

Towards a Pedagogy for Teaching Computer Ethics in Universities in Bahrain

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*This thesis is dedicated to my mother, the
courageous, determined and powerful woman
who has always inspired me.*

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The UK has been my home for seven years. I did not realise that I had become so attached to the places, the people and the culture until I went back to Bahrain. I will always remember the smiling, welcoming faces of the British people; I will always long for the Christmas songs and for the snow to fall; it will always be a bittersweet memory!

Abstract

This study presents a critical investigation into the teaching of computer ethics. A qualitative pluralistic approach (a mixture of qualitative approaches) was used to investigate case studies of teaching computer ethics to university-level students from Bahrain. The main issue was that ethics to Arabs and Muslims is a matter of religion than a matter of philosophy whereas the dominant perception in the academic literature which discussed computer ethics teaching is that computer ethics is a form of practical philosophy and hence separate from religion. In order to shed light on this, the study investigated computer ethic's perceptions and teaching practices which were occurring in universities in Bahrain. The study found that the issue was not a matter of perception but rather a matter of confusion and a misconception. Computer ethics was being confused with morality, religion, basic computer skills to name just a few. And such confusion was causing computer ethics to gradually disappear from the curriculum and become substituted with concepts which were not necessarily capable of building students' ethical thinking. The study recommends that computer ethics teachers and policy makers from Bahrain distinguish computer ethics from religion, morality and from any other concept and identify it as *an independent field of study*, also teachers need to involve their students in social and ethical analysis of various kinds so that students understand that ethics is not a set of rules on what is forbidden and allowed aimed at providing straightforward answers to a given problem but rather ethics is a 'cognitive tool'; a mechanism through which different competing ethical theories and standards are used to reflect on a given problem.

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Glossary

Abduction - Reasoning process which starts with a seemingly unrelated or incomplete set of data and then proceeds to reach the likeliest possible conclusion.

Access - Gaining permission to conduct interviews, observations or collect data in a particular social setting.

Applied Ethics - A branch of philosophy concerned with analysing moral controversies. Examples of applied ethics are bioethics and business ethics.

Bias - Inclination or prejudice for or against an idea or a concept.

Cognitive Thinking - Mental process through which learners analyse, evaluate and solve problems. See also *Knowledge Construction*.

Conceptual Framework - A collection of ideas which the research problem, question, literature review and field data collectively project.

Conflated - Confusing two concepts together and giving rise to a fallacy.

Convention - Standards or rules.

Cultural Relativism - Truth or what is valid is relative to individual cultures.

Deduction - Reasoning process through which the researcher moves from a hypothesis or an assumption about the real world to observations or findings. The hypothesis is tested along the way.

Epistemology - The study of the nature of knowledge, addressing such questions as what is knowledge and how to acquire it?

Ethics - The study of moral systems.

Explanatory Critique - A critique which follows the diagnosis of a certain phenomenon, it is part of an explanation of why a certain belief or behaviour is considered false.

Gatekeepers - Individuals who have the power to grant or withhold access to people or research sites.

Hypothetico-Deductive Model - Also termed the *scientific method*. This is a model for scientific investigation and involves the formulation and testing of hypotheses. It is in contrast with inductive research methods.

Idealism - A stance towards reality which holds that the social world consists of ideas originating from perceptions and that reality exists only in the mind. Idealism is the opposite of realism. Realism is the belief that reality exists independently of observers.

Induction - Reasoning process through which the researcher moves from observations of individual instances to the formulation of a theory.

Inference - Reasoning process which drives conclusions from a certain premise. The process can be inductive or deductive.

Inherent - Originating or existing in something.

Knowledge Construction - Learning process which involves cognitive thinking and analysis.

Mechanisms - Also termed *causal mechanisms* or *generative mechanisms*. Mechanisms are the interplay of cause and effect between one transfactual condition and another.

Mental Schema - A set of linked mental representations of the world.

Morality - Codes of conducts put forward by a religion, a society or accepted by an individual.

Ontology - The study of being, existence or reality addressing such questions as what is the meaning of being and what can be said to exist?

Paradigm - A basic set of beliefs which guide action.

Pedagogy - Strategies of instruction; theories, beliefs and policies which inform the process of teaching.

Powers - Potentialities which may or may not be exercised.

Professional Ethics - A field of study concerned with one's behaviour and conduct. Recurring themes in professional ethics are codes of ethics, ethical decision making and ethical theory.

Retroduction - Reasoning process through which the researcher moves from knowledge of one thing to knowledge of something else. Retroduction encompasses both induction and deduction. It is similar to Abduction.

Social Structures - System of human relations.

Structures - The composition of an object, making each object what it is and not something else. Methodologically speaking, the building blocks of a single structure are the total number of transfactual conditions and causal mechanisms in that structure.

Theoretical Sensitivity - The ability to recognise what is important in the data and to give meanings to the data.

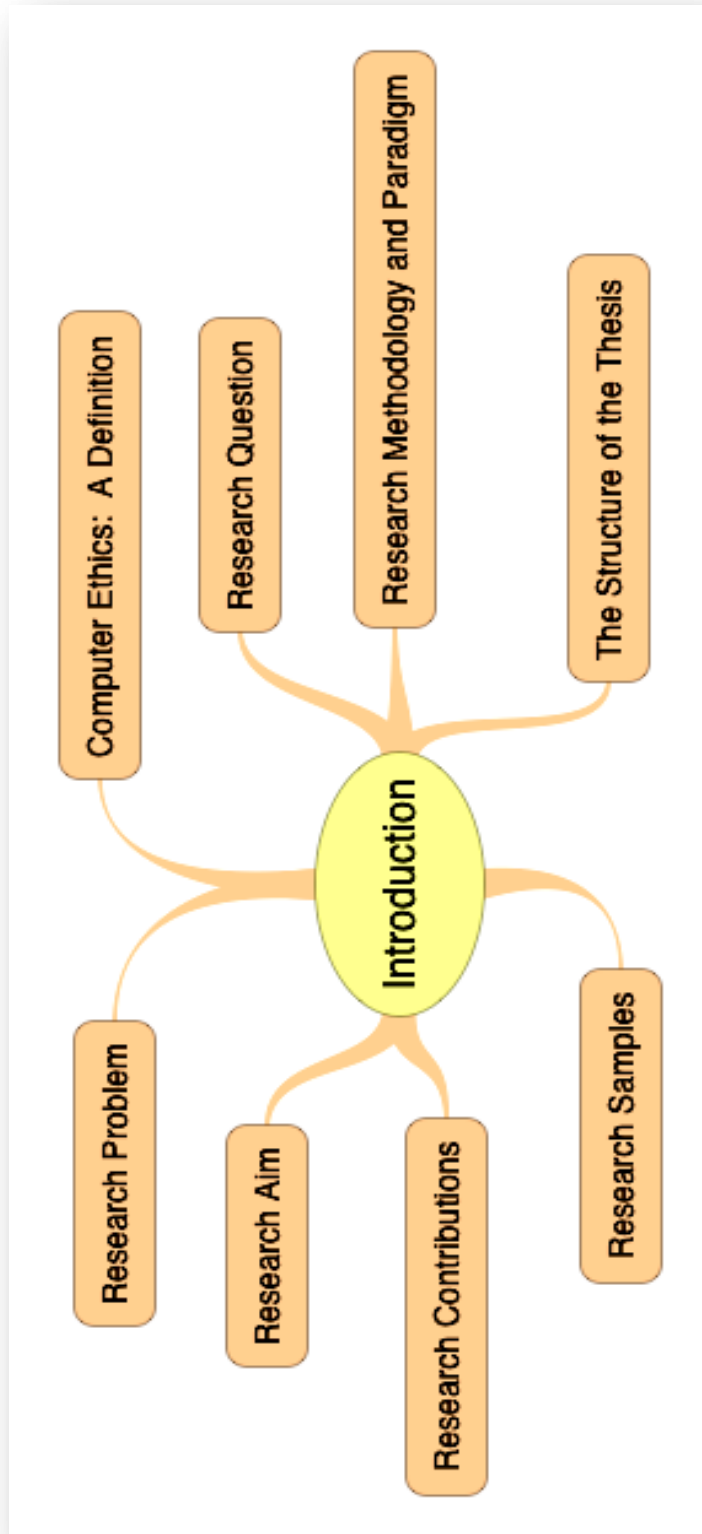
Theory - Plausible relationships produced among concepts and sets of concepts.

Transfactual - Beyond the factual or beyond the empirical.

Transfactual Conditions - Preconditions for an object to be what it is and not something else.

1. Introduction

Figure 1.1 A map of this chapter



Over the last 50 years computer technologies have altered the lives of most of the people on earth. The information revolution exemplified in the World Wide Web has altered the way in which people shop, socialise, learn and communicate (Schultz, 2006). Technologies in general are making our lives easier; however along with the benefits come social and ethical concerns. Such concerns or issues as computer crimes and abuses, the impact of Information Technology (IT) on society, intellectual property rights, democracy and civil liberties in cyberspace and issues of privacy in the information age. These are only a few of a diverse and large collection of issues which feed the debates in the field of computer ethics.

1.1 COMPUTER ETHICS: A DEFINITION

Computer ethics has a number of definitions. Discussions on the nature and scope of the field of computer ethics are presented in the ‘Theoretical Framework’ chapter (chapter 2) in this thesis but a definition to start with is that computer ethics is the field of study which examines the social impacts and ethical issues of Information Technology.

1.2 RESEARCH PROBLEM

Brey (2007), Collste (2008) and Wong (2012) suggested that at the time of writing their papers computer ethics concepts, theories and discussions have been predominantly western in nature and computer ethics as a topic has mainly been discussed by western scholars. Brey (2007), who attempted to develop a global concept for computer ethics, found that the western and non-western nations have different grounds for moral judgment and different understandings of the concept of ethics. He thought that a global concept could not be established without an understanding of the ethics of other nations. Brey (2007) called for an intercultural dialogue between the western and non-western scholars to bridge the cultural relativism gap in relation to computer ethics. This study is perceived to be contributing to the body of literature which is, thus far, not fully informed of the ethics of non-western nations in relation to computer ethics.

The review of the literature which was conducted as part of this study came to a somewhat similar conclusion to that of Brey (2007) Collste (2008) and Wong (2012).

The teaching practices reported in the literature were of cases occurring mainly in the west. Furthermore, computer ethics as a concept in the literature is based on the western, and in particular the secular western, understanding of ethics where ethical judgment becomes an exercise of the mind and hence based on philosophical ethics rather than based on the standards of one particular religion. However, such a conception of how to formulate ethical judgments is not universal. For instance, Al Brazi (2001) suggested that, in the Arabic world, ethical judgment is considered a matter of religion rather than a matter of philosophy. Also, Al Jabri (2006) reported that Arabs have made few contributions to their ancient moral philosophy because Islamic ethics, which is embedded in the Sharia Law, is considered the most appropriate and complete source for ethical judgment. This all indicates that computer ethics as a concept, and perhaps also the pedagogies of computer ethics, might be different in the Arabic world. Nevertheless, publications on the subject of teaching computer ethics in the Arabic or Muslim world were almost non-existent. Throughout the life time of this study, the researcher has been continually searching in libraries and in online databases for publications of this sort but only one paper was located: that of Al A'ali (2008). The paper was not fully dedicated to the issue of teaching computer ethics; as such many questions remained unanswered. Such questions as what was the foundation for the ethical discussions in Al A'ali's (2008) computer ethics classes? Which standards of analysis were being used? What kind of role did the religion of Islam play in the teaching and learning of computer ethics?

The scarcity of information in relation to teaching computer ethics in the Arabic/Muslim world presents computer ethics educationalists, especially those who operate outside of the west such as the researcher of this study, with an uncharted realm when it comes to the teaching of computer ethics to students who might not differentiate between religion and ethics.

1.3 RESEARCH AIM

This study set out to examine the computer ethics teaching practices which were occurring in universities in Bahrain in order to identify hindrances and struggles, if any, standing in the way of teaching computer ethics, this in order to inform teaching practices. This was done through presenting descriptions and critiques of the teaching

practices in Bahrain and through comparing them with the computer ethics concepts and practices reported in the literature. Bahrain is the home country of the researcher of this study and she wanted to improve her future practice which would involve the teaching of computer ethics. This study, as such, was instigated by a practical need: the need for improvement.

1.4 RESEARCH QUESTION

This study was guided by the following question:

- * *How is computer ethics perceived and taught in Bahrain and how can any associated challenges be addressed?*

Further questions were developed to guide the fieldwork:

- What are the **topics** that are being discussed in the computer ethics classes?
- Which **standard(s) of analysis**, if any, are being used for the analysis of computer ethics issues?
- Which **analysis method(s)**, if any, are being used for the analysis of computer ethics issues?
- Is there any involvement of **religion** in the teaching of computer ethics? If yes, what role does/do the religion(s) played in the teaching of the subject?

In addition to the above questions, background information was sought about the teachers, the computer ethics courses¹ and the universities involved. These were intended to place the findings of the study into their context and give extra meaning to the findings.

1.5 RESEARCH CONTRIBUTIONS

This research provides a platform for improvement; it provides computer ethics teachers, especially those who operate in the Arabic/Muslim countries, with a resource so that they can transfer or generalise what they deem fit of the knowledge and cases

¹ The term 'course' refers to a unit of teaching (a subject) which typically lasts one academic term. A course is equivalent to a module in the British sense.

presented in this study. This study, however, is not limited to Bahrain or to Arabs and Muslims. It communicates certain interesting culture and pedagogy-related aspects in relation to computer ethics teaching to the wider community of computer ethics scholars for consideration and reflection. In general, the aim was not to build an ideal computer ethics curriculum for the Arabic student/teacher but rather to highlight hindrances, misconceptions, powers, structures and mechanisms which maintained certain debilitating conditions in the path of teaching computer ethics.

This study also contributes to the body of literature which is almost lacking publications on the subject of ‘teaching computer ethics in Arabic/Muslim countries’; hence, it contributes to bridging the cultural relativism gap in relation to computer ethics.

The ‘Theoretical Framework’ chapter (chapter 2) in this study provides a bounded system of knowledge, which does not exist thus far under one single publication, of the issues related to the teaching of computer ethics. As such, this study provides computer ethics educationalists with a reference or a review of the literature of the issues which are most important to them.

1.6 RESEARCH SAMPLES

This study involved all of the Bahraini universities with the exception of The Medical University of Bahrain and The Arabian Gulf University because these were not relevant to this study; the former is a medical university and the latter is a postgraduate university whereas this study was aiming to examine computer ethics courses taught to undergraduate computing students.

The researcher searched for computer ethics courses in the computing programmes of the targeted universities and it appeared that computer ethics as a stand-alone (separate) course was being taught at five universities out of a total ten. One of these universities refused to participate. The focus, as a result, shifted to four universities; in addition, a special case was studied in which, it was claimed, religion was involved.

The universities involved in this study are considered cases (each separately) and within each there are one or two cases of computer ethics teaching identified by the name of

the teacher. Table 5.2 on page 146 provides a visual representation of the cases. The purposive sampling or theoretical sampling concept guided the sampling procedure in this study.

1.7 RESEARCH METHODOLOGY AND PARADIGM

Data were collected by means of fieldnotes, observations, questionnaires, documents and interviews. This study maintained a multi-method (qualitative) approach combining techniques, philosophies and methods from ethnography, case study research, critical theory studies and hermeneutics; taking inspirations from grounded theories, action research and from the general qualitative research approaches. As for the paradigm, this study was inspired by Bhaskar's (1978) philosophy of critical realism.

1.8 THE STRUCTURE OF THIS THESIS

The 'Theoretical Framework' chapter (chapter 2) of this thesis highlights topics related to computer ethics education attempting to answer three main questions: 'what is computer ethics?', 'how to teach it', and 'how religion especially Islam is relevant?'

The 'Research Context' chapter (chapter 3) in this thesis presents background and context-related information about the researcher and the research. The chapter commences with information about the researcher of this study then moves to topics that were deemed relevant to this study such as the status of education in the Arab world and the social structure of the modern Bahraini society.

