class were also brought in where ethical, philosophical, and careers questions might be brought into the forum.

Science teachers informed me that students had been covering abortion in religion class and the teacher was uncomfortable answering the scientific questions that were emerging about the embryo. The teachers themselves were upfront about their own limitations within both knowledge domains and saw this session as an opportunity for overlap. The religion teacher explained to me her nervousness about over-emphasising or highlighting a particular ideology on abortion to her class for fear that it might reveal any subjectivity. As part of the pilot for the introduction of a new religious education syllabus, students and teachers are given autonomy by the Department of Education and Science to construct, with the teacher, their own learning plan from a wide syllabus. The religion teacher presented a choice of topics for the students to choose from at the beginning of the year, one of which was

abortion. Most students had selected abortion as top of their list and this was the topic they were covering at this point. The NICB researcher and I combined to present a joint presentation. To both teachers, this session represented an ethical/ scientific dual identity. Questions on reproductive technologies, whether scientific or ethical, could be brought into this forum where there were two perceived experts.

The teacher contributed to this combined class, contributing some expertise to the scientific elements of the presentation rather than ethical elements. Other teachers sat in this large, cold but crowded room in anticipation beforehand. It was very much a 'lecture' format.

Our double-act reminded me of de Certeau's (1984) Expert and Philosopher duality. The Expert (bioscientist) moves from his competency to a place of authority to enter the social sphere, whereas the Philosopher (in this instance I took that position) must take ordinary yet critical questions into a well-practiced component of the technical field.<sup>6</sup> The event seemed to be going well. The bioscientist speaker was driving it. He occasionally linked his view of the ethics of biotechnology to *The Gift* or to other material I would have covered on another occasion but, in terms of framing, this session was undoubtedly a science forum. There were some terms from the scientist's world which needed explaining, like 'published science,' what I often identified in fieldnotes as *Geertz symbols* from a particular subculture. Students were not inhibited from interrupting and asking questions; an information sharing pedagogy.

A pivotal moment then occurred. 'How do they decide what is abortion?'

The question came out of the blue. It came from a 'Potential Scientist' (Costa, 1995; Aikenhead, 1996) from the pilot, who joined us as part of the fifth years in the bioscientist session. She has a follow-up question: 'From a moral point of view what is the difference between stem cell research, IVF and abortion?' This changed the nature of the discussion from the realm of the scientific to that of a shared value that was ethical in nature. Here at last students got to ask the question they were asking their religion teacher. There could be no satisfactory answer from us – or from me as the 'ethics expert' – on this, except to refer to the issue as a question that is currently occupying ethicists, scientists, theologians, policy-makers, and sociologists and will become a sharper focus in Ireland over the coming years as

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<sup>6</sup> Bucchi (1998) explains how the messiness of social process of scientific crafting is removed in public communication.

the Irish Government responds to the CAHR (Commission for Assisted Human Reproduction, 2005) report.

This bioscientist session did indeed have a twin identity. Scientific questions were fielded, our personal histories, religion, and controversy were placed into the discourse from student, teacher, and researcher.

The next phase of this bioscientist-cum-ethics session, in keeping with the structure of other schools, was a questions and answers session, followed by the group feedback session.

Students asked:

Is the science good?

Can cancer make you go bald?

Is the course from which the bioscientist speaker graduated long?

Has bioscientist speaker made any breakthroughs?

Are there jobs in zoology? What courses are available?

Are the college points high for biotechnology?

All valid questions across different worlds that could not be denied answers.

The next phase of the proceedings was also a unique, unscheduled departure from other schools. Most students and all teachers left for their break, or to prepare for the next class. However eight students remained. They included the participant interviewees, who, crucially, were not being interviewed today. These students, the speaker and I assumed, were students most motivated to engage more and ask further questions. I was surprised to see two of the teacher's 'troublemakers' there. These students were not, to my knowledge, directly asked to remain for this session. At first they spoke about the session, how they enjoyed it, what parts they liked. They were talkative; even those interviewees who were usually quiet. Then criticisms slowly began to emerge about the school. One complaint followed another.

Funds go towards teachers, never the students.

It would not be possible for outsiders to see beneath the surface. What the outsider sees is just 'cosmetics.'

Why do I think it is so cold in here? They never have the heating on.

Student voice is unrepresented. A teacher sits on the student council and can override decisions made by students.

They want to be consulted on the content of the curriculum.

This was powerful – and dangerous – material for qualitative researchers. Could it be that in this activity they saw a forum to air their grievances which had previously been denied them? The fact that respect, a degree of authority and trust was handed to these eight students by us outsiders may have inspired them to use this to speak to us, the outsiders.

The speaker and I defended the teacher. We felt compelled to explain the teacher's generous time for us and drive for a more relevant, practical, and society-oriented classroom. Were it not for the teacher's commitment, we protested, we would not be there in the first place. There were moments when students had to watch their guard as their teacher was in close proximity.

For the sake of their confidentiality, I could not raise this event in any concrete way with this teacher. I could only allude to student opposition, but the teacher in question generally did not show an awareness of the fractured nature of the relationships between teacher and students. Whereas this teacher appeared to outwardly encourage participation and explore news headlines and new media outside of the rigidity of curriculum, they felt the teaching methods of the school generally denied them a voice, or expression of any view on NRGTS or bioscience issues. They particularly connected this problem with a need to assert more authority over certain personalities in the class, which disrupted the continuity and wholeness of the learning experience. There was clearly a border between teacher and students. It can be said that in normal biology class, the teacher and students exist in different worlds, and for some, the border is insurmountable (Costa, 1995).

In the analysis here, care needs to be taken to distinguish between genuine grievances and unwarranted attacks on teachers. Students will perhaps always rebel against their teachers and against a structure or system. However I was encouraged by the student's own analysis of the situation and their own quest for solutions. There were feelings of powerlessness in this school, but out of these also came suggestions of a particular agency as students reflected on how school itself might change in their favour brought out, even if they saw, to a degree, an external locus of control in how the curriculum is planned and implemented. During the three phases of the session – presentation, Q&A, normal break-out with the full group, and small focus group afterwards – a range of topics showed a very reflexive agency among these young people: a lack of trust in Government regulations on NRGTS post-CAHR; the need for activism among legal experts who can do more practically than philosophers can; the political power over NRGTS should be with the people not the legislature. In many ways, this was the beginning of a type of life political movement within their school. When outlining the

theoretical and methodological development in Chapter 3, I mentioned the critical aspect of inquiry that appeared in my research. This session was the defining moment. This was the moment where I realised I needed to look at power and access to the values – not necessarily information – that divides normative school science from life political socioscientific discussion.

The last two sections were vignettes in these closing stages of the thesis which brought into sharper focus the connections between pedagogy and wider discussion on NRGTs, between the local and the global, the agent and the structure. The next section will respond directly to these young people's requests in this section, to look closely – reflexively – at the activities themselves through their eyes.

### **Young people's reflections on activities in the context of science and wider pedagogy**

This section reflects on the framing of issues closer to experiential conversational resources than the theoretical (and for many, faraway) notions of NRGTs in society or the future of human nature. The focus here is the direct point of contact between local life politics and media. Reflected on here are the ways of perceiving the proximate in schools, such as learning styles and the use of media in pedagogy. Participants were asked to comment on activities to allow them to reflexively join me in evaluating the process, to engage them in local matters partly as an evaluation exercise.

The previous section recounted an event that demonstrated power relationships and a certain rebellion against constraints of pedagogic power and the school system. Here is Katherine from SK:

[Use of these activities] is a good thing because it opens your eyes to the world around you. ...It was really good because you showed a whole load of point of views and it wasn't just you standing up and talking to us about it. It was something you could see for ourselves, how real life scenarios.... how this can actually happen. It's a lot easier to look at it than you trying to explain it on a blackboard (Katherine, SK2).

Katherine called the discussion sessions the 'argumental side of biology.' She liked seeing other views but was not comfortable arguing herself. She was quiet in the class debates, but very articulate in interviews. The classroom arguments that took place in SK struck a chord with her; she says she has been 'attacked' in discussion for her beliefs from other students, although there is an oppressive dimension from curriculum also – as with other students, she feels atheistic view is not considered acceptable in religion class. So Katherine knew what it is to be in the heat of battle on these sensitive issues – and wants little part in it. However, she also felt media should be a normal part of curriculum. For those who liked to argue, there was the drama dimension, both the real world of the classroom and onscreen, and the exposition of decision-making possibilities.

Teachers too saw how it made those quieter students interact, even if, for some teachers, they felt they needed to know more 'facts' in advance. However one teacher's views on the length and depth of the video was that it was 'too long and drawn out' and would not hold the attention of those who were 'enthusiastic but without the greatest ability.' This view was also reflected in what another teacher from an all-male school from a large town that participated in the pilot. He suggested that it could be broken up, similar to elearning packages with which he was familiar. This point warrants further examination given the responses of some students to the type of learning that watching TV might be:

Well dramatising made it more interesting and I suppose raised a lot more issues and made it more controversial, but whether that was good or bad I'm not really sure. If there was more factual information in it I suppose it would be more beneficial towards the learning process (Katherine, SK).

Of course there was the 'novelty' element. '[Film] is a good idea' Kevin from SK told me. 'You actually do learn more than sitting in class reading a book.' Why is this?

Cos you pay more attention to someone you don't know coming in like, more than you'd pay attention to your teacher like. You pay more attention to a video like. Even if it is boring. You just...It's a video so you watch it...(Kevin, SK)

But there was something beyond curriculum here, a way of 'learning about life' that was 'worlds apart from school learning.' But the film was a 'trigger' only:

Yeah there are a lot of issues you kind of have to ... you see you have to ask yourself a lot of questions before coming to a full on



decision. Like if it was you what would you do? If you were put in a position to choose what you want your child to be would you? I mean.. I don't know.. it's not really that straightforward (Katherine, SK2).

Katherine would actually learn science theory in class better by reading and taking notes. References to watching a film as outside pedagogy however suggests a framing of science education in a way that could be normative for all education in Ireland. It might be called an *empty vessel* frame, given the way participants spoke about the cognitive aspects of learning through books and writing notes in contrast to the affective and the aesthetic of watching TV. 'Bioethical' dilemmas in the Gift were tied into soap operas such as Coronation Street but seemed at a considerable remove from school science.

'I don't know what it is when you're watching telly but it all goes into your head.' Wanda from SW says. Deirdre from ND typifies this response:

Well I think its brilliant cos you get to know more about it. And em... it's really good for our exam because when you do workshops it kind of *sticks* with you rather than just sitting in a class and doing out stuff and learning it off (Deirdre, ND, *my emphasis*).

Denise from ND certainly could not see this as learning. 'Its just .....hav[ing] a laugh...but its not learning.' Katherine surmises that with more 'factual information' in the film it actually could help the learning process. The framing of science education does not recognise the learning potential of exchanges of views. These are perspective caught up in an aesthetic outside the idea of the learning process. Only Lorraine from LH recognised how the Leaving Certificate is missing this kind of discourse, 'science, philosophy and morality.'

The other frame that emerged from reflections on the activities themselves was a *life planning* frame. Both Lisa and Laura from LH spoke of the bioscientist session as a tool for career guidance, or maybe towards learning, getting something for the future, rather than experiencing for the value of the concept itself. On the other hand Denise brings this human side of science back towards 'the body.' 'He told us what he was doing with his life' she says. Could this be contrasted with what he did for a *living*?

..the way he was saying like he didn't know everything got to do with it either. See they way people would be asking him questions? Then he was saying 'I don't know everything' like 'I only know some things' (Denise, ND3)

Katherine says the presenter is 'someone who actually does the work... talking about it will mean it will be easier to understand.' So this humanised presenter has removed himself from the expert systems, becoming part of life planning for young identities. As Giddens (1991) says:

On a psychological level, there are close connections between the sequestration of experience, trust and the search for intimacy. Abstract systems help foster day-to-day security, but trust vested in such systems...carries little psychological reward for the individual; trust brackets out ignorance, but does not provide the moral satisfactions that trust in persons can offer (Giddens, 1991, p185).

### **Internal support: classroom, crossing curricula, and management**

In the Institute of Education's *Valuable Lessons* report (Levinson and Turner, 2001), teachers from one thousand secondary schools from the social and the physical science subjects highlighted the need for formal assessment of socioscientific issues based on 'well-reasoned argument'. Emphasis was put on building self-confidence, developing critical thinking and enabling students to deal with socio-scientific issues in a balanced way, and engendering sensitivity towards the rights and needs of others. Humanities teachers were most confident when covering general ethical and social issues, but less confident about addressing socioscientific issues, considering the scientific facts incidental to their teaching of issues-based topics. Science teachers felt that disregarding the science and its accuracy might diminish the subject. The report recommended that science teachers should be supported in these discussions.

Osborne *et al* (2002) found there is a lack of pedagogic knowledge among science teachers in dealing with the kind of issues that emerge from discussion about science and society. Assessment has been criticised in the UK as too objective-oriented and this is another point raised by Levinson and Turner (2001) and Osborne *et al*'s (op.cit) *Breaking the Mould*. Most science examinations reward knowledge and understanding rather than well-reasoned argument.

Whereas a cross-disciplinary approach is advocated by the 'collapsed days' of Ratcliffe *et al*. (2003) and Levinson and Turner (2001) – where various school subjects look at genetics

from various perspectives on a single day – *Beyond 2000* was empathic about separating career science from everyday science. The report recommending a structural change to the science curriculum, differentiating between content that would enhance ‘scientific literacy’ and content suitable for the early stages of specialist training in science. Could such an initiative be possible in this new multicultural Ireland, where the issue culture of popular media, the normative discourses of school, and the real world science of the commercial or academic lab could meet or be strands of a curriculum (Fig 7.1)? ‘Anything can work as long as it is planned and prepared well’ as SWt says. Yet some teachers in this programme expressed the need to maintain borders. The SD head teacher, for example, is both science and drama teacher, but is reluctant to mix these, preferring to keep them as separate disciplines. Besides the challenge set for the individual to ‘switch cultures’ as it were, he feels the cross-disciplinary requires teacher collaboration that might be unmanageable. Yet resources and time gets mentioned frequently as stumbling blocks. The next section looks externally for how this external assistance might aid this approach in schools.

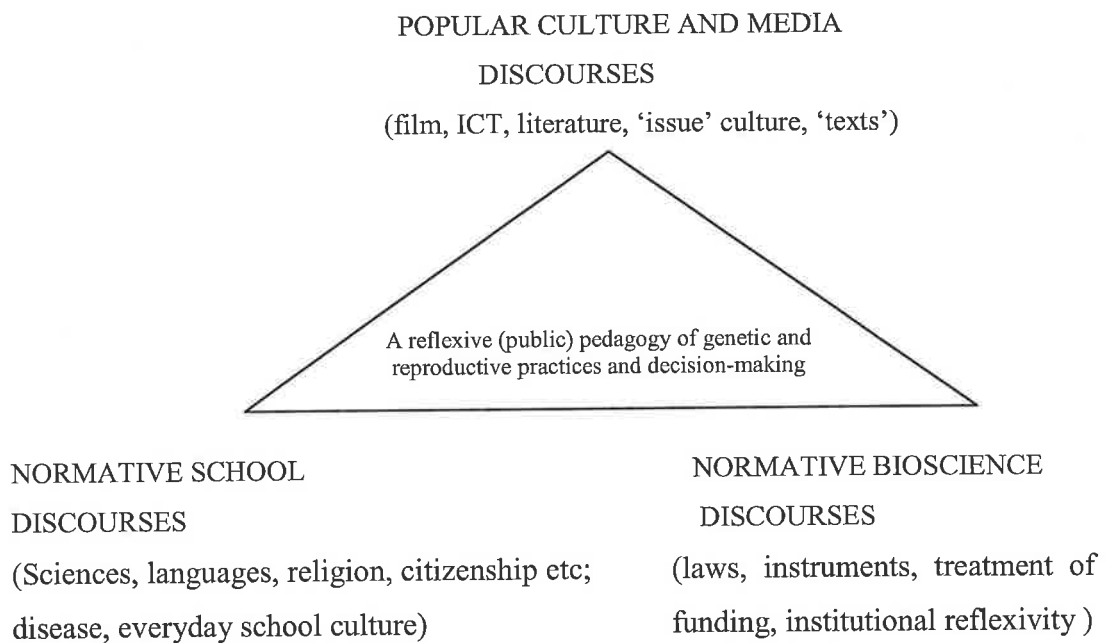


Fig. 7.2. The triad of discourses which a reflexive pedagogy of senior educational level must address.

### **External support: the school as *agora*?**

Many teachers have spoken to me about the 'fourth level' proposed in recent Government reports (Ireland, Department of Enterprise, Trade and Employment, 2004; 2006) and prospects for their students to participate in the bioscience. For a place like SW, this world seems far away. Few students go on to a career in science. There is a similar situation in ND. The original research question of access is central, but is more immediate, in that lack of access can be linked to socioeconomic disadvantage. I have taken the life political argument here, rather than the economic one however<sup>7</sup>. It comes down, as I have said before, to what education is. Is the school a place of democracy, a place of discourse? Could it have elements of Nowotny's *agora*? Nowotny *et al* (2001) argues that science, along with other bastions of modernity such as market, state and culture itself, are beginning to dissolve in an evolutionary process that has the borders of science, society and culture falling down, allowing interconnection and contextualisation. Nowotny's conceptual pillars for re-thinking science sees a context-sensitive science, knowledge generated in the context of application. By contextualisation she means technology parks, technology transfer, greater links between universities and industry; universities need to be adaptable, she says contexts are made not given; people can enter the *agora*, there are of course also increased uncertainties but also increased openness about these uncertainties as well as the scientific certainties of their cultural backgrounds:

Contemporary society is characterised - irreversibly - by pluralism and diversity and also .... volatility and transgressivity. It can no longer be understood either in terms of the norms and practices of scientific rationality.... or in terms of hegemonic forces such as the market ('commodification') to which other perspective have been subordinated, although we accept that our account of social change can be criticised for paying insufficient attention to power (Nowotny *et al*, 2001, p21).

Not unlike Habermas' public sphere, this space is open for discourse, but following the pedagogy of de Certeau and practice theories of Schatzki, also the non-spoken, the tacit, the practical consciousness of Giddens where there are silent body language practices and meaning is brought away privately. There may very well be difficulties negotiating between the university institution, the school institution, safety personnel, teachers, lab managers and

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<sup>7</sup> I have already mentioned criticism of Giddens's perceived lack of consideration for the economic constraints on life politics.

administrators. This is an administrative matter, not a pedagogical matter in the Giroux sense. of a public pedagogy.

Most important of all for this thesis, this is the space for a reflexive late modernity, where the identities of Goffman, Gamson, Giddens, Beck, and Lash, among others, are negotiating their way in a runaway world that has many things to offer them. There seems to be little debate from teachers or students about bringing media into the classroom. It is a given in this mediated society. However this media is a window on ourselves as human beings as well as the dialectic between individual agency and constraining structure, between human and nature. The school subcultures operating within curricular and practical confines are shown in this thesis to struggle to attain this modern dialectic of systems operations and existential/lifeworld expression.<sup>8</sup> It is only when social systems become 'institutionally reflexive' Giddens (ibid.) says, (2004 p145), do they move from an organisation formed round the pragmatism of tradition and taken-for-granted customs that keep nature exogenous, to one that is internally referential, [and also without nature?]. For the social system of education in reflexive modernity, questions of morality are further removed from day-to-day practices because 'moral principles run counter to risk' and 'morality is extrinsic so far as the colonisation of the future is concerned' (both p145(2004)). Does this mean schools, in the teaching of biology, need to retain tradition at the expense of modern reflexivity to approach moral and ethical issues of biology education, but ironically by remaining both traditional and sequestered from experience, they are neither morally aware nor adequately reflexive? Giddens deals with this contradiction:

The case of tradition is complicated...because appeals to traditional symbols or practices can themselves be reflexively organised and are then part of the internally referential set of social relations rather than standing opposed to it. The question of whether tradition can be 're-invented' in settings which have become thoroughly post-tradition has to be understood in these terms. (p150)

If schools have attained anything of late modernity, in common with cultures of biotech in Ireland, is it in the art of self-referentiality (self-confirmation) over reflexivity (self-criticism)? Perhaps a future school could be part of the 'communicative networks that turn critically back upon and, ideally... aim further to democratise civil society itself' that Emirbayer and Sheller (1999) call 'civil publics' (p145)

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<sup>8</sup> A more utilised theory perhaps is Habermas' (1992) similar ideas of the invasion of systems by the lifeworld - the hermeneutics of the existential - although this communicative action theory has stronger critical links to the modernist project and the Enlightenment subject.

## Conclusions

The principle event recounted in this chapter was the near-rebellion that occurred in one school, borne out of young people's feelings of powerlessness against affecting change in curriculum and the front presented to outsiders. We outsiders were the conduit for these expressions of rage which were acts of self-identity as a kind of political empowerment through external visitors.

There was also disengagement in certain schools from those young people who did not wish to talk too much about life politics. There was a general malaise in one particular school, as voiced by the biology teacher. This was demonstrated in a lack of enthusiasm among students for the activities presented to them. Young people have just the same problems in this regard as we educators do in making sense of a changing biomedical world. They frame things in their way, they emphasise de-emphasise, omit information in their explanations, as an intentional action. They organise the world in close proximity, such as education with a normative approach that suggests a cognitive empty vessel frame. The human touch emerges out of the expert systems of science to give advice on how to live the rest of their lives – the life planning frames. These and other frames have a fair degree of packaging, ways of organising storylines into their self-identity. Frames have cultural resonances, links to Eder's three cognitive devices of subjectivity: the moral, the factual and the aesthetic; ideas about progress, nature, religion, rights, and commodification in terms of themes and counterthemes that have commonality with wider discourse. There is a flexibility and reflexivity in performed debate with knowing references to media.

There are three ways that the embryo is framed regarding personhood: embryo not person, embryo as person (secular), and traditional Catholic. The first one is the most used. There were 'floating frames' that transformed positions, making them fluid, or allowing other perspectives, or just those who never thought about it and 'moved about' on the floor positions. There were semi-fluid frames which drew on personal experience of genetic disease, but have no hard-line position. These were very much in the minority, as were the religious viewpoint.

Issues which have the embryo as the core frame are the more 'solid', are most politically contentious, and more emotive. However these frames are rare. Issues of identity and genetic control have the more 'fluid' frames at their core. Yet there is a discomfort with the

'meddling' effects of NRGTs in general (on the embryo, on identity, on society), some of this justified on secular or humanitarian grounds.

In this applied analysis, I followed the advice of Gamson (1992), Eder (1995), and Benford and Snow (1989) to look for masterframes in the discourse. Masterframes are solid collective frames that can be said to have reached a certain critical mass of opinion. This is dealt with in the final chapter.

Media and discursive activities such as debate and presentations offer multiple perspectives on decision-making in NRGTs. For young people contributing to wider discourse, even non-intentionally

the self is not a passive identity, determined by external influences; in forging their self-identities, no matter how local their specific contexts of action, individuals contribute to and directly promote social influences that are global; in their consequences and implications. (Giddens, 1991/2004, p 2).

This chapter intended to show, in the manner of Giddens structural approach, the deep connections between mediated structure of curriculum and discourse and the mediated performances of local embodied practices by tying previous theoretical and empirical concepts together. The final chapter will discuss the conclusions and implications of these findings and make recommendations for educational policy and further research.

## Chapter 8: Conclusions, implications, recommendations

This thesis explored, through a discursive, ethnographic approach, the dialectic relationship between the discourses of the young in the classroom about NRGTs and broader global and institutional discourses of biotechnology. It did this using two basic activities – film and a visiting biotechnologist – with a recorded discussion or debate following each activity. In the sections that follow, I first of all pull together the emergent interpretations of experiences in the classroom during the activities and discussions. I then draw conclusions on what these interpretations mean for life politics and a pedagogy of media and discourse in the biology class and principally what they might mean for the participants of this study. I then outline the implications for education policy and wider society. Based on these, a set of recommendations are laid down for a more discursive, open biology pedagogy of formal and informal education that challenges teachers to be facilitators as well as gatekeepers. There is also a discussion about how this might be assessed. In the fifth section, I position myself as an ethnographic scholar working in the boundaries of science/society studies, communications studies, and education, and how this thesis has contributed to knowledge in the field. The fifth and final section closes the thesis with final comments on this work.

### Thesis review

Two core themes were explored through the research questions: the potential for the emergence of *life politics* among young people, a project of the social self following Giddens (1991), that is, constructed through the mediated nature of late modernity, sometimes a struggle, sometimes a path of least resistance for authenticity, moral sense, and rights; and *pedagogic practices*, the descriptions of negotiations at local level by teachers, students, researchers, and the ethnographer himself to engage in the political (or Political) implications of NRGTs, particularly using film, discussion, and presentations. Both themes took a



*structurational view* (Giddens, 1984) of a controversial topic, new reproductive and genetic technologies (NRGTs), that is, a dual analysis connecting the performed action in the *locale* and *fields* of the schoolrooms (agency) and wider communicative strategies of discourse such as cultural *frames* (structure). Pre-implantation genetic diagnosis (PGD) and human embryonic stem cell research (HESC) were the NRGTs in focus, with other references by bioscientists to cancer and diabetes research using genetic techniques. Using these technologies as topics, discussions centred on how decisions made can affect disease, families, the individual, and society. I looked for expressions in these discussions about the reflexive project of self-identity for young people.

Regarding an emergent *life politics*, access to popular and media representations of biosciences in nature, identity, and society is difficult through the current education system. However, *teachers were interested in addressing the social implications of biotechnology and were willing to use film and discursive formats in class*. They had significant time and curriculum constraints imposed on them – even within the post-2002 syllabus – and indicated that they would mainly use short, dedicated periods to discuss topics such as genetic engineering when covered in class in future. This could only hinder access to ideas about the biosciences and humanity from popular science and wider culture, such as the writings of Dawkins or films such as *Gattaca* (1998). A *gulf (sequestrations and separations) often existed between teachers and their students and between individual students on wider issues of a general pedagogy* including the life planning of NRGTs, and sometimes *between individual students and the world outside* their familiar environments. Media and discussion activities such as debate and presentations offer multiple perspectives on decision-making in NRGTs, *that which is brought into discourse through the practices they describe*; it is not theoretically or empirically necessary here to discuss cognition or belief systems.

Through these representations, however, some conflicts with the authority of pedagogy emerged. This conflict involved how students saw current science education in terms of relevance and in how particular science teachers viewed this qualitative thesis as relevant to their own research agenda. The student/teacher conflict is one of disengagement and feelings of powerlessness. Various types of disengagement occurred in both rural and urban schools, although most prominently in disadvantaged areas. There was no evidence of any less teacher support for students in disadvantaged areas than the more affluent although less funded schools were more chaotic which impacted on teacher workload. Also, teachers often recommended potential research participants, most likely the more academically gifted.

There were three aspects of powerlessness that may not be mutually exclusive:

- (i) First, there was a *confrontation with formal pedagogy*. The students of one school felt a powerlessness in influencing the curriculum. They also felt that the openness that teachers have for external speakers is a performance, in Goffmanesque terms a front presented to outsiders which disguises the rigidity of normal pedagogy.
- (ii) The second part, which was prominent in another school (but not common overall), was a kind of *common sense disengagement*: why do we need to enter into a discussion about NRGTs? This was often represented by the popular wisdom phrase 'you might as well use PGD.' This was not interpreted as a lack of understanding or a deep rejection of discussion *per se* but that the tools for discussion were not developed, at least not within the context of biology class. Yet for those with more developed argumentation skills, the object of disgruntlement was authority rather than the abstract issues of the biosciences at issue.
- (iii) In addition, some students from disadvantaged areas had a third kind of powerlessness in feelings of *isolation and powerlessness within their own communities*. In one case, I failed to connect with Kei, a Japanese exchange student who had to surmount a significant language barrier in her school.<sup>9</sup>

Where perspectives on NRGTs in the real world were explored based on a fictional, hypothetical scenario in a film, *discourse 'frames' emerged, following Gamson (1992), that drew on often opposing cultural themes such as (scientific) progress, harmony with nature, risk, fate, a sense of the sacred, liberal individualism, and social responsibility*. The sacred in this sense did not always mean a traditional Catholic view, which, perhaps surprisingly, was rarely expressed explicitly in conversations. There was some discomfort with manipulating the essence of humanity or nature through NRGTs, particularly for the embryo, suggesting perhaps a legacy from traditional Catholicism, or closer to the European dignity perspective of the embryo. These frames, as Eder (1995) suggests, have deep cultural resonance, and set up oppositional ideas about nature, technology, and society, aligning with Giddens, Beck and Lash's late modernity. These findings have similarities to the PARADYS project's findings of the 'science expert' in conflict with the 'concerned citizen' (Bora and Hausendorf, 2004).

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<sup>9</sup> It must again be noted that these cases were constituted through particular discursive projects on ethnographic visits and do not reflect school policy or common feelings of powerlessness among students in general.

Students often used conversational resources to justify decisions based on personal experience, 'popular wisdom,' or media references which included TV and film. There was also a 'positional fluidity,' where frames that seemed to oppose each other were conjoined epistemologically or aligned with each other to support a central argument. For example, it was possible for a student to use a *scientific rationalism* frame to argue against the use of PGD, on the grounds that it would affect evolution. This contrasts with Gamson's (op.cit.) more 'solid' notion of frames.

Let us recap again the specifics of what young people discussed about NRGTs regarding human relations, identity, and society. Most young participants disagreed with selecting an embryo for non-life threatening diseases or sex selection. There was strong agreement among young participants that they should have more involvement with the dissemination of genetic test results and that an arbitrary age limit threatens their empowerment. There were strong pragmatic solutions for regulation: experiential knowledge will cause people to do something that may be generally wrong, but morally right for a given situation. Young people within the extremes of debate then, like their older counterparts in media debates, frame the embryo in two directly oppositional ways first of all: as a person, therefore with human rights, or as a potential person with lesser or no rights. A third *embryo* frame emerges which can override this latter frame: experience. The shock of potentially having a child with a severe genetic disease will tend to motivate young people to reevaluate moral and ethical guidelines, as Deirdre from ND informed us here, and move into a new frame that places prominence on the individual's needs and those of the family (current and future) over that of 'society.' The *Umwelt*, as Giddens describes it, becomes disrupted; the 'moving world of normalcy which the individual takes from situation to situation' (Giddens, 1991, p126-127) needs major readjusting. This frame would appear currently to be used by a small minority of young people unless they have first hand experience of trauma caused by genetic disease and experience in using a technique like PGD. Most other students who may not have strong conviction either way will draw on either of these three *embryo* frames or roam in the embodied field of a 'fun' debate.