The 'Methodology' chapter (chapter 4) starts with an overview of the paradigms which exist in the social sciences then proceeds to argue for a realist approach. The chapter also talks about the type of this research and why it was meant to be qualitative, the approach adopted for this study explaining why a multi-method approach was perceived the most suitable, the samples and how the participants were recruited. Also the methods utilised to gather data are discussed in this chapter. This study utilised fieldnotes, observations, questionnaires, documents and interviews to collect data. Field issues are also discussed such as the issue of access and ethical considerations. An

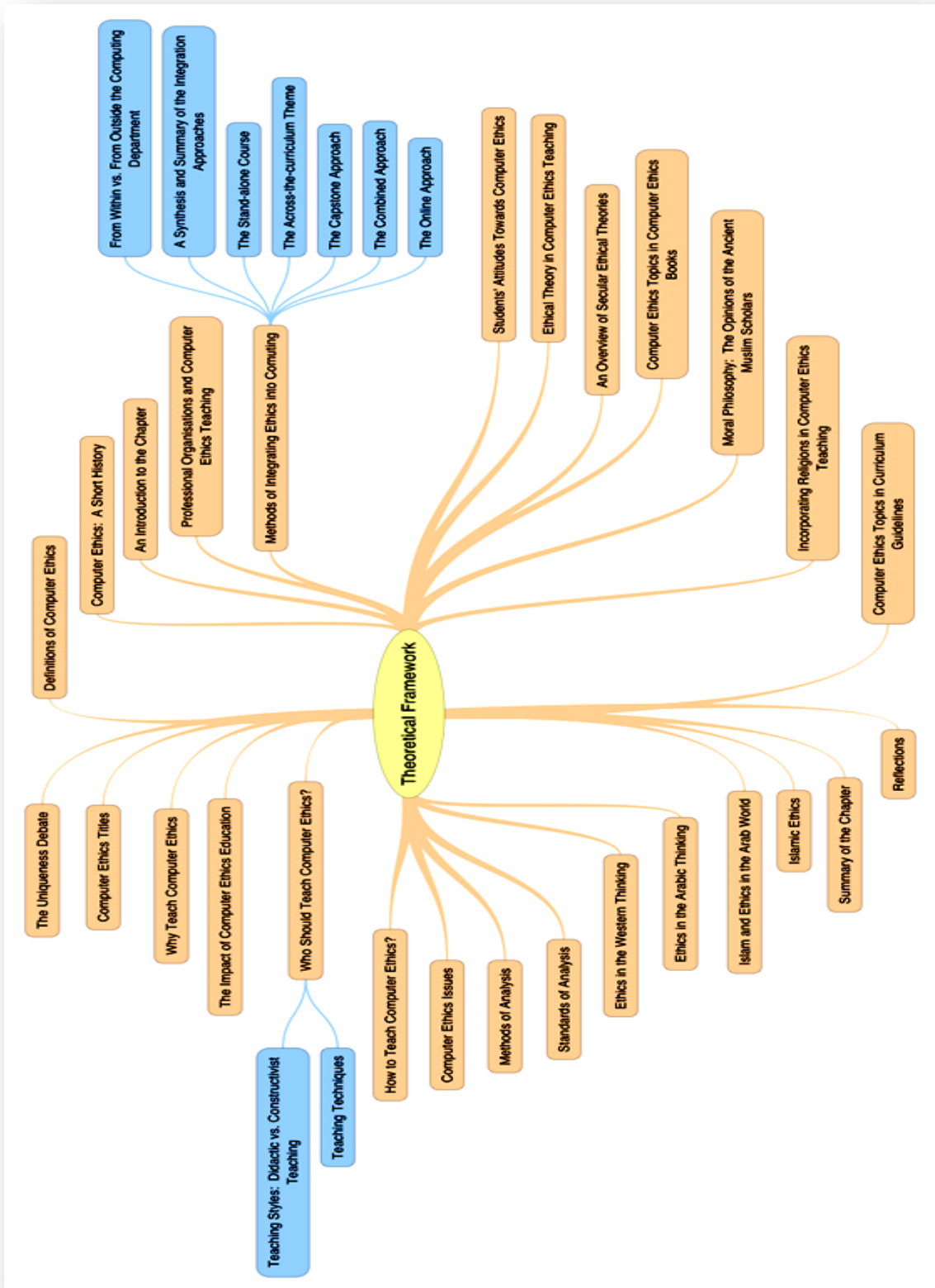
extensive section is dedicated to discuss the analysis approach. The chapter ends with a discussion of the conceptions of validity reliability and generalisation arguing for alternatives.

The 'Findings and Discussion' chapter (chapter 5) commences with short descriptions of the case studies involved then moves to provide explanations and critiques of the evidence found in relation to the research question in light of the evidence found in the interviews, observations, questionnaires and course materials.

The 'Conclusions and the Way Forward' chapter (chapter 6) provides a summary and a synthesis of the thesis presenting firstly the assumptions which underpinned the study and the results from the empirical study and how the researcher view them in light of the theoretical framework and in light of the data presented in the 'Research Context' chapter providing, in light of this all, recommendations on how to improve the teaching of computer ethics.

2. Theoretical Framework

Figure 2.1 A map of this chapter



2.1 AN INTRODUCTION TO THE CHAPTER

The review of literature in this chapter was inspired by three main questions: ‘what is computer ethics?’, ‘how to teach it’, and ‘how religion especially Islam is relevant?’ The chapter starts with a brief review of the history of the field of computer ethics then moves to what is known in the literature as ‘the uniqueness debate’ in which different scholars discuss the nature and scope of the field. A brief section, then, follows on the different titles used to refer to the field. Then the chapter moves to topics on the teaching of computer ethics attempting to answer questions surrounding ‘why and how to teach computer ethics?’, ‘what to teach in computer ethics?’, ‘who should teach computer ethics?’ and ‘how to integrate computer ethics in to the curriculum?’; this with a special attention to the role of ethical theories and standards of analysis in the teaching of computer ethics, this in an attempt to identify how the scholars in the field recommend judging the ethicality of situations. Then the chapter approaches the end with topics on computer ethics and religion. The researcher attempted, first, to identify how ethics is portrayed or realised in the English literature vs. how it is portrayed or realised in the Arabic literature. Then a review on the Islamic moral philosophy follows. Then there are brief reviews on Islamic Ethics and the relationship between Arabs and Islam, this in order to give the reader a feel of the context surrounding religion and ethics in the Arab world. The final section demonstrates the different views on the incorporation of religion into ethics education. The chapter ends with a summary and a reflection on the main ideas discussed in the literature.

2.2 COMPUTER ETHICS: A SHORT HISTORY

Computer ethics is relatively a young field. According to Bynum (2001), the history of computer ethics goes back to the 1950s when Norbert Wiener, an American professor, presented a discussion of the implications of machines in his book ‘The human use of human beings’. Wiener did not mention the term computer ethics but predicted that intelligent machines, such as computers, would affect societies and people in such a way that policy makers would have to introduce new laws and that scholars in different fields would need to study the impacts of machines (Bynum and Rogerson, 2004a). In the 1970s, and when personal computers became widely available, some of Wiener’s predictions became true. For example, in the US, privacy-related concerns emerged

about information which was kept in centralised databases (Johnson, 2001). During this time the term computer ethics was coined by Walter Maner (2004), a computer scientist and philosopher and, in the 1980s, James Moor (1985), a prominent figure in the field, wrote his famous article: ‘What is computer ethics?’

2.3 DEFINITIONS OF COMPUTER ETHICS

Bynum and Rogerson (2004b) suggested that the nature and boundaries of the field of computer ethics is still being thought through by computer ethics scholars. Bynum and Rogerson (2004b) identified five different definitions made by prominent figures from the field. The following section elaborates on this.

2.4 THE UNIQUENESS DEBATE

Differences in perception towards the concept of computer ethics stimulated what is known in the literature as the ‘uniqueness debates’ in which scholars who are involved in the debate agreed that computer ethics as a field of study is unique but each viewed this uniqueness differently. For example, Deborah Johnson (1994a) decided that computer ethics is not unique because it is part of the applied ethics field however computer ethics *issues* are unique. She said: they are new versions of the same old existing moral problems. What made these issues unique in her view is the involvement of technology. She thought technology complicates the ordinary moral problems in the sense that computer ethics issues are ordinary moral issues but with a little bit of a twist.

James Moor (1985) thought that computer ethics depends on the applied ethics for the analysis of its cases but it can also be considered a separate discipline in its own right. Hence, in Moor’s (1985) view, computer ethics is a unique field bringing about unique issues. Moor (2001) thought that the uniqueness of computer ethics issues stems from the involvement of technology but that computer ethics, as a field of study, will evolve in the future as a unique discipline. According to Moor (1990; 1999), there are often misconceptions about how to develop or use technology in an ethical way; these misconceptions and policy vacuums are likely to intensify in the future as technology starts to become ubiquitous and this, Moor (2004) said, will strengthen the importance of computer ethics; consequently, the field will grow as a separate discipline.

Rogerson and Bynum (1996) thought that computer ethics is unique and interdisciplinary. They signified that computer ethics bears more than just an applied ethics approach to the analysis of its cases. Rogerson and Bynum (1996) viewed computer ethics as a wide and interdisciplinary field spanning disciplines: across journalism, political science, psychology, law, computer science, sociology and philosophy to name just a few. Rogerson and Bynum (1996) renamed the field, calling it 'Information Ethics' and signifying that the field had expanded.

An optimistic view of the uniqueness of the field was expressed by Gorniak-Kocikowska (2004) who argued that computer ethics might replace ordinary applied ethics and eventually emerge as the global ethics of all nations on the basis that most of the ethical issues in the future will stem from or will involve technology. Therefore, as technology is becoming global, computer ethics will become global as well and will replace ordinary ethics.

Another view is that of Donald Gotterbarn (1991). He argued that the analysis of computer ethics issues is fundamentally about the moral actions of computer professionals. Therefore it is best to narrow the focus of the field to the domain of professional ethics.

2.5 COMPUTER ETHICS TITLES

Since the expansion of this field, there have been attempts to move away from the title 'computer ethics'. For example, Tavani (2011) said that discussions concerning computer ethics are no longer about the uses and abuses of hardware and software and about moral problems; the field has now expanded to include social impacts, topics related to legal issues, such as the intellectual property rights, and issues related to the Information Age. Tavani (2011) proposed the term 'Cyberethics' instead of 'computer ethics' and Rogerson and Bynum (1996) proposed the title 'Information Ethics'. Other

titles which are being used are ‘Information and Communication Technology (ICT)² Ethics’ and ‘IT Ethics’.

In this study, the term “computer ethics” is used throughout because most of the literature which discusses computer ethics teaching uses this title and, since this study is contributing to the already existing debates, the researcher decided that it was best to follow suit.

2.6 WHY TEACH COMPUTER ETHICS?

Rogerson and Thimbleby (2000) suggested that the design of technology can affect people’s lives in a very drastic way, either positively or negatively. The researcher of this study agrees. Take, for instance, the case of the London Ambulance Service’s Computer-Aided Dispatch Project (Bynum and Rogerson, 2004c). The objective of the project was to replace the time-consuming manual methods used to dispatch ambulances. However, the specifications for the system were developed with almost no input at all from the ambulance drivers and the company who developed the system had no prior experience of building ambulance dispatch systems. These, in addition to many other reasons, led to the failure of the project. When the system was put into operation many things went wrong and a number of people may have suffered because they did not get to hospital in time. This is an example of a technology which was not designed properly and the results were near catastrophic. Therefore researchers such as Horowitz, Morgan and Shaw (1972) and Gotterbarn and Miller (2004) thought that computer ethics teachers should instil a sense of responsibility into their students, encourage them to think deeply about the consequences of their projects, and raise their awareness of the ethical issues which could lie ahead so that they could provide society with safe and secure artefacts.

Woodcock (2000) suggested that computer ethics education is important even if ethical codes existed; this is because computer ethics teachers teach the skills of ethical analysis and computer professionals often need to analyse situations and make

² Information Communication Technology (ICT) is broader than Information Technology (IT). The latter is used to refer to the industry whilst the former is used to refer to the utilisation of the internet and communication technologies to access, store and manipulate information.

judgments on the best courses of action. Therefore, students need to learn skills of analysis in spite of the availability of codes.

Rogerson and Bynum (1995) suggested that knowing about computer ethics issues should not be restricted to computer professionals because computer ethics issues are about the IT users as much as about the IT developers, in the sense that government policy makers, organisations and the general public collectively need to be aware of the ethics and impacts of IT. This view was also supported by Martin and Holz (1992) who thought that the primary and most basic goal of teaching computer ethics is to sensitise the students and make them aware that technology can have ethical and social implications.

In summary, and based on the above, computer ethics is taught to: a) raise IT users' and IT professionals' awareness of the importance of ethics in IT; b) encourage professional practices; and c) equip future generations of IT professionals with the skills of ethical and social analysis.

2.7 PROFESSIONAL ORGANISATIONS AND COMPUTER ETHICS TEACHING

Well established professional organisations reacted positively to the importance of ethics in computing, either through issuing computer ethics curriculum recommendations or through accrediting those institutions which include ethics in their computing curriculum (Brown, 1997). Examples of such organisations are the Accreditation Board for Engineering and Technology (ABET), the Australian Computer Society, the British Computer Society (BCS) and the Association for Computing Machinery (ACM) (Greening, Kay and Kummerfeld, 2004).

2.8 THE IMPACT OF COMPUTER ETHICS EDUCATION

Studies carried out by computer ethics teachers showed that computer ethics education can have a positive impact on students' appreciation of ethics in IT and on their ability to formulate ethical judgments. For example, Slomka (2004), who conducted a pre- and post-course assessment on an undergraduate course on computer ethics, found that the course resulted in changes in the way students thought about ethical issues. Also, Wong (1995), who conducted class observations and interviews with a group of students

attending a computer ethics course, noticed that the students showed a change in attitude towards some ethical issues after six weeks of teaching. Moreover, Staehr and Byrne (2003), who used a 'before and after' test with a controlled group, noticed that the moral judgment of the students matured over the semester.

2.9 METHODS OF INTEGRATING ETHICS INTO COMPUTING

Wahl (1999) and Terrell Ward Bynum (personal communication, May 25, 2007) said that different universities develop their students' ethical sensitivities differently. Students may be required to take a generic course on ethics from the department of philosophy or take a computer ethics courses from within the computing department (Rahanu, 1999). If the course is offered from within the computing department, it can take the form of a 'stand-alone' course (i.e. a separate course) or an 'across-the-curriculum' theme where computer ethics issues are integrated into the existing computing courses (Duquenoy, 2003). Some other approaches also exist, such as: Martin and Holz's (1992) combined method where both a stand-alone course and an across-the-curriculum theme are used; the capstone approach (Gotterbarn, 1992), which is a stand-alone course combined with a final project; there is also the online method. The following paragraphs will elaborate on the integration methods and some other related issues.

2.9.1 From Within vs. From Outside the Computing Department

Quinn (2006a) who surveyed a quarter of the accredited undergraduate computer science programs in the US found that there is a trend towards teaching computer ethics from within the computing departments. Staehr (2002) and Quinn (2006a) thought that generic ethics courses taught from the philosophy department were unlikely to spend adequate time on computer-specific related issues; also, when philosophers teach the subject they tend to focus on the ethical theories rather than on trying to give guidance on the best courses of action. Martin and Holz (1992) reported that, when students observe that their teachers are giving importance to ethics, they too appreciate the importance of ethics in their area of study.

Certain obstacles impede the teaching of computer ethics from within the computing department and these revolve mainly around the competence of the computing teachers

(Duquenoy, 2003). Greening, Kay and Kummerfeld (2004) and Dark and Winstead (2005) mentioned that teachers who teach computing/technical related courses are often not convinced of the importance of ethics or they are uncertain how to present the course to the students. Schulze and Grodzinsky (1996) and Searls (1988) suggested that the computing teachers' reluctance to adopt the teaching of computer ethics is perhaps due to the fact that they did not have any training or education in ethics or computer ethics during their school or university years. Moreover, Martin and Holz (1992) suggested that computer ethics teaching requires pedagogical concepts and techniques that are different from those often used in teaching technical courses. Sanders (2005) said that the computing teachers are not used to essay grading because it is less grounded in objective criteria, while Dudley-Sponaugle and Lidtke (2002) suggested that the computing teachers are accustomed to objective epistemologies where answers to a given problem are often in the form of Yes or No, while answers in computer ethics are rather more circumstantial than static. There was a consensus that the most effective solution to this problem lies in training the teachers in computer ethics pedagogies and topics (Appel, 1998; Lee and Bowyer, 2000; Dudley-Sponaugle and Lidtke; 2002).