These descriptions of NRGTs from young people show a strong desire to control their own destiny, move away from notions of fate, following Giddens' descriptions of the move from traditional to a post-traditional society. Yet paradoxically, fate clings on in traces, a 'sacred' notion of the embryo as explained above, with explanations that are not always religious. A line can be drawn; for instance, something is not quite right if an embryo is disrupted or pre-selected for development of 'cosmetic' treatment, for example, in a hypothetical narrative.

The moral boundary depends on how young people 'sort the world' through framing, how they form objective meaning from the actions and ideas of others without *acknowledging* individual bias (Eder, 1996, p166).

The views may not be so closely aligned to political representations, yet they do bear resemblance. It may be asked, is there potential here for a social movement toward various forms of life politics as a forum for education/pedagogy beyond the formal structures of conventional politics and schools? The fact that the representations are not overtly political as understood in general terms means that these *positionings are not always - and sometimes not at all - reflexive in terms of traditional political or moral representation. However a reflexive life politics occurs in the self-awareness of the dynamics of debate and how perspectives are always open to contestation.* These young people may not represent a political force in the traditional sense – they sometimes show little interest in news media coverage of NRGTs – but their interests can be aligned with new life politics *below the level of conventional representation.*

Regarding local *pedagogic practices, choosing a view on NRGTs is a choice of discursive identity; justifications are immanent,* using Harre's phrase - borrowed from theology - of language and intrinsic meaning based on conversations past. They are *contextual, performed, they mix the rational and the moral of rhetoric, they are taken from cultural resonance, media, and experience.* The dynamics of 'role-play' and their own cultural practices within subcultures in classrooms and dramatic debate were influences on young people's decisions on wider issues of NRGTs. Gender, peer power, and personal relationships between participants contributed to positioning strategies. One student expressed a view more consistent with pro-life perspectives in interviews than he did in class sessions. Students had strong identifications with narrative and characterisations and internal power structures of the films as they described possible life choices and possible consequences when choosing positions of agreement on film characters' decisions. Those teachers that participated (unfortunately only three of the six directly took part in debate) were also caught up in the power and performance. Teachers feel they need to compete with media, including social media, and *perform pedagogy, 'sticking to the script,'* as one put it, but only in outlining competitive points of view, *never revealing their own perspectives* similar to the 'balancing act' of objectivity experienced by teachers in Levinson and Turner (2001, p14). Exploration of the moral nature of decision-making in NRGTs then becomes a collection of worldviews from other students in which the teacher cannot take sides or offer much in the way of advice.

Although the cognitive dimension to biosciences learning was not a focus, part of the reflexivity that I traced across the participants demanded that I reflect their views on the activities and the research itself. There were no opposing voices from students to the use of films or speakers in the biology classroom, which was expected, most preferring this type of 'learning' to reading and supporting its potential to open up discussion on decision-making scenarios (part of Giddens' (1991) future colonising measures perhaps) for society. However the use of terms like 'sticking in the head' and 'remember it better' to describe the learning effect of a film suggest a cognitive *empty vessel* frame, where facts are poured in and perhaps also suggesting an enculturation consistent with much public criticism of Irish curricula. Students framed the films and presentations as being 'science,' given their pedagogical context, and applied a frame usually reserved for science subjects. That said, the existence of the views of other people on science-related issues was a major new insight for many, which seemed to allow a different approach to the biology subject. There were positive feelings towards the opportunity to express a point of view and listen to other perspectives from an outside expert. A bioscientist speaking in class automatically switched to a careers or *life planning* frame. Yet to frame this in the manner of Giddens, young people in classrooms took on a somewhat paradoxical *acceptance of the authority of an external expert to add to a 'bank of knowledge,' a trust in expert systems beyond the curriculum, yet they may resist the local knowledge that teachers provide*. The elements of self-identity provided in formal education are supplemented – perhaps exceeded – by external visitors and media. These speakers deliver *known facts* from the 'real world'.

Students have expectations of 'outreach' visitors and a power dynamic exists that create identities of 'expert' 'giving information' to the 'unknowledgeable student.' For researchers and indeed myself as ethnographer, participation involved valorising science and knowledge as content. However, along with these content-driven expectations, students want the human aspect, the NRGTT decision-making and life choices of career provided to them by the bioscientist sessions. These local expectations and our inability to move from an expert identity suggest that *the deficit model of science communication is represented as a cultural practice within new education and outreach activities and is difficult to change*. However, by looking at the gendered, expert-student, and teacher-student relationships, a micro context was added in this study at the performed action level that manifests itself in pedagogic practices.

This thesis defended Giddens against other commentators of late modernity, such as Beck (1992, 1994a, 1994b), Lash (1994), Bauman (1979, 1997, 2000), and Fairclough (1999), as

well as education theorists such as Giroux (1992, 1994a, 1994b, 1997a, 1997b) and Solomon (1983, 1992, 1994) and the practice theorists from contemporary theory with a theoretical lineage coming from Bourdieu and Foucault, such as Schatzki (2001) and Reckwitz (2002). Although the late modernity social theory model goes beyond the borders of curriculum, I have shown how new constructivist education as well as Fairclough's progressivist education, and of course Bourdieu and Bernstein, consider the school as a social space, recognising power relations and performance. There are structurational tensions between the sociological and the educational as areas of study. As an ethnographic study, it attended to the contingency and the *immanence of methods*, the interactions among Giddens' (1991) locales across institutions of modernity, including the education system. The interaction practices between mediated society, classroom and the growing cultures of the biosciences is an exciting space for a new look at pedagogy, as evidenced by the combined science/careers/religion/ethics session described in Chapter 7. Here, the moral choices of late modernity are placed into an open forum: lifestyle, health matters - specifically genetic disease, cancer, and diabetes treatment - existential questions of biology such as embryos and genes, and identity relationships between families, mediated experience, careers, and society. Teachers and students responded positively to this way of looking at media in science education, some having experiences of these life decisions in their own lives, others imagining through the narrative of film.

Chapters 2 and 3 set out the theoretical and methodological context for addressing the research problem of connecting school pedagogy to wider discourse. Chapter 4 and 5 provided an interpretive-descriptive account of the six schools under study and the potential for NRG T pedagogy through local practices. Chapter 6 explored the structural discourse units, or frames, that emerged. Finally, Chapter 7 drew some conclusions about how the theory-practice dialectic of life politics as contextualised within NRG T discourse in classrooms might practically be addressed in media debates and everyday representations as well as in schools.

### **Conclusion: frames and power**

What then do these interpretations mean for a concept of 'life politics' and a pedagogy of media and discourse in the biology class? What do they mean for the participants of this

study? I wish now to tie the interpretations of the previous chapters together to offer a conclusion on which other questions can be raised.

I started out looking for some type of broad map of young people's perspectives on NRGTS that could be tied in to current debates. This developed into a framework for identifying a relationship between the *frames* that are constructed in formal and everyday discourse when young people draw on particular cultural resonances to talk about issues of nature and humanity in NRGTS, and the *power* that is present in all discourse. The use of film, 'live' presenters, and argument/discussion in a biology class of six schools became the research fields for this exploration of frames and power.

The 'bodies' under study here are not necessarily tied into rigid personal attitudes on NRGTS or societal influences of new technologies. There are embodied, tacit, power plays, each of which contributes to how a young person represents herself on wider technological concerns for society. These power plays are between genders; between teacher, student, and science communicator (and researcher); between narrative portrayals and an active media audience; and between the academic categories assigned to students by teachers and between those that the students may assign to themselves. Young people positioned themselves when asked on NRGTS decision-making and took up recognised dichotomised positions of 'strongly for' and 'strongly against' a technology as well as more central positions. However the strategic communication processes based on the power plays allowed for variances in how the participants framed their arguments. There was often similar framing coming from different positions. For example Des and Damien from NDC both agreed that society should limit the use of NRGTS; they both took the same position but Des used sacred frames about the embryo while Damien used a *scientific rationalism* frame to address the problems such a technology would have for society.

I have looked further into the external power context to these frames. The question of life politics for young people and responding pedagogic practices becomes one of *access*. All young people in the study wanted to be involved in these types of activities even if there was some (rare) resistance to the content. There were glimpses of a community coming through the voices of Deirdre, Donal, and Denise of ND, as they defended their school and their area. These three participants – Denise in particular, as she is considered a weaker student – send out a strong message to scientific and education communities that their school should not be neglected as a place of discourse about new technologies or careers in biotechnology on the basis of its location in a disadvantaged area. These participants draw on more localised power

frames, representing community. Localised frames are also evident in the closed discourse of SW, as embodied by the pragmatism of Wanda, who feels there is no need for debate, perhaps because such debate is not part of what she normally experiences in education.

The teachers, for their part, often performed a deeply-entrenched role, taking a position as objective gatekeeper, sometimes finding it difficult to represent a 'messy real world' outside of science class. To be fair to teachers, they may well find it difficult to facilitate the emotional release of such a debate in an overcrowded LH classroom. Also, the fact that a discussion which attempted to bring an important first step towards empowerment to the science classroom could become an opening for a critical attack on the school as institution is significant, as happened in one school. Regardless of how 'strong' or 'weak' the students were considered academically, their resistance to the instrumentalisation of science pedagogy as part of wider educational constraints embodies the type of life political struggle with which young people were involved.

The practices of pedagogy then, even in the fractured dynamism of Giddens (1991) and Beck's (1992) late modernity, may make it difficult for teachers and science communicators to break out of the internal framing mechanisms of education that creates a boundary between a science lesson and a discussion about life decisions. There was an abundance of an *empty vessel* frame, sometimes using the phrase that the content of our activities 'sticks in the head' better than curriculum science content. Were pedagogic practices to change to facilitate debate, the participants of this study might still offer a pragmatic form of resistance. The socioscientific activities used in this thesis, film and bioscientist presenters – common to science communication programmes – cannot always adequately reach people like Donal or Denise from often neglected urban areas of ND, or the new Irish with linguistic barriers such as Kei. Current bioscience education aligned with the technoscience of the economy does not have a moral or values dimension and falls outside the 'pure relationship' that Giddens (1991) speaks of as important to late modern self-identity.

There is difficulty in creating enough dynamic at the border that has been constructed between the 'inside' of science education and the 'outside' of real life decisions and 'real science.' The life politics of late modernity that allows young people enough access to emerging technology discourse and decision-making is a major challenge and may be impossible under the present curriculum and set of pedagogic practices. Where there is a strong conceptual border between inside and outside the classroom, there is less scope for the young to find information from scientists like Presenter A and Presenter B on their own



terms, the information that makes 'common sense' to them. Where there is a resistance from young people to biotechnology pedagogy because it contains less personalisation, or may seem to be reproducing the instrumental only, and where there is no acknowledgement from the scientific and science communication communities of the immanent logic and rhetoric of a 'performed debate', these communication and education processes may paradoxically be driving future 'scientists' away from the expert systems of the knowledge-based economy. Strategies of technoscience education may wield the most power, and thus use stronger frames, while the tactics of resistance may not always be visible. Thus we may conclude: **activities such as film followed by debate and discussion and bioscientist presentations demonstrated the expressions of complex frames of meaning and resistance by young people, but only within the strong boundaries of technoscience communication and science education.**

### **Implications for education policy and wider society**

We can now broaden out the discussion to look at the implications of this research. Regarding implications for educational practices and curriculum, the voices coming from each school must be allowed to speak formally and informally in the classroom, and through classroom-based media. Science teachers are reluctant to show the difficulty they have managing the expectations of young people and their own control of a more open curriculum. Institutions that do not address these concerns are holding on to a modernist ideal that fits into the Enlightenment project, but are struggling in the fractured world of late modernity. The framing devices demonstrated here at local cultural levels may aid pedagogic practices in dealing with such sensitive material. It would prevent an either/or approach in accepting the premise of science. Also there is, of course no simple divisions – just because a student is considered a rationalist, doesn't mean she will automatically have a pro-choice view of NRGTs. Frames as 'discursive worlds' would further enrich the field for research and practice, extending much other work on argumentation in classrooms as a way of engaging with socioscientific issues. There are also implications here for the governance of high-profile, state-driven S&T regarding how students and other publics in a 'captive' forum deal at informal conversational level with bioscientists.

The concern would be that the biology subject, far from dealing with the embodied discourses put forward here, would move from a Victorian classification system to the dominant progress nation-state discourse of emergent technologies (that is, institutional reflexivity) rather than the socialised, complex Mode-2 processes of knowledge production that Nowotny *et al* (2001) describe and which provides the necessary platform on which life politics keeps challenging (Giddens, 1991). The disenfranchised in this study may well be unaware of hegemonic strategies employed by S&T outreach and awareness programmes – which might miss these constituencies completely in their locales and fields of action – but nonetheless these young people may adapt and use NRGTs. They may well resist such strategies with their own ruses (de Certeau, 1984).

Regarding theoretical development, there was emphasis throughout the thesis on a qualitative approach that tied together interpretations rather than tested hypotheses. However while connecting local school discourse on NRGTs with wider cultural representations in discourses, a broader connection with theory emerged, and indeed was needed, in the structural view of practices. It is important then to acknowledge the tensions that remain between the customs and knowledge systems of the local and the patterns of the structural that define practice theory as it is placed into the research framework here in both formal debate and non-verbal, tacit actions. The highest priority became allowing young citizens to explore everyday life skills associated with future technologies as well as the lesser priority of formalised positioning of the transcendental/intersubjective perspectives on these technologies.

There are many tensions in applying such a theoretical framework, but, as has been previously addressed, two are particularly strong. First, as we approach the end of the thesis, a sense of what *is* moral is still problematic, considering the technologies under discussion. Is it the ‘good life’ in everyday practice, as studied by de Certeau, Thevenot and Boltanski, or the moral that Giddens suggests that re-enters discourse through life politics, the moral of existential self-identity that can once more aestheticise the expert systems of our social and personal lives? Secondly, there is a tension in *applying* a theory for society and identities in the moral order of the local. There was a choosing of opinions here which represented choosing an identification in opposition to, or aligned with, others in the classroom linking, as discussed in Chapter 3, to wider society. The wider cultural fields of Chapter 3 are impacted upon by Giddens’ life politics and sequestration of experience as structural theory and the embodiment ideas of such theorists as Taylor, Butler, and Shilling. A tension

that creates a veritable fault line is the justifiable criticism of Giddens' internalised subject that compromises the habitual, embodied practices of Thevenot, Schatzki, de Certeau etc.

To remain on the structural level, assuming that the six schools represented here inform us about a local field for deciding on NRGTS, can we assume, because of references to higher order powers of progress and nature or lower order appeals to the personal and individual, that a median of communitarianism may diminish from the society in which these young people will contribute as they leave school? Very few young people referred an identity to a local area with notable exception of the ND students, and this was done in terms of resistance against stereotypical representations. It must be acknowledged however that communitarianism was not referred to in either film or bioscientist sessions. Giddens' late modernity ties the self with society on a global level, not necessarily at the expense of the community in contradistinction to practice theorists such as Charles Taylor, but because this level can be bypassed.<sup>10</sup> Yet recent Irish commentary – not necessarily borne out by this thesis study – describes a decrease in active public participation among young people which has implications for Government strategy of active citizenship (Taskforce on Active Citizenship, 2006). Often governance and dissemination is seen as competing with popular culture. Practical measures, such as those in this study, combine these, as will be increasingly necessary in the future. Critics of the 21<sup>st</sup> Century Science programme for example, have concerns about contemporary preoccupations of young people, or their apparent cynicism in challenging science edicts. Cynicism of one sort or another may be a healthy part of late modernity shown in detached resistance to TV emotionalism (Chouliaraki, 1998) and a 'knowingness' (Chouliaraki and Fairclough, 1999 citing Billig, 1996) or 'banality' (Chouliaraki and Fairclough, 1999, citing Billig, 1996) about common held beliefs or rhetoric of the principle contributors to discourses. Where detachment exists in young people's expressions here, it appeared to be tied up with local understandings, or lack of discursive resources to engage in debate. In general, young people were very lucid and articulate about NRGTS concerns. It was theoretically necessary to align concerns with wider structural discourse, frames being the optimal way of doing this. It may be prudent to ask: was Foucault's biopolitics evident, or put another way, was there sufficient resources and strategies available in framing to mobilise as a social movement, towards a masterframe, perhaps of *the body* in body piercing, hairstyles, subcultures, personal decision-making (including reproductive decisions) reacting against the abstract systems masterframe of institutions?

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<sup>10</sup> As mentioned briefly in other chapters, another ripe area for research here is the proliferation of online communities.

Besides collective responsibility and a sense of embodiment, other social phenomena can be described about the schools in the study. Based on the little amount of religious views on NRGTs, can we assume there is less religion in Ireland among the young and thus less deontology? Or does *fortuna* remain according to the results of my frame analysis? Although there can be little doubt Ireland is in a post-Catholic phase, a secular sacredness remains. We might certainly see more liberalism, a commodification culture in descriptions in marketing terms which may allow tacit, passive acceptance of PGD, but equally, modern Ireland's linguistic devices may well be infused with consumerist *tactics* rather than neo-liberalist *strategies*. Whichever, young people feel it is wrong to meddle (wrong for other people at any rate). There is a strong feeling against messing with nature but only when attention is brought to those decisions when they are in a discursive forum. On a practical level, there exists a wider spectrum of views on NRGTs in society than the simplistic pro-life/pro-choice media frames.

The informal ran up against the formal in this project in education, science, and civic debate. Did we witness the further socialisation and publicisation of the private? The informalisation of the formalised structures of education and government? Giddens' modernity too has tradition embedded in many aspects. In Latour's (1991) words, we have never been modern. The expert systems have allowed a co-production of both science and technology and thus uncontested knowledge systems:

[T]he expertocratic perspective is mainly dealing with the relation between efficiency (resources) and effectiveness (outcome, effects), with questions of *choice*; whereas a 'civic opening' of the political process would focus on the relation between effectiveness and legitimacy and would treat questions of citizenship as questions of *voice* (Bora 2005, p4, his emphasis)

Finally, a brief word on research policy: this work aligns itself with the struggle for the humanities and social sciences to present their case for serious science and technology studies (S&TS) in Ireland, to sail on the ocean of S&T policy that, it appears, will continue for some time.

## Teaching culture: recommendations for an STS pedagogy that includes NRGD decision-making

What practical measures can be addressed by the various areas brought together here for this project? The recommendations in this section apply to both teaching practices and curriculum policy as *social pedagogy* informed by contemporary sociological perspectives. These actions would facilitate reflexivity in a mediated, late modern context (for students *and* teachers). There are also recommendations for further research within the areas under discussion.

Concerning *teaching practices*, the most important aspect of a pedagogy based on this study is the inclusion of all those who feel outsiders within their communities, within the classroom, and within the subculture of science (Aikenhead, 1996). To do this, *we must look at teaching culture, doubly meaning how culture may be taught in biology class and how the culture of teaching can adapt to suit the reflexivity of Giddens' late modernity*. Teachers need to be cognisant - many are - of the inequity in learning opportunities among the many sub-groups within their classrooms. Another form of access that may seem less important but is nonetheless vital for a progressivist approach for *all* students (Chouliaraki, 1996), is access to popular culture through science fiction and popular science writing. There should be other explorations of ways of knowing science. Formal education tends to remove issues concerned with identity, morality, and societal values. A practice approach, in line with constructivism, introduces culturally resonant aspects that are of interest to humanity collectively, particularly the young and this includes, as this study shows, human/nature/technology interfaces and engagement with all three cognitive devices of discussions (Eder, 1996), the moral and aesthetic as well as the factual. For those who have no interest in science, whether popular or otherwise, there is still, to quote de Certeau (1984), the practice of the everyday. The pragmatism of PGD and HESC requires plain talking and everyday thinking about such decision-making, as the SW school and the *Prime Time* (2005) debate demonstrated in Chapter 7. Too much of the debate can be caught up in the language and debate of scientific rationalism or moral philosophy through 'bioethics.'<sup>11</sup> The primary recommendation here is to *allow young people themselves to exercise power beyond the curriculum*, even at a political level, so that the established polity are obliged to act. Katherine's point must be noted here when she says she wants to be consulted on the syllabus. Curriculum content

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<sup>11</sup> I am under no illusions here. The language of this thesis is also bound up in this discourse and would not be approved of in many of the schools I visited. I am arguing that philosophy, history, social studies, and science studies should be accessible to those young people that want it; likewise I take on board Wanda and the rest of the SW school's tacit (unspoken) advice for me to keep it real where that is required.

driven by young people themselves is being investigated in Futurelab's (2007) 'Enquiring Minds' initiative, for example.

Teacher constraints emerge strongly in this study. Before I address possible curriculum measures, it is important to stress once again that I define pedagogy in terms of constructing a formal/informal education network as a resource for young people. The teaching 'evangelists' contributing to this study are thus good exemplars of what can be done regardless of curriculum. In addition, DVDs, games, web searches, e-portfolios, the emerging ICT of wikis, blogs, vlogs, and podcasts are already used by other teachers. We must not rely solely on traditional film as a decision-making narrative in the classroom however, as the students here have indicated; short multimedia pieces now dominate chatrooms and YouTube, with more interactivity and granularity. Perhaps there is scope here for adding practical solutions to frame theory in how different discursive emphases in learning spaces can create their own world of possibilities in NRGT decision-making and self-created narratives. Also, social networking sites and Web 2.0 have transformed the media audience/consumer into a media producer and out of these exciting new spaces online identities are constantly being constructed. These are ripe areas for research into the choosing of young identities in late modernity.

There is also a case for using pedagogic tools already at one's disposal. For the identities already 'performing' in classrooms as shown by this thesis, role-play might be a suitable and novel activity for NRGT decision-making. As mentioned in Chapter 3, it was not considered for data collection here as it might have constructed more rigid identifications in debate (varying from participants' own 'opinions'). However this is already a common resource for NRGTs in education and would suit a multi-perspective approach. Although requiring more structure and a more challenging prospect, there could be consideration for merging subject classes in the manner of the religion/science careers/ science ethics experiment of SK (Chapter 7). Ratcliffe *et al.* (2003) and Levinson and Turner (2001) propose 'collapsed days' where the humanities and the sciences collaborate on addressing common issues and problems. Besides the administrative difficulties, such activities depend on the power of discourse - quite literally - being managed. More than one study has been undertaken to assess the level of training needed for teachers in this cross-curricular model, to ensure they are prepared for the contingent, sometimes iterative, cycle of views that are drawn from various sources. There can be both 'fun' and serious aspects to this enterprise, but the main objective is the release of bodies from the lab bench or the desk. The creativity to view other frames of meaning is already there, the choices to pursue this in classrooms, as they do

'outside' and to see the politics and choice-making in action, even where the supposed objectivity of science is at issue. Science teachers need to address their concern about subjectivity. These are all training issues. The teacher is the objective facilitator at times, but on other occasions may reveal some critical evaluation that falls short of the ideology that concern some educators (as though the ascetic situation of ideology-free classrooms could exist – see Giroux (1994a)). Students can and will deal with ideology inside and outside the classroom and would benefit to see how others deal with it. This view of science education moves away from content and towards *process*.

Part of the formal/informal network includes other institutions outside schools which have an important role in supporting teachers. This requires that they move away from the deficit approach to an inclusive shared-meaning forum of discussion and mutual project-building. The NICB needs to encourage its staff to be involved with such initiatives (the fact that two researchers responded to my request to participate in an 'ethics' programme says something of the culture of expert systems). *We must learn from models of science communication and public engagement existing in other countries*. In Fig. 7.1 of the previous chapter, I set out the triad of discourses which a reflexive pedagogy at senior level must address to adapt to changing landscapes brought about by emerging technology and reflexivity: normative school discourses, normative technology discourses, and popular and media culture. Equal prominence is given to practices in each sphere, concentrating on the constructivist and critical pedagogical vision that gives voice to a young person's negotiations with identities in these fields, and with the classroom as intersection. Just as the teacher and student needs to cross the classroom boundaries to access these connecting spheres, so the outsider 'expert' also needs to learn from the cultural strategies and tactics that occur within the classroom. The external guide, just as much as the teacher, is part of the student's solutions, as alluded to on more than one occasion by SKt to his students. Young people need to be seen as active identities, not receivers of expert content.

The National Council for Curriculum and Assessment (NCCA) is believed to be undergoing further reviews of the Leaving Certificate and recent publications suggest that smaller STS-type modules may be part of this review. The curriculum as it currently exists caters for the knowledge end of the learning scale and rudimentary applications rather than the affective domains of learning, questioning context, values, and offering other perspectives. However the issue of assessment recurs in teacher discourses. In line with humanities assessment of essays and journals, an effective framework is surely feasible, for example a *banding system of assessment* that might traverse learning outcomes in a new syllabus. These bands might

draw on Driver *et al.*'s images of sciences or Korpan *et al.*'s (1997b) typography of science literacy in the context of effective reading of science news, which includes data and statistics, method, references to other research, and social context. However, above all, we must release ourselves from the grip of assessment. The activities in this project relied on debates and presentations as open and exploratory, with the potential for moral guidance or objectivity from a facilitator. Following the recent criticisms of the 21<sup>st</sup> Century Science GCSE curriculum (Critics attack new science GSCE, 2007; Osborne and Millar, 2007), the NCCA are on controversial ground here, but one which must be addressed.

Finally, there are many avenues that can be approached for further study: youth subcultures, qualitatively addressing the concerns that young people have about their lives; more phenomenological studies, richer than ROSE, and more informed by modes of moral action (Giddens and Weber rather than Heidegger); further development on the use of argument drawing from discursive psychology; seeing the connections between local, performed arguments and positioning on topics, taking from Billig's (1996) approach in identity formation, a process in which this is a starting point; and a further look at how Bernstein's (1990, 1996) ideas of framing might inform the power relations of emerging technology education models. Small-scale, closer, direct relationships between onscreen identifications and young people's self-identities might also be explored, even behaviour, to bring back an outmoded term in qualitative research that is not so alien to practice theory research. Classic rhetoric may well teach us something about Goffman's performers and frame strategists in the classroom (and outside). There is a lot to be learned here about education combined with the modern pragmatism of consensus (Moscovici, 1984; Solomon, 1994). There are also current theories such as positioning theory and positioning analysis (Davies and Harre, 1997) which may throw more light on connections between micro/macro moral orders and their relationships to Thevenot's (2001) pragmatic regimes.

My principle concern however is communication processes of science for young people - ecological, biological, genetic, ICT - where ideas of identity are constructed, either belonging to a group or representing self in society. Other emergent technologies such as nanotechnology are part of the wider perspectives of all actors in late modernity communicating notions of risk and fate. While activities such as those used here may well form a larger part of 'education and outreach' programmes, it would be wise also to evaluate the learning potential and *moral common sense* that the targets of these programmes construct from them.



## **The contribution of this thesis to knowledge**

In this section, I want to address a central concern for a thesis, that is, its contribution to knowledge. Firstly, a research question was identified which inquired how two activities introduced to the biology classroom, film and bioscientist presentation, could address the connections between micro practices of young peoples discussions in a science classroom with wider debates about NRGTs. This was accomplished through the identification of cultural frames of discourse among young people's discussions concerning NRGTs and contextual power processes surrounding and influencing these frames.

Identities are constructed within these spaces categorised below. I have positioned myself within a contemporary theory of practices (Schatzki, 2001; Reckwitz, 2002) where pedagogic identities can explore and challenge the concept and application of emergent technologies. This is the intersection of the practices of a film audience, bioscientists' 'outreach' practices, and science education practices. The theoretical framework adds to many studies in education and sociology by Goffman, as well as Giddens' (1991) life politics in social theory and Gamson's (1992) applications of frame analysis, derived from Goffman, as methodology.

Given the interdisciplinary nature of this thesis, the contribution to three fields of knowledge is addressed.

### *Contribution to educational practices*

This was an ethnography of external support entering a school and presenting the biology subject as a discursive topic about life-planning and decision-making. The field work offers a model to teachers and other educators showing how the education system and external institutions might work together to provide broader perspectives on a difficult topic such as NRGTs. In addition, teachers themselves will identify the challenges and power strategies they bring into the classrooms and perhaps more importantly, gain insight into how young people react to such activities and concepts and how they bring their own various discursive and power *tactics* (de Certeau, 1984) into the classroom field. (A summary report of this thesis will be distributed to all participating schools).

### *Contribution to communication theory*

The thesis contributed to the understanding of applied communication processes by bringing a particular frame analysis tool used by Gamson (1992) to science education. While a more abstract theoretical approach to frames and performance was strongly influenced by Goffman (1959,1974), it was Gamson's empirical applications which were, perhaps for the first time, applied to an educational setting, connecting 'frames' of common discourse between groups of young people in a school locale and wider debates about NRGTs. I would argue here that this method of analysis addresses a boundary that has remained too solid between biology education and popular culture/popular media

*Contribution to the connections between contemporary sociology and education with respect to emerging technologies*

The thesis will have contributed to the connected areas of study that is schools as social systems and contemporary social theory. While Gamson's frame analysis model identifies cultural themes in discourse, the extra 'power and positioning' approach used here developed a model that contextualised these frames through thick description of socioeconomic and state-driven frames as well as the micro orders of power in schools that relate to these frames, similar to what Bernstein would call regulative discourse controlling pedagogy. Bourdieu's fields of pedagogic discourse were also identified as a context in which these frames and power contexts were identified. This thesis therefore puts forward a study of the performative aspects of perspectives on NRGTs. This was not merely asking young people their opinions on the many facets of NRGT decision-making – it examined how they played with the ideas and positioned themselves against a background of proximal and wider cultural power.

**Final reflections**

This was an ethnographic study of six Leinster schools at senior level, Transition Year and fifth year. There were five co-ed and single-ed schools in North Dublin, Louth, rural Kildare and Wicklow, and one co-ed boarding college. It has been an opportunity to observe borders between the local of biosciences education inside the classroom and the global 'issue culture' of biotech and NRGTs outside. However it was more than that. I addressed theory within a particular interpretation of practical action in schools. This work is a starting point in some ways, a tying together of multiple theoretical and practical strands to see what would aid the understanding of NRGTs within identity, society, and education. For this reason, it has been a

challenge not to allow the strands to unravel or to take the journey too far down blind alleys. I wanted to see how, following Giddens (1991), institutions of modernity such as the education system might remove existential, moral, and complex social problems associated with self-identity and life planning from discourse, what he calls the sequestration of experience, and how students, and to a lesser extent teachers, could 'bring these back' through a life political pedagogy. Giddens also describes how the mediated developments of late modernity have brought back these issues in both personal and more global common practices, such as humanitarian aid and ecological conservation, aspects of life politics. My intention was not to test Giddens' theory in practice; rather Giddens' theories were a theoretical lens - which I also drew from the practice theories of Bourdieu, Schatzki, and Boltanski and Thevenot, among others - to observe local iterative practices and contingencies that utilise a *scientific rationalism* frame, sidelining issues concerned with identity, morality, and societal values from biology education (as one participant, Derek of NDC said, genes cannot be what define us). I wanted to view the barriers that would make it difficult to bring NRGTs into a science education and explore the possibility of a wider pedagogy than the teacher provides, a critical pedagogy of civic and contemporary global discourses, while being mindful of the more pressing struggles for students to negotiate exam pressures, poor resources, over-crowded classrooms, ineffectual teaching practices, etc.

Outside the classroom, news stories and entertainment images carry concerns about humanity and nature. A principal one is undoubtedly global warming, but body issues also occur with a kind of 'DNA salience' through popular culture and the public imagination. Sci-fi and literature provide other meanings of self- and human identity. Some groups are even looking at ways humans can be set free from biological constraints.<sup>12</sup> Outside also are the commercial imperatives and normative practices of the biosciences in Ireland and these are salient in biology education, from a curriculum and teaching perspective, as shown here.

I have however, attempted to remove NRGT discussion in the classroom deliberately from a discourse that is exclusively educational. By widening out to contemporary social theory I can draw on larger visions - I am not afraid to say *grand narratives* - of education as argued for by the likes of Bourdieu, Bernstein, Dewey, and Freire. A science subject must fit within these visions of a liberatory, consensual pedagogy, rather than the other way around.

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<sup>12</sup> The discourses of sci-fi (see William Gibson) but also the transhumanist movement (Stock, 2002).

Inside the classroom, young identities are being constructed. There is, according to many theorists of modernity - Giddens, Beck, Lash, and Bourdieu among others - a reflexive agency in action in late modernity, where people are aware of uncertainties, of the tangled connections between 'nature' and 'society,' of the environmental and biological risks to the planet, and bypass traditional politics in order to use a new (proto) political expression in new modernity of the 'desired' and the 'familiar' (Beck, 1994b). The struggle is not a revolution; it is tacit. It is life itself. Young people use a kind of popular wisdom when describing this struggle, some resistant - 'messing with nature,' 'playing God,' and 'shopping for children' 'its not fair on the child' - but others are more benign, phrases or maxims in everyday usage such as 'you might as well use it [PGD] when its available' because a child can 'have a full life.' The views represented here are *perspectives*, not yet opinions, often contradictory, and *identifications* with people and concepts that are bound up in modern Western discourses across all forms of electronic media, both new (text, weblogs, wikis) and old (newspapers, TV) as well as more 'traditional' methods of communication such as chat, stories, and gossip.

As I developed my research questions - from their broad beginnings to a more focused endpoint - people often asked me throughout the four years: what was the point? Why is it important to see what young people say about types of biotechnology and why is that useful to the education system? A life political answer is that the interaction young people have had with current NRGT discourse throughout this research allowed them a first step towards empowerment, to put forward their own voices. As these are profound new technologies and research practices that, for many members of society, involve changing the body, the disembodied person of the embryo, or inter-generational identity, this is also a chance for us to look ahead. It is mapping a future - colonising it as Giddens (1991) describes it - not just for education policy requirements but also colonising for the young themselves so that by participating in these discourses, they themselves are breaking out of old constraints while assessing some boundaries, redrawing others, and retaining those borders that still hold value. They are creating their future from a multitude of possible futures or by social and performative practices of discussion and debate. They are choosing their positions on socioscientific issues as well as choosing individual and collective identities. It is important to reflect on the next generation's ideas on these matters: how they map to current discourses on the seemingly disparate spheres of social identity, education, and NRGTs; how young people construct moral frameworks to deal with these issues; how schools can be used as a platform for discussing controversial issues in NRGT; how to give young people a voice and, if necessary, begin the preparation for them to actively participate in informed debate on such issues.

Perhaps in doing this, I am, like Giddens' self-description, a 'utopian realist.' But I have not provided rounded answers for education, merely described some of the choices. Choice is a term that defines our current phase of modernity – choice of cultural self-determination, choice of individuality, choice of sub-group identification. Those who propose abortion legislation in Ireland define themselves as *pro-choice*, in line with the international understanding of this term. Pro-choice is a modern identity. Ireland, too, is asked to choose an identity, a position in relation to NRGTs that will define how it is perceived in the context of EU regulatory frameworks and global science. Ireland is being asked not to sit on the fence, not to use a diplomatic solution to the problem. The suggestion is: are we a progressive, rational nation or do we still hold traditional values dear to our hearts? There are times, it seems, when the contingencies and multiple perspectives of modern politics is not enough. With a clear, final, legal definition on one fact – the status of the embryo – suddenly medical, scientific, philosophical, and moral guidelines will fall into place, or so the abstract systems of modernity demand of us. Yet reification in law has not been the final word elsewhere. Neither are the words of institutional guardians final. Worldviews that remain 'outside' the dominant scientific discourse must be both respected and taken on board; similarly the Catholic Church also cannot be allowed to control this discourse. In my view, a political solution – perhaps a fudge to some – is the only solution. The actors within the network of NRGTs are many things to many people.

In referring here to 'actors' I shall address once more my struggles with theory. The two tensions identified in the previous section and in Chapter 3 were: the problem with applying a micro/macro model for investigation and the problem of identifying a moral framework for pedagogy. The first tension arises from applying a theoretical lens of practice theory, drawing on the body/ knowledge/things-complexes from the ANT side of science studies (Schatzki, 2001; Knorr-Cetina, 2001) while responding to the emancipatory cries of young science students caught in a rigid curricular system. In many ways the empowered voices from Chapter 7 pushed the limits of the detached practice theory perspective of human/non-human interaction and networks. For the second tension it must be asked: were voices given to young people within the theoretical confines of practices? Was there a 'moral habitus' of Giddens, de Certeau, Thevenot and Boltanski being expressed rather than the more passive habitus of Bourdieu? Expert systems still increase in late modernity and are constructed in practices. Actor-network analysis is useful to analyse these structures but it is not the full story. A life politics analysis brings the outline of a *subject* back into systems talk of genes, biotech processes, and economies. And in the paradox of structuration, life politics depends

on expert systems. They emerge from them. Thus regulation and careful deliberation on genetic decision-making – even at the safe distance of the classroom – represent the ruses against the technoscientific systems, but are ultimately influenced by cultural events, local nuances, embodiment and power play, much of which are also caught in the system. This is my contribution to theory and, to quote Stuart Hall, a great advocate of interdisciplinary studies in the humanities, ‘the only theory worth having is that which you have to fight off, not that which you speak with profound fluency’ (Couldry, 2000 p 14 quoting Hall, 1992, p208).

Although there would appear to be an inherent contradiction between my call for a more open, discursive curriculum and my tentative conclusion that there is a new pragmatism within life political decision-making, I feel that we *are* products of modernity, albeit late modernity, and discussion is part of politics, of chat shows, of scientific argument, of the academy. There should be room in the science classroom for the practical doers, the thinkers, and the careers people. Far from dumbing down, as some commentators have suggested about this type of science teaching, it becomes much more of a challenge for students and teachers. Science has more to offer in terms of argument, experiment and, above all, a creative synthesis of ideas, even for those who want to explore and work in the lab and let others get on with the talking. Just as not every student will become a scientist so I have realised, not everyone wants to be an amateur philosopher of S&T either. But every student should have the right to think, talk, and do as standard practice in a (socio) scientific activity and address common moral questions.

Near the end of the research phase at SK, SKt told me in an interview that he is the father of a Down’s Syndrome child. As a scientist, he feels research needs to take place for disease prevention. As a father, he is uncomfortable about using PGD. Both self-identities beg for clarification, an answer that might suit both perspectives. The classroom discussions cannot offer comfort except to demonstrate how difficult an easy answer could be.

And where do I myself stand on the use of PGDs and stem cell research? I started off in somewhat agreement of the use of all NRGTs, whatever the circumstance. However I, too, modified my views. I became more neutral as I listened to positions. I became more critical of the use of embryo technologies. Although I afford some sense of human dignity on the embryo, I do not consider it a person. The use of NRGTs does not personally present a moral problem for me. However, while there are large numbers of people who dissent from the normative *progress* frame, then this needs to be accounted for legislatively and practically.

Although I share the many more centralised views in this thesis, I have respect for the sacredness that emerges when referring to the embryo. A dichotomy becomes constructed in the issue cultures and storylines of media and the speech acts of discourse. The common idea of framing a pregnancy depends on circumstances, expectations and current requirements; is it a baby-to-be or inconvenience? However the application of their use in PGD and stem cell research must take account of abiding ideas of humanity in a way that does not privilege wealth or consumer-driven superficiality or a rationalist-only pedagogy. Nature discourse in ecological, embryo, genetic, or other technological debates, are part of a network of body/knowledge/things-complexes (Reckwitz, 2002). Given this, I am confident of an emerging set of tools from a morality of the everyday – including redevelopments of old conventions that may be physical, psychological, psychical, historical, or emotional, but are especially political in that practical moral sense – and with these tools humanity, in its continuing development and its realignment of older modes of existence, will use for a more inclusive common purpose.

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## Appendix A: Letter to participants' parents/guardians

BioSciences and Society Group,  
School of Communications,  
Dublin City University,  
Glasnevin,  
Dublin 9

Phone: 01 7007703  
Email: padraig.murphy@dcu.ie

Dear Parent/ Guardian,

I am a researcher based in the School of Communications in Dublin City University. I am conducting research going towards a Ph.D. on behalf of the BioSciences and Society (BSS) programme at DCU funded by the National Institute for Cellular Biotechnology (NICB). The BSS programme is involved in studies on communication between biotechnologists and the public and other scientists, as well as media coverage of biotechnology and genetics in education.

My study investigates how young people perceive new technologies using genetics and the embryo (eg cloning, human stem cell research, pre-implantation genetic diagnosis (the screening of embryos for genetic disease)) as part of their own culture and values system. SCHOOL NAME has kindly agreed to participate in this research. I will be using this school with five others as part of a study of teacher and student attitudes as well as focusing on various teaching methods that allow students express their views about biology as a concept and the applications of biotechnology. As part of this research, we would like to talk with some young people - on your consent - to share their views on the above topics as well as seeing how they learn about them within and outside school lessons. Among the activities used will be a video drama followed by discussion and a visit to the school by a biotechnology researcher. Two -to-three sessions are planned for each school in a classroom or school lab, each session being of single or double class duration. All discussion will be recorded on MiniDisc audio, and discussion will take place in the presence of the rest of the class and teacher. Follow-up interviews will be conducted with three participants individually in a public space. Some written exercise work may also be required.

All the sessions will be conducted by me, and as you can see from the enclosed documents, I have carefully considered all the ethical issues entailed. I would be at all times very vigilant as to the student's ability and willingness to participate and will respect their wishes in this accordingly. It is rare that young people get the opportunity to discuss the sensitive issues concerning genes and the embryo with researchers, and I will at all times respect their sensitivities.

Please find enclosed a copy of our standard DCU informed consent form, modified to include aspects of this research. If you have any further queries, please contact Padraig Murphy at the above details.

I am entirely grateful for your son/daughter's assistance in this research.

Yours faithfully,

---

Pádraig Murphy

## Appendix B: Informed consent form

### DUBLIN CITY UNIVERSITY RESEARCH - INFORMED CONSENT FORM

#### I. **Project Title:**

*Choosing identities: cultural and classroom perspectives on human reproductive and genetic technologies* (WORKING TITLE)

#### II. **Introduction to this study:**

Researchers and scientists working in biotechnology are currently operating in one of the most exciting but also one of the most contentious fields of science. The term 'biotechnology' is a catchall phrase for a range of manufacturing and medical processes involving living organisms or biological material. Huge advances in medicine and industry have been made in the last twenty years. But recent controversies over reproductive cloning, genetically-modified organisms (GMOs) and human embryonic stem cell research now have an added Irish dimension as new guidelines are being introduced for the regulation of these technologies here and throughout Europe. Viewpoints on whether to use or ban these technologies are often polarised and heated, particularly when raised in the media. Some people oppose technologies such as human embryo stem cell research or in vitro fertilisation (IVF) on the grounds that the human essence of the embryo is destroyed. Others have concerns about the security risks of permitting access to certain genetic information; or the threat to equality should future techniques of genetic enhancement go unregulated; or the potential threat to the environment caused by GMOs.

This study intends to explore how young people at senior level feel about these controversies. The young are often neglected in studies on people's attitudes to biotechnology despite the fact that they are our future citizens and scientists.

The research process will be an inclusive and encouraging one, where each student will express and argue points of view but will respect and learn from other perspectives.

#### III. **Purpose of this study:**

This PhD study uses methods from the social sciences to examine how young people understand concepts and technologies involving genetics and the embryo, what ethics they apply to them, and how they impact on their sense of identity. By identity, we mean how a young person makes sense of the world around them to establish who they are and where they belong. The information and tools for self-identity might come from biology (such as genetics or the human body), but it might also be derived socially (family background, friends, teachers), or from religious, civic or personal education. Ideas about how genetics might have an effect on identity might come from news items or even science fiction movies (genetic mutations leading to 'superpowers'). A person's or group's identity also influences where a position is taken on a controversial issue such as human cloning.

The study will try to make links between what young people are saying about identity and new genetic technologies, and what is being said about these matters in wider society. Connections will be made to see if the next generation use similar or different value systems when talking about the ethics of such technologies as cloning or gene therapy.

The study will explore young people's understandings and views on these matters and how this might be grounded in formal or informal education, news and entertainment media or lived experiences. Teachers, youth groups and curriculum developers will also be included in this study. This study is not however an evaluation of teaching methods or school curricula.

The participants are transition, fourth and fifth year students and their teachers in schools from a range of different backgrounds around the country and youth groups. To facilitate discussion on genetics and society, the central activity in the study is the showing one of two films: 1) *The Gift* about two generations of a family who have an inherited disease and must make decisions on the how they will deal with this disease for themselves and the next generation, using genetic screening; and 2) *If cloning could cure us* following the court case of a young scientist who attempts to use an embryo older than the permitted age limit under UK law to harvest stem cells for potential treatment for a terminally ill man. A second activity (which may only apply to schools) is a presentation given by a researcher at the National Institute for Cellular Biotechnology (NICB) at Dublin City University (DCU). Both activities will use different approaches to engage young people in how genetic technologies impact on society and the individual.

This research is being carried out by the BioSciences and Society (BSS) group, supported by the NICB. BSS is a research group situated in the School of Communications, DCU and is involved in studies on: communication and dialogue models between biotechnologists and the public and biotechnologists and other scientists; media coverage of biotechnology; and biology in education.

**IV. This research study will take place in a classroom or school laboratory with a teacher/facilitator and researcher present.**

**V. This is what will happen during the research study:**

- a) Participants will view a video/CD-ROM of either *The Gift* or *If cloning could cure us*
- b) Discussion activities will be used to debate these issues, exploring perspectives on characters' motivations in the films.
- c) Participants may be asked to review media coverage of bioscience issues and write reports on them.

**[a) to c) over two double-classes]**

- d) A scientist from DCU will visit the school and talk about his/her work.
- e) Three students from the class/group will be asked to participate in a 15-20 minute interview with the researcher.
- f) Students will be, at times, asked to fill out questionnaires or surveys.

**[d) -f) schedules and times to be negotiated with teachers]**

For the purposes of obtaining data for this study, the researcher will sometimes use audio recordings of participants' discussions, lesson activities and interviews on MiniDisc audio recorder (see VIII below for a confidentiality clause). Participants are assured that they will be notified at all times prior to recording that recording will take place. As a

participant in this study, the participant has the right not to participate in such audio recordings. The researcher will also use observation studies of classes by taking notes.

#### **VI. Risks associated with the study:**

Topics which deal with people's beliefs systems, particularly with issues of human identity and identity of the embryo, are sensitive and this study will afford the utmost regard for these sensitivities. All discussions will be mediated in a safe, open environment where respect for other viewpoints is an essential part of the process. However, participants will not be coerced if they do not want to participate in a matter that is of a sensitive nature to them.

Participants are assured that:

- Their vulnerability will be protected;
- The researcher will be sensitive to age, creed, race, colour, gender, disability, and social status. Gender, cultural and social inferences will only be made during analysis of the data after the classroom study, in full confidentiality.

There will be an obligation on the researcher to ensure that the research experience is a positive one for all participants and where there is anxiety (for reasons of apparent intrusions into private or personal worlds, or reluctance to impart knowledge), there is an obligation on the researcher to address this.

#### **VII. There may be benefits from participation in this study:**

This study will use an "advocacy, emancipatory and participatory research methodology". This means that the main focus of the research will be a rich and descriptive representation of under-represented points of view, whether they are positive or critical of the subject matter. The realities of students and teachers in a school context are emphasised at policy level. A summarised final report will be presented to the Department of Education and Science, the National Council for Curriculum Assessment (NCCA), and the National Biology Support Service (NBSS) as well as each school and youth group which participated in the study. Participation in previous DCU projects similar to this has increased the schools' visibility within the education research field.

#### **VIII. Confidentiality:**

Dublin City University will protect all the information about participants and their part in this study. Participant identity or personal information will not be revealed in this study, published or used in future studies. The study findings will form the basis for preparation of a postgraduate thesis, academic publications, conference papers and other scientific publications. The summary report will have a wider readership.

Participants are assured of:

- Anonymity - all identifiers will be removed, and participants in the study and institutions will have pseudonyms and name codes. No data will be published in the final report or subsequent papers that will reveal identity. No identifying photographs or video footage will be taken of the participants or the institution.
- Confidentiality - data is the property of each participant and will be stored in accordance with the Data Protection Act. Any data will not be shared with any



other researchers other than the BioSciences and Society Group at Dublin City University.

If third party information is required to give information on behalf of the participant, this will only be done at the request of the participant. No covert research methods or recording will be used. All participants will be informed of their participation, the purposes of the mode of research used and outcomes of the study. Where informed consent been obtained prior to aspects of the research, it will be obtained post-hoc.

**IX. If there are any questions about the research project, contact Padraig Murphy of the BioSciences and Society (BSS) group:**

Padraig Murphy is Research Assistant at BSS in DCU. He has a Master's Degree in Science Communication. The BSS is lead by Brian Trench, Senior Lecturer and Head of the School of Communications, DCU.

Contact:  
Padraig Murphy,  
School of Communications,  
Dublin City University,  
Collins Avenue,  
D9.  
01-7007703  
padraig.murphy@dcu.ie

**X. Declaration:** Taking part in this study is my decision. If I do agree to take part in the study, I may withdraw at any point. There will be no penalty if I withdraw before I have completed all stages of the study. However, once I have completed the study I will not be allowed to have my personal information and results removed from the researcher's confidential database.

**XI. Signature:**

I have read and understood the information in this form. My questions and concerns have been answered by the researcher, and I have a copy of this consent form. Therefore, I consent to take part in this research project entitled: *Choosing identities: cultural and classroom perspectives on human reproductive and genetic technologies*

**Signed:**

---

**Date:**

---

**Witness:**

---

Signature

## Appendix C: Plot synopsis of *The Gift* (© The Wellcome Trust)

### PRINCIPAL CHARACTERS

#### BARBARA KAY

Carrier of a defective copy of the gene for Friedreich's Ataxia, a genetic disorder. Mother to Annie and Ryan.

#### ANNIE KAY

A keen footballer in her teens, who inherits the genetic disorder, Friedreich's ataxia with profound consequences.

#### RYAN KAY

Annie's younger brother, who is also a carrier of the rogue gene, but not directly affected. Ryan grows up to marry Jennifer.

#### JENNIFER KAY

A radical opponent of genetic engineering, who is, however, also carrying a copy of the same rogue gene as Ryan. They have a son called Mark.

#### MARK KAY (16)

As a result of his parents' actions, Mark is clear of any genetic disorder and is now trying to make some big decisions about what to do with his life.



### TIMESPAN OF THE PLAY

The play tells the story of three generations of the Kay family. The action of the play shifts between 2025, 2010 and the present day.

### SYNOPSIS

#### Year 2028

MARK KAY (16) is at a competitive academy where he is training to become a tennis professional. It's his 16<sup>th</sup> birthday. His friends remind him that he should have received his genetic print out.

We see Mark's father, RYAN KAY (44) preparing to leave his house to visit his son on his birthday. Mark goes to ask the nurse for his genetic print out. Mark runs out of the academy and bumps into his father who is on his way to visit him. Mark has just been told that he was genetically selected and is furious with his father about this.

#### Year 1998

Ryan Kay (now aged 14) is playing football with his sister ANNIE (16), a promising footballer. Unusually, Annie falls over. Their mother, BARBARA KAY (45), who was a keen footballer in her time, comes and joins in then takes Annie inside.

Ryan and Annie are washing up, she drops a plate. Barbara phones a doctor to make an appointment for Annie. She is concerned about Annie's recent problems with balance and coordination. Ryan comes in and tells his mother he thinks it's because girls develop bosoms and that makes them fall over.

Annie collides with a player on her team and they both fall over. On the way to the doctors, Barbara tries to reassure Annie that she is just over-tired but Annie is frightened about what the results will be.

DR FISHER tells Annie that she has got Friedreich's ataxia and she will not recover. She runs out devastated. Barbara asks the doctor if Ryan will be okay. The doctor does not know. Annie runs out through the waiting room – Ryan follows her. Annie tells him that her life is over.

#### Year 2012

Ryan and his wife, JENNIFER, have decided to go for screening. They discover that they are both carriers of Friedreich's ataxia. Ryan reassures Jennifer that they can do something about it.

**Year 1998**

Annie explains recessive disorders to Ryan. She shouts at him, wanting to be left alone. Ryan is left worrying whether he too has Friedreich's ataxia.

Barbara tells Ryan that he should encourage Annie to 'do things'. He is upset that life revolves around Annie. Annie overhears the argument, she falls to the ground in fury and starts hitting herself. Barbara runs in and tries to calm her, Ryan follows. Barbara holds them both and tells them that she loves them.

**Year 2028**

Ryan is chasing after Mark. He tries to call Jennifer to talk to her about him. However he only reaches her Cybercall, an opinionated 21st century answering machine which argues with him about genetic selection.

Ryan finds Mark and begins to explain why they had to do the pre-natal selection.

**Year 2012**

Dr Burnside tries to persuade Jennifer to be tested but Jennifer is unsure - she wants a natural birth.

Ryan and Jennifer argue about genetic selection. Jennifer agrees to the testing.

**Year 2028**

Mark is upset, telling his father that he isn't who he thought he was.

**Year 1998**

Annie explains to Ryan the possibility of his inheriting the disorder. She is beginning to accept that she has it.

Ryan goes to the library and peruses the science section. Later we see him working through the library books on genetics.

Annie is trying out make-up in a shop but appears drunk. She runs out. Annie has difficulty walking along the street. An old woman looks at her disapprovingly.

Annie is struggling to come to terms with issues of her self-image, her growing disability. Ryan has decided to be tested to see if he has Friedreich's Ataxia. He practises what he is going to say to the doctor on Annie. Barbara overhears and is upset that he wants to go for testing but Annie persuades her that they should support him.

DR FLEMING refuses to test Ryan but Barbara says they will complain to the community health council.

Barbara and Ryan emerge triumphant from court. They have won the case to allow Ryan to be tested.

Ryan goes to get his results. Ryan returns home and tells his mother and sister that although he does not have Friedreich's, he is a carrier. He feels guilty that he will survive Annie. Annie persuades him that he must study genetics in order to help in the future.

**Year 2028**

Ryan explains to Mark that although he said he would choose an egg at random which did not have Friedreich's ataxia, he went further. Ryan explains that he chose the gene profile that showed high sporting ability. Mark understands why both his parents opted for selection but cannot accept that Ryan was right to choose a particular embryo. He makes his father realise that although he selected him for certain qualities, he cannot get him to think like him. He leaves his father telling him that his future is in his own hands.

## Appendix D: Plot summary of *If...Cloning could cure us* (©BBC)

It is 2014.

A climbing accident has left 28-year-old Andrew Holland paralysed from the waist down.

Celebrated researcher Dr Alex Douglas wants to inject stem cells into Andrew's spine, to regenerate his spinal cord.

If the treatment works, it could help Andrew to walk again.

However the only way that Alex can get the stem cells she needs is to break the law and to take them from a 19-day-old cloned embryo.

Her work is exposed by a whistleblower, and Alex is charged with "illegal experimentation on human embryos".

A landmark trial follows, exploring the revolutionary science and the key issues of current cloning and stem cell research.

Leading scientists and experts, such as Suzi Leather, head of the Human Fertilisation and Embryology Authority, and pro-life campaigner Josephine Quintavalle, expand on the arguments.



## Appendix E: 'Ethnomethodological' pilot interviews for students

### ICE BREAKERS/ LIKES

Now NAME there are quite a few questions, but nothing too difficult. There are no right or wrong answers, some are easily answered, some not too easy. Some questions are just general ones about your likes and dislikes. Some refer to school, family and friends. No questions are too personal. You're under no obligation to answer any questions, so let me know if you'd rather not answer. The first few questions might not seem relevant, but bear with me.

OK. "We'll start with a quick-fire round." Answer as quickly as you can. What's your favourite:

1. song;
2. movie;
3. TV programme?
4. Do you like sports?  
[If yes]
  - a. Which ones?
  - b. Who do you support?
5. What age are you?
6. What are your hobbies?
7. Give me one word that describes yourself.
8. What's your idea of heaven?

### SCHOOL

OK, now the slower round:

9. Would you say you're happy in school?
10. What subjects do you do?
11. Which is your favourite subject?
12. What would you change about school?
  
13. Describe a typical day in school (Costa, 1995).

### WORLDVIEWS/MULTIPLE WORLDS

14. Describe what you think biology is.
15. Describe what you think biotechnology is.
16. Do you think biology is powerful?
17. If something is described as 'natural,' what does that make you think about? (BIOCULT, 1998)
18. Do you ever think about biology outside of biology class?
19. How do you find science subjects in school?
  - a. What's most difficult about science?/ What do you like about science?
  - b. What's your favourite science topic [ if you have one!]

### PEERS AND BIOLOGY

20. Would biology ever come up in conversation with your friends (besides biology class)?

21. Do your friends do biology?

### FORMAL LEARNING (1)

22. What do you think about people like us coming in and giving talks, presentations etc about biotechnology and society?  
a. What did you think of the video in class about genetics?  
b. What did you think of the biotechnology researcher?
23. Is biology a good subject for these kind of activities or would it suit other subjects better?
24. What would you change about the biology subject?
25. Do researchers or outside speakers often come in to other classes or do you go on field trips for any subjects?

### PEERS AND COMMUNITY

26. Describe your group of friends in one word.
27. Do you prefer large group of friends or smaller group of friends?
28. Would you go out more than once a week?
29. Do you do any paid work outside of school hours?
30. Do you do any community/ charity work as an individual? With the school?
31. What do you think of \_\_\_\_\_PLACE NAME\_\_\_\_\_?

### FAMILY/ BELIEFS

32. How many are in your family?
33. Are your family in good health?
34. How far do you have to travel to school?  
You may not know, or want to answer, the following:
35. What are your parents' / guardians' occupations?
36. What's their religion?
37. Would you consider them religious?
38. Would you consider yourself religious?
39. Do you do religion in school?  
a. [If yes] Are there any other subjects that the religion L.C. subject might cross over into?
40. Do you know how your parents vote?
41. Can you very briefly give me an example of a "magic moment", something that happened at home, that sticks in your memory?

### EXPECTATIONS

42. Would your parents/ guardians encourage you more about doing some school subjects than others?  
a. Which ones?  
b. Would they help you with homework?
43. What plans have you after you have completed the Leaving Certificate?

### INFORMAL LEARNING

44. When you're watching \_\_\_\_\_ have you ever thought "I'm learning more watching this than in school."
45. Has it happened with any (other) programme?
  - a. [If yes] When was that?
46. What TV programmes do you watch has biology/science in them?
47. What material containing biology do you read outside of school?
48. Any material containing biology you've come across on the web that interests you?

#### **FORMAL LEARNING (2)**

49. Why are you doing biology?
50. Do you find it useful?
51. Can you think of any other school subjects that might contain biology or biology-related information?

#### **BIOLOGY, IDENTITY, SOCIETY, CULTURE**

52. During the discussions after the video where everyone took positions on the floor in agreement or disagreement with statements I called out, you tended to:
  - [either]
  - agree with statements that supported the use of pre-implantation genetic diagnosis in most cases
  - [or]
  - remain neutral on the use of pre-implantation genetic diagnosis
  - [or]
  - agree with statements that did not support use of pre-implantation genetic diagnosis except in exceptional cases
 Would you like to comment on this?
53. Teachers and researchers often say that students do not appreciate the importance of science in our lives. Do you think this is justified?
54. Do you think the film was far-fetched in showing a person being cloned/ selected at embryo stage to screen for disease and characteristics?

## Appendix F: 'Active' interviews for students

What defines you?  
stories

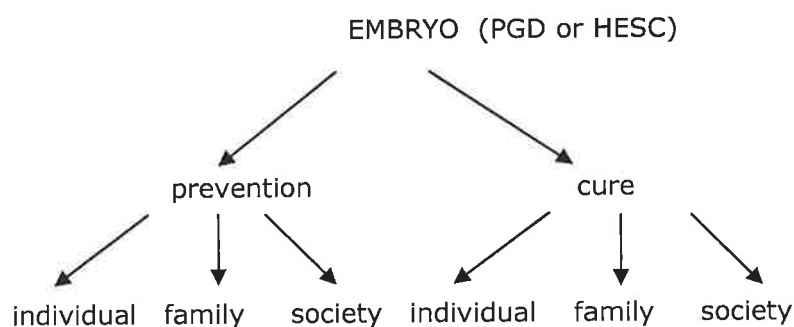
What do you like?

Why this school subject?      values, norms, beliefs,  
expectations, conventional  
actions

Who are your:  
family   friends   teachers  
identity

embedded in

peers  
role models?  
representations



What if you were: Mark / Jennifer / Ryan / Doctor | Alex / Harry / Chechnyan

How would you feel about *being a result of*  
*benefiting from* these  
technologies?

Would you think or feel differently if you knew more about the science?  
Where have you heard about this before?  
Remind you of someone/something?

**contradictions** -connections and separations

**Science themes**    content, process, social      sci-fi, am I learning?

### Value themes

Identifications of self;

subcultures

Globalised identity: 'contract' ['client'/'audience'] ⇔ choice; commodification  
lifestyles

power/empowerment    control    freedom    trust

'abstract systems'

life politics

authenticity [self-actualisation, finding the real *me*];

transcendence [questions about finitude]



identification with others, society

**Moral frameworks**

**what's NOT being said**

## Appendix G: Science teacher questionnaire

SCHOOL CODE \_\_\_\_\_

M/F \_\_\_\_\_

### BACKGROUND

1. Where are you originally from?
2. Where were you educated?
3. Why did you become a teacher?
4. Why science?
  - a. Why biology?
5. What are your hobbies and interests?
6. What religious denomination are you if any?