2.9.2 The Stand-alone Course

Martin and Holz (1992) and Duquenoy (2003) suggested that when computer ethics is taught as a stand-alone course by a competent teacher, computer ethics issues can be covered in more depth. However, the drawback is that computer ethics can appear irrelevant to the students since the rest of the faculty are not involved in the ethics discourse.

2.9.3 The Across-the-curriculum Theme

Weltz (1997) and Staehr (2002) agreed that the across-the-curriculum theme, in theory, is better than the stand-alone course because when computer ethics issues are discussed across-the-curriculum, students observe that all of their teachers are involved in computer ethics discussions so they too will appreciate the importance of ethics; however, in practice, the approach is difficult to implement. Weltz (1997) suggested that even if the competence obstacle was overcome and all of the computing teachers were competent and willing to integrate computer ethics into their courses, it would be difficult to guarantee that the entire list of important computer ethics issues are weaved

into the discussions in the different computing subjects with minimum overlap. Wertz (1997) thought that the across-the-curriculum approach requires extensive planning and coordination. Staehr (2002) said that it is true that with this approach relevance can be achieved, it cannot be guaranteed that students are properly taught because, in reality, many teachers are not competent. Staehr (2002) was in favour of the stand-alone approach and, more precisely, in favour of the capstone approach recommended by Gotterbarn (1992).

2.9.4 The Capstone Approach

The strength of the capstone method, according to Gotterbarn (1992), is in its timing. With this method ethical cases are integrated into a project-based course in the final year (Goold and Coldwell, 2005). Gotterbarn (1992) suggested that last-year students can refer to concepts from their previous courses and use them in this course; also, because they are seniors, they are more likely to appreciate the importance of ethics.

2.9.5 The Combined Approach

Wertz (1997) thought that introducing computer ethics as a single subject at the end of the students' academic year might be too little too late. Martin and Wertz (1999) proposed an early introduction where computer ethics is introduced as a stand-alone course in the first or second year then a continued discussion of computer ethics issues whenever relevant in any of the computing programme's courses (i.e. across-the-curriculum), this in addition to a capstone course.

2.9.6 The Online Approach

Goold and Coldwell (2005) suggested that it is possible to teach computer ethics through a virtual classroom; however, certain pedagogical principles need to be considered or altered for successful teaching and learning. For example, Schahczenski (1998) found that virtual discussions require greater instruction time and ingenious methods in order to motivate students and Miller (1999) found that misunderstandings can easily occur because verbal and facial cues are missing hence emoticons are essential as substitutes for the missing facial expressions. On the other hand, several advantages were identified with online methods. For example, Jefferies and Rogerson

(2003), who used asynchronous computer conferencing to teach computer ethics, reported that their students appreciated that they could access the discussion boards at any time and place and that they were able to choose how much time they needed to reflect and respond. Also, online teaching was found to encourage learner-centred and constructivist learning. For example, Miller (1999) found that the online method encouraged his students to explore the internet for sources of information; as such, it encouraged independent learning.

2.9.7 A Synthesis and Summary of the Integration Approaches

Based on the above, it appears that it is best if the computing departments take charge of computer ethics and teach the subject from within their own departments. The benefit of this is that students will then feel that computer ethics is part of the computing curriculum and not just an extra which they are forced to take. Moreover, when the course is assigned to a teacher from within the computing department, as opposed to a philosopher from the philosophy department, the discussions will remain within computing and will focus on ethical analysis and judgment. This, however, is only possible if the assigned computer ethics teacher is competent or is trained in the pedagogy and topics of computer ethics. The benefit of a stand-alone course is that teachers can cover topics in depth and make clear the importance of ethics in computing. However, the general view is that, if computer ethics were contained in one single course as opposed to being taught across-the-curriculum, students might underestimate its importance. On the other hand, the across-the-curriculum method, which is perceived to be capable of achieving relevance, is perceived to be difficult to implement because all the computing teachers must be competent in teaching computer ethics and willing to dedicate effort and time to planning so that they cover all of the important topics with minimum overlap. With regards to timing and when to introduce computer ethics, there were differences in opinion: Gotterbarn (1992) thought it best to integrate it into the final year project but Martin and Wertz (1999) thought it better to introduce it at the beginning and at the end, using both the stand-alone and the across-the-curriculum methods. Another method which proved useful but which had limitations was the online method.

2.10 WHO SHOULD TEACH COMPUTER ETHICS?

One of the earliest papers which contained a discussion of the educational backgrounds of computer ethics teachers is that of Pecorino and Maner (1985). The authors thought that computer ethics needs to be taught by computer scientists who are trained in ethics; however, due to the interdisciplinary nature of the subject, some parts of the course can be taught by instructors from outside of the department. Guenther (1997) equally thought that the computing faculty needs to be responsible for this course, this in order to emphasise to the students that ethics is part of their discipline. The element of the role model, said Quinn (2006a), may disappear if the course is taught by an outsider; as in a philosopher from the philosophy faculty.

However, and on the other hand, Johnson (1994b) argued that it is best if philosophers, or at least social scientists, teach computer ethics because computer scientists are often not trained in philosophical debate and have no repository of ethical concepts. Opponents of this position mentioned, among other reasons, that when philosophers teach the course they fail to reinforce the theories into the practices of the IT professionals and into the context of the engineering profession (Guenther, 1997; Staehr, 2002; Quinn, 2006a).

Tavani (2002) thought that the essence of the differences in opinion on this subject was due to the differences in perceptions concerning ‘why teach computer ethics’. Johnson (1994b) emphasised the importance of teaching ethical theories whereas computer scientists emphasised the importance of teaching ethical judgments. Tavani (2002) concluded that the question of ‘who should teach computer ethics’ cannot have a definitive answer because ‘who should teach’ depends on ‘why teachers want to teach computer ethics’ or what sort of aims the teachers want to set for their students.

2.11 STUDENTS’ ATTITUDES TOWARDS COMPUTER ETHICS

Wong (1995) who conducted a study to investigate students’ attitudes towards computer ethics found that students in general are not interested in studying the subject. Jewett and Kling (1996) also mentioned that they heard one of their students saying “why do I have to take this class... all I want to do is write computer programs?” (p.13).

Moreover, Gooday (2012), who had eight years of experience with teaching computer ethics, reported that students are either indifferent about the subject, thinking that ethics will always be someone else's concern, or that learning ethics is not important since ethical and legal guidelines exist, or that the subject is irrelevant to their future practices, or that ethics is just a matter of common sense. This all shows that students may have misconceptions. Teachers, as such, may need to spend time confronting these misconceptions to encourage positive attitudes towards computer ethics.

2.12 HOW TO TEACH COMPUTER ETHICS?

A number of writers (Brown, 1997; Vartiainen, 2003; Maner, 2004) have emphasised that computer ethics teaching should not turn into some form of preaching or indoctrination. Vartiainen (2003) suggested that indoctrination in computer ethics occurs when teachers impose their personal ideas on their students. Brown (1997) said that indoctrination can arise when teachers lack experience in teaching in the sense that inexperienced teachers preach their own moral codes. Brown (1997) also thought that indoctrination can arise when constructivist methods of teaching are substituted with didactic methods in which teachers give few chances for interaction and seldom allow their students to think about the answers for themselves. Maner (2004) said that, in order to avoid indoctrination, teachers need to allow their students to reflect, criticise and question the topics presented, and even reflect on codes of ethics.

2.12.1 Teaching Styles: Didactic vs. Constructivist Teaching

Evidence from the field of education shows that teachers who use a didactic style in their teaching reflect the behavioural philosophy; behaviourism is a learning perspective in education. Teachers and textbooks within the behavioural philosophy are considered as the sole dispensers of information (Marlowe and Page, 1998). Teachers, as a result, are forced to view students' brains as empty vessels waiting to be filled by the teachers' undisputed knowledge (Fosnot, 1996). Concepts are presented as if they are the ultimate truths and students, as such, are denied the opportunity to reason or use their cognitive abilities (Gould, 1996). On the contrary, teachers who adopt the constructivist philosophy support the view that knowledge is constructed and can comfortably be constructed by the learners themselves (Fosnot, 1996). Constructivists allow their

students to look at problems or situations from different perspectives; they facilitate the learning process but never dominate the learning environment, giving importance to students' active involvement in class discussions and in cognitive activities (Reeves and Reeves, 1997). Based on this all, it can be argued that constructivist teaching styles can guard against indoctrination and enhance computer ethics teaching and learning whereas behaviourism or didactic approaches impede learning and encourage indoctrination.

When it comes to the opinions of the scholars from the field of computer ethics about which of the teaching styles is best, almost all of the scholars encouraged constructivist teaching styles such as experiential learning, critical thinking and collaborative learning (see for example: Schulze and Grodzinsky, 1996; Jewett and Kling, 1996; Dark and Winstead, 2005; Goold and Coldwell, 2005; DeWitt and Cicalese, 2006; Gooday, 2012).

2.12.2 Teaching Techniques

A variety of teaching techniques for teaching computer ethics were mentioned in the literature, examples of which are:

- * Using case studies (Little, 2003).
- * Sharing personal experiences of computer ethics cases (Towell, Thompson and McFadde, 2004).
- * Using codes of ethics (Gotterbarn, 1998).
- * Inviting guest speakers (Schulze and Grodzinsky, 1996).
- * Asking the students to write an essay, for example, to analyse a case (Wahl, 1999).
- * Conducting face-to-face or online discussions (Wertz, 1998; Schahczenski, 1998).
- * Using role play to represent a variety of points of view during discussions (Canosa and Lucas, 2008).
- * Utilising the white board to keep track of the major points raised during discussions and to provide visual descriptions (Appel, Miller and Quinn, 2005).

- * Using games or web-based applications, for example, Agora (www.ethicsandtechnology.com); a web-based application developed by three universities from the Netherlands (Burg and Poel, 2005); and the SoDIS Project Auditor, a software developed by two university professors: Donald Gotterbarn and Simon Rogerson, to reveal risks in software projects (Gotterbarn and Clear, 2004).
- * Using term projects (Jewett and Kling, 1996). One example is asking students to prepare a Social Impact Statement report in which they study the social context of a computing system then provide an analysis of the issues related to the design (Shneiderman and Rose, 1996).
- * Asking students to maintain a journal for reflection or a notebook to post articles and provide analyses of cases which they post in their notebooks (Jewett and Kling, 1996).
- * Using movies or stories which raise technology-related ethical or social issues (Artz, 1998; Applin, 2006).
- * Taking advantage of programming assignments to reveal to the students that poorly designed programmes can have ethical implications (Schulze and Grodzinsky, 1996).

On the other hand, lecturing and term exams were perceived to be less effective (Jewett and Kling, 1996; Schulze and Grodzinsky, 1996). According to Wahl (1999), since every technique has its own strengths and weaknesses, teachers need to choose the technique which best suits the situation and their students' learning styles.

2.13 COMPUTER ETHICS TOPICS IN CURRICULUM GUIDELINES

Three curriculum guidelines were examined to look at the recommendations regarding computer ethics topics: the final report of the ImpactCS paper (Martin and Weltz, 1999), The Royal Academy of Engineering's Curriculum Map (2007) and the Computing Curricula (2001). All of the guidelines agreed on the importance of teaching the following principles:

1. The history of computing: the social and ethical dimensions.

2. Issues related to professionalism and the computing professional.
3. The methods and tools of ethical and social analysis.
4. Philosophical concepts such as: ‘why be ethical?’, ethical models (e.g. Bentham’s Utilitarianism), the importance of rationality, and how to avoid some of the misconceptions in ethics (e.g. how to avoid naïve relativism which states that since morality is relative to people’s situations then truth does not exist and hence there is no need to study ethics). It is worth mentioning here that these philosophical concepts are based on the western philosophy of ethics. Thus, they may not necessarily be shared with people who come from other parts of the world.

2.14 COMPUTER ETHICS ISSUES

To gain an impression of the type of issues which exist in computer ethics, ‘The Tavani Bibliography of Computing, Ethics, and Social Responsibility’ (Tavani, 1996) was used to compile headings and subheadings (as illustrated below) of some of the major issues related to IT. This was supplemented with some of the emergent issues which appeared in the table of contents of Tavani’s (2011) book. Please note that the following list is not comprehensive:

*** IT and privacy**

- Issues related to personal information in commercial databases, such as access to and sale of personal information.
- Local and international regulations to protect personal data.
- Privacy and government control.
- Electronic surveillance.

*** IT and society**

- Technology and the disabled.
- The impact of IT on workers and their work-life (e.g. deskilling, health hazards, employee surveillance).
- The digital divide.
- Gender and IT.

* **Computer crimes and abuses**

- Hacking.
- Viruses and sabotage.
- Software piracy.

* **Intellectual property rights and legal issues**

- Electronic information ownership and copyright/patent laws.

* **Cyberspace issues**

- Cyber terrorism.
- Freedom of speech in cyberspace.
- Community in cyberspace.

* **Professional ethics, codes of conduct, and responsibility**

- Responsibility of the engineering profession.
- Whistle blowing.

* **Ethical aspects of ambient intelligence, bioinformatics, and nanocomputing**

- Bioinformatics and computational genomics.
- Nanotechnology and nanocomputing.
- Future challenges: cyborgs, bionic chip implants.

2.15 COMPUTER ETHICS TOPICS IN COMPUTER ETHICS BOOKS

Eight books were examined to look into computer ethics topics; (Johnson, 1994a; Langford, 1995; Spinello, 1995; Johnson, 2001; Bynum and Rogerson, 2004d; Schultz, 2006; Quinn, 2006b; Tavani, 2011). All of the books discussed professionalism, privacy and intellectual property; this shows how important these topics are in computer ethics. All of the books tried to explain, in one way or another, why computer ethics is important. Privacy and intellectual property chapters were always extensive and many issues seemed to be related to these two concepts. On the other hand, professionalism, as a concept, emerged as a foundation for discussion in these books. With regards to ethical issues, with the exception of privacy and intellectual property, each book presented somewhat different issues. For example, Schultz (2006) concentrated on issues which are related to business while Tavani (2011) presented a wide range of

issues and organised them in groups. All of the books, except for Bynum and Rogerson (2004d), dedicated a chapter to ethical theories (the western secular theories) and how to analyse ethical issues; this indicates that the most popular standards for analysis in computer ethics are the secular ethical theories. In Bynum and Rogerson (2004d) ethical theories were considered one single approach amongst a collection of approaches for the analysis of ethical cases.

2.16 METHODS OF ANALYSIS

A number of methods for the analysis of computer ethics issues were identified in the literature. Huff and Martin (1995) provided a framework for analysis in the form of a table where every ethical concern can be located at a particular level of social analysis. For example, privacy, which is an ethical concern, can be discussed or located at different levels of social analysis, such as on an individual level, on a community level or on a global level.

Another analysis method is Quinn's (2006c) case-based analysis (casuistry) method. Quinn's (2006c) method resembles the applied ethics approach where students are asked to reflect on a case using different ethical theories. The strength of the method, Quinn (2006c) said, is that students can draw on principles from different theories and apply only the relevant ones. However, its weakness is that successful case analysis requires reasoning by analogy and if poor analogies are chosen, then the results may turn out to be flawed.

Another method is the Social Impact Statement proposed by Shneiderman and Rose (1996). The authors stated that this method proved to be successful in their classes. The Social Impact Statement resembles an environmental impact study where a software system is examined from the perspective of its social and ethical consequences.

Liffick (2004) provided a method which resembles computer programming. The idea is to break a large problem into smaller ones and work from the smaller to the larger parts.

The advantage, he said, is that students can easily apply the method because it resembles the programming method with which they are familiar.

Yet another method is that of Rogerson (2004) who developed a set of questions for those who work on software development. However, other than these, there are software used for analysis, examples of which include the SoDIS Project Auditor developed by Gotterbarn and Rogerson to reveal risks in software projects (Gotterbarn and Clear, 2004) and the Case Retrieval Tool developed by Don Sherratt to find analogous cases of computer ethics in a case library (Sherratt, Rogerson and Fairweather, 2005).

2.17 STANDARDS OF ANALYSIS

Many books on computer ethics encourage using ethical theories as standards for analysis. Moreover, the majority of the papers which were examined and which discussed the teaching of computer ethics encouraged the use of ethical theories. The theories which were referred to were the western secular ethical theories. In addition to ethical theories, other standards were proposed such as codes of ethics, legal standards and community or personal values. On the other hand, a few scholars encouraged religious ethics.

Saidin and Bakar (2005), Al A'ali (2008) and Hameed (2009) proposed Islamic values as standards for analysis and Fandrich (1992), Barger (2003) and Houston (2007) encouraged Christian ethics for the teaching of computer ethics. It is not clear though how religious ethics are possible in the teaching of computer ethics when no one single religion is universal? The scholars who proposed religious ethics did not reflect on the possible impacts of using certain preferred groups of theories in the teaching of computer ethics, in the sense that none of them wondered if Islamic or Christian ethics would result in alienating certain groups of students. A counter argument, of course, is possible in the sense that secular ethics is not universal either. However, the researcher of this study believes that secular ethics is, to some extent, neutral, in the sense that it is separate from, but inclusive of, religions and this make it relevant to a wider group of students as opposed to religious ethics.

A number of scholars advocated some other approaches and standards for ethical analysis. For example, Moor (2004 and 1999) encouraged the use of value judgments, rational discussions and shared values, suggesting that applied ethicists often carry out ad hoc analysis, selecting solutions from a myriad of inconsistent theories. Feminist ethics was also proposed to provide a gender perspective. For example Adam (2001) illustrated that feminist ethics can provide fresh ways of looking at issues of access, hacking and responsibility which all bear a gender dimension.

2.18 ETHICAL THEORY IN COMPUTER ETHICS TEACHING

Several authors have argued in favour of the importance of incorporating ethical theories into computer ethics teaching whereas only one author has argued against using ethical theories. For example, Taylor (2004) and Martin et al. (1996) suggested that, in order for the computer ethics students to reason about the moral consequences, and in order for them to properly grasp the essence of the discussions in computer ethics classes, they need some grounding in ethical theory. Staehr (2002) thought that it is essential to include ethical theories in computer ethics classes because they provide a framework for ethical analysis. And Glagola et al. (1997) suggested that when students learn about ethical theories they realise that ethics is not subjective. Glagola et al. (1997) also said that the use of theories in computer ethics needs to be kept to a minimum and used to stimulate students' ethical thinking rather than using them as ends in themselves.

On the other hand, Liffick (2004) said that the problem with applied ethics was that there are competing moral theories, each providing a different solution to a given problem. Taylor (2004) provided a convincing answer to this predicament; he said, the inconsistency of ethical theories need not be viewed as a negative thing because ethical theories should not be used directly to solve ethical problems; rather, they are used to provide different perspectives to one single issue, encouraging the students to reason about the best possible answer. Glagola et al. (1997) also thought that the focus in computer ethics classes needs not to be on the theories themselves but on how they can help in analysing the problems.

Another argument which was put forward by Liffick (2004) was that students often show little interest in ethical theories, face difficulties in applying them to cases, and that codes of ethics already incorporate the views of ethical theories. However, observations conducted by Greening, Kay and Kummerfeld (2004) and Gotterbarn and Miller (2004) revealed almost the same attitude towards codes of ethics. Accordingly, perhaps students' negative attitudes are related to something other than the analysis standards themselves.

Based on the above, it can be argued that the incorporation of ethical theories is essential for ethical reasoning and objective thinking. The focus should not be on the theories themselves but on how the theories can enhance students' analysis and understanding and how the theories can enable better judgments.

2.19 AN OVERVIEW OF SECULAR ETHICAL THEORIES

According to Quinn (2006c), popular books on computer ethics introduce Utilitarianism, Deontology, Social Contract and Virtue Ethics as foundations for analysis. To clarify what these theories mean: Utilitarianism suggests that an act is ethical when it can achieve the greatest good for the greatest number of people so, with this theory, the ethicality of an act is based on its consequence (Artz, 1994).

Deontological theories are based on the ideas that some acts are good in themselves and some acts are intrinsically wrong; therefore, ethicality here is based on intentions (Walsham, 1996). Examples of Deontology ethics are the Categorical Imperatives of Kant and the Divine Command theories. The Divine Command theories encompass the ethics contained in religions (Fieser, 2003). Kant's theory is based on the idea that moral actions are based on reason and good intentions (McCormick, 2001). With the Divine Command theories morality depends on God's commands and the obligation to obey God (Austin, 2006).

Regarding Social Contract theories, there are several versions of this theory but the most recent is John Rawls' Theory of Justice. The idea behind this theory is that people have a capacity to judge the ethicality of a situation if they take an impartial position (Friend, 2004). With regards to Virtue Ethics, these theories focus on the attitudes and

characters of those who carry out the actions rather than on the consequences of actions or the intentions behind them (Athanasoulis, 2004).

2.20 ETHICS IN THE WESTERN THINKING

It is worth mentioning here that the researcher of this study noticed that publications which are written in the English language distinguish between ethics and morality even though the two terms are sometimes used interchangeably. Morality refers to codes of conduct put forward by a religion or a society (Gert, 2002). Ethics (also called Moral Philosophy), on the other hand, is the study of moral systems. The Oxford English Dictionary (2012, screen 1, emphasis added) defines ethics as: “the branch of *knowledge* that deals with moral principles”. Furrow (2005, p. 1, emphasis added) defined ethics as: “the systematic *study* of the nature of morality”. And a quick search of the internet can reveal that ethics in the western thinking is a *science*; a branch of philosophy distinguished from morality and religion. In books which were written in the English language and which were written by western scholars (e.g. Fieser, 2003; Thompson, 2003; Warburton, 2004) ethics is not aimed at providing straightforward answers to a given problem because different competing ethical theories exist and each can provide a different answer to a given problem. Ethics instead is a ‘cognitive tool’ which sharpens one’s own moral awareness and, in doing so, enables ethical choices. As such, ethical decision making from the western perspective, and from the perspective of applied ethics, which is part of the greater field of Moral Philosophy, does not have to rely on the standards of one particular religion or the standards of one particular ethical system/theory; ethics (the philosophical kind) is a science and is separate from religion.

2.21 ETHICS IN THE ARABIC THINKING

Ethics in the Arabic thinking is linked to the religion of Islam; it is portrayed in both the philosophical and religious ethics however religious ethics (Islamic ethics) has the leading role when it comes to ethical judgment (Fakhry, 1998; Hourani, 2007). For example, when the internet was searched for Arab-related Moral Philosophy, the results indicated that there is no such thing as Moral Philosophy that is separate from Islam; instead, there is Islamic Moral Philosophy which discusses moral issues but from an Islamic perspective. Furthermore, Al Brazi (2001) suggested that, in general, little

attention is paid to Moral Philosophy in the Arab world because ethics or what is right and wrong is considered a matter of religion rather than a matter of philosophy. Moreover, Al Jabri (2006) reported that Arabs have made few contributions to their ancient Moral Philosophy because Islamic/religious ethics, which is embedded in the Sharia Law, is considered the most appropriate and complete source for ethical judgment. This all means that Moral Philosophy, the one which is separate from religion and the one which provides a tool for thinking, is missing or undeveloped in the Arabic world; instead, ethics becomes a matter of religion as opposed to a matter of philosophy. This, of course, shifts the domain of ethics from the scientific sphere to the religious one and the discussion of ethics, as a result, becomes sacred and limited to religious scholars. The reader might want to reflect on the possible implications of this.

In summary, it is possible to infer from the above that there are two types of ethics in the Arabic understanding: philosophical ethics and Islamic ethics; both are tied to Islam and both can be used for making ethical judgments, as Mognaiyah (1977) and Hamedh (1990) have suggested, but Islamic ethics is considered the main source of ethical judgment (Al Jabri, 2006).

2.22 ISLAM AND ETHICS IN THE ARAB WORLD

To understand why Islam in particular is linked to ethics in the Arab world, one must understand what Islam means to Arabs. Arabs and the religion of Islam are historically linked. The *Quran*, which is the sacred book of Muslims, was revealed in the Arabic language because Mohammed, the Prophet of Islam, was an Arabic man (Amuni, 2005). According to Rao (2011), Arabs prior to Islam were living in *Jahiliah* (ignorance); they used to wage war on the slightest of provocation and they used to bury their female newborn babies alive under the Sahara desert sun merely to avoid mockery because females were thought to bring disgrace to the family. When Mohammed emerged, he banned *Jahiliah* rituals; called for justice, brotherhood, and introduced Islam; a system which encouraged moral practices. Then Islam shifted the Arabs (Muslims and non-Muslims alike), in a relatively short frame of time, from a small community of mainly illiterate people who occupied part of the Arabian peninsula into a nation spanning from Spain to India, a nation led by scientists and engineers who built sophisticated cities,

hospitals, universities, gardens and infrastructures to support sewerages and running waters at a time when Europe was living in the Dark Ages (Al Hassani, Woodcock and Saoud, 2011). Therefore, Islam, to Muslims in general and to Arabs in particular, is not just a religion; it is a moral heritage. Barry Rubin, the director of the Centre for Global Research in International Affairs in Herzliya, Israel, said it is not just Islamists who turn to Islam; many Arabs look to Islam for their values (Martin, 2011).

2.23 ISLAMIC ETHICS

According to Mogra (2007), detailed personal, political, professional, environmental and social values are in place for Muslims. They are either stated in the *Quran* or in the *Hadith*³ or are left for *Ijtihad* or *Qiyas*⁴. For example, Muslims maintain ethical codes regarding how to conduct business, how to deal with the environment, and what to do and not do in wars (Kazendar, 2005). Also, details of etiquette exist, such as how to eat, drink, dress or sleep, in addition to general moral principles such as shunning pride, restraining from anger and forgiving people (Mogra, 2007). Some other examples of morality are that Muslims are instructed to avoid lying and refrain from harming humans, animals or other living things or offending them physically or physiologically. Other major sins are to burn living things, give false evidence, utilise interest, or infringe on the privacy of others (Kazendar, 2005).

2.24 MORAL PHILOSOPHY: THE OPINIONS OF THE ANCIENT MUSLIM SCHOLARS

According to Fakhry (1998), early writers on ethics, such as the followers of the Mu'tazilite school, were influenced by Greek philosophy but later writers blended religion with philosophy. The Mu'tazilites thought that ethics and ethical decision making is a mind-related matter and not religion-related. This stirred a reaction from some theologians who argued that ethics is a matter of religion and that decisions should be based exactly on what God commands or forbids. Al Ghazzali, who was a philosopher and a theologian, argued that since certainty about any issue cannot be obtained without knowledge of the *Quran* and *Hadith* then the instruction of religion is

³ *Hadith* is the commentaries of the Prophet in addition to descriptions of his actions.

⁴ *Ijtihad* means reasoning and *Qiyas* means reasoning by analogy from the *Quran* and *Hadith*. They are used when clear instructions about certain actions or issues are not found or are not clear in the *Quran* and *Hadith*.

supreme to reasoning because reasoning or philosophy cannot provide us with certainties (Sardar, 2004). This view, which emerged around the 12th century, has had a lasting impact on Muslims' thinking and their perception of ethics up to the present time (Mehmet, 1997). This view predominated in the Eastern part of the Islamic kingdom at that time however, in the western part and in particular in Spain, another view dominated; a view that was equivalent to the contemporary western secular view of ethics, this was of Ibn Rushd, also known as Averroës (Leaman, 2007).

Ibn Rushd's view was and still is unpopular, especially with theologians from the east. Ibn Rushd who was versed in philosophy, theology and law in addition to many other sciences, thought that there is no conflict between religion and philosophy (Hillier, 2004). He argued that religions present certainties whereas philosophy presents predications and human reasoning; the two are different in this respect, therefore they are not rivals to each other (Leaman, 2007). As a result, they should not be compared with each other and so it is better to set religion aside when reading or evaluating philosophy (Leaman, 2007). He said that philosophy encourages reasoning and this is essential even in trying to find the truth about God or to better understand concepts in life (Knight, 2009). He argued that philosophy alone can enable us to make ethical decisions and this need not to be taken as an imposition on Islam because both can lead us to truths while each has its own way (Knight, 2009). Ibn Rushd's view is thought to have been the precursor of the secular thought and enlightenment in Europe during which the Islamic Empire was starting to regress (Pasnau, 2011).

2.25 INCORPORATING RELIGIONS IN COMPUTER ETHICS TEACHING

Quinn (2006b) and Warburton (2004) thought it best to avoid incorporating the ethics of religions in the analysis of ethical issues because religions are diverse and therefore the ethics of one religion will always be inapplicable to people who follow a different religion. The literature on computer ethics education indicated that the western secular ethical theories are the main standards of analysis and religions do not take part in the teaching of the subject. However, Al Ali (2008), who is an Arabic computer scientist, wrote about his experience with the incorporation of Islam in the teaching of computer ethics. He thought that the incorporation had a positive impact on his students'

appreciation of the subject. The paper, however, did not discuss the impact of this incorporation on the teaching itself. The same applies to the western scholars who proposed Christian ethics for the teaching of computer ethics (e.g. Fandrich, 1992; Barger, 2003; Houston, 2007). They did not acknowledge the probable limitations of their proposal. It is not clear either if secular ethics poses a limitation on computer ethics education when the majority of the students are religious or when they come from a non-western background.

2.26 SUMMARY OF THE CHAPTER

The ‘uniqueness’ debate which exists in the academic literature surrounding the nature and scope of the field of computer ethics reveal differences in perceptions; computer ethics was considered part of applied ethics, professional ethics, interdisciplinary or a field with capacity to grow as a separate discipline. What is unanimous in these views is that ethics is philosophy-based as opposed to religion-based.

With regards to the issue of teaching computer ethics the review of the literature showed that computer ethics is taught to raise awareness of the importance of ethics in computing and to encourage ethical thinking and analysis. Computer ethics is integrated into the computing curriculum through one (or more than one) of the following methods: through a philosophy course, through a dedicated course on computer ethics, through infusing ethics into the already existing computing courses and/or through online courses.

Computer ethics is taught either by a philosopher, a social scientist or a computer scientist. It was claimed that philosophers and social scientists focus on ethical theories whereas computer scientists focus on ethical judgments. Therefore, the answer to the question ‘who should teach computer ethics’ depends on what sort of aims the computing department want to achieve with their students.

When it comes to students’ attitude, the review of the literature demonstrated that students can have misconceptions about the importance of ethics, for instance, it was reported that students can think that ethics is a common sense. On the other hand, the

literature indicated that teaching computer ethics requires a certain attitude or philosophy. Computer ethics scholars were against the idea of indoctrinating the students into a set of moral, political, personal or religious beliefs. Essential to this then was the idea of democracy and free thinking; in giving the students the space and tools to use their cognitive thinking and this all was perceived possible under the constructionist philosophy in education.

A variety of techniques were presented in this chapter for the teaching of computer ethics and the approaches which encouraged cognitive thinking were perceived by the scholars as the best approaches. All of the computer ethics books and curriculum guidelines which were examined in this chapter recommend teaching the skills of analysis and ethical theories. This shows that the skills of analysis and ethical theories were perceived as important by the computer ethics scholars. Skills of analysis develop students' ethical thinking and ethical theories provide the foundation for analysis. But beyond this there are different techniques or methods for analysing ethical cases and different standards by which such cases are judged.

When it comes to the issue of culture and how ethics is being portrayed, the literature showed that ethics in the English literature was part of moral philosophy; a cognitive tool which sharpens one's own moral awareness to enable ethical choices. In the Arabic literature ethics was very much tied to religion and portrayed as a set of rules which govern what is right/wrong. However, the ancient Arab moral philosophy shows that Arabs have in their capacity to view ethics as secular and separate from religion.