### CURRICULUM

7. What other subjects do you teach?
8. Do you teach..... Junior Cycle?  TY?  Senior Cycle?
9. How many classes do you teach per week?
10. Of those, how many are practical ?
11. Are you happy with the biology subject?
  - a. What would you do to change it?
12. What questions would students ask not necessarily covered in biology that would cross into the domain of other school subjects?
  - a. What subjects?
  - b. How do you deal with these questions?
13. Would students ever ask questions about reproductive technologies (eg stem cell research, IVF, cloning, pre-implantation diagnosis)?
  - a. Would you cover these topics without students' questions?
  - b. What biology topics would prompt such as discussion?
  - c. How easy would it be to facilitate a discussion around reproductive technology in biology class?
14. How easy would it be to incorporate a cross-curricular perspective ie ask other teachers to deal with specialist subjects such as science and society in biology class or allow biology students to go to other subjects such as religious or social education class ?
  - a. Would the school admin structure allow for this?
15. Have external speakers ever been in biology class to work with students?
  - a. What have they done?
  - b. What about other subjects, that you're aware of?
  - c. How easy would it be to allow other speakers to interact with students and teachers in class?
  - d. Would the school admin structure allow for this?
  - e. How would resource materials from other institutions benefit your biology class? (eg Industry, third level)
  - f. How would visits to other institutions benefit your biology class?

16. How relevant do you think biology is to students' lives?

**IDENTITY AND DIFFERENT STUDENT WORLDS**

17. Is it always easy to recognise those who are alienated from science?  
 a. What steps would you take with someone who feels alienated from science?
18. Could you give examples of where students have demonstrated knowledge or ideas about biology or biotechnology that would have been learned from outside of class (eg newspapers, games, TV, movies, word-of-mouth)?
19. In what way would the notion of identity ever be looked at in biology class from a biological/scientific perspective (eg race, genetics, Social Darwinism, evolution, 'humans-as -machines/animals', status of the embryo etc)?

**MEDIA**

20. Would you engage in any science material in any other media outside of school?
21. Would you use any types of media (TV, newspaper, video, audio) in biology class?

|  |  |
|--|--|
| TYPE OF LEARNING   |  |
| Science books  |  |
| Talk or demonstration from a research scientist  |  |
| Documentaries  |  |
| Other teachers   |  |
| Scientific papers, magazines or journals eg <i>New Scientist</i> , <i>Journal of Biology</i>   |  |
| Friends, family or community - conversations with peers about medical care, local science event or local research, or community information eg museums, awareness groups |  |
| Films  |  |
| Newspapers   |  |
| World Wide Web and computer packages   |  |
| Other  |  |

**COMMUNITY /PEER/ FAMILY**

22. How often would you have contact with students' parents or guardians?

**WORLDVIEWS/ WIDER SOCIETY AND FUTURE HUMANITY**

23. [*The Gift* showed a scenario where it was possible to predetermine, to a small extent, the destiny and identity of a son or daughter through embryo selection, based on physical characteristics such as sex and predisposition to sporting ability.]

or

[*If.. cloning could cure us* showed a scenario where a 19-day old embryo was used to research the possibility of developing stem cells for the regeneration of spinal chord tissue for the victim of a climbing accident.]

What are your views on this controversial topic?

- a. Would your views on experimentation on embryos or the use of embryos for biotechnology be brought into biology class?
  - b. Do you think the events portrayed in the film are a plausible scenario?
  - c. What would you consider a solution to the controversy surrounding this issue?
24. Teachers and researchers often say that students do not appreciate the importance of science in our lives. Do you think this is justified?

### **SCHOOL CULTURE vs SCIENCE SUBCULTURE**

25. How close to either pure science (that is scientific research to advance knowledge) and applied science (science applied to find a cure or for a commercial need) do you think school biology is?

### **THE SCIENCE OF LIFE PROGRAMME**

26. What do you think about people like us coming in and giving talks, presentations etc about biotechnology and society?
- a. What did you think of the video in class about genetics?
  - b. What did you think of the biotechnology researcher?
  - c. Would you use any of these methods in future?
  - d. Give me an example of how these topics eg stem cell research PGD, cloning would be discussed in future

## Appendix H: Religion teacher questionnaire

SCHOOL CODE \_\_\_\_\_

M/F \_\_\_\_\_

27. Where are you originally from? \_\_\_\_\_  
28. Where were you educated? \_\_\_\_\_  
29. Why did you become a teacher? \_\_\_\_\_

30. What other subjects do you teach? \_\_\_\_\_  
31. Why religion? \_\_\_\_\_

32. What are your hobbies and interests? \_\_\_\_\_

33. What is your subject (s)? \_\_\_\_\_ Religion \_\_\_\_\_

34. Is it a leaving certificate subject? \_\_\_\_\_

35. How many classes are there per week? \_\_\_\_\_

36. What elements of Religious Education deal with
- science ?
  - biology?

37. Do students ask questions that cross into the biology domain?

a. What questions?

b. How do you deal with these questions?

38. How easy would it be to facilitate a discussion around biology in RE class

39. How easy would it be to incorporate a cross-curricular perspective ie ask other teachers to deal with specialist subjects in RE class or allow RE students to go to other subjects during RE class ?

40. Have external speakers have ever been in RE class to work with students?

What have they done?

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a. What about other subjects?

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b. How easy would it be to allow other speakers to interact with students and teachers in class?

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c. How would you benefit from resource materials from other institutions?

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41. How relevant do you think RE is to the students' lives?

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42. How is identity dealt with in the curriculum?

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43. In what way would the notion of identity ever be looked in class at from a biological/scientific perspective (eg race, genetics, Social Darwinism, evolution, 'humans-as -machines/animals', status of the embryo etc)?

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## Appendix I: Social education teacher questionnaire

SCHOOL CODE \_\_\_\_\_

M/F \_\_\_\_\_

44. Where are you originally from? \_\_\_\_\_  
45. Where were you educated? \_\_\_\_\_  
46. Why did you become a teacher? \_\_\_\_\_

47. What other subjects do you teach? \_\_\_\_\_

48. Why are you teaching SocEd? \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

49. What are your hobbies and interests? \_\_\_\_\_

50. What is your subject? \_\_\_\_\_

51. Is it a leaving certificate subject? \_\_\_\_\_

52. What other subjects do you teach? \_\_\_\_\_

53. How many classes of Soc Ed are there per week? \_\_\_\_\_

54. What elements of \_\_\_\_\_ deal with

- science?
- biology?

55. Do students ask questions that cross into the biology domain?  
\_\_\_\_\_  
\_\_\_\_\_

a. What questions?  
\_\_\_\_\_  
\_\_\_\_\_

b. How do you deal with these questions?  
\_\_\_\_\_  
\_\_\_\_\_

56. How easy would it be to facilitate a discussion around biology in SE class  
\_\_\_\_\_  
\_\_\_\_\_

57. How easy would it be to incorporate a cross-curricular perspective ie ask other teachers to deal with specialist subjects in SE class or allow SE students to go to other subjects during SE class ?  
\_\_\_\_\_  
\_\_\_\_\_

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58. Have external speakers have ever been in SE class to work with students?  
a. What have they done?

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b. What about other subjects?

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c. How easy would it be to allow other speakers to interact with students and teachers in class?

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d. How would you benefit from resource materials from other institutions?

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59. Why do you think SE is relevant to students' lives?

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60. How is identity dealt with in the curriculum?

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61. In what way would the notion of identity ever be looked in class at from a biological/scientific perspective (eg race, genetics, Social Darwinism, evolution, 'humans-as -machines/animals', status of the embryo etc)?

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## Appendix J: LH Film Discussion Survey Results

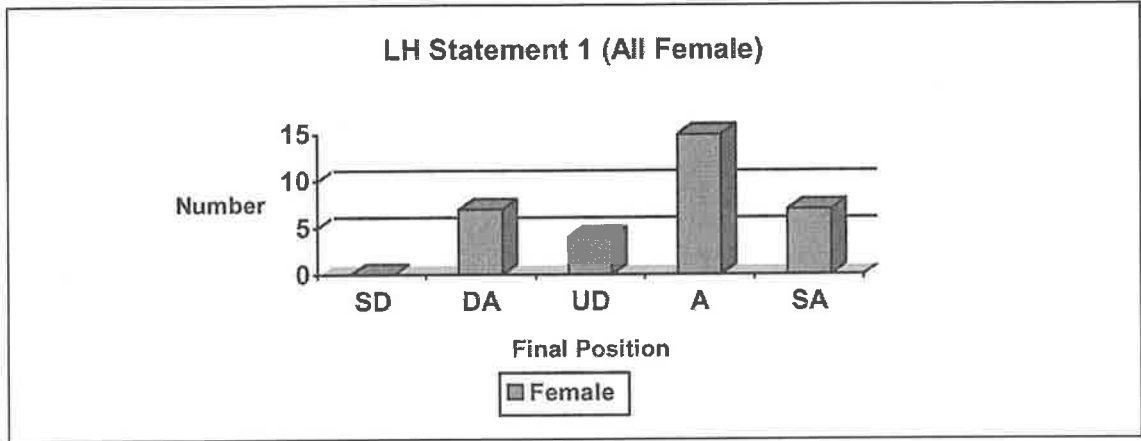
*(If ... cloning could cure us)*

KEY: Total = 33 (All F)  
 SD Strongly disagree  
 DA Disagree  
 UD Undecided  
 A Agree  
 SA Strongly agree  
 (A-SA), (UD-DA), etc Change of position from A to SA, UD to DA etc

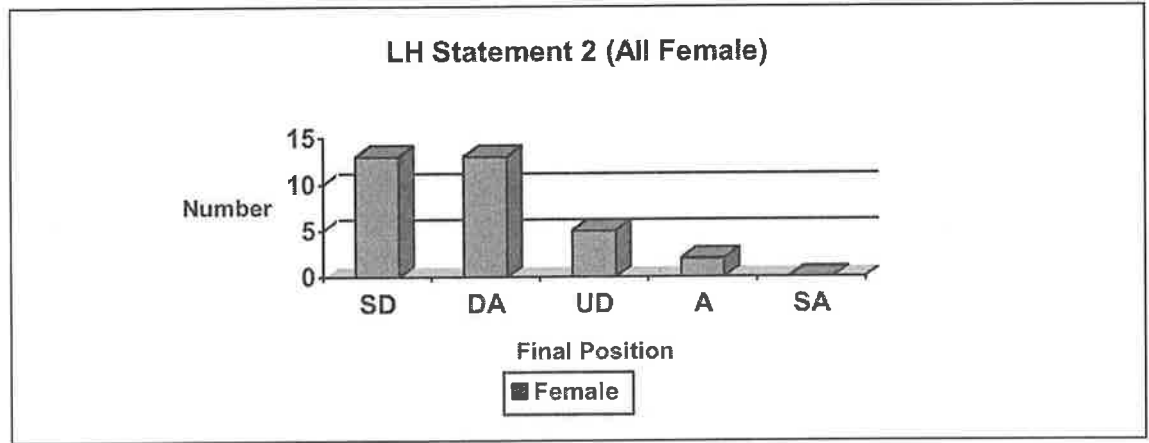
Student:

1.

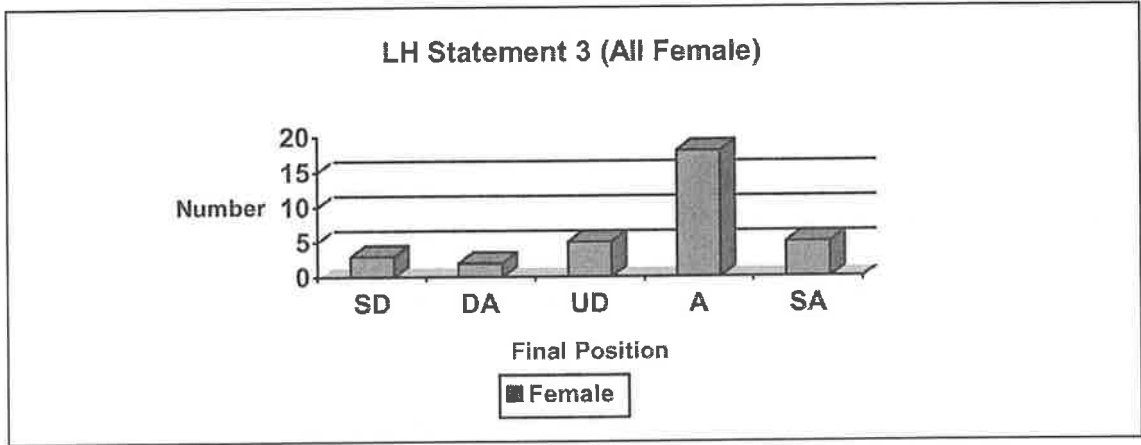
|      |                  |   |                              |      |    |
|------|------------------|---|------------------------------|------|----|
|      |                  |   |                              | SA   | 1  |
|      |                  |   | A                            |      | 2  |
|      |                  |   |                              | SA   | 3  |
|      |                  |   | A                            |      | 4  |
|      |                  | (UD)                                      | A                            |      | 5  |
|      |                  |   | (A)                          | SA   | 6  |
|      |                  | UD  |                              |      | 7  |
|      | DA               |   |                              |      | 8  |
|      | DA               | (UD)                                      |                              |      | 9  |
|      | (DA)             |   | A                            |      | 10 |
|      |                  |   | A                            |      | 11 |
|      |                  |   |                              | SA   | 12 |
|      |                  | UD  |                              |      | 13 |
|      | DA               |   |                              |      | 14 |
|      |                  | UD  |                              |      | 15 |
|      | DA               |   |                              |      | 16 |
|      |                  | (UD)                                      |                              | SA   | 17 |
|      | DA               | (UD)                                      | A                            |      | 18 |
|      |                  | UD  |                              |      | 19 |
|      |                  |   |                              | SA   | 20 |
|      |                  |   | A                            |      | 21 |
|      |                  | (UD)                                      | A                            |      | 22 |
|      |                  |   | A                            |      | 23 |
|      |                  |   | A                            |      | 24 |
|      | DA               |   |                              |      | 25 |
|      |                  |   | A                            |      | 26 |
|      | DA               | (UD)                                      |                              | SA   | 27 |
|      |                  |   |                              |      | 28 |
|      |                  |   | A                            |      | 29 |
|      |                  |   | A                            |      | 30 |
|      |                  |   | A                            |      | 31 |
|      |                  |   | A                            |      | 32 |
|      |                  |   | A                            |      | 33 |
| SD=0 | DA=7<br>(DA-A)=1 | UD=4<br>(UD-DA)=2<br>(UD-A)=2<br>(UD-D)=1 | A=15<br>(A-UD)=1<br>(A-SA)=1 | SA=7 |    |
|      |                  |   | Total changes=8              |      |    |



|       |    |           |           |          |                   |
|-------|----|-----------|-----------|----------|-------------------|
| 2.    | SD |           |           |          | 1                 |
|       |    | DA        |           |          | 2                 |
|       |    | DA        |           |          | 3                 |
|       |    | DA        |           |          | 4                 |
|       |    | DA        |           |          | 5                 |
|       | SD |           | (UD)      |          | 6                 |
|       |    | DA        |           |          | 7                 |
|       |    |           |           | A        | 8                 |
|       |    | DA        |           |          | 9                 |
|       |    |           | UD        | (A)      | 10                |
|       |    | DA        |           |          | 11                |
|       |    | DA        |           |          | 12                |
|       |    | DA        |           |          | 13                |
|       | SD |           |           |          | 14                |
|       | SD |           |           |          | 15                |
|       |    |           | UD        |          | 16                |
|       | SD | (DA)      |           |          | 17                |
|       |    |           | UD        |          | 18                |
|       | SD |           |           |          | 19                |
|       |    | DA        |           |          | 20                |
|       | SD |           |           |          | 21                |
|       | SD |           |           |          | 22                |
|       |    | DA        |           |          | 23                |
|       | SD |           |           |          | 24                |
|       |    |           |           | A        | 25                |
|       |    | DA        |           |          | 26                |
|       | SD |           |           |          | 27                |
|       |    |           | UD        |          | 28                |
|       |    |           | UD        |          | 29                |
|       | SD |           |           |          | 30                |
|       | SD |           |           |          | 31                |
|       | SD |           |           |          | 32                |
|       |    | DA        |           |          | 33                |
| SD=13 |    | DA=13     | UD=5      | A=2      | SA=0              |
|       |    | (DA-SD)=1 | (UD-SD)=1 | (A-UD)=1 |                   |
|       |    |           |           |          | Total changes = 3 |



|      |                  |                   |    |  |  |                  |   |      |
|------|------------------|-------------------|----|--|--|------------------|---|------|
| 3.   | SD               |                   |    |  |  |                  |   | 1    |
|      |                  |                   |    |  |  |                  | A | 2    |
|      | SD               |                   |    |  |  |                  |   | 3    |
|      |                  |                   |    |  |  |                  |   | 4    |
|      |                  |                   |    |  |  | SA               |   | 5    |
|      |                  |                   |    |  |  |                  | A | 6    |
|      |                  |                   |    |  |  |                  | A | 7    |
|      |                  |                   |    |  |  |                  | A | 8    |
|      |                  |                   |    |  |  |                  | A | 9    |
|      |                  |                   |    |  |  |                  | A | 10   |
|      |                  |                   |    |  |  |                  | A | 11   |
|      |                  |                   |    |  |  |                  | A | 12   |
|      |                  |                   | UD |  |  |                  |   | 13   |
|      |                  |                   |    |  |  |                  |   | 14   |
|      |                  |                   |    |  |  | SA               |   | 15   |
|      |                  |                   |    |  |  |                  | A | 16   |
|      |                  |                   |    |  |  | SA               |   | 17   |
|      | DA               |                   |    |  |  |                  |   | 18   |
|      |                  |                   |    |  |  |                  | A | 19   |
|      | (DA)             | UD                |    |  |  |                  |   | 20   |
|      |                  | UD                |    |  |  |                  |   | 21   |
|      | DA               | (UD)              |    |  |  |                  |   | 22   |
|      |                  |                   |    |  |  | SA               |   | 23   |
|      |                  |                   |    |  |  |                  | A | 24   |
|      |                  |                   | UD |  |  |                  |   | 25   |
|      |                  |                   |    |  |  |                  | A | 26   |
|      | SD               |                   | UD |  |  |                  |   | 27   |
|      |                  |                   |    |  |  |                  | A | 28   |
|      |                  |                   |    |  |  |                  | A | 29   |
|      |                  |                   |    |  |  |                  | A | 30   |
|      |                  |                   |    |  |  |                  | A | 31   |
|      |                  |                   |    |  |  |                  | A | 32   |
|      |                  |                   |    |  |  | SA               |   | 33   |
| SD=3 | DA=2<br>(DAUD)=1 | UD=5<br>(UD-DA)=1 |    |  |  | A=18             |   | SA=5 |
|      |                  |                   |    |  |  | Total changes =2 |   |      |



4.

|     |    |    |
|-----|----|----|
|     | SA | 1  |
|     |    | 2  |
| A   | SA | 3  |
|     | SA | 4  |
|     |    | 5  |
| A   | SA | 6  |
|     | SA | 7  |
|     | SA | 8  |
|     | SA | 9  |
|     | SA | 10 |
|     | SA | 11 |
|     | SA | 12 |
|     |    | 13 |
| A   | SA | 14 |
|     | SA | 15 |
|     |    | 16 |
| A   | SA | 17 |
| (A) | SA | 18 |
|     | SA | 19 |
|     |    | 20 |
| A   | SA | 21 |
|     | SA | 22 |
|     |    | 23 |
| (A) | SA | 24 |
|     | SA | 25 |
|     | SA | 26 |
|     | SA | 27 |
|     |    | 28 |
| A   | SA | 29 |
|     | SA | 30 |
|     | SA | 31 |
|     | SA | 32 |
|     | SA | 33 |

SD= 0

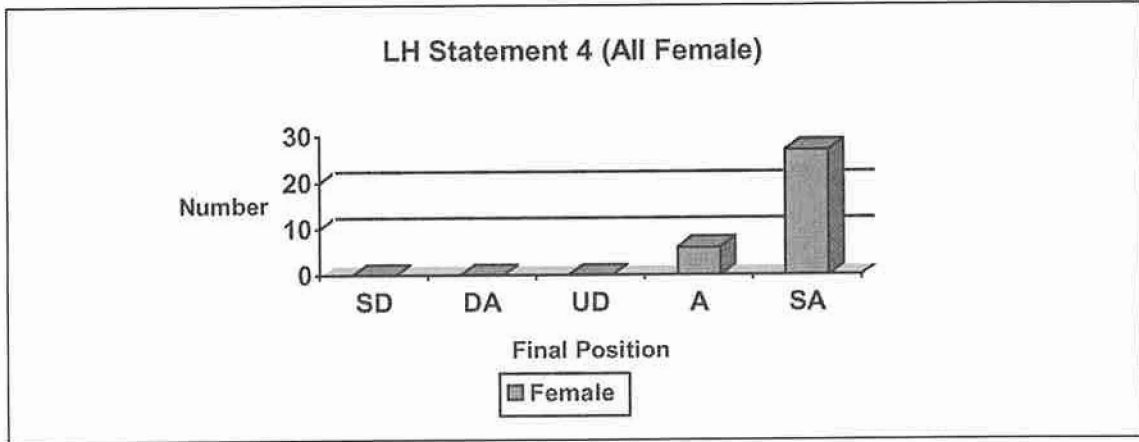
DA=0

UD=0

A=6  
(A-SA)=2

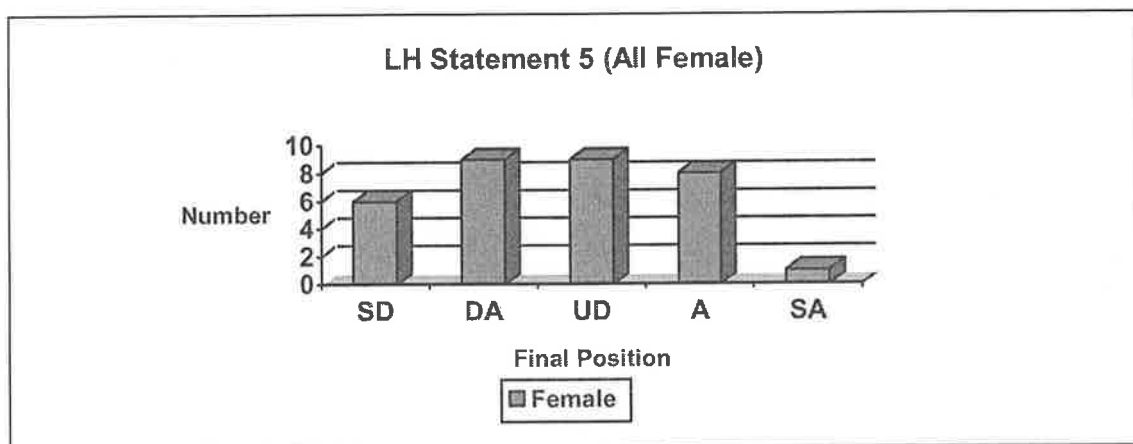
SA=27

Total changes =2



|    |    |      |      |     |    |    |
|----|----|------|------|-----|----|----|
| 5. | SD |      |      |     |    | 1  |
|    |    |      | UD   |     |    | 2  |
|    | SD |      |      |     |    | 3  |
|    |    | DA   |      |     |    | 4  |
|    |    |      |      | A   |    | 5  |
|    |    |      |      | A   |    | 6  |
|    |    |      | UD   |     |    | 7  |
|    |    | DA   |      |     |    | 8  |
|    |    |      |      | A   |    | 9  |
|    |    | DA   |      |     |    | 10 |
|    |    | DA   |      |     |    | 11 |
|    |    | DA   |      |     |    | 12 |
|    |    |      | UD   |     |    | 13 |
|    |    |      |      | A   |    | 14 |
|    |    |      | UD   |     |    | 15 |
|    |    |      |      |     | SA | 16 |
|    |    | DA   |      |     |    | 17 |
|    |    | DA   |      | (A) |    | 18 |
|    |    | DA   |      |     |    | 19 |
|    |    |      | UD   |     |    | 20 |
|    | SD |      |      |     |    | 21 |
|    |    |      | UD   |     |    | 22 |
|    |    |      |      | A   |    | 23 |
|    | SD |      |      |     |    | 24 |
|    |    |      | (UD) | A   |    | 25 |
|    |    |      | UD   |     |    | 26 |
|    | SD |      |      |     |    | 27 |
|    |    |      |      | A   |    | 28 |
|    | SD | (DA) |      |     |    | 29 |
|    |    | DA   |      |     |    | 30 |
|    |    |      |      | A   |    | 31 |
|    |    |      | UD   |     |    | 32 |
|    |    |      | UD   |     |    | 33 |

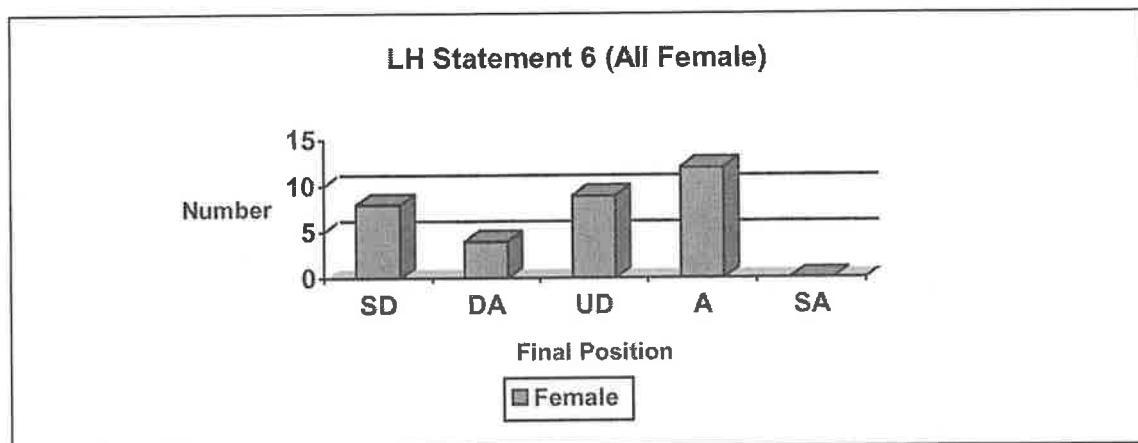
SD=6      DA=9      UD=9      A=8      SA=1  
 (DA-SD)=1      (UD-A)=1      (A-DA)=1  
 Total changes =3



|    |      |          |          |      |      |
|----|------|----------|----------|------|------|
| 6. | SD   |          |          |      | 1    |
|    |      | DA       |          |      | 2    |
|    | SD   |          |          |      | 3    |
|    | SD   |          |          |      | 4    |
|    |      | DA       |          |      | 5    |
|    |      |          | (UD)     | A    | 6    |
|    |      |          |          | A    | 7    |
|    |      |          |          | A    | 8    |
|    |      |          | (UD)     | A    | 9    |
|    |      |          |          | A    | 10   |
|    |      |          | UD       |      | 11   |
|    | SD   |          |          | A    | 12   |
|    |      |          |          | A    | 13   |
|    |      |          | UD       |      | 14   |
|    |      |          |          | A    | 15   |
|    | SD   |          |          |      | 16   |
|    |      |          | UD       |      | 17   |
|    |      | DA       | (UD)     |      | 18   |
|    |      |          | UD       |      | 19   |
|    | SD   |          |          |      | 20   |
|    |      |          |          | A    | 21   |
|    |      |          | UD       |      | 22   |
|    |      |          | UD       |      | 23   |
|    |      | (DA)     |          | A    | 24   |
|    |      |          | UD       |      | 25   |
|    | SD   |          |          |      | 26   |
|    |      |          | UD       |      | 27   |
|    | SD   |          |          |      | 28   |
|    |      |          | UD       |      | 29   |
|    |      | DA       |          |      | 30   |
|    |      |          | (UD)     | A    | 31   |
|    |      |          |          | A    | 32   |
|    |      |          |          |      | 33   |
|    | SD=8 | DA=4     | UD=9     | A=12 | SA=0 |
|    |      | (DA-A)=1 | (UD-A)=3 |      |      |

(UD-DA)=1

Total changes =5



7.

|    |      |   |     |    |    |
|----|------|---|-----|----|----|
|    |      |   |     | SA | 1  |
|    |      |   |     | SA | 2  |
|    |      |   |     | SA | 3  |
| DA |      |   |     |    | 4  |
|    | (UD) |   | A   |    | 5  |
|    |      |   | (A) | SA | 6  |
|    |      |   | A   |    | 7  |
| DA |      |   |     |    | 8  |
|    |      |   |     | SA | 9  |
|    |      |   |     | SA | 10 |
| DA |      |   | (A) |    | 11 |
|    | UD   |   | (A) |    | 12 |
|    |      | A |     | 13 |    |
|    |      |   |     | SA | 14 |
|    | UD   |   | (A) |    | 15 |
| DA |      |   |     |    | 16 |
|    |      |   | A   |    | 17 |
|    |      |   | (A) | SA | 18 |
| DA |      |   |     |    | 19 |
|    |      |   |     | SA | 20 |
|    |      |   |     | SA | 21 |
|    |      |   |     | SA | 22 |
| DA |      |   |     |    | 23 |
|    | UD   |   |     |    | 24 |
|    |      |   |     | SA | 25 |
|    |      |   |     | SA | 26 |
|    |      |   |     | SA | 27 |
|    |      |   | A   |    | 28 |
|    |      |   |     | SA | 29 |
|    |      |   | A   |    | 30 |
|    |      |   |     | SA | 31 |
|    |      |   | A   |    | 32 |
|    |      |   | A   |    | 33 |

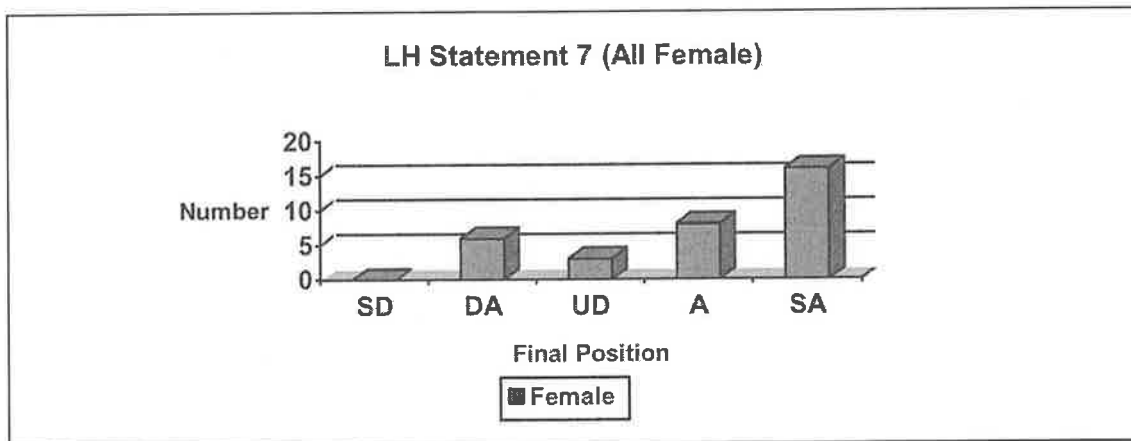
SD=0

DA=6

UD=3  
(UD-A)=1

A=8

SA=16  
(A-UD)=2  
(A-SA)=2  
(A-DA)=1  
Total changes =6

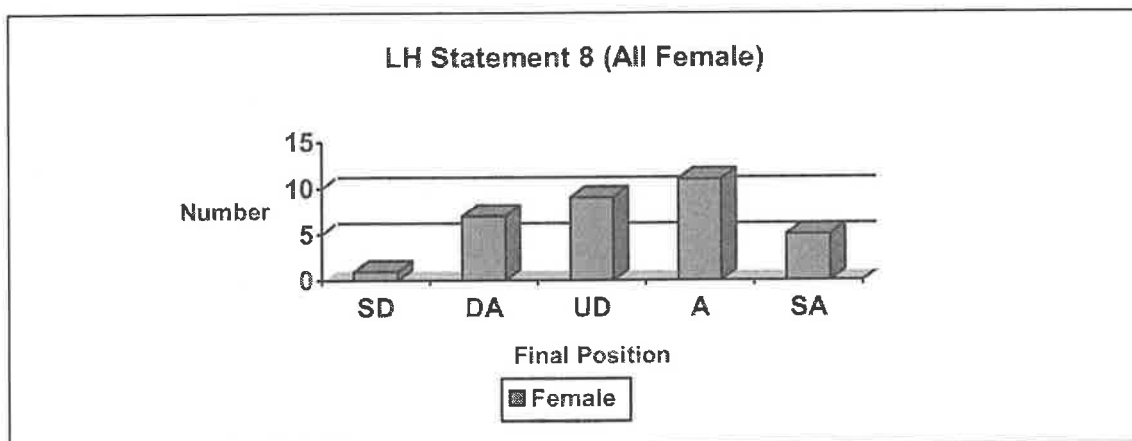


8.

|    |    |      |     |    |    |
|----|----|------|-----|----|----|
|    |    |      |     | SA | 1  |
|    |    | UD   |     |    | 2  |
|    |    |      |     | SA | 3  |
|    |    | UD   | (A) |    | 4  |
|    |    |      | A   |    | 5  |
|    |    |      | A   |    | 6  |
|    |    |      | A   |    | 7  |
|    | DA |      |     |    | 8  |
|    |    | UD   |     |    | 9  |
|    |    |      |     | SA | 10 |
|    |    |      | A   |    | 11 |
|    | DA | (UD) |     |    | 12 |
|    |    |      | A   |    | 13 |
|    | DA |      |     |    | 14 |
|    |    | UD   |     |    | 15 |
|    | DA |      |     |    | 16 |
|    |    |      | A   |    | 17 |
|    |    | UD   |     |    | 18 |
|    | DA |      |     |    | 19 |
|    |    |      | A   |    | 20 |
|    |    |      |     | SA | 21 |
| SA |    |      |     |    | 22 |
|    | DA | (UD) |     |    | 23 |
|    |    | UD   |     |    | 24 |
|    | DA |      |     |    | 25 |
|    |    | UD   |     |    | 26 |
|    |    |      |     | SA | 27 |
|    |    | UD   |     |    | 28 |
|    |    |      | A   |    | 29 |
|    |    |      | A   |    | 30 |



|      |      |      |           |                  |      |
|------|------|------|-----------|------------------|------|
|      |      |      | UD        | A                | 31   |
|      |      |      |           | A                | 32   |
|      |      |      |           | A                | 33   |
| SA=1 | DA=7 | UD=9 | (UD-DA)=2 | A=11             | SA=5 |
|      |      |      |           | (A-UD)=1         |      |
|      |      |      |           | Total changes =3 |      |



\*\*\*\*\*

**Highest agreement: SA= 27**

- (4) ALEX should have told ANDREW before proceeding with the research that there might be health risks after treatment.  
SA=16 A=8
- (7) ALEX should have checked where the eggs came from.  
A=18 SA=5
- (3) ALEX'S LAWYER is right to argue for the "defence of necessity", that is, ALEX acted in good faith to protect the life of her patient.  
A=15 SA=7
- (1) DR. McVEIGH, the main witness for the prosecution, was right to argue that a 19 day old embryo should not be used for stem cell research because a legal limit needs to be applied somewhere.  
A=12 SA=0
- (6) ALEX was right to go ahead, despite the illegality of the procedure.  
A=11 SA=5
- (8) DR. YAMA, for the prosecution, was right to say that the technology that ALEX is advocating is bad for humankind.

**Highest disagreement: SD=13 DA=13**

- (2) ANDREW has less right to treatment from such controversial technologies than the young girl in the video disk with diabetes.  
SD=8 DA=4
- (6) In treating ANDREW, ALEX was only doing what was best for him.

SD=6 DA=9

- (5) In treating ANDREW, ALEX was only doing what was best for him.

**Highest indecisive: UD=9**

- (5) In treating ANDREW, ALEX was only doing what was best for him.  
(6) ALEX was right to go ahead, despite the illegality of the procedure.  
(8) DR. YAMA, for the prosecution, was right to say that the technology that ALEX is advocating is bad for humankind.

**Total no. change of mind: 29** out of a possible 264 (33 students x 8 stmts)

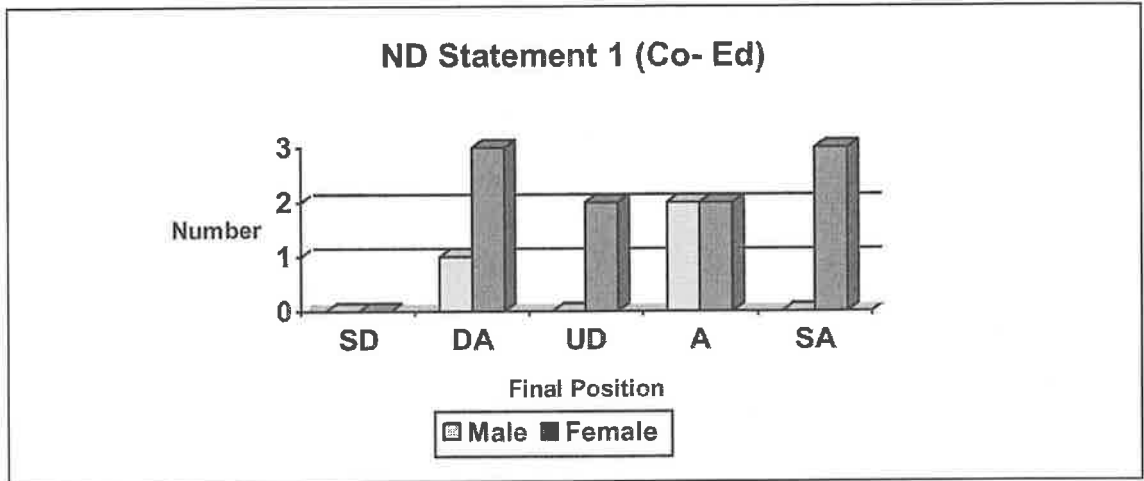
## Appendix K: ND Film Discussion Survey Results

(*The Gift*)

KEY: Total =13 (10 F +3 M)  
 SD Strongly disagree  
 DA Disagree  
 UD Undecided  
 A Agree  
 SA Strongly agree  
 (A-SA), (UD-DA), etc Change of position from A to SA, UD to DA etc

| Student: |    |    |    |   |    |     |    |  |    |
|----------|----|----|----|---|----|-----|----|--|----|
|          | 1. | SA |    |   |    |     |    |  | 1  |
|          |    | F  |    |   |    |     |    |  | 2  |
|          |    |    | DA |   |    |     |    |  | 3  |
|          |    |    | F  |   |    |     |    |  | 4  |
|          |    |    | DA |   |    |     |    |  | 5  |
| F        |    |    |    |   |    |     |    |  | 6  |
|          |    |    | DA |   |    |     |    |  | 7  |
| M        |    |    |    |   |    |     |    |  | 8  |
|          |    |    |    |   | UD |     |    |  | 9  |
|          |    |    |    | F |    |     |    |  | 10 |
|          |    |    |    |   |    | (A) | SA |  | 11 |
|          |    |    |    |   |    | F   |    |  | 12 |
|          |    |    |    |   |    | A   |    |  | 13 |
|          |    |    |    |   |    | F   |    |  | 14 |
|          |    |    |    |   | UD |     |    |  | 15 |
| F        |    |    |    |   |    |     |    |  | 16 |
|          |    |    | DA |   |    |     |    |  | 17 |
| F        |    |    |    |   |    |     |    |  | 18 |
|          |    |    |    |   |    | A   |    |  | 19 |
| M        |    |    |    |   |    | A   |    |  | 20 |
|          |    |    |    |   |    |     |    |  | 21 |
| M        |    |    |    |   |    |     |    |  | 22 |
|          |    |    |    |   |    |     | SA |  | 23 |
| F        |    |    |    |   |    |     |    |  | 24 |
|          |    |    |    |   |    | A   |    |  | 25 |
| F        |    |    |    |   |    |     |    |  | 26 |

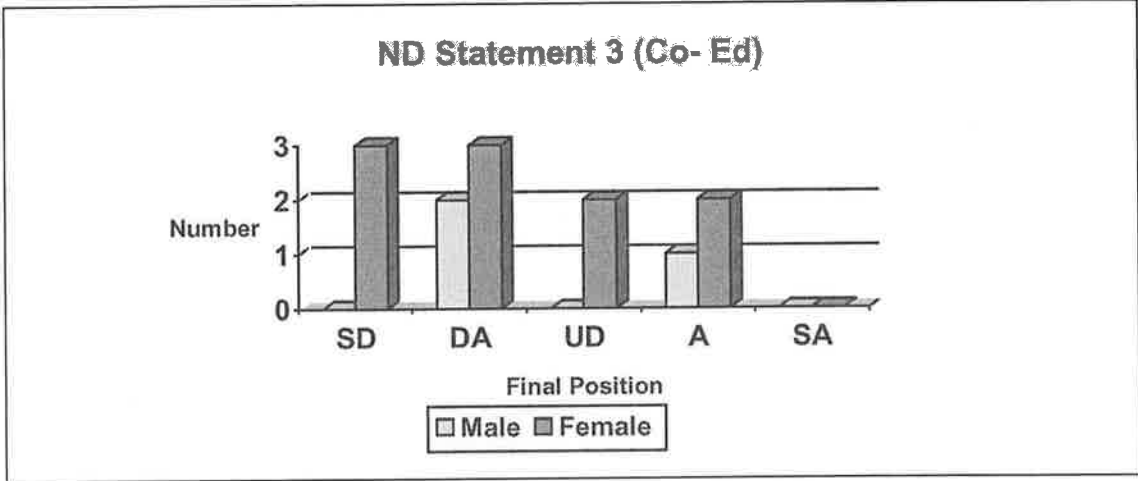
SD=0    DA=4 (3F, 1M)    UD=2 (F)    A=4 (2, 2)    SA=3(F)  
 (A-SA)=1(F)



|    |   |    |   |    |     |
|----|---|----|---|----|-----|
| 2. |   |    |   | SA | 1   |
|    | F |    |   |    | 2 F |
|    |   | UD |   |    | 3 F |
|    |   |    | A | SA | 4   |
|    | M |    |   | SA | 5 F |
|    |   |    |   | SA | 6 F |
|    |   |    |   | SA | 7 F |
|    |   |    |   | SA | 8 F |
|    |   |    |   | SA | 9 F |
|    |   |    |   | SA | 10  |
| M  |   |    |   | SA | 11  |
| M  |   |    |   | SA | 12  |
| F  |   |    |   | SA | 13  |
| F  |   |    |   |    |     |

SD=0    DA=0            UD=1(F)    A=1 (F)            SA=11(8F,3M)

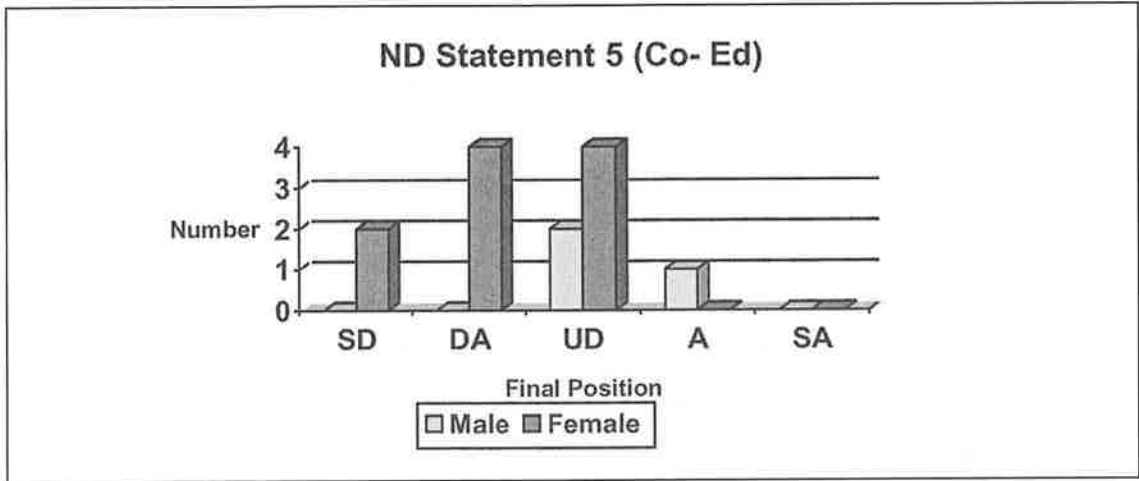




|    |    |    |    |    |
|----|----|----|----|----|
| 4. | SD |    |    | 1  |
|    | F  |    |    |    |
|    |    |    | UD | 2  |
|    |    | F  |    |    |
|    |    | DA |    | 3  |
| F  |    | DA |    | 4  |
| M  | SD |    |    | 5  |
| F  | SD |    |    | 6  |
| F  | SD |    |    | 7  |
| F  | SD |    |    | 8  |
| F  | SD |    |    | 9  |
| F  |    | DA |    | 10 |
| M  |    | DA |    | 11 |
| M  | SD |    |    | 12 |
| F  | SD |    |    | 13 |
| F  |    |    |    |    |

SD= 8 (F)      DA=4 (1F,3M)      UD=1(F)      A=0      SA=0

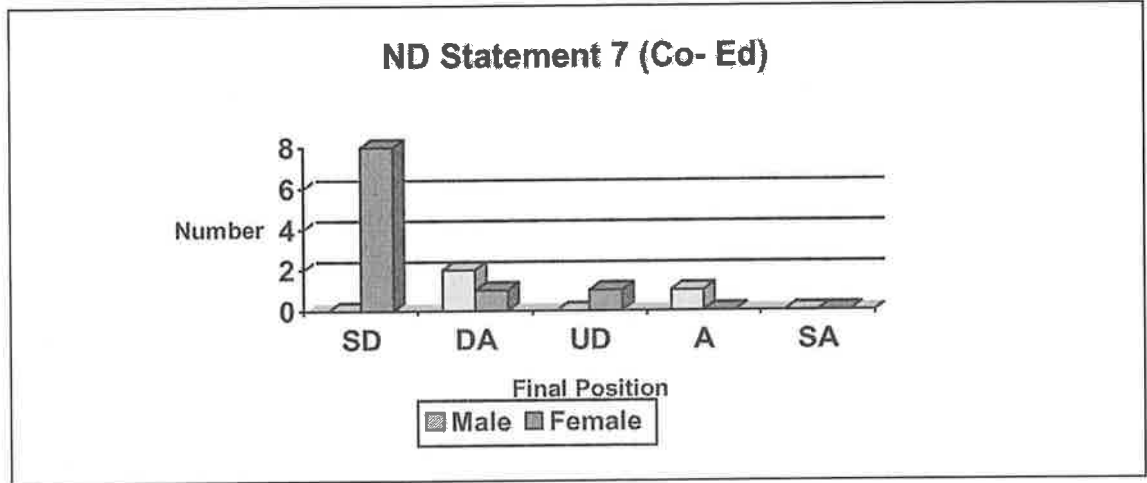




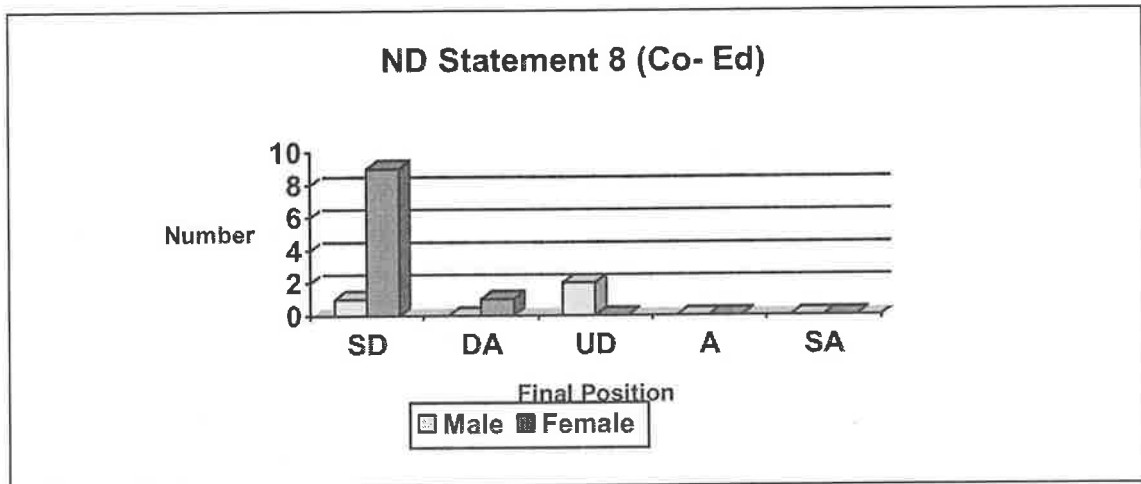
|    |         |          |               |            |             |
|----|---------|----------|---------------|------------|-------------|
| 6. |         |          |               | A          | 1           |
|    | F       |          |               |            | 2           |
|    |         |          |               | F          |             |
|    |         |          |               | A          | 3           |
| F  |         |          |               |            | 4           |
| M  |         |          |               |            | 5           |
|    |         |          |               | SA         |             |
| F  |         |          |               |            | 6           |
|    |         | DA       | (UD)          |            |             |
| F  |         | DA       |               |            | 7           |
| F  |         |          |               |            | 8           |
|    |         |          |               | A          |             |
| F  |         |          |               |            | 9           |
| F  |         |          |               | A          | 10          |
| M  |         |          |               |            | 11          |
| M  |         |          |               | A          |             |
|    | SD      |          |               |            | 12          |
| F  |         |          |               |            | 13          |
|    |         |          | UD            |            |             |
| F  |         |          |               |            |             |
|    | SD=1(F) | DA=2 (F) | UD=1 (F)      | A=6(4F,2M) | SA=3(2F,1M) |
|    |         |          | (UD-DA)=1 (F) |            |             |







|   |    |    |    |     |
|---|----|----|----|-----|
| 8.                                      | SD |    |    | 1 F |
|   | SD |    |    | 2   |
|   | F  |    |    |     |
|   | SD |    |    | 3   |
| F                                       |    |    |    |     |
|   | SD |    |    | 4   |
| M                                       |    |    |    |     |
|   | SD |    |    | 5   |
| F                                       |    |    |    |     |
|   | SD |    |    | 6   |
| F                                       |    |    |    |     |
|   | SD |    |    | 7   |
| F                                       |    | DA |    | 8   |
| F                                       |    |    |    |     |
|   | SD |    |    | 9   |
| F                                       |    |    |    |     |
|   |    |    | UD | 10  |
| M                                       |    |    |    |     |
|   |    |    | UD | 11  |
| M                                       |    |    |    |     |
|   | SD |    |    | 12  |
| F                                       |    |    |    |     |
|   | SD |    |    | 13  |
| F                                       |    |    |    |     |
| SA=10 (9F,1M) DA=1(F) UD=2 (M) A=0 SA=0 |    |    |    |     |



**Highest agreement: SA= 11(8F,3M) A= 1 (F)**

- (2) ANNIE is right, RYAN has a right to be tested because he has a right to know what's going to happen to him.

**A=6(4F,2M)**

- (6) RYAN and JENNIFER were right to select MARK to be free of Friedreich's ataxia.

**Highest disagreement: SD=8 (F) DA=4 (1F,3M)**

- (4) RYAN'S doctor is right to argue that Ryan shouldn't be tested if there is no treatment available.

**SD=8(F) DA=3 (1F,2M)**

- (7) RYAN was right to select the sex of his child.

**SD=3 (F) DA=5(3F,2M)**

- (3) JENNIFER'S doctor is right to argue that Jennifer must do something now that she knows the risk.

**SD=2 (F) DA=4 (F)**

- (7) In selecting MARK, RYAN and JENNIFER were only doing what was best for him.

**DA=4 (3F, 1M)**

- (2) JENNIFER is right to argue that even though she knows that there is a risk of her child inheriting Friedreich's ataxia, she wants 'nature' to take its course.

**Highest indecisive: UD=6 (4F,2M)**

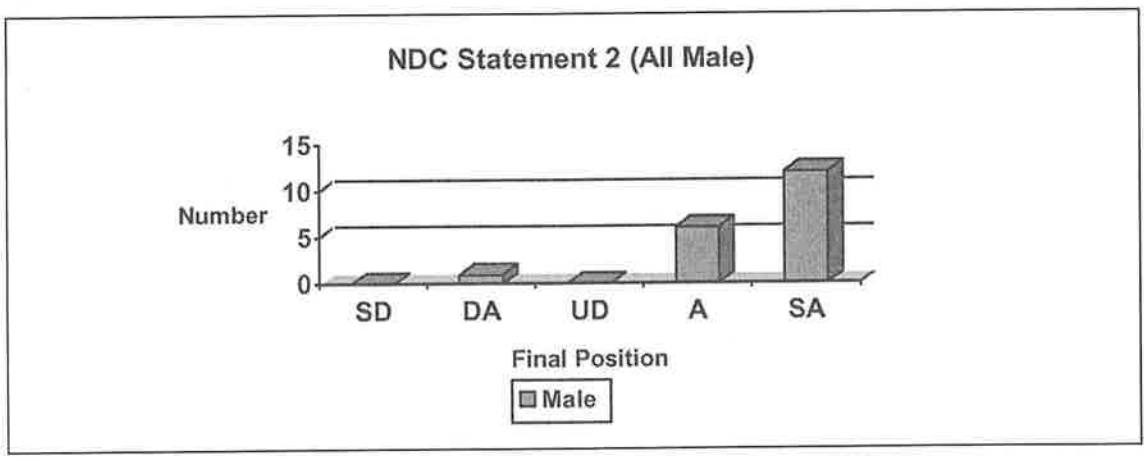
- (5) In selecting MARK, RYAN and JENNIFER were only doing what was best for him.

**Total no. change of mind: 3 out of a possible 104 (13 students x 8 stmts)**



|    |  |  |  |   |      |    |
|----|--|--|--|---|------|----|
|    |  |  |  |   | SA   | 3  |
|    |  |  |  | A |      | 4  |
| DA |  |  |  |   | (SA) | 5  |
|    |  |  |  | A |      | 6  |
|    |  |  |  | A |      | 7  |
|    |  |  |  | A |      | 8  |
|    |  |  |  |   | SA   | 9  |
|    |  |  |  |   | SA   | 10 |
|    |  |  |  |   | SA   | 11 |
|    |  |  |  | A |      | 12 |
|    |  |  |  |   | SA   | 13 |
|    |  |  |  |   | SA   | 14 |
|    |  |  |  |   | SA   | 15 |
|    |  |  |  |   | SA   | 16 |
|    |  |  |  |   | SA   | 17 |
|    |  |  |  | A |      | 18 |
|    |  |  |  |   | SA   | 19 |

SD=0    DA=1    UD=0    A=6    SA=12  
 (SA-DA)=1



|    |   |    |  |   |      |    |
|----|---|----|--|---|------|----|
| 3. |   |    |  |   | A    |    |
|    | 1 |    |  |   |      |    |
|    |   |    |  | A |      | 2  |
|    |   |    |  | A |      | 3  |
|    |   |    |  | A |      | 4  |
| DA |   |    |  |   | (SA) | 5  |
|    |   | UD |  |   |      | 6  |
| DA |   |    |  |   |      | 7  |
|    |   | UD |  |   |      | 8  |
| DA |   |    |  |   |      | 9  |
| DA |   |    |  |   |      | 10 |
|    |   | UD |  |   |      | 11 |
|    |   |    |  | A |      | 12 |

A 13

A 14

A 15

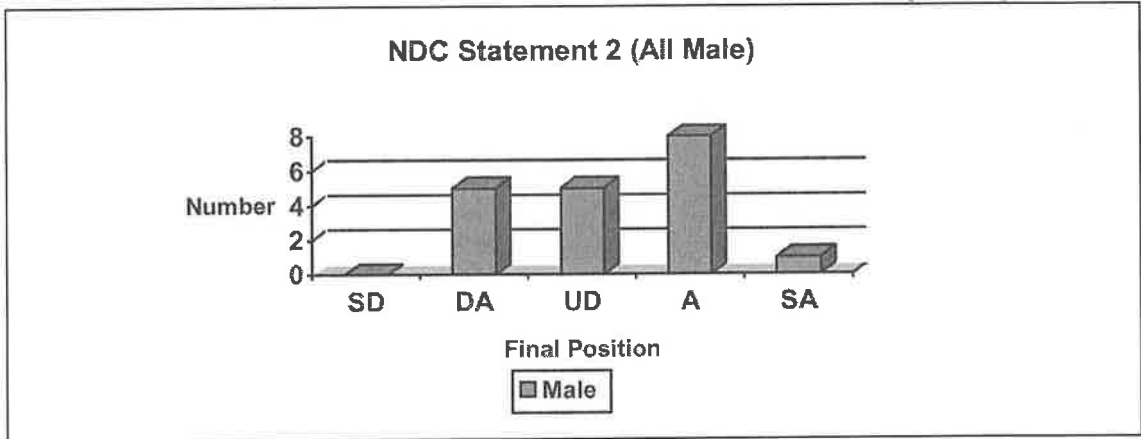
SA 16

UD 17

DA 18

UD 19

SD=0 DA=5 UD=5 A=8 SA=1 (SA-DA)=1



4. SD

1

DA 2

SD 3

SD 4

DA 5

SD (DA) 6

DA 7

SD 8

DA 9

SD 10

DA 11

DA 12

UD 13

SD 14

DA 15

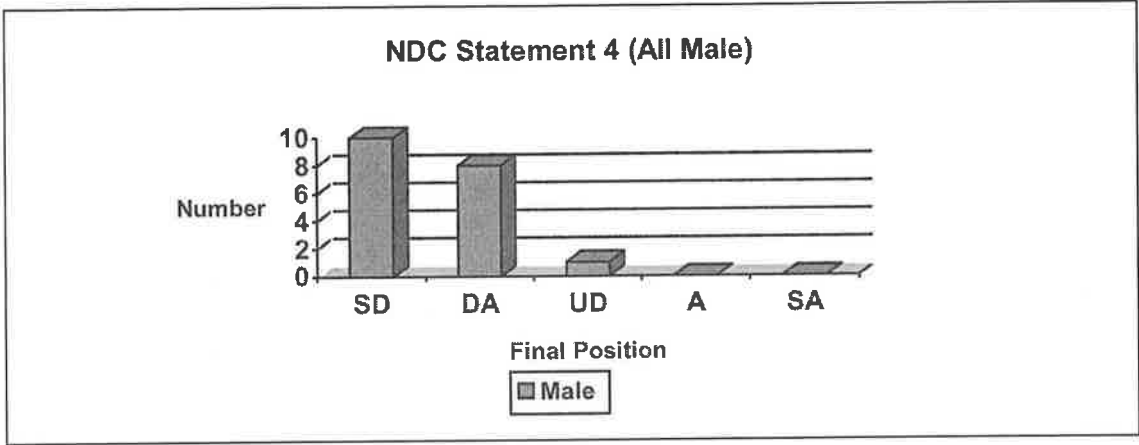
SD 16

DA 17

SD 18

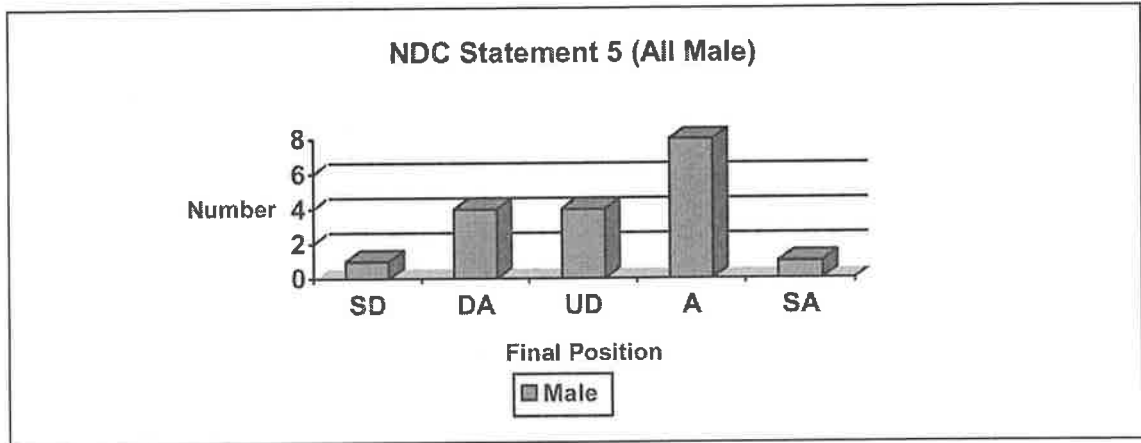
SD 19

SD=10 DA=8 UD=1 A=0 SA=0 (DA-SD)=1

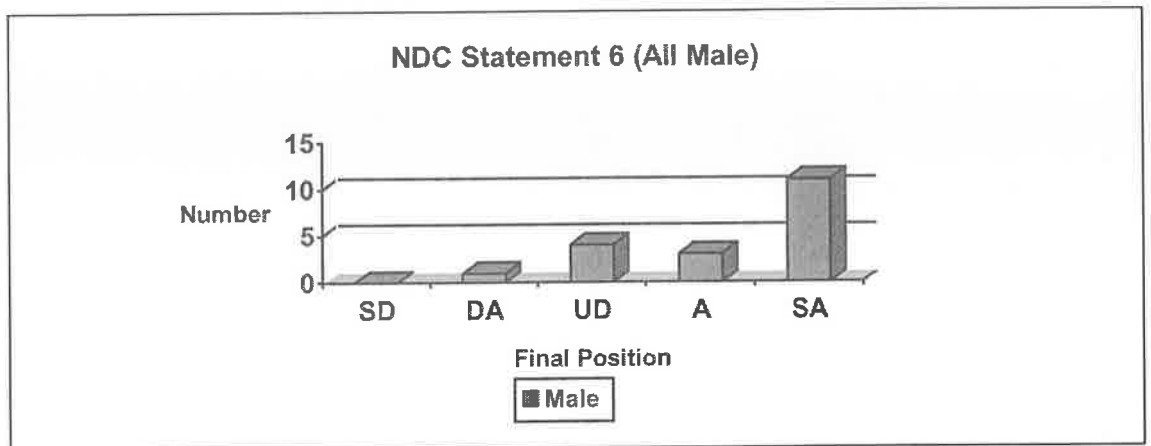


|    |      |      |           |  |     |  |      |  |     |
|----|------|------|-----------|--|-----|--|------|--|-----|
| 5. | SD   | 1    |           |  |     |  |      |  |     |
|    |      |      |           |  | A   |  |      |  | 2   |
|    |      |      |           |  | A   |  |      |  | 3   |
|    |      |      |           |  | A   |  |      |  | 4   |
|    |      |      | UD        |  |     |  |      |  | 5   |
|    | DA   |      |           |  |     |  |      |  | 6   |
|    | DA   |      |           |  |     |  |      |  | 7   |
|    |      |      |           |  | A   |  |      |  | 8   |
|    |      |      | UD        |  |     |  |      |  | 9   |
|    |      |      |           |  | A   |  |      |  | 10  |
|    |      |      |           |  |     |  |      |  | *11 |
|    |      |      | UD        |  |     |  |      |  | 12  |
|    |      |      |           |  | A   |  |      |  | 13  |
|    |      |      |           |  | A   |  |      |  | 14  |
|    |      |      |           |  | A   |  | SA   |  | 15  |
|    | DA   |      |           |  |     |  |      |  | 16  |
|    | DA   |      |           |  |     |  |      |  | 17  |
|    |      |      | (UD)      |  |     |  |      |  | 18  |
|    |      |      | UD        |  |     |  |      |  | 19  |
|    | SD=1 | DA=4 | UD=4      |  | A=8 |  | SA=1 |  |     |
|    |      |      | (UD-DA)=1 |  |     |  |      |  |     |