With regards to the issue of incorporating religions into computer ethics education, it appeared that computer ethics scholars who wrote on this subject were not in favour of integrating religions because no one religion is universal and hence religions will always enforce a culturally relative version of ethics on students who could come from a variety of different backgrounds and faiths. However and in spite of this, some scholars encouraged using religions in teaching computer ethics yet they did not appear to have reflected on such a predicament.

2.27 REFLECTIONS

It was mentioned in the Introduction chapter that the literature relating to computer ethics is dominated by western ideas/theories. As such, the mainstream conception of computer ethics which stem from the literature, the conception which considers computer ethics as philosophy-based and secular can be considered biased. And even though the literature is a cogent source since it provides arguments that are backed by evidences and empirical studies, non-western teachers and students of ethics may question the legitimacy of the literature's conception of computer ethics on the basis of power imbalance and they might ask: what makes the computer ethics conception which is dominating in the literature, the one which considers computer ethics as philosophy-based, secular field any more valid or correct than their own conceptions? The idea that teaching a religion-based computer ethics can alienate certain groups of students is a strong justification for secularising the teaching of compute ethics however it is not clear, so far and until the findings are examined, how in practice teachers and students from Bahrain teach/learn computer ethics. Are the teachers adopting the mainstream dominant (secular) conception of computer ethics? If yes, how this is impacting the pedagogy? If not, then what sort of alternatives they are adopting and how such conceptions are any better than the mainstream dominant ones? Also, and more importantly, how these alternative conceptions of computer ethics are improving education and advancing free thinking?

Yet another justification which emerged from the literature for teaching a philosophy-based computer ethics as opposed to a religion-based, is that religions and morality, by their nature, provide straightforward answers to what is right/wrong whereas philosophy encourages cognitive thinking and analysis. The former can be tied to the behaviourist philosophy in education with which knowledge is assumed to exist 'out there'; in books, in the minds of certain individuals, and hence the cognitive activity of the learner is restricted. The latter can be tied to the constructionist philosophy which empowers learners and provides a democratic platform giving the students the space and tools to use their cognitive thinking. According to Taylor (2004) when students practice drawing from a mired of different 'competing' ethical theories as opposed to drawing from one single ethical standard to reach ethical judgment they learn that ethical

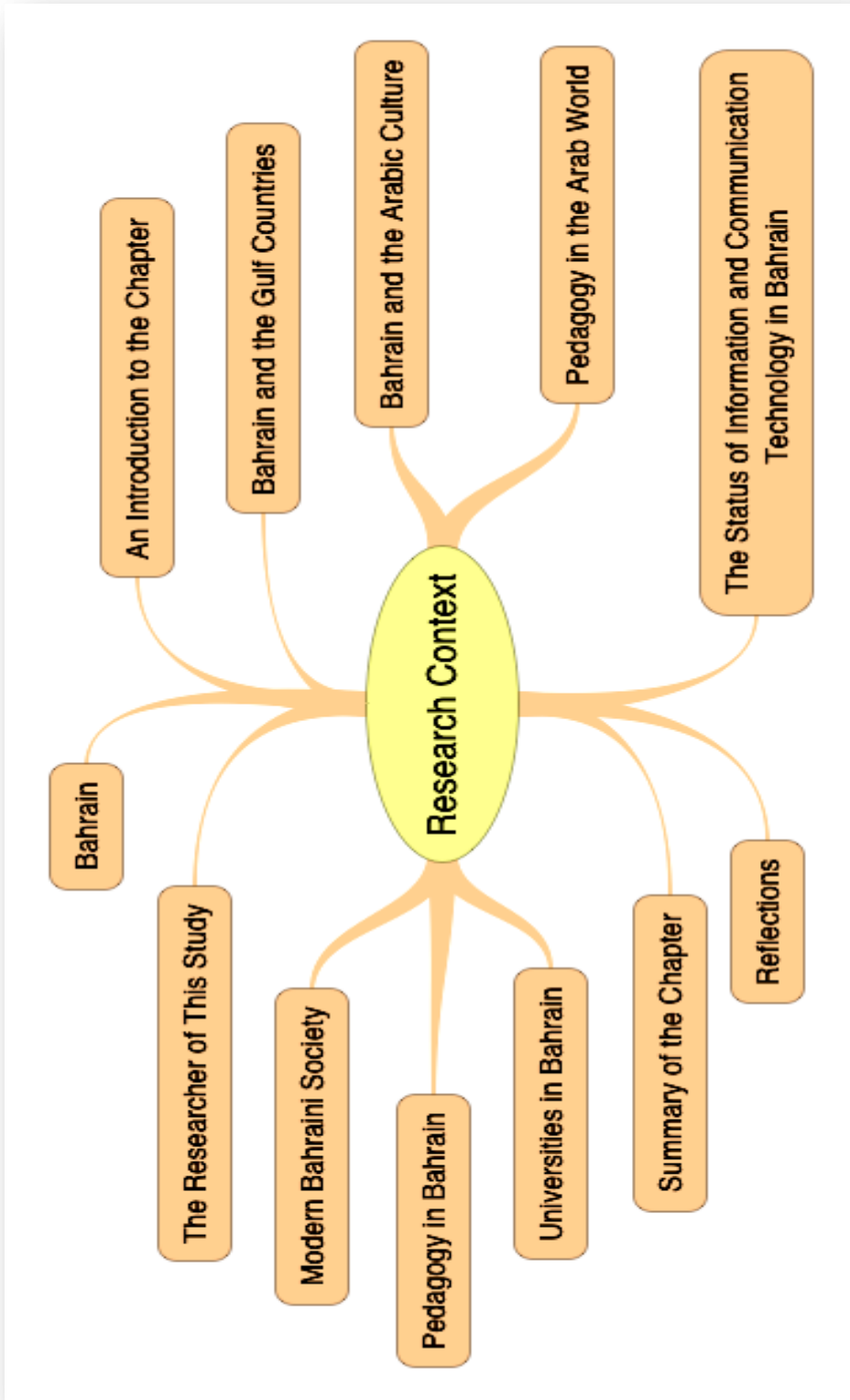
judgment is not a matter of locating right/wrong from an ethics code, this should work on building their ethical thinking and enable them to make ethical decisions whether codes existed or not.

These all, however, are ideas, inferences and synthesis originating from the literature and there remains the idea that Arabs perceive ethics as religion; a set of rules which govern what is right/wrong whilst the 'ethics' which is philosophy-based, secular and capable of developing student's cognitive thinking is underdeveloped in the Arab world. This introduces a series of questions: Is there a reconciling approach that is being utilised by the computer ethics teachers in Bahrain? What sort of standards and methods of analysis the teachers are using? And what role religions play, if any, in the teaching of computer ethics? The research question as such became more compelling:

* *How is computer ethics perceived and taught in Bahrain and how can any associated challenges be addressed in light of the review of the literature?*

3. Research Context

Figure 3.1 A map of this chapter



3.1 AN INTRODUCTION TO THE CHAPTER

This chapter presents background and context-related information in order for the reader to tie together information presented elsewhere in this thesis. The chapter starts with information about the researcher of this study to illustrate what instigated this study. Then moves to some selected topics about Bahrain to highlight information which was perceived relevant. The section on the relationship between Bahrain and the Gulf countries, which explains what the citizens of the Gulf and Bahrainis have in common, can help the reader judge the extent to which this study is transferable (or generalisable) to the teachers and students from the Gulf. The same applies to the section on ‘Bahrain and the Arabic Culture’. It attempts to show the link between Bahrainis and Arabs. The section on ‘Modern Bahraini Society’ talks about the fabric of society and how that Bahrain is a multicultural society consisting of people coming from different religions and background. The section which talks about the status of ICT in Bahrain shows that Bahrain is keen on improving aspects of ICT in Bahrain. The section on ‘Pedagogy in the Arab World’ attempts to show the status of education in the Arab world; there is in general stagnation and the researcher of this study perhaps, unconsciously, was attempting to address such a hurdle through adopting a critical approach to research and through wanting to improve the teaching of computer ethics. The section ‘Pedagogy in Bahrain’ reported almost the same problems which the section on ‘Pedagogy in the Arab World’ reported enforcing the need for educational improvements. The last section in this chapter talks about the status of universities in Bahrain and how that, with the exception of a few, the majority emerged suddenly around the year 2002 as part of private investments. And because the country had no regulations in place at that time, the credibility of the type of education provided by some of these universities was questioned. The final sections in this chapter provide a summary and a reflection trying to tie in the research problem, aim and some major reflections from the previous chapter.

3.2 THE RESEARCHER OF THIS STUDY

The researcher of this study is a Bahraini, Arab, Muslim woman. She is a teacher in the Information Systems Department at the University of Bahrain. The University, which has sponsored this study, had no particular aim regarding its sponsorship other than staff

development and to enable the researcher to gain her doctoral degree. As such, the researcher was given the freedom to choose the topic, aims and methods.

The researcher taught business and basic computer courses at the University of Bahrain before moving to the UK to pursue her postgraduate studies. She holds a Bachelor's degree in Office Management and a Master's degree in Information Technology Education. This study has been instigated by her aspiration to gain insight into her future practice which will involve the teaching of computer ethics.

During the course of writing up this thesis the researcher became influenced by some of the ideas and writings of Prof. Tariq Ramadan. Ramadan (2009), Professor of Islamic Studies at Oxford University, thought that Muslims need to practice Islamic philosophy in the sense that they need to stop being literalists or rigid when interpreting Islam, but rather try to reflect and understand Islam in light of the realities of the modern time. In a recent article Ramadan (Yassin-Kassab, 2012) suggested that Arabs need not only a political revolution but also an intellectual transformation, one which will inspire reflection on the status of religion, woman and secularism in the Arab societies.

The researcher had a chance to attend lectures and tutorials on computer ethics held at De Montfort University, UK. The course which the researcher attended was a separate course on computer ethics. The standards of analysis which were being used were purely philosophical. Religion was not being involved. However, perhaps as part of trying to expand students' understanding of the concept of ethics, a lecture was dedicated to ethics of religions. The teacher who delivered this lecture was a Muslim. The students were of mixed backgrounds and probably coming from different faiths. Some of the students were Muslims; this was obvious from their outfits. The Muslim students did not appear to have had difficulty with using the purely philosophical/secular theories in analysing the case studies. On the other hand, when the lecture on religion was introduced they seemed cynical of the topic. They were laughing and talking to each other especially when the teacher talked about ethics in Islam. Students who were non-Muslims were very quiet but their faces and ears were read. They seemed shocked and perhaps angry. This all was not the normal attitude

since the students were usually calm and relaxed. The topic did not seem to have served any purpose other than offending some of the students and entertaining others. On her way out, the researcher asked one of the students if she was offended by the topic of the lecture. It turned out that the student was a Muslim but she was not wearing head scarf. The student said she was offended because the topic was not fair to the non-Muslim students; she thought religion was not relevant here.

3.3 BAHRAIN

Bahrain is an island located in the Arabian Gulf region. The country is quite small; it has a total area of 741.4 Square Kilometres with population of 1,039,297 including foreigners (eGovernment Portal, 2012a). Oil and its products are the main sources of income (The World Factbook, 2012).

3.4 BAHRAIN AND THE GULF COUNTRIES

Regarding the relationship between Bahrain and the Gulf countries, Fares (2008) wrote that the citizens of the Gulf share tribal backgrounds in the sense that many of them are members of the same extended family; they share the same religion, moral values and history. The Gulf countries cooperate amongst themselves and share experiences and knowledge in matters related to education, the economy, the media and many other aspects (Thomas, 1990).

3.5 BAHRAIN AND THE ARABIC CULTURE

Bahrain is considered part of the Arab world⁵ (Fares, 2008). According to Wingfield (2001), Arabs are united by culture and history. Culturally, Arabs speak the same language, share similar values and have a shared interest in literature, particularly poetry. Historically, Arab countries were all part of the Islamic Empire. Arabs still uphold some of their pre-Islamic values such as hospitality, solidarity and honour (Tamari, 2008).

⁵ The Arab world consists of 22 countries located in the Middle East and North Africa examples of which are Algeria, Saudi Arabia and Yemen (Wingfield, 2001).

3.6 MODERN BAHRAINI SOCIETY

Modern Bahraini society is multicultural (MOFA, 2012). Very recently the government has started to issue Bahraini nationality to non-Arab families such as those who were originally from Iran and India. The majority of Bahrainis are Muslims but there are also Bahrainis who are Christians, Jews, Bahais and Hindus (MOFA, 2012). The Bahraini constitution protects people's right to worship and choose a religion of their choice (Fares, 2008). Bahrain is a secular state but derives its values from the religion of Islam which is the religion of the majority (FCO, 2012).

3.7 THE STATUS OF INFORMATION AND COMMUNICATION TECHNOLOGY IN BAHRAIN

According to Al Amer (2003), Bahrain has started to adopt a proactive strategy regarding the development of an information society. For example efforts are made to introduce ICT in government institutions as part of the larger e-government scheme (eGovernment Portal, 2012b). Also the Ministry of Education has been working on introducing ICT in public schools in Bahrain both as a subject and as an educational tool (MOE, 2012).

3.8 PEDAGOGY IN THE ARAB WORLD

According to Al Zubaidi (n.d.) and Kannan (2002), there is a consensus amongst Arab educationalists that the current systems of education in the Arab world are poorly designed and managed. For example, curricula are often shallow and out of date, and Arab teachers often assume supremacy, depend on didactic teaching and adopt an oppressive role in their classes. Similar problems have been reported in universities. For example Hassan (n.d.) reported that although universities in the Arab world spend heavily and although serious efforts are being made to improve education and delivery, the outcomes often do not meet the expectations. Hassan (n.d.) noted that, in general, there is little enthusiasm for conducting scientific research; also, governments often interfere in the management of the universities and promote academics without any recognition of eligibility; when it comes to teaching, didactic teaching is the mainstream.

3.9 PEDAGOGY IN BAHRAIN

Fadhel (2008) reported that education in Bahrain strives, amongst other things, to develop individuals who are morally fit to participate in society; it also strives to develop students' cognitive thinking, encourage the values of cooperation, justice, equality and respect. With regards to pedagogy, Fakhro (1997) reported that education in Bahrain depends on memorisation; also, teachers often are close-minded and teach concepts and principles as if they were the ultimate truths. Fadhel (2008) said that policy makers in Bahrain are aware of the fact that teaching in Bahrain is based on lecturing and memorisation and, as a result, the Ministry is striving to improve this situation. Fakhro (1997) said the current state of the Bahraini educational system emphasises the opposite values which Islam upholds, therefore serious efforts are needed to improve teaching and learning processes in Bahrain.

3.10 UNIVERSITIES IN BAHRAIN

Prior to 2002, Bahrain had only two universities: the University of Bahrain, a national university founded in 1968, and the Arabian Gulf University, a regional postgraduate university founded in 1979. After 2002, Bahrain witnessed a sudden growth in the number of privately-owned universities in the sense that ten universities emerged within a seven-year period (Bahrain in Figures, 2005); the credibility of the type of education provided by these universities was questioned. For example the Akhbar Al Khaleej (2009) newspaper reported that one of these universities has been issuing Master's certificates to students who had spent only 25 days studying for their Master's degree. On the other hand, the Kuwaiti Ministry of Education refused to acknowledge the certificates of Kuwaitis which has been granted by the new Bahraini universities on the basis that these universities failed to meet international academic standards (Bahrain News Agency, 2008). The Bahraini parliament urged the Secretary of the Higher Education Council to take action and the Higher Education Council put all of the private universities under a trial period and instructed them to develop their infrastructure (Bahrain News Agency, 2008). Since then, the universities have worked on improving their programmes because they have been subjected to reviews by the Quality Assurance Authority for Education & Training (QAAET, 2012).