\*Statement unanswered



|      |      |      |     |       |
|------|------|------|-----|-------|
| 6.   | UD   |      | 1   |       |
|      |      |      | SA  | 2     |
|      |      |      | SA  | 3     |
|      |      | A    |     | 4     |
|      |      |      | SA  | 5     |
|      |      | A    |     | 6     |
|      | DA   |      |     | 7     |
|      |      |      | SA  | 8     |
|      |      | UD   |     | 9     |
|      |      |      | SA  | 10    |
|      |      | UD   |     | 11    |
|      |      | UD   |     | 12    |
|      |      |      | SA  | 13    |
|      |      |      | SA  | 14    |
|      |      |      | SA  | 15    |
|      |      |      | SA  | 16    |
|      |      |      | SA  | 17    |
|      |      |      | SA  | 18    |
|      |      | A    |     | 19    |
| SD=0 | DA=1 | UD=4 | A=3 | SA=11 |





7. SD

1 UD 2

UD 3

UD 4

DA 5

SD 6

SD 7

SD 8

SD 9

SD 10

DA 11

DA 12

DA 13

DA 14

(SD) A 15

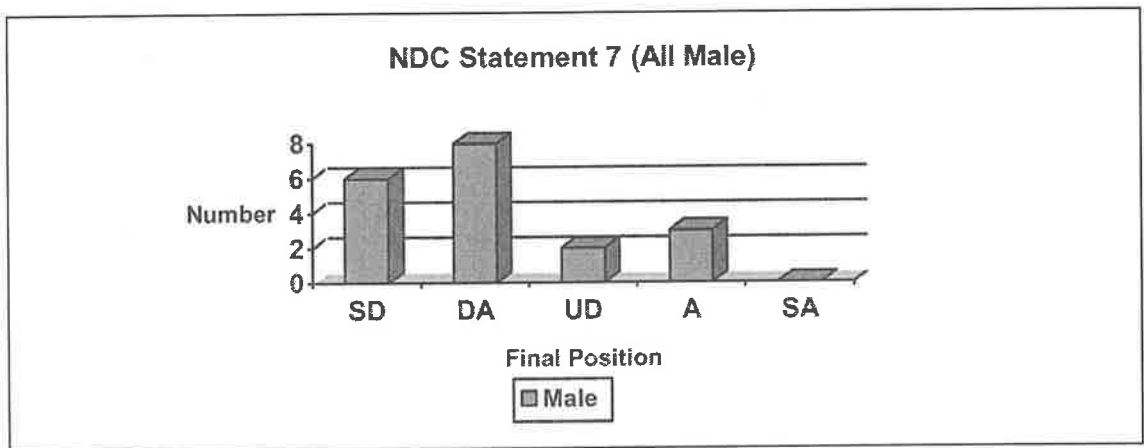
SD A 16

SD 17

DA 18

DA 19

SD=6 DA=8 UD=2 A=3 SA=0  
 (SD-A)=1 (A-DA)=1



8. SD 1

UD 2

A 3

DA 4

SD 5

DA 6

DA 7

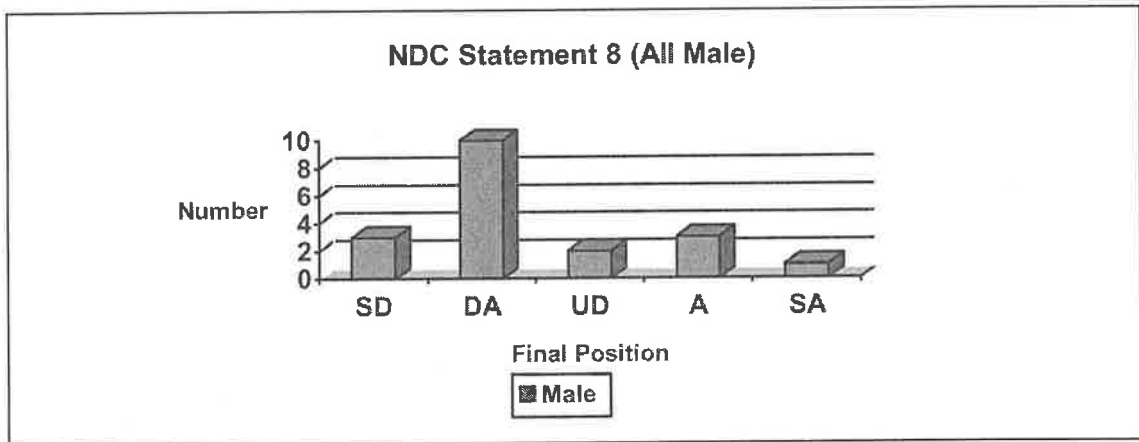
DA 8

DA 9

DA 10

SA

|      |       |      |          |      |    |
|------|-------|------|----------|------|----|
|      | DA    |      |          |      | 11 |
|      | DA    |      |          |      | 12 |
|      |       | UD   |          |      | 13 |
|      | DA    |      | (A)      |      | 14 |
|      |       |      | A        |      | 15 |
|      |       |      | A        |      | 16 |
| SD   |       |      |          |      | 17 |
|      | DA    |      |          |      | 18 |
|      | DA    |      |          |      | 19 |
| SD=3 | DA=10 | UD=2 | A=3      | SA=1 |    |
|      |       |      | (A-DA)=1 |      |    |



**Highest agreement: SA=12 A=6**

(2) ANNIE is right, RYAN has a right to be tested because he has a right to know what's going to happen to him.

**SA=11 A=3**

(6) RYAN and JENNIFER were right to select MARK to be free of Friedreich's ataxia.

**A=8 SA=1**

(1) JENNIFER is right to argue that even though she knows that there is a risk of her child inheriting Friedreich's ataxia, she wants 'nature' to take its course.

**Highest disagreement: SD=10 DA=8**

(4) RYAN'S doctor is right to argue that Ryan shouldn't be tested if there is no treatment available.

**SD=6 DA=8**

(7) RYAN was right to select the sex of his child.

**SD=3 DA=10**

(8) RYAN was right to select MARK to have the best qualities.

**SD=3 DA=6**

(1) JENNIFER is right to argue that even though she knows that there is a risk of her child inheriting Friedreich's ataxia, she wants 'nature' to take its course.

**Highest indecisive: UD=5**

(3) JENNIFER'S doctor is right to argue that Jennifer must do something now that she knows the risk.

**UD=4**

(5) In selecting MARK, RYAN and JENNIFER were only doing what was best for him.

(6) RYAN and JENNIFER were right to select MARK to be free of Friedreich's ataxia.

**Total no. change of position: 9** out of a possible 152 (19 students x 8 stmts)

### Appendix M: SD Film Discussion Survey Results

(If ..cloning could cure us)

Total = 14 (7 M+ 7F)

KEY:

SD Strongly disagree  
 DA Disagree  
 UD Undecided  
 A Agree  
 SA Strongly agree  
 M Male  
 F Female

(A-SA), (UD-DA), etc Change of position from A to SA, UD to DA etc

|    |     | Student: |    |
|----|-----|----------|----|
| 1. |     | (A)      | SA |
|    | 1 F | A        | 2  |
|    | F   | A        | 3  |
| F  |     | A        | 4  |
| F  |     | A        | 5  |
|    | M   | A        | 6  |
|    |     | M        | 7  |
|    |     | M        | 8  |
| M  |     | UD       | 8  |
|    |     | A        | 9  |
| M  |     |          | 10 |
|    |     | UD       | 10 |
| F  |     |          | 11 |
|    |     | A        | 11 |
| M  |     | A        | 12 |
|    |     | A        | 13 |
| F  |     | A        | 13 |
| M  |     |          | 14 |
|    |     | (UD)     | 14 |
|    |     | A        | 14 |

SD=0

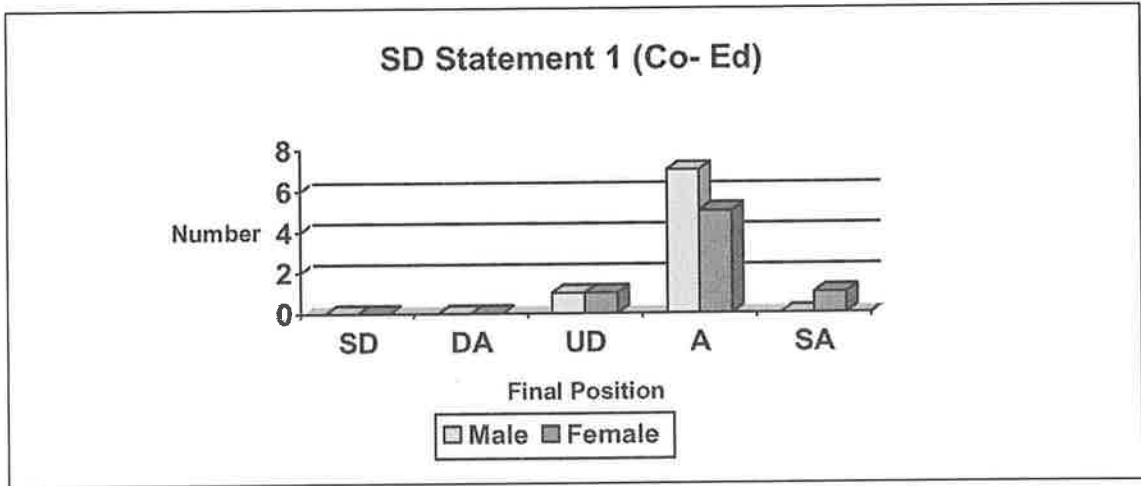
DA=0

UD=2 (1,1)  
 (UD-A) = 1(F)

A=12 (5F,7M)  
 (A-SA)=1 (F)

SA=1(F)

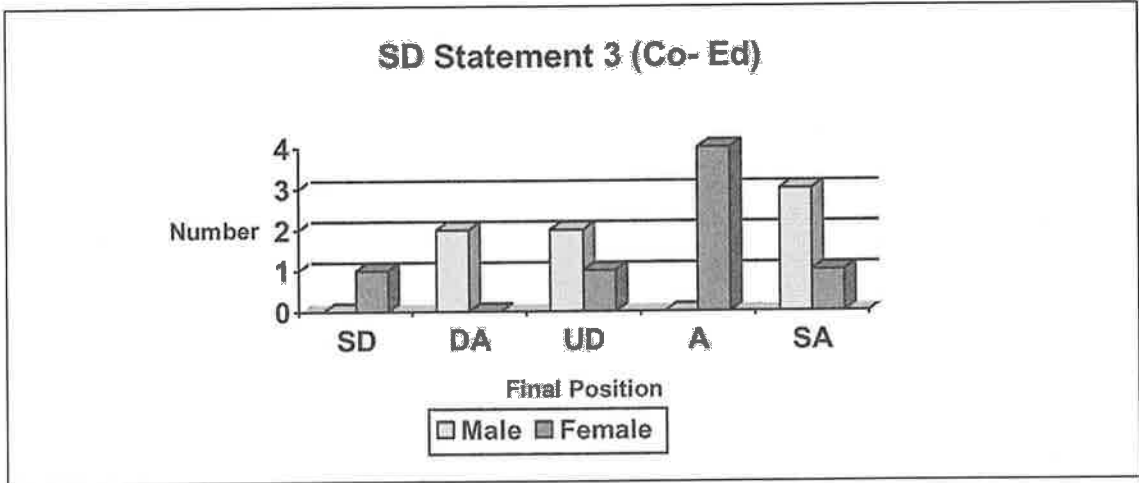
Total changes =2



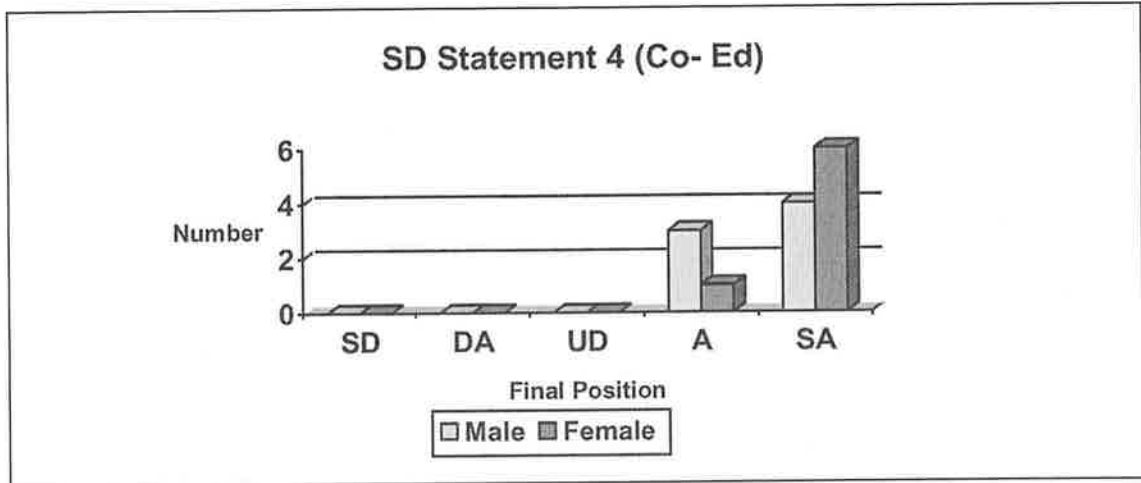
|    |    |    |   |    |     |       |
|----|----|----|---|----|-----|-------|
| 2. | SD |    |   |    |     |       |
|    |    | 1  | F |    |     |       |
|    |    |    | F |    |     | SA 2  |
|    |    |    |   |    |     | SA 3  |
|    |    | F  |   |    |     |       |
|    |    |    |   | UD |     | 4     |
|    |    | F  |   |    |     |       |
|    |    | M  |   |    | A   | 5     |
|    |    |    |   |    | A   | 6     |
| M  |    |    |   |    |     |       |
|    |    | DA |   |    |     | 7     |
| M  |    |    |   |    |     |       |
|    |    |    |   | UD |     | 8     |
| M  |    |    |   |    |     |       |
|    |    |    |   |    | A   | 9     |
| M  |    |    |   |    | A   | 10    |
| F  |    |    |   |    | A   | 11    |
| M  |    |    |   |    | (A) | 12    |
|    |    | DA |   |    |     |       |
| F  |    |    |   |    |     |       |
|    |    | DA |   |    |     | 13    |
| M  |    |    |   |    |     |       |
|    |    |    |   |    |     | SA 14 |
| F  |    |    |   |    |     |       |

SD=1(F)    DA=3(1F,2M)    UD=2 (F,M)    A=5(1F,4M)    SA=3 (F)  
 (A-DA)=1(F)  
 Total changes =1





|    |      |      |      |            |              |    |
|----|------|------|------|------------|--------------|----|
| 4. |      |      |      | SA         | 1 F          |    |
|    |      |      |      |            | SA           | 2  |
|    | F    |      |      |            | SA           | 3  |
| F  |      |      |      |            | SA           | 4  |
| F  |      |      | A    |            |              | 5  |
| M  |      |      |      |            | SA           | 6  |
| M  |      |      | A    |            |              | 7  |
| M  |      |      |      |            | SA           | 8  |
| M  |      |      |      |            | SA           | 9  |
| M  |      |      | A    |            |              | 10 |
| F  |      |      |      |            | SA           | 11 |
| M  |      |      |      |            | SA           | 12 |
| F  |      |      | A    |            |              | 13 |
| M  |      |      |      |            | SA           | 14 |
| F  |      |      |      |            |              |    |
|    | SD=0 | DA=0 | UD=0 | A=4(1F,3M) | SA=10(6F,4M) |    |



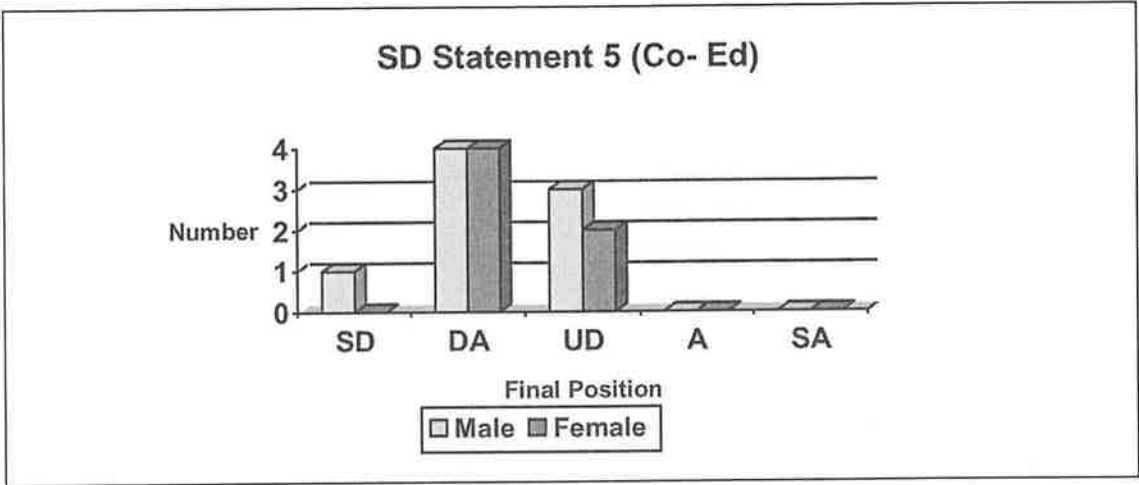
5.

|    |      |     |    |
|----|------|-----|----|
|    | 1 F  | DA  |    |
|    |      | 2 F |    |
|    | DA   |     | 3  |
|    | F    |     |    |
|    | DA   |     | 4  |
|    | F    |     |    |
|    | DA   |     | 5  |
|    | M    |     |    |
|    |      | UD  | 6  |
|    | M    |     |    |
|    |      | UD  | 7  |
|    | M    |     | 8  |
| SD |      |     |    |
| M  | DA   |     | 9  |
| M  |      | UD  | 10 |
| F  |      |     |    |
|    | DA   |     | 11 |
| M  |      | UD  | 12 |
| F  |      |     |    |
|    | (DA) | UD  | 13 |
| M  |      |     |    |
|    | DA   |     | 14 |
| F  |      |     |    |

SD=1M      DA=8 (4,4)      UD=5(2F,3M)      A=0      SA=0  
 (DA-UD)=1(M)

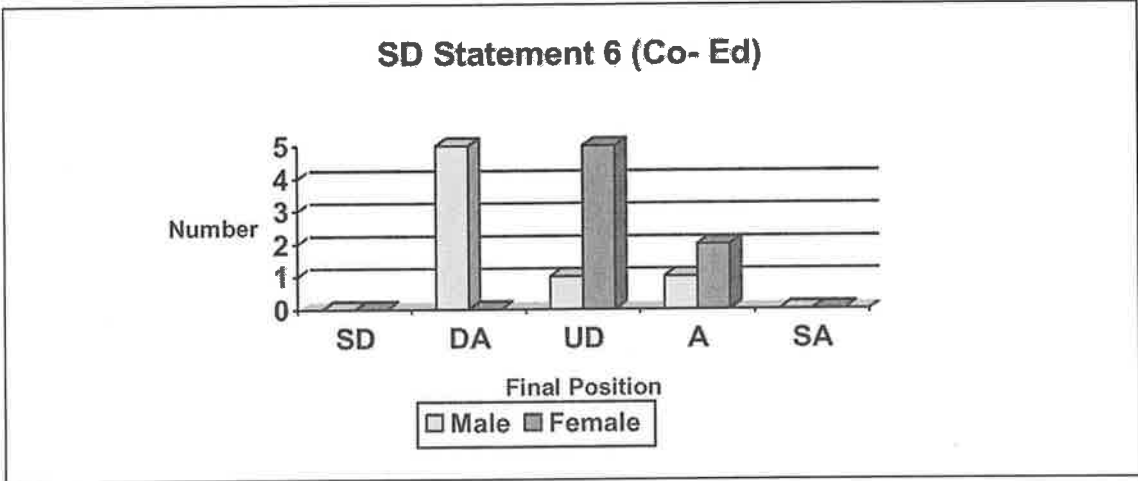
Total changes =1



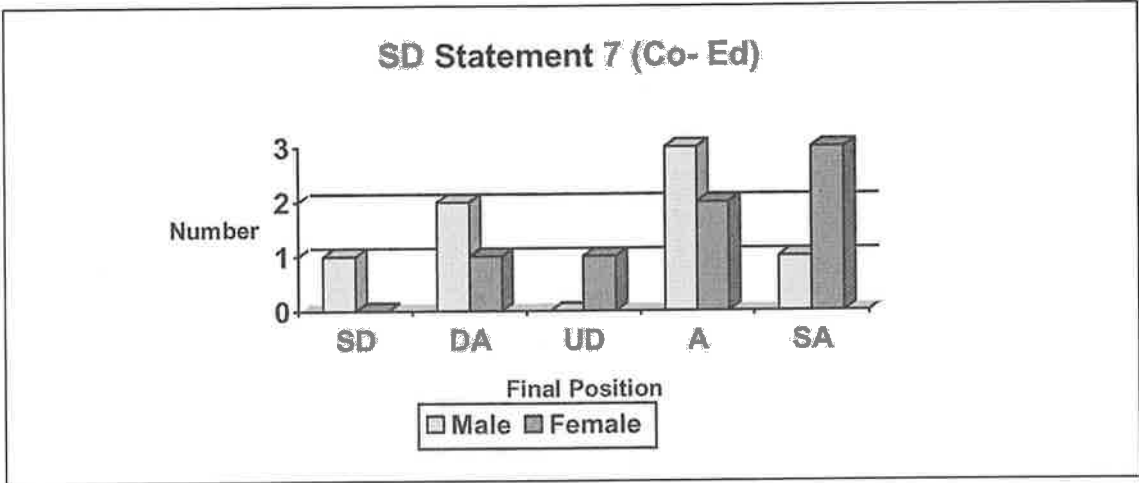


6.

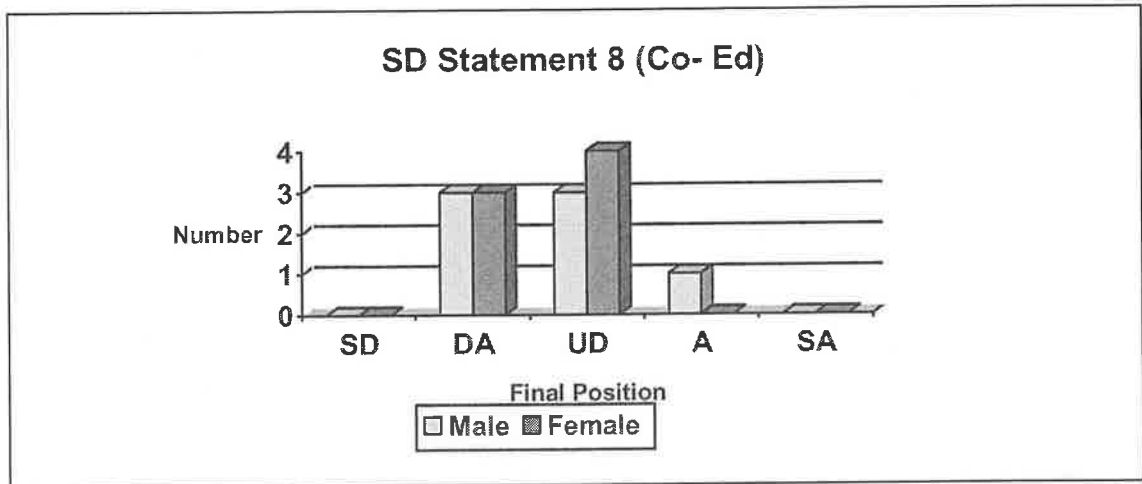
|   |      |          |             |               |      |                  |
|---|------|----------|-------------|---------------|------|------------------|
|   |      | 1 F      |             | UD            |      |                  |
|   |      |          |             | UD            |      | 2                |
| F |      |          |             | UD            | (A)  | 3                |
| F |      |          |             | UD            |      | 4                |
| F |      |          |             |               |      | 5                |
| M |      | DA       |             |               |      | 6                |
| M |      |          |             |               | A    | 7                |
| M |      | DA       |             |               |      | 8                |
| M |      | DA       |             |               |      | 9                |
| M |      |          |             | UD            |      | 10               |
| F |      |          |             |               | A    | 11               |
| M |      | DA       |             |               |      | 12               |
| F |      |          |             | UD            |      | 13               |
| M |      | DA       |             |               |      | 14               |
| F |      |          |             |               | A    | 14               |
|   | SD=0 | DA=5 (M) | UD=6(5F,1M) | A= 3 (2F,1M)  | SA=0 |                  |
|   |      |          |             | (A-UD) = 1(F) |      |                  |
|   |      |          |             |               |      | Total changes =1 |



|   |     |    |    |    |   |      |    |
|---|-----|----|----|----|---|------|----|
| 7.  |     |    | DA |    |   |      |    |
|   | 1 F |    |    |    |   | SA   | 2  |
|   |     |    |    |    | F | SA   | 3  |
| F   |     |    |    |    |   | (SA) | 4  |
| F   |     |    |    |    | A |      | 5  |
| M   |     | DA |    |    |   |      | 6  |
| M   | SD  |    |    |    |   |      | 7  |
| M   |     |    |    |    | A |      | 8  |
| M   |     |    |    |    | A |      | 9  |
| M   |     | DA |    |    |   | SA   | 10 |
| F   |     |    |    |    |   | SA   | 11 |
| M   |     |    |    | UD |   |      | 12 |
| F   |     |    |    |    |   |      | 13 |
| M   |     |    |    |    |   | A    | 14 |
| F   |     |    |    |    |   | (SA) | 14 |
| SD=1(M) DA=3(1F,2M) UD=1(F) A=5(2F,3M) SA=4 (3F,1M) |     |    |    |    |   |      |    |
| (SA-A)=2 (F)  |     |    |    |    |   |      |    |
| Total changes =1                                    |     |    |    |    |   |      |    |



|   |      |               |              |         |                  |
|---|------|---------------|--------------|---------|------------------|
|   | 8.   |               | UD           |         |                  |
|   |      | 1 F           |              |         |                  |
|   |      |               | UD           | 2       |                  |
|   | F    |               |              |         |                  |
|   |      | DA            |              | 3       |                  |
| F |      | (DA)          | UD           | 4       |                  |
| F |      | DA            |              | 5       |                  |
| M |      | DA            |              | 6       |                  |
|   |      | M             |              |         |                  |
|   |      |               | UD           | 7       |                  |
| M |      | DA            |              | 8       |                  |
| M |      |               |              |         |                  |
|   |      |               | UD           | 9       |                  |
| M |      |               | UD           | 10      |                  |
| F |      |               | UD           | 11      |                  |
| M |      |               |              |         |                  |
|   |      | DA            |              | 12      |                  |
| F |      |               |              |         |                  |
|   |      |               | A            | 13      |                  |
| M |      |               |              |         |                  |
|   |      | DA            |              | 14      |                  |
| F |      |               |              |         |                  |
|   | SA=0 | DA=6 (3,3)    | UD=7 (4F,3M) | A=1 (M) | SA=0             |
|   |      | (DA-UD)=1 (F) |              |         |                  |
|   |      |               |              |         | Total changes =1 |



**Highest agreement:** SA= 10 (6F,4M) A=4 (1F,3M)

- (4) ALEX should have told ANDREW before proceeding with the research that there might be health risks after treatment.  
A=12 (5F,7M) SA=1(F)
- (1) DR. McVEIGH, the main witness for the prosecution, was right to argue that a 19 day old embryo should not be used for stem cell research because a legal limit needs to be applied somewhere  
A=5(2F,3M) SA=4 (3F,1M)
- (7) ALEX should have checked where the eggs came from  
A=5(1F,4M) SA=3 (F)
- (2) ANDREW has less right to treatment from such controversial technologies than the young girl on the videodisk with had diabetes.

**Highest disagreement:** DA=8 (4,4) SD=1 (M)

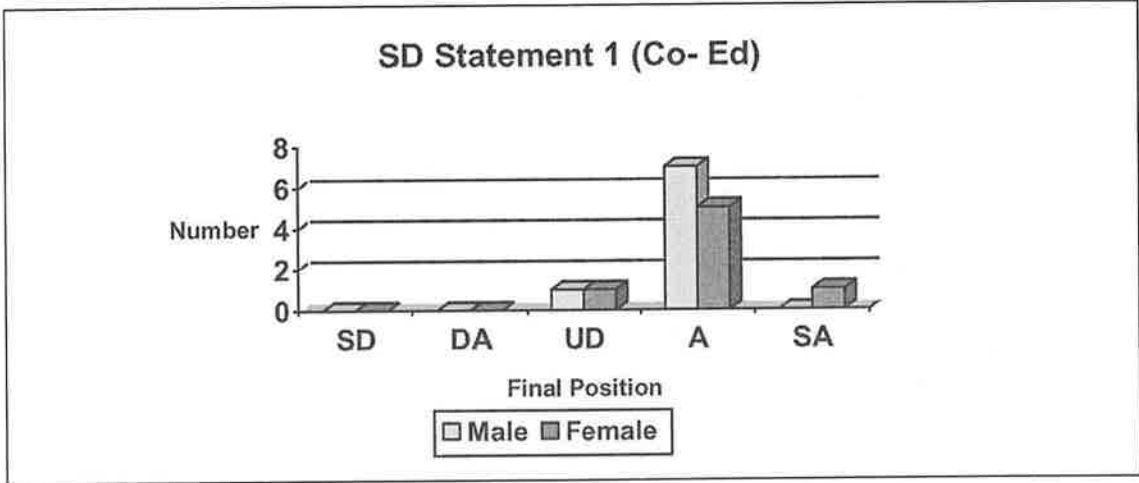
- (8) In treating ANDREW, ALEX was only doing what was best for him.  
DA=6 (3,3)
- (8) DR. YAMA, for the prosecution, was right to say that the technology that ALEX is advocating is bad for humankind.  
DA=5 (M) SD=0
- (9) ALEX was right to go ahead, despite the illegality of the procedure.

**Highest indecisive:** UD=7 (4F,3M)

- (8) DR. YAMA, for the prosecution, was right to say that the technology that ALEX is advocating is bad for humankind.  
UD=5(2F,3M)
- (5) In treating ANDREW, ALEX was only doing what was best for him  
UD=6(5F,1M)
- (6) ALEX was right to go ahead, despite the illegality of the procedure

**Total no. change of mind: 10** out of a possible 112 (14 students x 8 stmts)

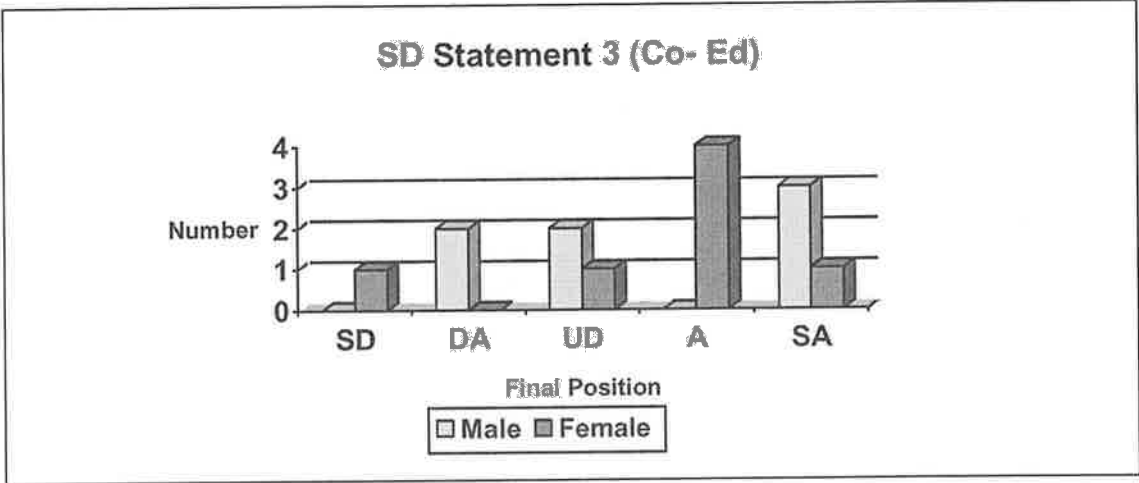




|    |    |    |   |    |     |       |
|----|----|----|---|----|-----|-------|
| 2. | SD |    |   |    |     |       |
|    |    | 1  | F |    |     |       |
|    |    |    | F |    |     | SA 2  |
|    |    |    |   |    |     | SA 3  |
|    |    | F  |   |    |     |       |
|    |    |    |   | UD |     | 4     |
|    |    | F  |   |    |     |       |
|    |    | M  |   |    | A   | 5     |
|    |    |    |   |    | A   | 6     |
| M  |    |    |   |    |     |       |
|    |    | DA |   |    |     | 7     |
| M  |    |    |   |    |     |       |
|    |    |    |   | UD |     | 8     |
| M  |    |    |   |    |     |       |
|    |    |    |   |    | A   | 9     |
| M  |    |    |   |    | A   | 10    |
| F  |    |    |   |    | A   | 11    |
| M  |    |    |   |    | (A) | 12    |
| F  |    | DA |   |    |     |       |
|    |    | DA |   |    |     | 13    |
| M  |    |    |   |    |     |       |
|    |    |    |   |    |     | SA 14 |
| F  |    |    |   |    |     |       |

SD=1(F)    DA=3(1F,2M)    UD=2 (F,M)    A=5(1F,4M)    SA=3 (F)  
 (A-DA)=1(F)  
 Total changes =1



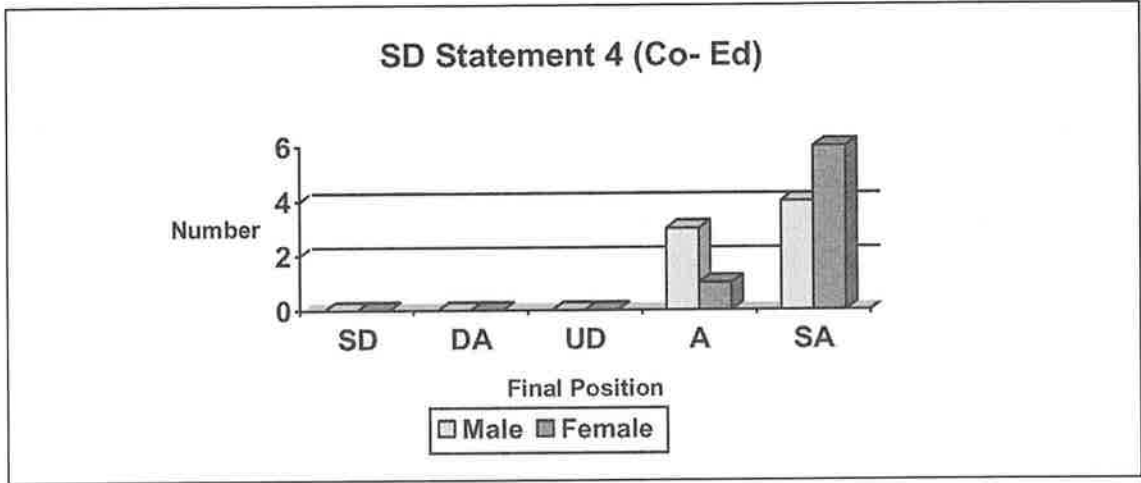


4.

|   |   |  |  |    |     |    |
|---|---|--|--|----|-----|----|
|   |   |  |  | SA | 1 F |    |
|   |   |  |  |    | SA  | 2  |
|   | F |  |  |    | SA  | 3  |
| F |   |  |  |    | SA  | 4  |
| F |   |  |  | A  |     | 5  |
| M |   |  |  |    | SA  | 6  |
| M |   |  |  | A  |     | 7  |
| M |   |  |  |    | SA  | 8  |
| M |   |  |  |    | SA  | 9  |
| M |   |  |  | A  |     | 10 |
| F |   |  |  |    | SA  | 11 |
| M |   |  |  |    | SA  | 12 |
| F |   |  |  | A  |     | 13 |
| M |   |  |  |    | SA  | 14 |
| F |   |  |  |    |     |    |

SD= 0 DA=0      UD=0      A=4(1F,3M)      SA=10(6F,4M)



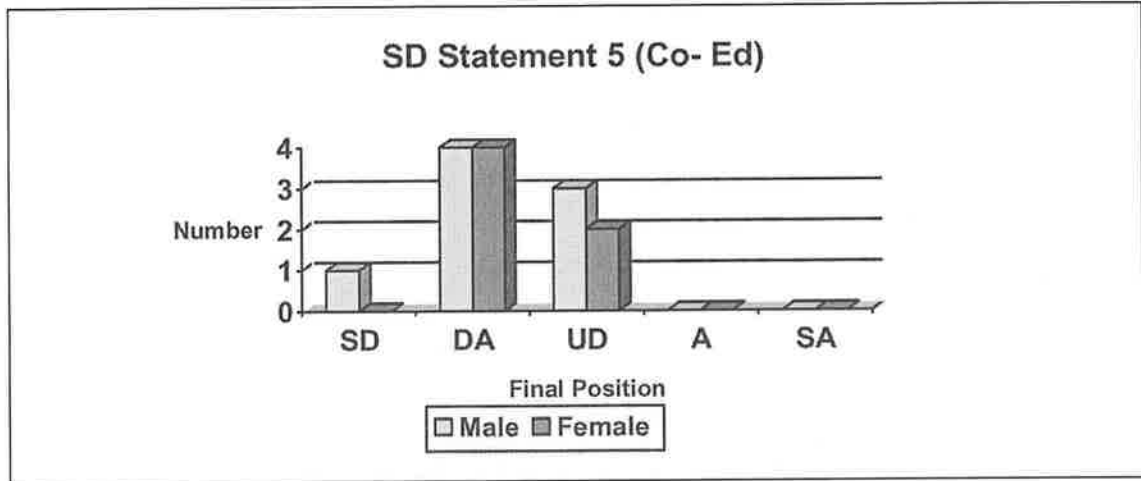


5.

|    |  |      |    |     |    |
|----|--|------|----|-----|----|
|    |  | 1 F  | DA |     |    |
|    |  |      |    | 2 F | DA |
|    |  | DA   |    |     | 3  |
|    |  | F    |    |     | 4  |
|    |  | DA   |    |     | 5  |
|    |  | F    |    |     | 6  |
|    |  | DA   |    |     | 7  |
|    |  | M    |    | UD  | 8  |
|    |  | M    |    | UD  | 9  |
|    |  | M    |    |     | 10 |
| SD |  |      |    |     | 11 |
| M  |  | DA   |    |     | 12 |
| M  |  |      |    | UD  | 13 |
| F  |  |      |    |     | 14 |
| F  |  | DA   |    |     | 15 |
| M  |  |      |    | UD  | 16 |
| M  |  |      |    |     | 17 |
| F  |  | (DA) |    | UD  | 18 |
| M  |  | DA   |    |     | 19 |
| F  |  |      |    |     | 20 |

SD=1M      DA=8 (4,4)      UD=5(2F,3M)      A=0      SA=0  
 (DA-UD)=1(M)

Total changes =1



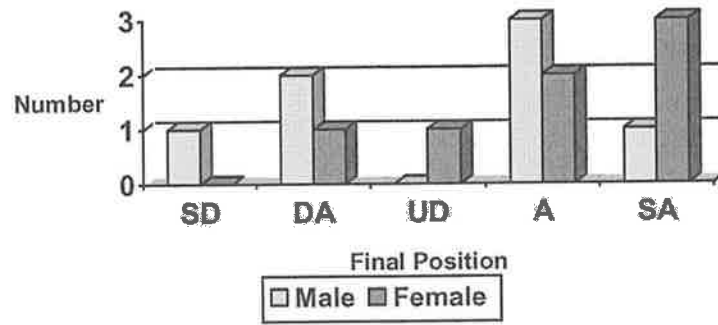
6. UD

|   |     |    |  |     |    |
|---|-----|----|--|-----|----|
|   | 1 F |    |  |     |    |
|   |     | UD |  |     | 2  |
| F |     | UD |  | (A) | 3  |
| F |     | UD |  |     | 4  |
| F |     |    |  |     | 5  |
| M | DA  |    |  |     | 6  |
| M |     |    |  | A   | 7  |
| M | DA  |    |  |     | 8  |
| M | DA  |    |  |     | 9  |
| M |     | UD |  |     | 10 |
| M |     |    |  | A   | 11 |
| F | DA  |    |  |     | 12 |
| M |     | UD |  |     | 13 |
| F | DA  |    |  |     | 14 |
| M |     |    |  | A   | 15 |
| F |     |    |  |     | 16 |

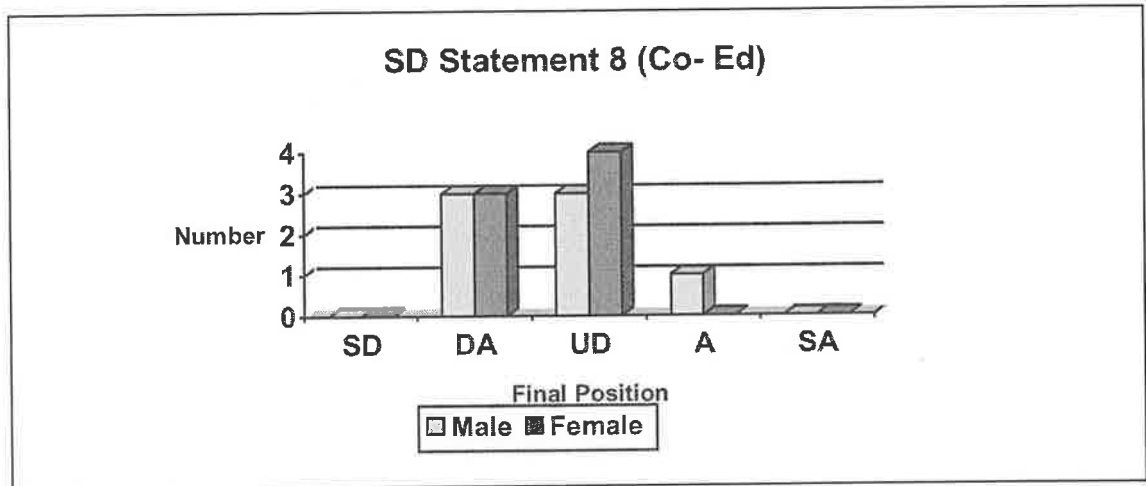
SD=0      DA=5 (M)      UD=6(5F,1M)      A=3 (2F,1M)      SA=0  
(A-UD) = 1(F)  
Total changes =1



### SD Statement 7 (Co- Ed)



|    |      |                             |              |         |                  |
|----|------|-----------------------------|--------------|---------|------------------|
| 8. |      | UD                          |              |         |                  |
|    | 1 F  |                             | UD           |         | 2                |
|    | F    |                             |              |         | 3                |
| F  | DA   |                             |              |         | 4                |
| F  | (DA) | UD                          |              |         | 5                |
| M  | DA   |                             |              |         | 6                |
|    | M    |                             | UD           |         | 7                |
| M  | DA   |                             |              |         | 8                |
| M  |      |                             | UD           |         | 9                |
| M  |      |                             | UD           |         | 10               |
| F  |      |                             | UD           |         | 11               |
| M  |      |                             |              |         | 12               |
| F  | DA   |                             |              | A       | 13               |
| M  |      |                             |              |         | 14               |
| F  | DA   |                             |              |         |                  |
|    | SA=0 | DA=6 (3,3)<br>(DA-UD)=1 (F) | UD=7 (4F,3M) | A=1 (M) | SA=0             |
|    |      |                             |              |         | Total changes =1 |



**Highest agreement:** SA= 10 (6F,4M) A=4 (1F,3M)

- (4) ALEX should have told ANDREW before proceeding with the research that there might be health risks after treatment.  
A=12 (5F,7M) SA=1(F)
- (1) DR. McVEIGH, the main witness for the prosecution, was right to argue that a 19 day old embryo should not be used for stem cell research because a legal limit needs to be applied somewhere  
A=5(2F,3M) SA=4 (3F,1M)
- (7) ALEX should have checked where the eggs came from  
A=5(1F,4M) SA=3 (F)
- (2) ANDREW has less right to treatment from such controversial technologies than the young girl on the videodisk with had diabetes.

**Highest disagreement:** DA=8 (4,4) SD=1 (M)

- (10) In treating ANDREW, ALEX was only doing what was best for him.  
DA=6 (3,3)
- (8) DR. YAMA, for the prosecution, was right to say that the technology that ALEX is advocating is bad for humankind.  
DA=5 (M) SD=0
- (11) ALEX was right to go ahead, despite the illegality of the procedure.

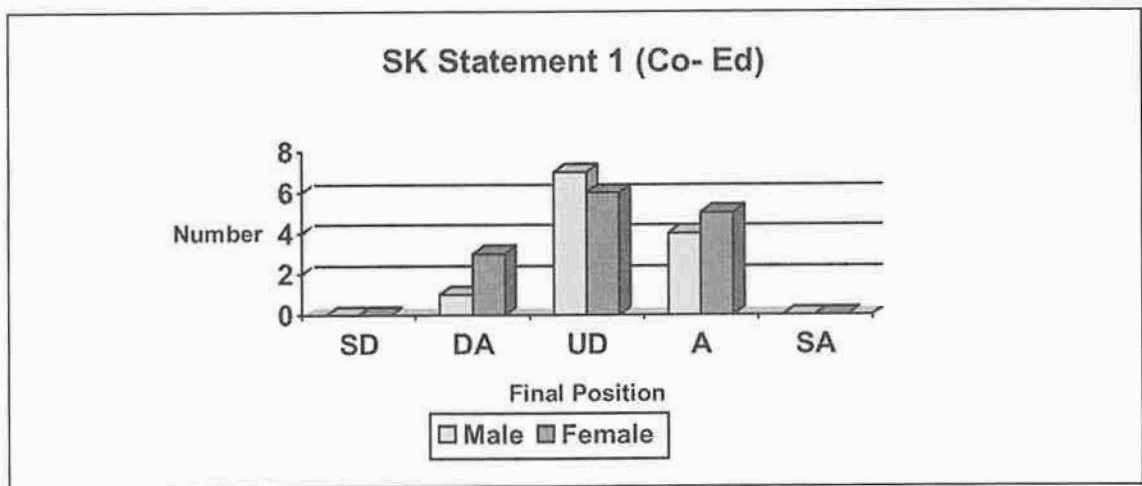
**Highest indecisive:** UD=7 (4F,3M)

- (8) DR. YAMA, for the prosecution, was right to say that the technology that ALEX is advocating is bad for humankind.  
UD=5(2F,3M)
- (5) In treating ANDREW, ALEX was only doing what was best for him  
UD=6(5F,1M)
- (6) ALEX was right to go ahead, despite the illegality of the procedure

**Total no. change of mind: 10** out of a possible 112 (14 students x 8 stmts)

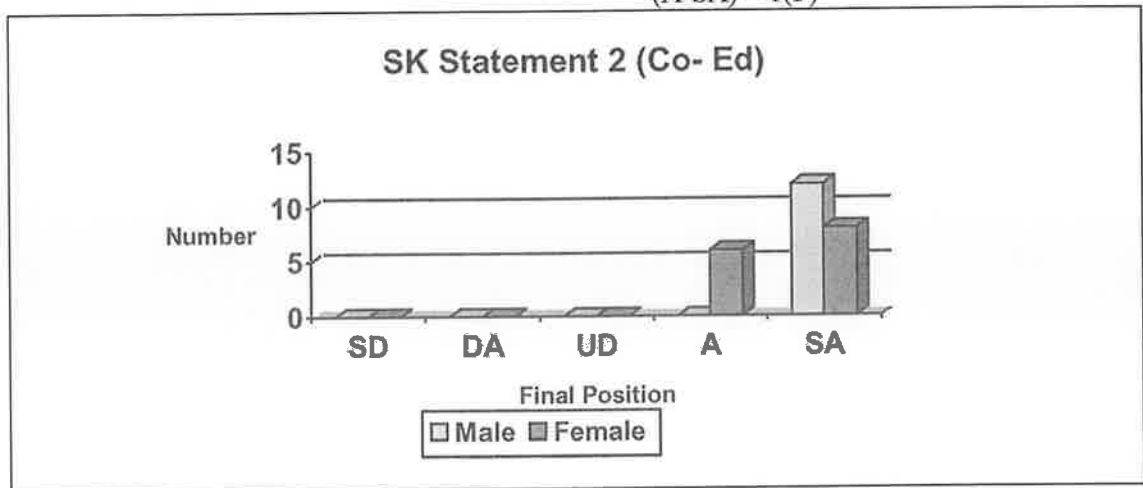


|      |             |    |               |            |      |
|------|-------------|----|---------------|------------|------|
|      |             | DA |               |            | 21   |
| F    |             |    |               | UD         | 22   |
| M    |             |    |               | UD         | 23   |
| M    |             | DA |               |            | 24   |
| M    |             |    |               | UD         | 25   |
| F    |             |    |               |            | 26   |
|      |             |    |               | A          |      |
| M    |             |    |               |            |      |
| SD=0 | DA=4(3F,1M) |    | UD=13(6F,7M,) | A=9(5F,4M) | SA=0 |



|    |   |     |  |     |       |
|----|---|-----|--|-----|-------|
|    |   |     |  |     | SA    |
| 2. |   | 1 M |  |     |       |
|    |   |     |  |     | SA 2  |
|    |   | M   |  |     | SA 3  |
|    | F |     |  |     | SA 4  |
|    | F |     |  |     | SA 5  |
|    | F |     |  |     | SA 6  |
| F  |   |     |  |     | SA 7  |
| M  |   |     |  |     |       |
|    |   |     |  | A   | 8     |
| F  |   |     |  | A   | 9     |
| F  |   |     |  | (A) | SA 10 |
| F  |   |     |  |     |       |

|      |      |      |               |                |       |
|------|------|------|---------------|----------------|-------|
|      |      |      |               | A              | 11    |
| F    |      |      |               | A              | 12    |
| F    |      |      |               |                | SA 13 |
| M    |      |      |               |                | SA 14 |
| M    |      |      |               |                | SA 15 |
| F    |      |      |               |                | SA 16 |
| F    |      |      |               |                | SA 17 |
| M    |      |      |               | A              | 18    |
| F    |      |      |               |                | SA 19 |
| M    |      |      |               |                | SA 20 |
| F    |      |      |               |                | SA 21 |
| F    |      |      |               |                | SA 22 |
| M    |      |      |               |                | SA 23 |
| M    |      |      |               |                | SA 24 |
| M    |      |      |               | A              | 25    |
| F    |      |      |               |                | SA 26 |
| M    |      |      |               |                |       |
| SD=0 | DA=0 | UD=0 | A=6 (F)       | SA=20 (8F,12M) |       |
|      |      |      | (A-SA) = 1(F) |                |       |



3.

M

A

1



|   |   |    |    |   |       |
|---|---|----|----|---|-------|
|   |   |    |    | A | 2 M   |
|   |   |    |    | A | 3 F   |
|   |   |    |    | A | 4 F   |
|   |   |    |    | A | 5     |
| F |   |    |    | A | 6     |
| F |   |    |    | A | 7     |
| M |   |    |    | A | 8     |
| F |   |    | UD |   | 9     |
| F |   |    |    | A | 10    |
| F |   |    |    | A | 11    |
| F |   |    |    | A | 12    |
|   | F |    |    | A | 13    |
|   | M |    |    |   | 14    |
|   | M | DA |    |   | 15    |
|   | F |    |    | A | 16    |
|   | F |    |    | A | 17    |
|   | M |    | UD |   | 18    |
|   | F |    |    | A | 19    |
|   | M |    |    | A | 20    |
|   | F |    |    | A | 21    |
|   | F |    |    | A | 22    |
|   | M |    |    | A | 23    |
|   | M |    |    |   | SA 24 |
|   | M |    |    |   | SA 25 |
|   | F |    |    |   | SA 26 |
|   | M |    |    |   |       |

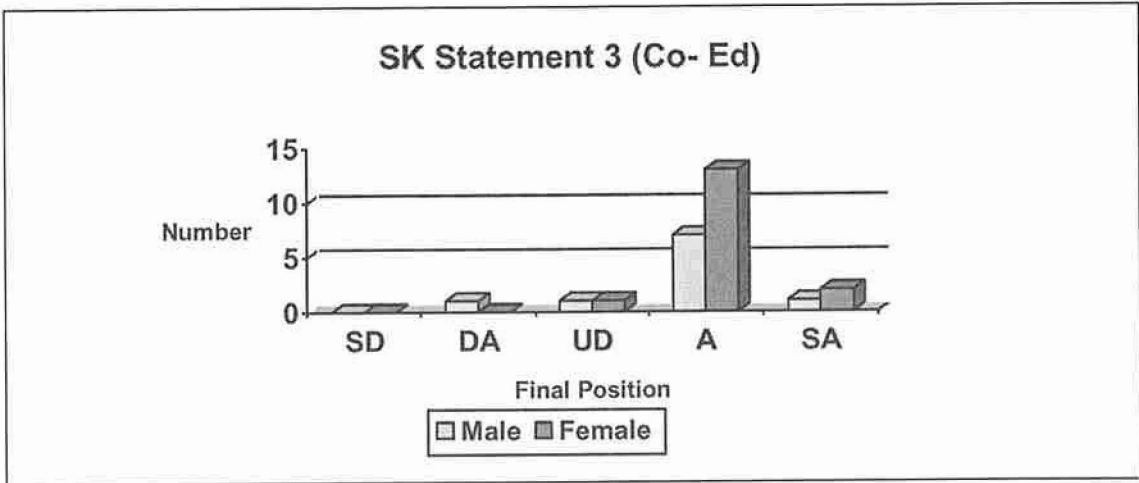
SD=0

DA=1 (M)

UD=2(1,1)

A=20 (13F,7M)

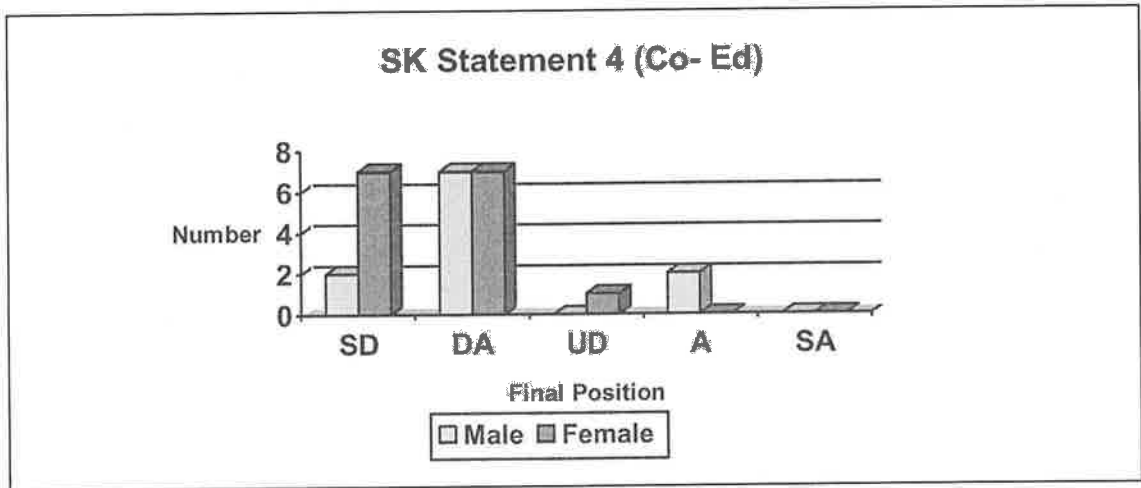
SA=3(2F,1M)



|   |    |    |    |     |    |
|---|----|----|----|-----|----|
|   | 4. | DA |    | 1 M | 2  |
|   |    | M  | DA |     | 3  |
| F |    |    | DA |     | 4  |
| F | SD |    |    |     | 5  |
| F | SD |    |    |     | 6  |
| F |    | DA |    |     | 7  |
| F | SD |    |    |     | 8  |
| M |    | DA |    |     | 9  |
| F |    | DA |    |     | 10 |
| F |    | DA |    |     | 11 |
| F | SD |    |    |     | 12 |
| F |    |    | UD |     | 13 |
| F |    | DA |    |     | 14 |
| M |    |    |    |     | 15 |
| M | SD |    |    |     | 16 |
| M | SD |    |    |     | 17 |
| F | SD |    |    |     | 18 |
| F |    | DA |    |     |    |
| M |    |    |    |     |    |
| M | SD |    |    |     |    |
| F |    |    |    |     |    |

|   |    |    |    |
|---|----|----|----|
|   |    | DA | 19 |
| M |    | DA | 20 |
| F | SD |    | 21 |
| F |    | DA | 22 |
| M |    | DA | 23 |
| M |    |    | 24 |
| M |    |    | 25 |
| F |    |    | 26 |
| M |    |    |    |

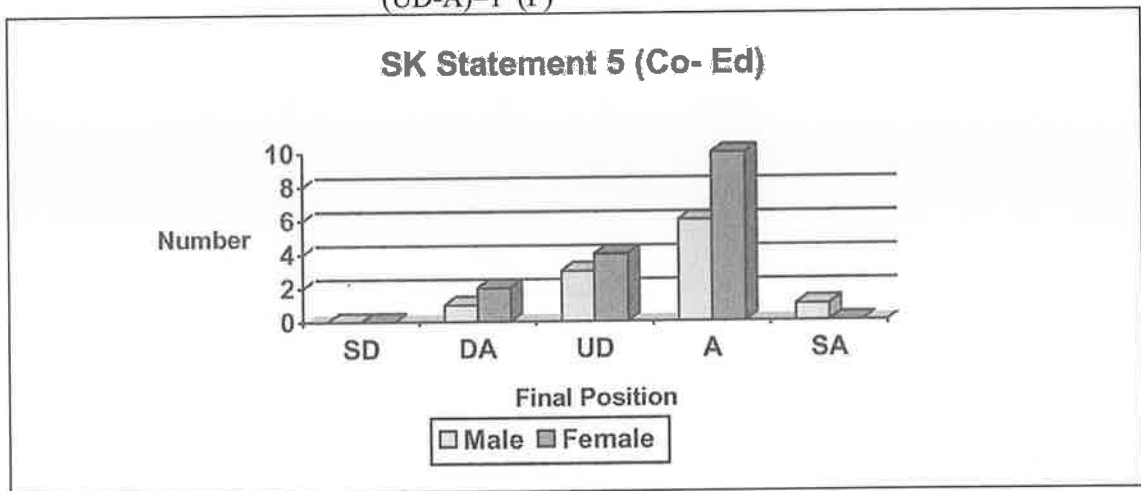
SD= 9(7F,2M)    DA=14(7F,7M)    UD=1 (F)    A=2(M)    SA=0



|   |   |    |      |   |   |
|---|---|----|------|---|---|
|   |   |    | UD   |   |   |
|   | 1 | M  |      |   | A |
|   |   |    | 2    | M |   |
|   | F |    |      |   | A |
|   | F |    |      |   | A |
|   | F |    | (UD) |   | A |
|   | F | DA |      |   |   |
|   | F |    |      |   | A |
|   | M |    |      |   |   |
|   |   | DA | UD   |   |   |
| F |   |    |      |   | A |
| F |   |    |      |   |   |

|   |    |    |   |    |
|---|----|----|---|----|
|   |    | UD |   | 10 |
| F |    | UD |   | 11 |
| F |    | UD |   | 12 |
| F |    |    | A | 13 |
| M |    |    | A | 14 |
| M |    |    | A | 15 |
| F |    |    | A | 16 |
| F |    |    |   | 17 |
| M | DA |    |   | 17 |
| F |    |    | A | 18 |
| M |    |    |   | 19 |
| M |    |    |   | 19 |
| F |    |    | A | 20 |
| F |    |    | A | 21 |
| F |    |    | A | 22 |
| M |    |    |   | 23 |
| M |    | UD |   | 23 |
| M |    |    | A | 24 |
| M |    |    | A | 25 |
| F |    |    |   | 26 |
| M |    | UD |   | 26 |