3.11 SUMMARY OF THE CHAPTER

The researcher of this study is a Muslim Arab woman teaching at a well established university in Bahrain. This study has been instigated by her aspiration to gain insight into her future practice which will involve the teaching of computer ethics. The researcher believes that Arabs need an intellectual transformation; one which will enable them to dare to question the status of woman, secularism and concepts related to their religion. As part of her experience, the researcher attended a course on computer ethics at De Montfort University, UK. The Muslim students from the UK did not appear to have had difficulty separating ethics from religion. On the other hand, in a class which consisted of students from different backgrounds and faiths, religion appeared irrelevant and offending. Bahrain, the target of this study, is an Arab country and is also part of the Arabian Gulf countries. Bahrainis and the citizens of the Gulf share tribal backgrounds in the sense that many of them are members of the same extended family; they share the same religion and moral values. Arab countries were all part of the Islamic Empire; Islam, therefore, is part of the Arab culture. However, the modern Bahraini society is multicultural encompassing Bahrainis from different faiths and backgrounds. Bahrain is a secular state and the Bahraini constitution protects people's right to choose a religion or a lifestyle of their choice. When it comes to the status of ICT in Bahrain, the country was keen on introduce ICT in government and in learning. 'How the country is preparing the future generation of IT professionals, an important element in any ICT infrastructure, for the ethical controversies which lay ahead them?' is a question to reflect upon. This leads to the issue of pedagogy. The status of education in the Arab world and in Bahrain was not up to the expectations of the Arab educationalists; shallow and out of date curricula with didactic teaching as the mainstream. The underlying problem seems to be due to corruption in governance, because it was mentioned above that top officials interfere in the management of the universities. Perhaps also the social class divisions (upper class-ruling family, middle class-educated citizens, and lower class-poor uneducated citizens) which has long been enforced upon the Arab people was exhibiting itself in the classrooms with the teacher wanting to assume supremacy and with the teachers' pedagogical philosophies becoming more didactic and indoctrinating. Bahrain witnessed a sudden growth in the number of privately-owned and managed universities around the year 2000 and the

credibility of some of these universities was questioned. The country had no legislations in place at that time to control the quality of education provided by these universities but then it attempted to counteract this through inspection and quality control.

3.12 REFLECTIONS

Power relationship might have played a role in how the participants reacted to the researcher during fieldwork. The fact that the researcher comes from a prestigious university and was targeting the newly established universities might have encouraged or discouraged the participants. For instance some of the participants appeared hesitant. Perhaps they thought they were being evaluated or judged. There is also the possibility that the culture was forcing itself upon them; in the sense that Arabs have been living in a culture of fear and silence for years, the reactions, as such, might have been a normal projection of the status of disempowerment. Alternatively, some of the participants might have perceived the researcher as an expert in her field and evidence to this is that they had more questions than answers for her and that they asked for advice on materials. The issue of gender did not appear to have had an influence since Bahrain is a secular country and men and women interact freely with each others, unlike, for instance, in Saudi Arabia where there is gender segregation.

Research, like any literary or artistic creation, is influenced by its creator. Researchers bring their cultural, historical and ideological selves into their research (Creswell, 2007). As such, this research surely has been influenced by the background, ideology and preferences of the researcher especially her views on the importance of philosophy to emancipate the Arab mind from rigid thinking and from the restricting approaches to education and the importance of critically reflecting upon what we (the Arabs) take for granted as valid or correct. This, however, need not to be taken as a war waged against Islam or the Arabic culture. The researcher of this study herself is a Muslim and an Arab; what she aspires for is 'improvements', but this, in her view, cannot happen unless the traditional ways of doing things (including the traditional way of perceiving ethics) are questioned. Islam is a rich religion and evidence to this is that Arabs have in their capacity to view ethics as separate from religion without having to think that this is

an imposition on Islam. The reader may wish to take this all into account when judging the appropriateness of the analysis provided in this study. This is because this study is not purely descriptive, but rather maintains a normative stance on what it perceives to be best for social and individual transformation.

It was mentioned in this chapter that the modern Bahraini society is multicultural encompassing Bahrainis who belong to different faith groups, this could possibly mean that the idea of teaching computer ethics from a religious 'strictly Islamic' perspective is neither democratic nor effective for a society which strives for tolerance and cohesion.

The Muslim students from the UK appeared capable of separating ethics from religion. Further, teaching ethics from a religious perspective appeared irrelevant and offending in a multicultural society such as the UK. Muslim students from the UK, however, are not living in the same cultural, political and social contexts of the Muslim students from Bahrain. Bahraini (and perhaps also Arab as opposed to western) Muslim students might perceive things differently.

Bahrainis share with the people of the Gulf the same religion and moral values also many come from the same extended family. Bahrain is part of the Arab world and Arabs are united by culture and history; they speak the same language and share similar values. However, the social, political and economic contexts of Bahrain are neither identical with that of the Gulf countries nor identical with the rest of the Arab countries; there are similarities in terms of the culture, history and values which they share but there are also differences in terms of the political, economic and social structures in which they operate. This all can help the reader to judge the extent to which this study is transferable (or generalisable) to the teachers and students from the Gulf and from the Arab world.

The section which talks about the status of ICT in Bahrain shows that Bahrain is working towards establishing an information society and has taken steps to introduce ICT into government and education. However important to any information society is

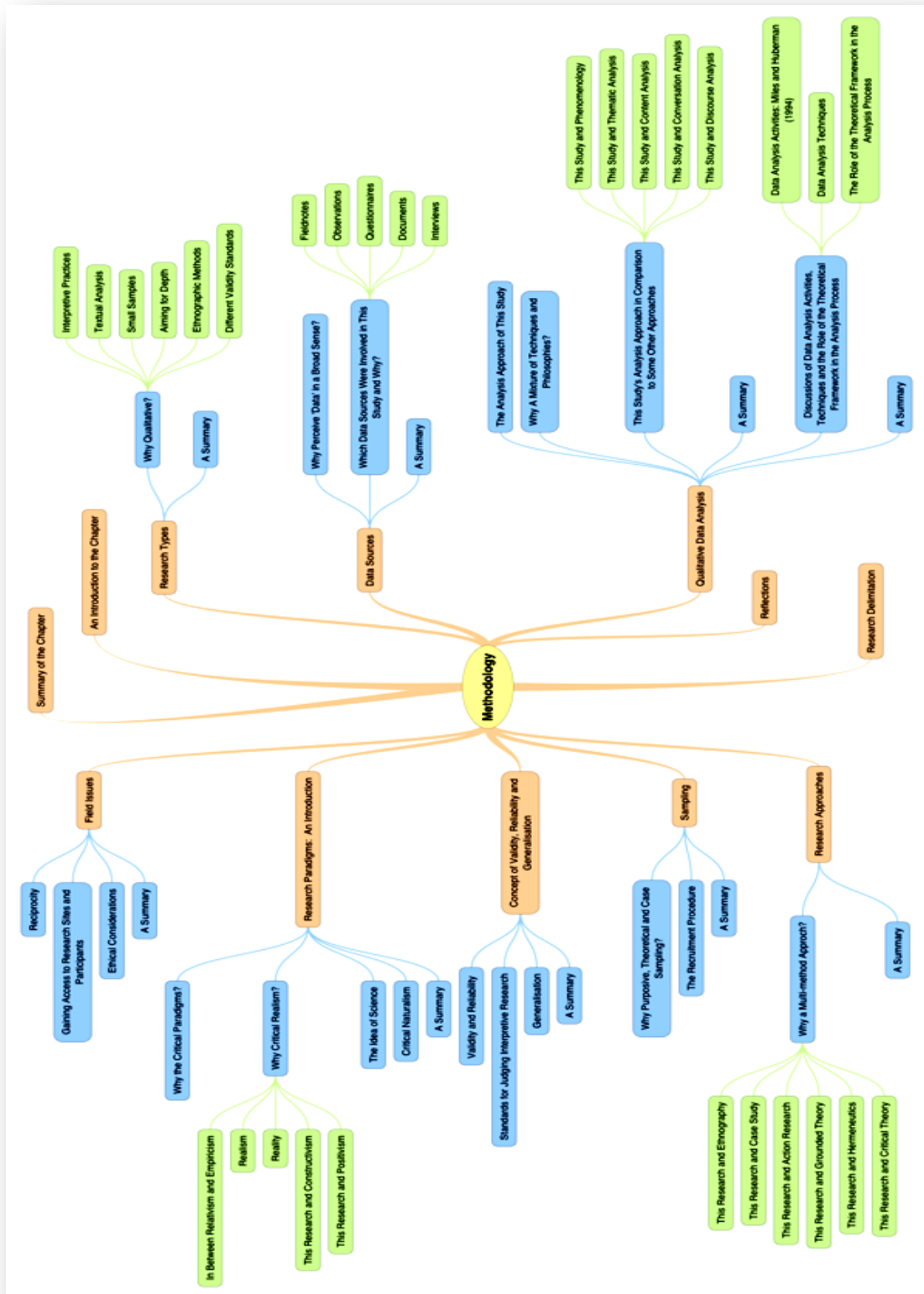
the ethical sensitivity of its members and their ability to make ethical judgments and one of the ways to achieve this is through understanding how best to teach computer ethics in Bahrain.

As illustrated above, the status of education in the Arab world and in Bahrain was not up to the expectations of the Arab educationalists. It was mentioned that didactic teaching was the mainstream and Arab teachers often want to assume supremacy in the class. This was also perceived to go against the teaching of Islam. Social class divisions imposed upon the Arabs and corruption in governance might have contributed to such a state. This shows that educationalists in the Arab world and in Bahrain are searching for clues on how to improve education and are most likely not against any emancipatory project which would recommend transformation and improvement; one which would in particular promote cognitive thinking since this, as mentioned above, was reported as one of the objectives which the Bahraini curriculums strives to achieve. Indeed maintaining the status quo was perceived by these educationalists to go against the teaching of Islam.

The surrounding context and conditions of this study surely must have shaped the outcomes of this research. For instance, this study might have been different if; the data collected for this study were richer, if the researcher was ideologically and culturally different, if the quality of education provided by the universities involved in this study was of a different standard. This, however, does not mean that research outcomes are purely subjective and that there is no research claim that is better than the other. Researchers need to hold steadfastly with the aim of getting it right on the hope that what they are providing are advancing understandings of what is true, valid, correct and fair for human flourishing. The following chapter will elaborate on such ideas discussing issues of paradigm and methodology. A map (Figure 4.1) is provided on the next page to provide a visual representation of the chapter.

4. Methodology

Figure 4.1: A map of this chapter



4.1 AN INTRODUCTION TO THE CHAPTER

This chapter talks about the philosophies which underpinned this study and the research methods through which the research was conducted. The chapter starts with an overview of the existing paradigms in the social sciences then moves to highlight the paradigm relevant to this study elaborating on why this study operated from within the critical paradigm and why it chose the critical realist philosophy. Concepts such as realism and critical naturalism are explained along the way. The chapter then moves to talk about the type of this research and why it was meant to be qualitative. A section then follows on the approach adopted for this study explaining why a multi-method approach was perceived the most suitable. Then the chapter moves to show on what level ethnography, case study research, action research, grounded theory, hermeneutics and critical theory research relate to this study and on what level they do not relate. Included in this chapter also information about how the samples were selected and how the participants were recruited. The sampling approach was purposive, theoretical and case based. Following the discussion on sampling is a section on methods. This study utilised fieldnotes, observations, questionnaires, documents and interviews to collect data. What is discussed next is the concept of reciprocity, the issue of access and the ethical considerations observed in this study. An extensive section in this chapter is the one about data analysis. This section talked about the analysis approach adopted for this study and provided the justification for why a mixture of techniques and philosophies were perceived the most suitable. A comparison with some other approaches to data analysis is provided to show the overlap, when relevant, between this study's approach and the analysis approaches which are most frequently mentioned in the literature. The chapter also discusses the philosophy which underpinned the analysis approach; this was the Miles and Huberman's (1994) conception. The chapter also talks about the analysis techniques each separately to show how they were involved in this study. The theoretical framework in this study had an important role in the analysis process; this was explained in a separate section. The chapter approaches the end with discussion of the concepts of validity, reliability and generalisation and in the course of this the trustworthiness concept which was adopted for this study is explained. The chapter ends with a summary and a reflection.

4.2 RESEARCH PARADIGMS: AN INTRODUCTION

The most frequently mentioned paradigms in the social sciences literature are the positive, the interpretive and the critical. Each of these are broad, encompassing a set of interrelated frameworks and philosophies for the conduct of research (Denzin and Lincoln, 2000; Orlikowski and Broudi, 2002). Generally speaking, these three paradigms are distinguished by certain characteristics.

Within the positive paradigm there is an emphasis on the findings which are observable or possible to capture through the senses, the best methods for the conduct of research, therefore, are the experimental and statistical methods (Hammersley and Atkinson, 2007). Furthermore, the researcher is perceived to be external to the research project therefore the researcher tries to reduce his/her influence on the research and tries to control the research environment so that objectivity is achieved (Schwandt, 1997). Positivists are generally realists in the sense that they believe that reality or truths exist independently of observers (Robson, 2004). Interpretivists, on the other hand, are in general constructivists; to them reality cannot be captured because it is constructed therefore they focus on meanings and perceptions as opposed to discovery of truths (Denzin, 1997).

Research within the interpretive domain aim to understand the inter-subjective meanings of the social world and aim to provide explanations which are considered constructed and based on the theoretical framework of the mind of the researcher and participants (Orlikowski and Broudi, 2002). The best methods to the study of the social world, therefore, are the qualitative approaches which emphasise the importance of context and language in the production of research (Robson, 2004). The critical paradigm pushes language further to the normative level.

Within the critical paradigm the researcher brings to consciousness the conditions which stand as hurdles to liberation (Orlikowski and Baroudi, 2002). The critical researcher is committed to free individuals from all sorts of domination and oppression (e.g. false beliefs, under-utilised resources, injustices and inequalities) (Guba, 1990). Therefore, at the heart of the critical project is a moral sense of obligation pushing for emancipation

and improvement (Stahl, 2008). Focusing on conflicts and contradictions, the critical researcher attempts to disrupt, rather than describe or legitimise, existing patterns of power and authority (Howcroft and Trauth, 2013). Reflexivity also is a theme in critical research; being reflective means being honest and transparent about assumptions and biases which influence the research and being willing to question them (Stahl, 2008). Critical researchers question the taken for granted assumptions of doing things and try to tie the research with wider social, political, historical and ideological contexts (Howcroft and Trauth, 2013). According to Howcroft and Trauth (2013) the term 'critical' in the social sciences refer to a range of approaches (e.g. critical theory, critical ethnography, feminist studies) which operate within a broad range of epistemological and ontological positions drawing from a variety of social theories and thinkers (e.g. Habermas, Anthony Giddens).

4.2.1 Why the Critical Paradigm?

This thesis was written at a time in which the Arabs are revolting against their oppressive governments and in the course of this, the meaning of freedom, democracy, secularism and the role of Islam in decision making are continuously being questioned and discussed. This study is an extension of this political atmosphere; it situates itself within the critical paradigm which is motivated by the desire to free individuals and improve societies.

4.2.2 Why Critical Realism?

Critical realism is a philosophy associated with the work of a number of philosophers, Roy Bhaskar (1978), amongst whom, is perceived as the most influential (Collier, 1994). In his book, 'A Realist Theory of Science', Bhaskar (1978) outlined a critique of the already existing traditions in the philosophy of knowledge and argued for a realist philosophy.

In Bhaskar's view (1978), the philosophy of human sciences has centred on dichotomies: fact vs. value, theory vs. practice and realism vs. idealism. One major dichotomy is the paradigmatic divide between the positive traditions and the interpretive ones (Bhaskar, 1998a). As mentioned above, theories of knowledge (epistemologies)

vary and they can overlap however Bhaskar (1978) still saw a dichotomy between the epistemologies which fall within the positive paradigm and those which fall within the interpretive.

According to Archer (2003), the enlightenment brought about secularisation which, in turn, endorsed the notions that humans are self-determined, have the power to know the world and are capable of controlling their own destiny; this led to the enforcement of the positive paradigm. The problem with positivism, and its modified versions which followed the hypothetico-deductive model, is their emphasis on empiricism (Bhaskar, 1978). Empiricism is a philosophy which holds that “the only genuine or legitimate knowledge claims are those founded directly on experience” as in knowledge obtained through observations or experiments (Schwandt, 1997, p. 119). With empiricism there is a lesser dependence on interpretations or theorisation because abstract entities, such as language, theories and interpretations, are considered incapable of providing accurate information about reality (Collier, 1994). With empiricism there is more emphasis on the identification of the constant conjunctions⁶ of events or correlations between ‘observed’ entities than on information formulised through mind; or, there is an emphasis on deductivism in an attempt to falsify a theory and this process of deductivism yet again gives too much attention to empirical evidence (Hartwig, 2007; Robson, 2004). This all shows that there is an emphasis on events taking place on the empirical domain. According to Schwandt (2007), empiricism is based on a naive assumption about reality. Naive realism assumes that observations are unproblematic and that they provide a mirror to reality. Naive realism neglects the relativity of knowledge and the consideration that different people perceive things differently due to their prior experiences, and the consideration that the mind is active in shaping our knowledge of this world (Silverman, 2005). Positivism, which dominated the social and natural sciences for years, was eventually challenged by constructivists who maintained that prior knowledge affect how people view this world; it affects their observations and their research outcomes (Guba and Lincoln, 2004).