SD=0    DA=3 (2F,1M)    UD=7 (4F,3M)    A=16 (10F,6M)    SA=1(M)  
 (UD-A)=1 (F)



|   | 6. |     |   | (A) | SA    |
|---|----|-----|---|-----|-------|
|   |    | 1 M |   | A   | 2     |
|   |    |     | M | A   | 3     |
| F |    |     |   |     | SA 4  |
| F |    |     |   | A   | 5     |
| F |    |     |   |     | SA 6  |
| F |    |     |   |     | SA 7  |
| M |    |     |   | A   | 8     |
| F |    |     |   | A   | 9     |
| F |    | UD  |   |     | 10    |
| F |    |     |   | A   | 11    |
| F |    |     |   | A   | 12    |
| F |    |     |   |     | SA 13 |
| M |    | UD  |   |     | 14    |
| M |    |     |   |     | SA 15 |
| F |    |     |   |     | SA 16 |
| F |    |     |   | A   | 17    |
| F |    |     |   | A   | 18    |
| F |    | UD  |   |     | 19    |
| M |    |     |   |     | SA 20 |
| F |    |     |   |     | SA 21 |
| F |    | UD  |   |     | 22    |
| M |    |     |   | A   | 23    |
| M |    |     |   |     | SA 24 |
| M |    |     |   |     | SA 25 |
| F |    |     |   | A   | 26    |
| M |    |     |   |     |       |

SD=0

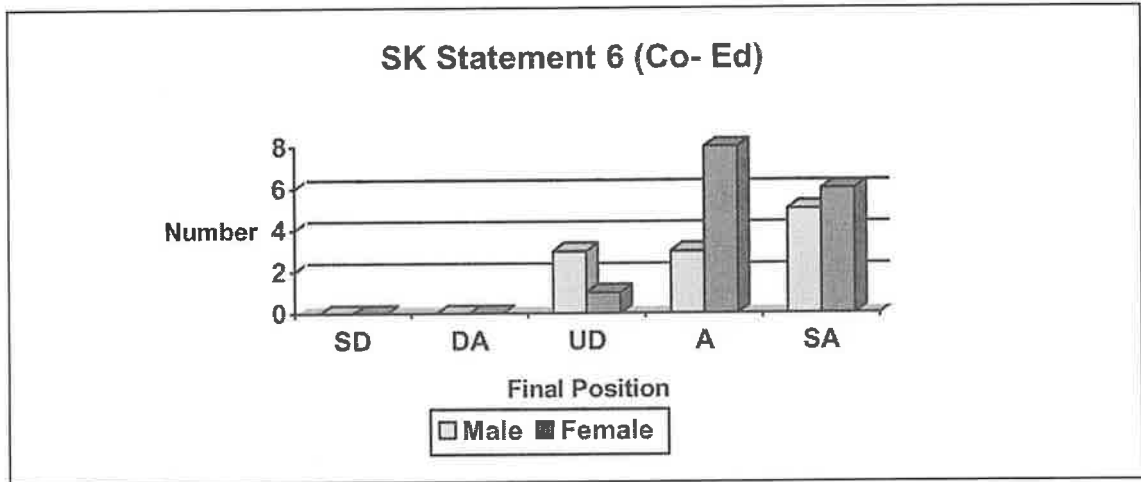
DA=0

UD=4(1F,3M)

A=11(8F,3M)

SA=11(6F,5M)

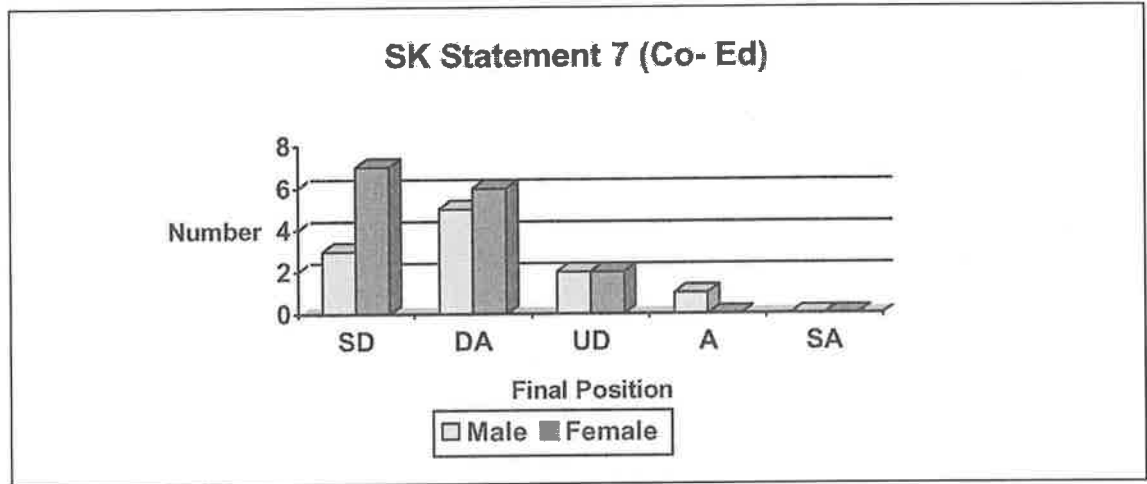
(A-SA)=1 (M)



|   |    |     |    |    |   |    |
|---|----|-----|----|----|---|----|
|   | 7. |     | DA |    |   |    |
|   |    | 1 M |    |    |   | 2  |
|   |    |     |    |    | M | 3  |
|   |    |     |    | UD |   | 4  |
| F |    | SD  |    |    |   | 5  |
| F |    | SD  |    |    |   | 6  |
| F |    | SD  |    |    |   | 7  |
| F |    | SD  |    |    |   | 8  |
| M |    | SD  |    |    |   | 9  |
| F |    |     | DA |    |   | 10 |
| F |    |     |    | UD |   | 11 |
| F |    |     | DA |    |   | 12 |
| F |    |     | DA |    |   | 13 |
| F |    |     |    | UD |   | 14 |
| M |    | SD  |    |    |   | 15 |
| M |    |     | DA |    |   | 16 |
| F |    |     | DA |    |   |    |
| F |    |     |    |    |   |    |

|   |  |    |    |    |
|---|--|----|----|----|
|   |  | SD |    | 17 |
| M |  | SD |    | 18 |
| F |  |    | DA | 19 |
| M |  | SD |    | 20 |
| F |  | SD |    | 21 |
| F |  |    | DA | 22 |
| M |  |    |    | 23 |
|   |  |    | UD | 23 |
| M |  |    | DA | 24 |
| M |  |    | DA | 25 |
| F |  |    | DA | 26 |
| M |  |    |    |    |

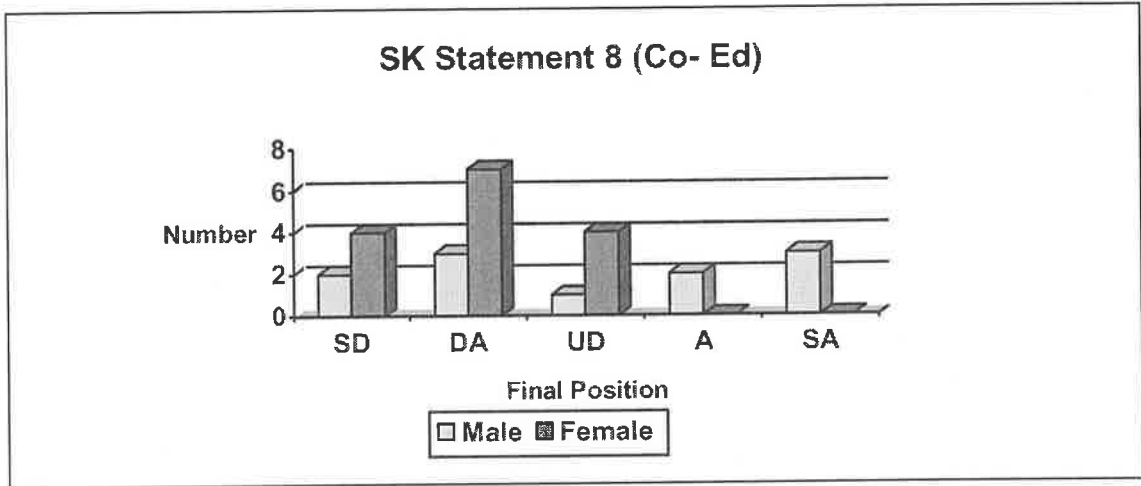
SD=10(7F,3M)      DA=11(6F,5M)      UD=4(2F,2M)      A=1 (M)      SA=0



|    |  |     |    |    |   |
|----|--|-----|----|----|---|
| 8. |  |     | DA |    |   |
|    |  | 1 M |    |    |   |
|    |  |     |    | SA | 2 |
|    |  | M   |    |    |   |
|    |  |     | UD |    | 3 |
| F  |  |     |    |    |   |
|    |  | SD  |    |    | 4 |
| F  |  |     |    |    |   |
|    |  | SD  |    |    | 5 |
| F  |  |     |    |    |   |
|    |  |     | DA |    | 6 |
|    |  | F   |    |    |   |
|    |  | SD  |    |    | 7 |
| M  |  |     |    |    |   |

|   |  |    |  |    |    |    |
|---|--|----|--|----|----|----|
|   |  | SD |  |    |    | 8  |
| F   |  | SD |  |    |    | 9  |
| F   |  |    |  | UD |    | 10 |
| F   |  |    |  |    |    | 11 |
|   |  | DA |  |    |    | 12 |
| F   |  | DA |  |    |    | 13 |
|   |  |    |  |    | SA | 14 |
| M   |  | SD |  |    |    | 15 |
| M   |  |    |  | UD |    | 16 |
| F   |  |    |  | UD |    | 17 |
| F   |  | DA |  |    |    | 18 |
| M   |  | DA |  |    |    | 19 |
| F   |  | DA |  |    |    | 20 |
| M   |  | DA |  |    |    | 21 |
| F   |  | DA |  |    |    | 22 |
| F   |  |    |  |    | A  | 23 |
| M   |  |    |  | UD |    | 24 |
| M   |  |    |  |    | A  | 25 |
| M   |  | DA |  |    |    | 26 |
| F   |  |    |  |    | SA |    |
| M   |  |    |  |    |    |    |
| SD=6(4F,2M) DA=10 (7F,3M) UD=5 (4F,1M) A=2 (M) SA=3 (M) |  |    |  |    |    |    |





**Highest agreement: SA= 20 (8F,12M) A=6 (F)**

- (2) ANNIE is right, RYAN has a right to be tested because he has a right to know what's going to happen to him.  
A=9(5F,4M)
- (1) JENNIFER is right to argue that even though she knows that there is a risk of her child inheriting Friedreich's ataxia, she wants 'nature' to take its course.  
A=20 (13F,7M) SA=3(2F,1M)
- (3) JENNIFER'S doctor is right to argue that Jennifer must do something now that she knows the risk.  
SA=11(6F,5M) A=11(8F,3M)
- (6) RYAN and JENNIFER were right to select MARK to be free of Friedreich's ataxia.  
SA=1(M) A=16 (10F,6M)
- (5) In selecting MARK, RYAN and JENNIFER were only doing what was best for him

**Highest disagreement: SD =9(7F,2M) DA=14 (7F,7M)**

- (4) RYAN'S doctor is right to argue that Ryan shouldn't be tested if there is no treatment available.  
SD = 10(7F,3M) DA=11(6F,5M)
- (7) RYAN was right to select the sex of his child.  
SD=6(4F,2M) DA=10 (7F,3M)
- (8) RYAN was right to select MARK to have the best qualities.

**Highest indecisive: UD=13 (6F,7M,)**

- (1) JENNIFER is right to argue that even though she knows that there is a risk of her child inheriting Friedreich's ataxia, she wants 'nature' to take its course  
UD=7 (4F,3M)
- (5) In selecting MARK, RYAN and JENNIFER were only doing what was best for him  
UD=5 (4F,1M)
- (8) RYAN was right to select MARK to have the best qualities.

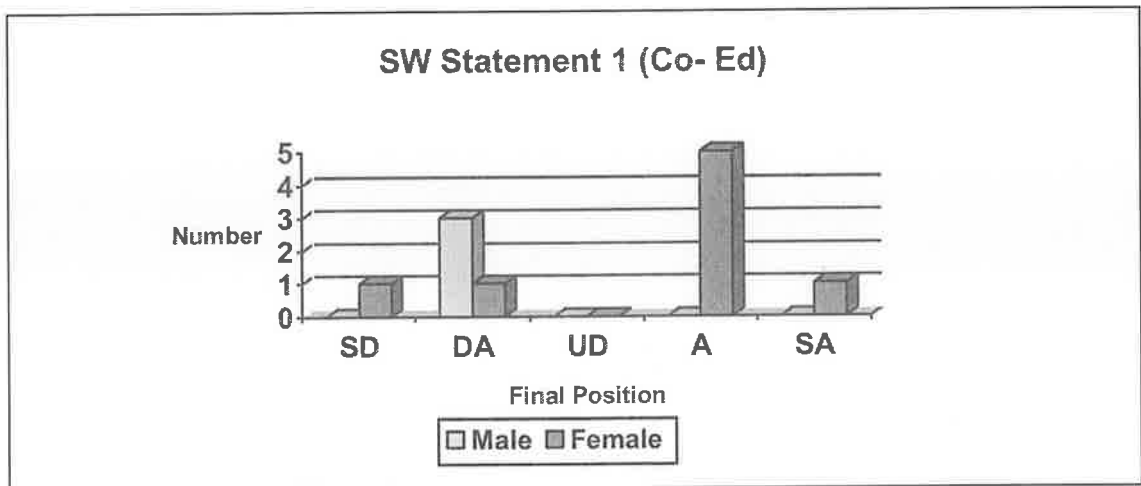
**Total no. change of mind: 3 out of a possible 208 (26 students x 8 stmts)**

**Appendix P: SW Film Discussion Survey Results**  
*(The Gift)*

KEY: Total =10 (7 F + 3 M)  
 SD Strongly disagree  
 DA Disagree  
 UD Undecided  
 A Agree  
 SA Strongly agree  
 (A-SA), (UD-DA), etc Change of position from A to SA, UD to DA etc

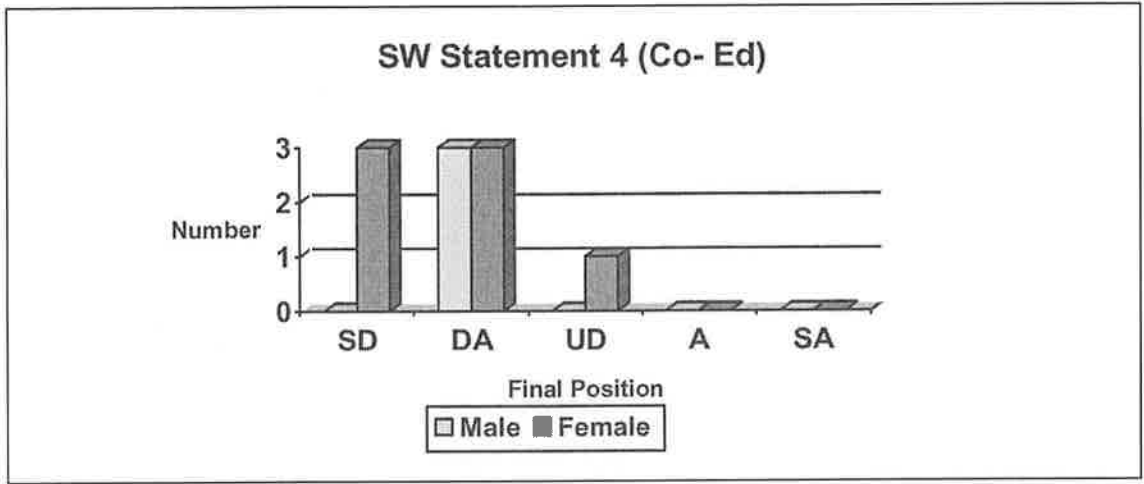
|          |   |    |  |  |  |   |    |    |
|----------|---|----|--|--|--|---|----|----|
| Student: |   |    |  |  |  |   |    |    |
| 1.       |   |    |  |  |  | A |    | 1  |
|          |   | F  |  |  |  |   |    | 2  |
|          |   | SD |  |  |  |   |    | 3  |
|          | F |    |  |  |  |   | SA | 4  |
| F        |   |    |  |  |  |   |    | 5  |
|          |   |    |  |  |  |   |    | 6  |
|          |   |    |  |  |  |   |    | 7  |
|          |   |    |  |  |  |   |    | 8  |
| M        |   |    |  |  |  |   |    | 9  |
|          |   |    |  |  |  |   |    | 10 |
|          |   |    |  |  |  |   |    | 11 |
|          |   |    |  |  |  |   |    | 12 |
|          |   |    |  |  |  |   |    | 13 |
|          |   |    |  |  |  |   |    | 14 |
|          |   |    |  |  |  |   |    | 15 |
|          |   |    |  |  |  |   |    | 16 |
|          |   |    |  |  |  |   |    | 17 |
|          |   |    |  |  |  |   |    | 18 |
|          |   |    |  |  |  |   |    | 19 |
|          |   |    |  |  |  |   |    | 20 |
|          |   |    |  |  |  |   |    | 21 |
|          |   |    |  |  |  |   |    | 22 |
|          |   |    |  |  |  |   |    | 23 |
|          |   |    |  |  |  |   |    | 24 |
|          |   |    |  |  |  |   |    | 25 |
|          |   |    |  |  |  |   |    | 26 |
|          |   |    |  |  |  |   |    | 27 |
|          |   |    |  |  |  |   |    | 28 |
|          |   |    |  |  |  |   |    | 29 |
|          |   |    |  |  |  |   |    | 30 |
|          |   |    |  |  |  |   |    | 31 |
|          |   |    |  |  |  |   |    | 32 |
|          |   |    |  |  |  |   |    | 33 |
|          |   |    |  |  |  |   |    | 34 |
|          |   |    |  |  |  |   |    | 35 |
|          |   |    |  |  |  |   |    | 36 |
|          |   |    |  |  |  |   |    | 37 |
|          |   |    |  |  |  |   |    | 38 |
|          |   |    |  |  |  |   |    | 39 |
|          |   |    |  |  |  |   |    | 40 |
|          |   |    |  |  |  |   |    | 41 |
|          |   |    |  |  |  |   |    | 42 |
|          |   |    |  |  |  |   |    | 43 |
|          |   |    |  |  |  |   |    | 44 |
|          |   |    |  |  |  |   |    | 45 |
|          |   |    |  |  |  |   |    | 46 |
|          |   |    |  |  |  |   |    | 47 |
|          |   |    |  |  |  |   |    | 48 |
|          |   |    |  |  |  |   |    | 49 |
|          |   |    |  |  |  |   |    | 50 |

SD=1(F) DA=4 (1F, 3M) UD=0 A=5 (F) SA=1(F)



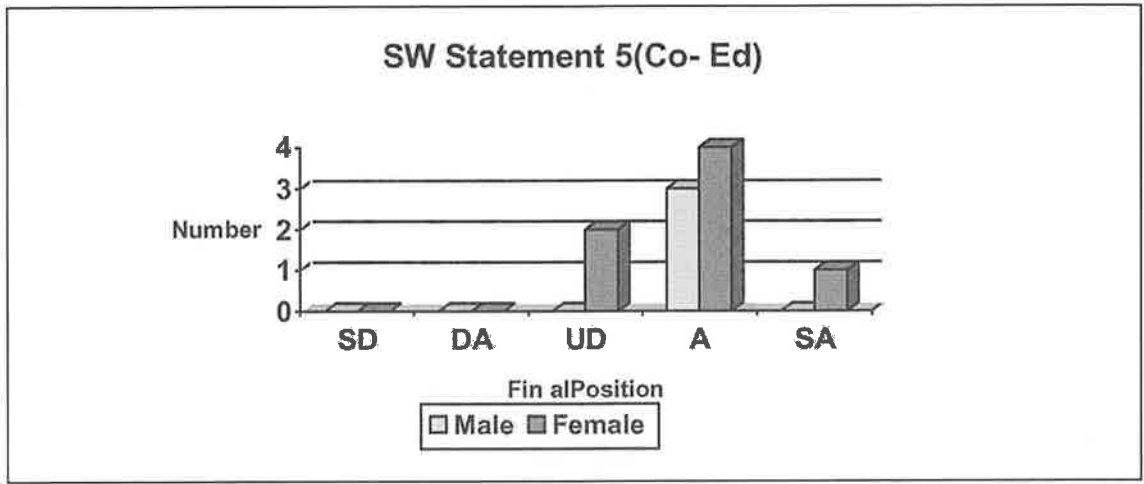






5.

|   |      |      |         |            |
|---|------|------|---------|------------|
|   |      |      | A       |            |
|   | 1 F  |      |         |            |
|   |      | SA   |         |            |
|   |      | 2 F  |         |            |
|   |      | UD   |         | 3          |
|   | F    |      | A       | 4          |
|   | M    |      |         |            |
|   |      | UD   |         | 5          |
|   | F    |      | A       | 6          |
|   | M    |      | A       | 7          |
|   | F    |      | A       | 8          |
| M |      |      | A       | 9          |
| F |      |      | A       | 10         |
| F |      |      |         |            |
|   | SD=0 | DA=0 | UD=2(F) | A=7(4F,3M) |
|   |      |      | SA=1(F) |            |

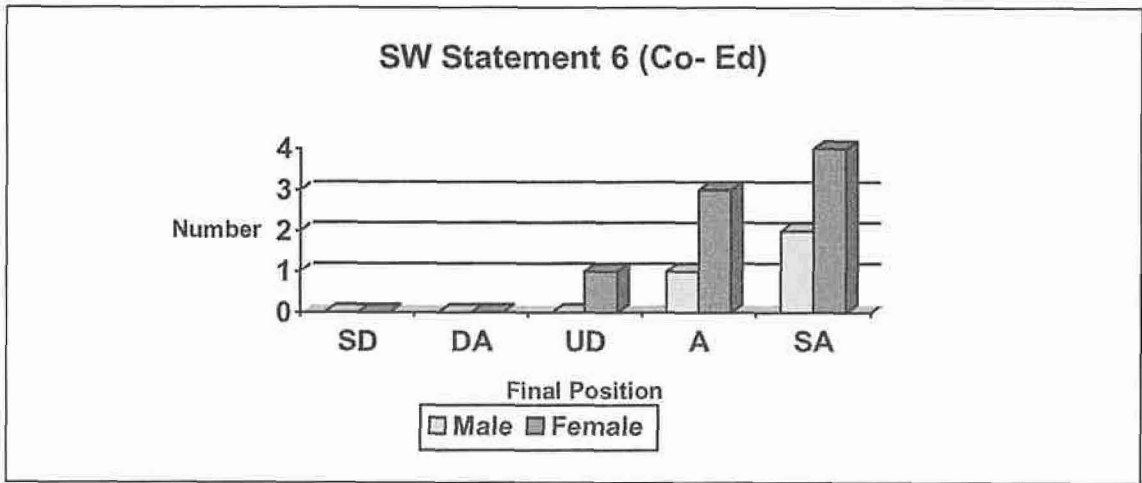


6.

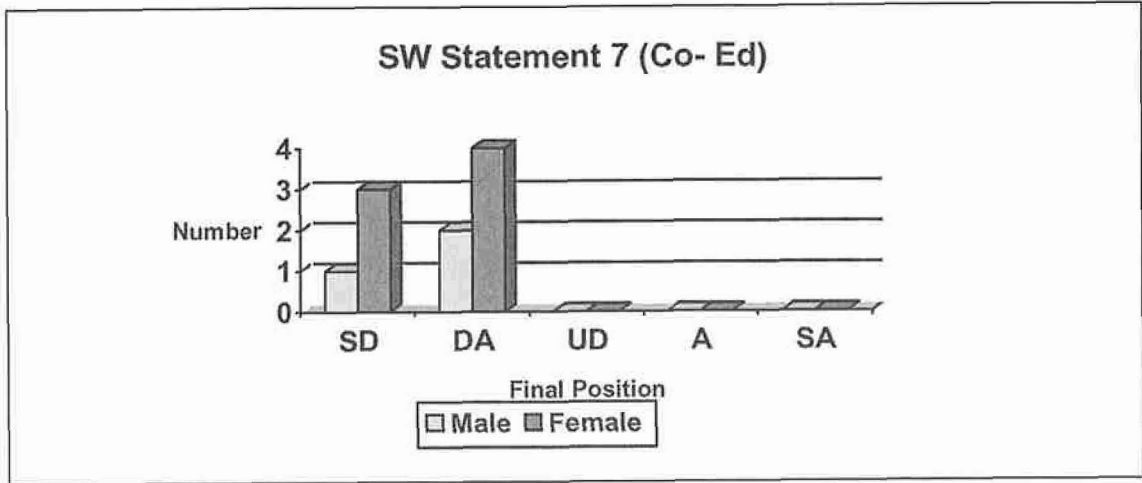
|   |     |            |    |
|---|-----|------------|----|
|   | 1 F | A          |    |
|   |     | SA         | 2  |
|   |     | F<br>A     | 3  |
| F |     | SA         | 4  |
| M |     |            |    |
|   | UD  |            | 5  |
| F |     |            |    |
|   |     | A          | 6  |
| M |     |            |    |
|   |     | A [and] SA | 7  |
| F |     |            |    |
|   |     | SA         | 8  |
| M |     |            |    |
|   |     | SA         | 9  |
| F |     |            |    |
|   |     | SA         | 10 |
| F |     |            |    |

SD=0      DA=0      UD=1(F)      \*A=4(3F,1M)      \*SA=6(4F,2M)

\*Tally= 11 for STMT 6; one girl chose A and SA

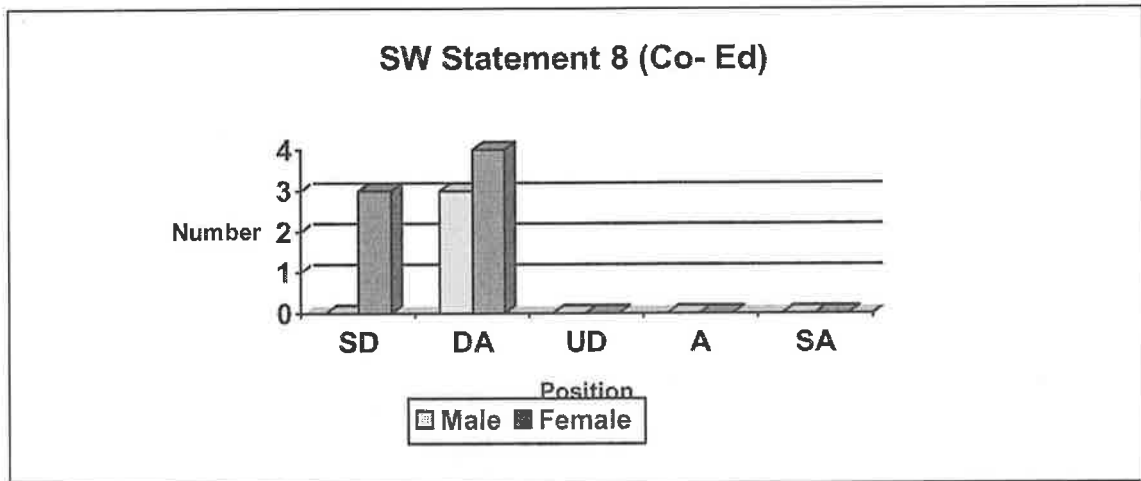


|              |    |              |    |      |      |
|--------------|----|--------------|----|------|------|
|              | 7. |              | DA |      |      |
|              |    | 1 F          |    |      |      |
|              | SD |              |    |      | 2    |
| F            |    |              | DA |      | 3    |
| F            |    |              | DA |      | 4    |
| M            |    |              | DA |      | 5    |
| F            |    |              | DA |      | 6    |
| M            |    |              | DA |      | 7    |
| F            |    |              |    |      | 8    |
| M            | SD |              |    |      | 9    |
| F            | SD |              |    |      | 10   |
| F            | SD |              |    |      |      |
| SD=4 (3F,1M) |    | DA=6 (4F,2M) |    | UD=0 | A=0  |
|              |    |              |    |      | SA=0 |



|          |     |              |  |      |
|----------|-----|--------------|--|------|
| 8.       |     | DA           |  |      |
|          | 1 F |              |  |      |
|          |     | DA           |  | 2    |
|          | F   | DA           |  | 3    |
| F        |     | DA           |  | 4    |
| M        |     |              |  | 5    |
|          | SD  |              |  |      |
| F        |     | DA           |  | 6    |
| M        |     | DA           |  | 7    |
| F        |     | DA           |  | 8    |
| M        |     |              |  | 9    |
|          | SD  |              |  |      |
| F        |     |              |  | 10   |
|          | SD  |              |  |      |
| F        |     |              |  |      |
| SD=3 (F) |     | DA=7 (4F,3M) |  | UD=0 |
|          |     |              |  | A=0  |
|          |     |              |  | SA=0 |





**Highest agreement: SA= 8 (6F,2M)**

- (2) ANNIE is right, RYAN has a right to be tested because he has a right to know what's going to happen to him.

**SA=6 (4F, 2M) A=4 (3F,1M)**

- (6) RYAN and JENNIFER were right to select MARK to be free of Friedriech's ataxia.

**Highest disagreement: DA=6 (3F,3M) SD= 3 (F)**

- (4) RYAN'S doctor is right to argue that Ryan shouldn't be tested if there is no treatment available.

**DA=6 (4F,2M) SD=4 (3F,1M)**

- (7) RYAN was right to select the sex of his child.

**DA=7 (4F,3M) SD=3 (F)**

- (8) RYAN was right to select MARK to have the best qualities.

**Highest indecisive: UD=2 (F) for both**

- (3) JENNIFER'S doctor is right to argue that Jennifer must do something now that she knows the risk.

- (12) In selecting MARK, RYAN and JENNIFER were only doing what was best for him.

**Total no. change of mind: 0 out of a possible 80 (10 students x 8 stmts)**