⁶ David Hume’s term for causal law, also known as empirical invariance (where x then y) (Hartwig, 2007).

Interpretivists argued that the positive paradigm, its concepts, and its methods are ill suited for social studies where the main objects of investigation are concepts and perceptions as opposed to physical objects. Therefore they argued for an inter-subjective approach into social inquiry in which reality becomes a mental construction (Denzin and Lincoln, 2000). According to Archer (2003), as a reaction to positivism, an extreme form of interpretivism emerged committing the same mistake which positivism committed; in being excessive; by thinking that knowledge of this world is purely subjective, and that humans are incapable of knowing and that no account is better than another. Danermark et al. (2002) said the rejection of the positive paradigm led many to take a relativist stance in claiming that reality does not exist outside the boundaries of the mind. The adoption of the 'either-or' approach is clear, for instance, in Guba's (1990) understanding when he said, "the only alternative to relativism is absolutism" (p. 18). Critical realists believe that such a binary approach in thinking about the epistemological positions needs to be abandoned in favour of a 'both-and' approach; critical realism is perceived to be the most representative (Bhaskar, 1978; Mingers, 2009; Shipway, 2011).

4.2.2.1 In Between Relativism and Empiricism

Shabani-Varaki and Earl (2005) suggested that relativists reduce reality into text and render scientific claims as meaningless. The basic tenet of relativism is that words or statements cannot perfectly capture the nature of the world itself; statements refer to other statements and to mental images but not to any external reality (Scott and Morrison, 2005). This, however, means that science has no privilege over other forms of social activity (e.g. journalism) and, as such, has no greater claim to truth; relativism, in maintaining this stance, undermines the value of science itself and its capacity for social improvement (Mingers, 2009). From a relativist view there is no objective reality but multiple subjective realities constructed by the mind of the researcher and participants (Denzin and Lincoln, 2000). Critical realists believe that the value-ladenness of observations and the fact that different people perceive things differently does not warrant the abandonment of the idea that there is an objective reality *external* to the mind of the researcher and participants. Critical realists believe in the existence of a reality that is objective and 'out there', real objects of investigation existing

independently of our perceptions of them (Groff, 2004). Critical realists, however, do not adopt the opposite excessive view, the positive view, which breaks text into reality and focuses on the empirical. Critical realists are not empiricists; they maintain that what is real is not necessarily only that which we can directly observe (Schwandt, 2007). That is why there is a need to go beyond empirical observations and use a hermeneutic approach to the analysis of social problems (Carter and New, 2004). Critical realism accepts the basic tenets of constructivism and that people view the world through lenses; as such, there is *no direct access to reality* (Bhaskar, 1998a). Therefore critical realists believe in the *objectivity* of reality and in the *subjectivity* of knowledge.

4.2.2.2 Realism

A fundamental principle in Bhaskar's (1978) critical realism is to distinguish between *reality*, which exists independently of our perceptions and activities, and *knowledge of reality*, which is a social product; each of which existing in a separate dimension (Groff, 2004). Reality exists in the ontological dimension whilst knowledge of reality operates in the epistemological dimension (Bhaskar, 1978). Reality is *intransitive* whilst knowledge of reality is *transitive* (Outhwaite, 1998). Intransitive means that reality (social or physical) exists and acts independently of people's descriptions of it; as such, reality, in Bhaskar's (1978) view, is relatively enduring (i.e. resistant to change) (Hartwig, 2007). Transitive means that knowledge of reality is a social product and hence subject to change. This all means that objects of investigation (reality), such as rocks or chairs, or social objects, like concepts, phenomena and social structures, needs to be distinguished from theories and paradigms about these objects; theories are the transitive objects of knowledge which are used to understand the intransitive (Bhaskar, 1998a).

Because there is no direct access to reality and there is access to reality only through knowledge (i.e. the mind), critical realism holds that knowledge of reality is mediated through the lenses of culture, experience and others (Krauss, 2005). Knowledge as such is a mental picture of reality; it is a social product, provisional knowledge and subject to error, whilst reality remain relatively enduring (i.e. relatively stable and relatively

unaffected by people's perceptions) (Shabani-Varaki and Earl, 2005). Failure to recognise such a distinction between reality and knowledge results in epistemology and ontology becoming conflated. Bhaskar (1998a) termed this 'the epistemic fallacy'. In his view, the epistemic fallacy causes polarisation in the epistemic thought and subsequently introduces errors into research processes and outcomes. The following sections should illuminate this further.

4.2.2.3 Reality

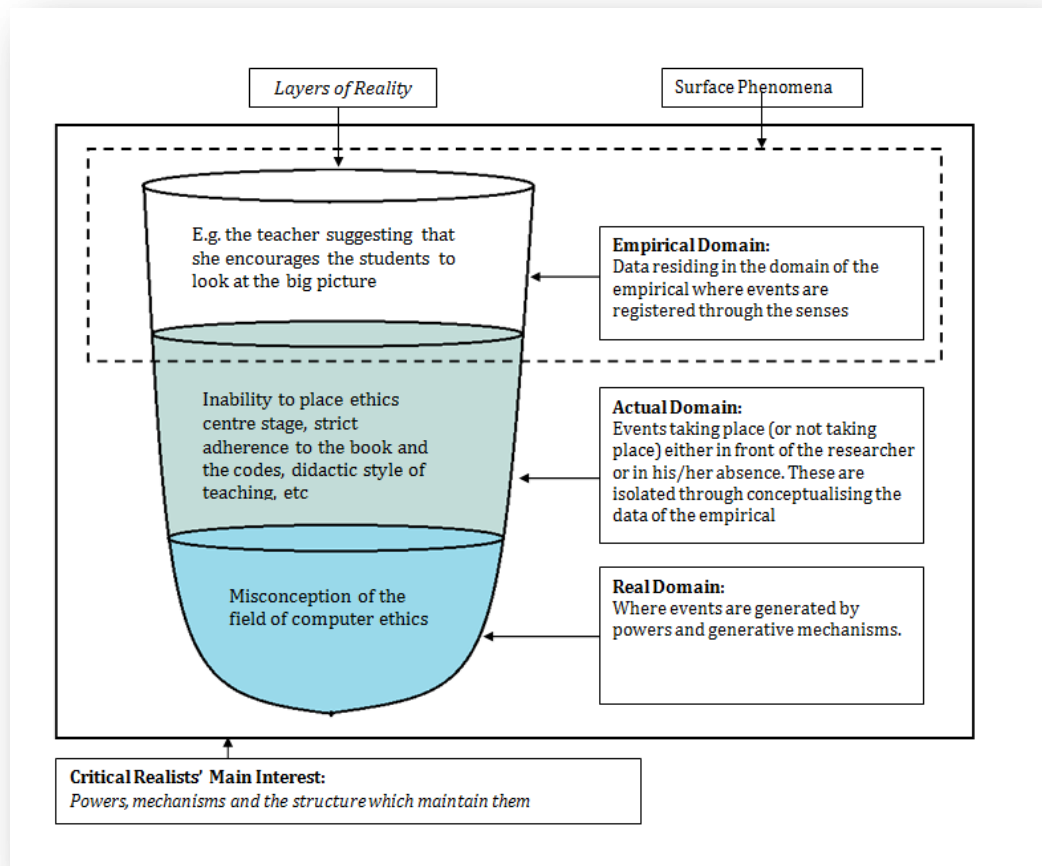
In Bhaskar's (1998b) view, reality is: a) differentiated and b) stratified.

a) *Differentiated* means that it consists of three different domains:

- **The empirical**, where events such as conversations or behaviours are registered through the senses.
- **The actual**, where events take place (*or do not take place*) either in front of the researcher or in his/her absence.
- **The real**, where events are generated by powers, structures and mechanisms; these elements maintain certain conditions and states of affairs whilst negate others.

When mechanisms produce an event, the event comes under the domain of the actual. Then, when perceived by the researcher, it becomes under the domain of the empirical (Danermark et al., 2002). Figure 4.2 on page 69 illustrates this.

Figure 4. 2: Layers of reality diagram



Critical realists are expected to unearth powers, structures and mechanisms which reside in the real domain (Hartwig, 2007). They are expected to work from the empirical domain and, by using a mixture of theoretical reasoning (conceptualisation) and examining empirical evidence, they work their way to the real domain where powers, structures and mechanisms become clearer (Krauss, 2005). The focus is not on the events which are in the empirical domain (i.e. on observations or on conversations) but rather on the causal powers and mechanisms which produce them and on the structures which maintain them *or negate them* (Danermark et al., 2002). Observations, as such, are not enough to capture the best image of reality because observations will expose only one layer of reality; conceptualisation, therefore, is an important tool to dig deeper into the layers of reality (Sayer, 1998). It is worth mentioning here that Bhaskar (1998a) identified his critical realism as ‘transfactual’ because it encourages the researcher to search beyond the empirical (Hartwig, 2007).

b) *Stratified* means that people's perceptions and activities reside in a stratum of reality that is different from the stratum in which social structures reside (Danermark et al., 2002). Perceptions and activities reside in the transitive dimension and social structures reside in the intransitive dimension (Outhwaite, 1998). Take, for instance, teachers' perceptions of computer ethics and their teaching of the subject vs. 'computer ethics teaching' as a bounded system or a social structure. Critical realism maintains that peoples' perceptions and activities do not provide accurate information about the social structures themselves (Archer, 1998a). This can be translated into the example above in that teachers' perceptions of computer ethics and their teaching practices do not provide accurate information about 'computer ethics teaching' as an independent concept. That is why there is a need to go further than perceptions and activities. The critical realist would need to identify the powers and mechanisms which maintain certain structures (Bhaskar, 1998b). What establishes the autonomy and independence of a certain structure (e.g. computer ethics teaching as a bounded system of knowledge) is its emergence (Bhaskar, 1998b). The following paragraph will attempt to clarify the concept of emergence.

'Computer ethics teaching', as a system of knowledge or a structure, is independent of teachers' perceptions or activities because it already exists as a system of knowledge in academic publications. This system or structure, although having 'emerged' out of the early perceptions of and practices in relation to computer ethics teaching, and although it is continuously being affected and shaped by teachers' perceptions and practices, it nonetheless remains relatively enduring as a separate object of investigation residing in the real domain. As such, it is important to understand that social structures do not exist independently of peoples' perceptions of them or people's activities in relation to them because initially these structures are social products (Porpora, 1998). Take another example: the meaning of a banking system is extended from the type of banking transactions people conduct in relation to such a system. Such meanings are also bounded by space and time and are subject to change (Bhaskar, 1998b). For example, banking systems have existed since

ancient Mesopotamia (now Iraq) but many aspects of this system have changed since then. For instance, there were then no deposits of money but of cattle, grain and other crops (Davies, 2005). As such, structures, and people's perceptions of such structures, shape and re-shape each other over time; meanings also change *but not in a reductionist manner* (Bhaskar, 1998b). Social structures are social products but once they 'emerge' and become established they become part of the intransitive dimension and then become relatively enduring (Archer, 1998a). A banking system is a social product but, once emerged and established, it does not simply change based on how people perceive it or how people may wish to use it; i.e. one cannot simply decide to use cattle or grain as money nowadays. Bhaskar's (1998b) philosophy is against reducing societies (or social structures) into individual perceptions; they are connected; they affect each other, but the pre-existence of a structure establishes its autonomy.

4.2.2.4 This Research and Constructivism

The researcher of this study agrees with constructivists on the relativity of knowledge but disagrees with them on their conception of reality. The researcher agrees that "facts are facts only within some theoretical framework" (Guba, 1990, p. 25) for facts are theory-dependent as Danermark et al. (2002) suggested. However, facts are not theory-determined; they will remain relatively isolated from our perception of them and from our theorising. Constructivists think that facts are part and parcel of mental constructions because reality, in their view, exists only in a mental framework but this is epistemology and ontology conflated, resulting in an epistemic fallacy. This reduces reality and the state of affairs to what theorists *perceive*, rather than to what reality and the state of affairs truly *are*; this can have implications for the outcomes of any research.

Constructivists (e.g. Guba, 1990) think that there is no way to know whether one account is better than another; the researcher of this study agrees to some extent. It is impossible to be certain about research outcomes as these will always be provisional. However, the fact that there are multiple interpretations of any given phenomenon does

not mean that all interpretations are equally valid (Reason, 1998). Constructivists have lost hope of finding reality; that is why they assert that what distinguishes one account over another is the “more informed and sophisticated constructions” (Guba, 1990, p. 26). However, research is about reality and the state of affairs *as they really are* than about rhetoric and mental constructions (Archer, 1998a). For this reason critical realists believe that there are rational and ethical⁷ grounds for preferring certain accounts over others (Shipway, 2011; Bhaskar, 1998a). And beyond this, there are tools which can help capture the best image of reality, such tools as triangulation, explanatory critiques, the identification of causal powers and mechanisms and maintaining a balance between conceptualisation and empiricism (these are going to be discussed separately in the coming pages).

The researcher of this study agrees with constructivists that there is no neutral observation, description, interpretation or theorisation. This is because knowledge is mediated through the lenses of culture and other factors (Guba and Lincoln, 2004). Real objects are subject to value-laden observations (Krauss, 2005). That is why researchers should dig deeper into the layers of reality and use a whole host of tools to come as close to reality as possible.

Constructivists do not aim to capture any external reality; they rather aim to reveal different points of view (Stringer, 1996). Reality, from the point of views of constructivists, is shaped through the eyes of the researcher and participants (Hammersley and Atkinson, 2007). Furthermore, the goal of research is to identify perceptions and understand points of view rather than making claims of truth (Walliman and Baiche, 2001). Critical realists think that this attitude towards knowledge production hinders improvement because science must have the capacity to generalise or theorise so that research informs social practices (Danermark et al., 2002). Of course, these generalisations or theories will remain social products and subject to error.

⁷ According to Bhaskar and Norrie (1998, p. 57) “[Critical realism] has also had an ethical dimension which is rooted in the analysis of scientific practice, and seen in Bhaskar’s analysis of emancipatory critique”.

In Bhaskar's view (1998c), human sciences not only *need* to be critical, practical and transformative; they, inherently, *are* critical and aim for transformations.

4.2.2.5 This Research and Positivism

The researcher of this study agrees with positivists' basic conception of reality (that reality exists and is 'out there') but disagrees with them on how to attain it. Positivists assume that events in the empirical world can provide a mirror to reality (Schwandt, 2007). That is why there is an emphasis on capturing events in the empirical domain either through building co-relations or through identifying constant conjunctions of events (Orlikowski and Baroudi, 2002). Positivists focus on the surface level of reality but critical realists look deeper for powers and mechanisms.

Unlike the positive paradigm, which favours the quantification of the data and deductivism, critical realism argues for a hermeneutic approach to the study of the social world and a retroductive reasoning which is a combination of induction, deduction and abduction (Carter and New, 2004). The concept of retroduction is explained in more detail later.

The positive paradigm also encourages the character of the 'disinterested social scientist', said Schwandt (2007). The disinterested scientist is expected to maintain a value-free attitude toward research; he/she, as a result, is forced to expand on theoretical descriptions and limit critiques. However, those who adopt the critical stance in their research think that purely descriptive research are muted; they obscure more than illuminate our knowledge of this world (Popkewitz, 1990). From the point of view of critical realists, research aims to transform and improve; accordingly, it is inherently or inescapably evaluative and critical; not merely descriptive (Mingers, 2009).

In order to capture reality undistorted, the disinterested social scientist is expected to control his/her effect on research participants (Denzin and Lincoln, 2000). The researcher of this study thinks that structuring the research in order to avoid 'contamination' of the data will not stop values from latching onto the data captured from participants. On the other hand, the amount of structure forced on the data

collection process will instead have an adverse effect on the process and outcome of the inquiry. From experience, the researcher tried structured Observation Sheets in an attempt to neutralise the instruments but then little information was possible to capture and still, it was difficult to control an open system (the social world) and control interactive conscious subjects (people). According to Johnson (1975) participants will inevitably be affected by such elements as the researcher's gender, ethnicity and other factors. On the other hand, critical realists believe in experiments and in observing reactions (Hartwig, 2007; Bhaskar, 1978). Therefore, it would instead be informative to present participants with loaded questions or with some unexpected behaviours (that are within ethical considerations) just to observe their reactions. Nevertheless, critical realists do not extract reality from the empirical domain (i.e. merely from participant's perceptions or actions) therefore controlling the researcher's effect on participants is of less importance in the critical realist's thought since reality does not reside in the empirical domain.

Orlikowski and Baroudi (2002) suggested that within the positive paradigm, researchers have become preoccupied with statistics, with generalisations, with theorisation or with the practicality of applying research methods to the point that they undermine the importance of conceptualisation and the tying of the research context with their research. Within the critical paradigm, researchers need to maintain a balance. Critical realism favours a hermeneutic/explanatory-critique approach to the study of the social world and insists on conceptualisation as a medium to unearth the real (Danermark et al., 2002). However, critical realism also argues in favour of generalising and theorising because research needs to inform social practices. However, in general, critical realism refuses the paradigmatic war which exists between the qualitative and quantitative traditions, arguing that methodologies, be they statistical, experimental or hermeneutic, are determined by the nature of the object under investigation and by the nature of the research problem, rather than by adherence to one particular methodology (Danermark et al., 2002). The researcher of this study believes that quantitative approaches are not any less important than qualitative ones but the nature of this inquiry (mainly the research problem and aim) determined that a qualitative approach would better serve this research.

With the positivist hypothetico-deductive model, questions or hypotheses are stated at the outset and are then subjected to falsification through empirical tests (Guba, 1990). In this study, a research problem was stated at the outset; then the research was developed through cycles of interaction with the conceptual framework⁸ by means of retroduction. This is elaborated further under the ‘Coding’ section in the following pages.

4.2.3 The Idea of Science

Bhaskar’s (1998d) critical realism is based on the assumption that knowledge is a social product which has standards and skills that are subject to change like any other socially constructed idea/activity. For instance, Manicas (2007) suggested that if social scientists were to go back in time to the year 1890 in Oxford or at the Sorbonne they would find social science practices unfamiliar. From this, it follows that science has no fixed image and that scientists must continue to search for the best approaches to inquiry.

4.2.4 Critical Naturalism

Traditionally, social scientists thought that the ‘scientific’ method is the best method for studying both the social and natural worlds (Hitchcock and Hughes, 1995). Bryant and Charmaz (2007) defined the scientific method as:

The belief that (natural) science is the highest (perhaps the only true) form of knowledge as well as the process of acquiring knowledge-specifically in its positivist or empiricist form (p. 52).

Proponents of the scientific method (the scientific method is also termed the hypothetico-deductive method) argued for a unity between the social and natural sciences. However, proponents of interpretive methods argued for a separation on the basis that the scientific method is ill suited for the study of human perceptions and social concepts (Donmoyer, 1990; Hitchcock and Hughes, 1995). Bhaskar (1998b)

⁸ The term ‘conceptual framework’ in this study refers to the collection of ideas which the research problem, question, literature review and field data collectively project.

argued for 'critical naturalism'. Critical naturalism means that the dichotomy between the social and natural sciences needs to be abandoned in favour of a realist platform which recognises that the object of the natural is different from that of the social therefore a hermeneutic (or in critical realism terms, an explanatory critique) approach is needed for the study of the social world. This study adopted Bhaskar's (1998b) concept of critical naturalism.

4.2.5 A Summary

This study operates from within the critical paradigm, motivated by the desire to improve individuals and societies. The researcher thought that critical realism encourages looking deeper at causes, structures and conditions of social problems as opposed to surface-level events, occurrences and variables. Critical realism further enables researchers to maintain a stance towards what is perceived best for social and individual transformation; the interpretive and positive approaches are perceived incompatible with the critical project in this respect because critiques requires some form of realism. However, the normative stances and the grounds which support them are all socially and historically constructed and hence subject to error. The same applies to the idea of science or what is perceived to be scientific; our understanding of what is scientific will continue to evolve.

4.3 RESEARCH TYPES

In addition to the paradigm distinction, research in the social sciences is categorised by type and whether research is quantitative, qualitative or a mixture of both. Even though the root of the difference between the quantitative and the qualitative is debated (Denzin and Lincoln, 2002; Pole and Lampard, 2002), there are certain characteristics which tell them apart. Generally speaking, qualitative studies make use of interpretive practices such as research journals and fieldnotes to understand the social problem (Denzin and Lincoln, 2000). On the other hand, quantitative studies use statistics and experiments to identify correlations between variables (Schwandt, 2007). Perhaps the most obvious difference between the two is that data in qualitative research mainly consists of words and the analysis is textual whereas in quantitative research the emphasis is on numbers and statistical analysis (Creswell and Clark, 2007). Yet another distinction is that

quantitative research is concerned with hypothesis testing and verification whereas qualitative research is concerned with knowledge construction (Flyvbjerg, 2006). Denzin and Lincoln (2000) thought that the difference between the two is epistemological; researchers who adopt the qualitative approach believe in the value-laden nature of inquiry, and in the complexity of the social settings whereas those who adopt the quantitative approaches believe that value-free inquiries are possible and that social settings can be measured through quantifications. There are probably some other characteristics but those which are relevant to this study are discussed in the following pages but first the following section will provide the justification for why this study is qualitative.

4.3.1 Why Qualitative?

The researcher chose the qualitative approach because she thought it fits the overall research paradigm and aim. This research adopted the philosophy of critical realism and critical realists are expected to identify structures, powers and mechanisms; these could not have been possible to achieve through quantification. Also critical realism requires a hermeneutic approach and the utilisation of language to identify powers, structures and mechanisms and hermeneutics (or interpretations) are often marginalised in quantitative studies (Sayer, 1998). Furthermore, within the critical paradigm there is an emphasis on reflections; tying social, political and historical context with the research; this too is not a feature in quantitative approaches. Variables are often stripped from their contexts in quantitative studies (Mason, 1996). Also, the researcher aimed for depth as opposed to breadth to understand the research problem; important, therefore, were perceptions and states of affairs within individual cases as opposed to quantification of the data or statistical generalisations across cases.

This all, however, does not mean that the researcher thinks that the qualitative approach is superior. The researcher agrees with the philosophy of critical realism which considers both the qualitative and the quantitative approaches as legitimate and equally valuable and rejects, thereby, the idea that one of the approaches is better than the other (Danermark et al., 2002). The researcher agrees with Silverman (2001) who said that both of the approaches have strengths and weaknesses; therefore, researchers need to

choose the approach which can best answer their research questions and fulfil their research aim.

The following sub-sections highlight the characteristics which align this study with the qualitative domain and in the course of this it compares these characteristics with that of the quantitative approaches.

4.3.1.1 Interpretive Practices

One major characteristic which defines qualitative research is the use of interpretive practices such as narratives, story-telling, fieldnotes and research journals. According to Denzin and Lincoln (2000):

Qualitative research... consists of a set of interpretive material practices... They turn the world into a series of representations, including field notes, interviews, conversations, photographs, recordings, and memos... (p. 3).

Quantitative studies, on the other hand, do not make use of such practices; they, instead, use surveys, experiments and structured observations and interviews (Robson, 2004). This study involved interpretive practices such as the utilisation of fieldnotes, research journals, conversations and memos.

4.3.1.2 Textual Analysis

Yet another characteristic which distinguishes qualitative research is its emphasis on descriptions. According to Creswell and Clark (2007), qualitative research comes in the form of words and the analysis is textual whereas, in quantitative research, the emphasis is on quantification and statistical analysis. This, however, does not mean that qualitative researchers do not use quantification. Qualitative researchers use numbers and charts but the focus is on descriptions rather than on correlations or statistical significances (Arksey and Knight, 1999). In this study, the analysis was textual and the emphasis was on descriptions, or rather more precisely, on providing critiques of the cases under investigation.

4.3.1.3 Small Samples

In general, qualitative research is characterised by small samples which have been selected purposefully, often to ‘saturate’ a theory whilst quantitative research is characterised by large samples selected randomly to achieve statistical significance (Miles and Huberman, 1994). In this study, the samples were selected purposefully in order to saturate a theory or rather more precisely the samples were selected purposefully in order to inform the research problem.

4.3.1.4 Aiming for Depth

Several commentators argued that qualitative studies provide in-depth insights into social problems; something which quantitative studies are incapable of. Miles and Huberman (1994) thought that qualitative studies are characterised by small samples and this enables in-depth studies. Mason (1996) said that the phenomenon in qualitative studies is viewed from within its context and this provides an in-depth view whereas, in quantitative studies, variables need to be stripped from their context; thus, meanings provided by the context, as such, become lost. Potts (2007) also said that qualitative research is characterised by immersion and this enables an in-depth view. With immersion, researchers prefer prolonged observations in the organisation or culture which is being studied and prefer closeness to or interaction with the participants because, in their view, meanings are generated by communication and empathetic interviews whereas immersion and closeness to participants is not a feature in quantitative studies (Potts, 2007).

In this study, the context of the research (for instance, incidents happened before, after or during the interviews) was linked whenever deemed necessary to illuminate the data. Context, as such, shaped the interpretations and most certainly the outcomes of this research. Whether it provided an in-depth view of the phenomenon under study or not is for the reader to judge; however, the researcher came to realise that context-related information helped to dig deeper into the layers of reality.

As for the immersion strategy, the original plan for this study was to conduct an extended period of observation and study one or two cases in depth; however, this was

not possible due to issues of ‘access’. Nevertheless, the researcher tried to come as close to the participants as possible through conducting informal conversations with them and conducting unstructured interviews.

4.3.1.5 Ethnographic Methods

Gillham (2000) and McEwan and McEwan (2003) suggested that qualitative studies often follow an ethnographic method⁹ for their data collection and design where the researcher follows a flexible design and an opportunistic data collection strategy involving unstructured interactions with the participants, with decisions being taken on the spot. This flexible design is also called an emergent design. Becker and Geer (1982) suggested that researchers who adopt the emergent design continuously modify their study in order to better address their research problem. Rapley (2007) also said that researchers who adopt emergent designs avoid setting up a well defined plan and avoid setting up hypotheses; they, instead, set up a problem or a set of questions and use inductive reasoning to answer their research problem. Yet another similar concept is ‘naturalism’. McEwan and McEwan (2003) suggested that qualitative research is naturalistic in the sense that researchers ‘go where the action is’ in order to become a first-hand witness of what is happening in the field; this all was present in this study. Quantitative studies, on the other hand, follow structured designs and standardised measurements, said Miles and Huberman (1994). Quantitative studies, also, are associated with hypothesis testing and deductive reasoning (Silverman, 2001).

This study followed an ethnographic (naturalistic) and flexible method in its design and data collection. In relation to the research design, although a great deal of planning and preparation was undertaken in advance of commencing the fieldwork, adjustments to the original plan had to be carried out to keep the research going and to continue searching for the answers to the research problem. The fieldwork was filled with unexpected circumstances; potential participants changing their mind about participating; difficulty with getting access to information (to view evidence of this,

⁹ Please note that ‘ethnographic methods’ are different from ‘ethnography’. Ethnography is a methodology often used to study cultures whilst ethnographic methods are general qualitative research techniques used for data collection and design of the research.

refer to the Research Journal in Appendix 7.1 or refer, in particular, to the entries made on 3rd of March (the third bullet point) and to the 4th of March (the second bullet point)). A flexible design, as such, was the most suitable for this study. This study also followed an emergent design. It was guided by a research problem rather than a hypothesis but the analytic reasoning was not purely inductive; it was retroductive. In relation to the data collection, the researcher attempted to design somewhat structured observation sheets in the second round of data collection in an attempt to make the data collection more accurate, and in order to construct some form of measurement. However, the structured sheets yielded shallow data and the information instead often came from the 'B3.1 Notes/descriptions' section of the sheets (to visualise this refer to Appendix 7.2). Typing up the conversations and incidents which were happening during the sessions and creating 'reports' out of them proved to be much more useful for, without the descriptions, the researcher would have ended up with very few or no data (Appendix 7.3 contains a sample of the Reports of Observations). Standardised measurements, as such, proved ill suited for this study because the aim was not statistical.

4.3.1.6 Different Validity Standards

Creswell (2007) suggested that qualitative studies use validity standards that are different from those used in quantitative studies. The validity standards used in this study were more in line with the ones used in qualitative studies; these standards are discussed in a separate section.

4.3.2 A Summary

This research was perceived best in a qualitative form. The aim was to investigate perceptions and identify social structures, the qualitative approach, as such, was perceived the most suitable. This research utilised interpretive material practices, such as field notes and research journals, its analysis was textual and its sample was selected purposefully to inform the analysis rather than meet certain statistical requirements. This research aimed at understanding the social problem under study at depth and through small sample of cases rather than understanding it at breadth and achieving statistical generalisations across cases, this was done through ethnographic methods of

data collection and design with a flexible research design and decisions being taken on spot. Validity standards suitable for this study, therefore, are ones which are used to judge qualitative research.

4.4 RESEARCH APPROACHES

Within the qualitative domain there are a variety of approaches to study social settings. The IS World site (<http://www.qual.auckland.ac.nz/>) identified and discussed action research, case study research, ethnography and grounded theory. Schwandt (2007), in talking about qualitative research in the social sciences, mentioned ethnography, case study research, ethnomethodology, life-history, naturalistic inquiry and narrative inquiry. All of these have their root in the *hermeneutics* and *Verstehen* traditions with which interpretivism is an important element however research design and data collection techniques differ with every approach (Creswell, 2007). This study adopted a multi-method approach combining techniques, philosophies and methods from ethnography, case study research, critical theory studies and hermeneutics; taking inspirations from grounded theories, action research and from the general qualitative research approaches.

4.4.1 Why a Multi-method Approach?

From the IS field, Orlikowski and Baroudi (2002) suggested that a single perspective for studying IS phenomena is unnecessarily restrictive and much can be gained if plurality is employed; from the field of education, Griffith (2009) suggested that there is no one particular methodology that can claim to fit the critical paradigm therefore a range of approaches are more suitable and realistic; the researcher of this study agree. The researcher was inspired by those who support pluralism in research (e.g. Burgess, 1984; Denzin and Lincoln, 2000; Danermark et al., 2002; Hammersley and Atkinson, 2007). To pluralists, the best approach to research is that which enables the research questions to be answered and the demands of the inquiry context to be fulfilled. The researcher believes that methodologies and philosophies are there to borrow from and to combine in order to create new approaches to inquiry; they are not there to imitate or slavishly adhere to. Therefore the researcher thought that a mixture of method is better than being restricted with one single methodology.

Methodologies come with strengths and weaknesses or come with a set of characteristics; in adopting a multi-method approach one can avoid weaknesses (or characteristics which might not serve one's research) residing in one particular methodology and draw strengths from another methodology. This does not mean that cohesion is lost when a multi-method is used; every research is backed with an umbrella paradigm or philosophy, whether explicit or implicit, this paradigm or philosophy provides cohesion to the multi-method approach (Miles and Huberman, 1994; Charmaz, 2006). In this study, the methodology operated from within the boundary of critical realism.

The following subsections will show on what level ethnography, case study research, action research, grounded theory, hermeneutics and critical theory research relate to this study and on what level they do not relate.

4.4.1.1 This Research and Ethnography

Ethnography in its literal sense is the study of culture (Hammersley and Gomm, 2000). This study was not attempting to study a culture but rather study a phenomenon 'perception and practices of computer ethics'. Moreover, one major characteristic which several authors (e.g. Hammersley and Atkinson, 1995; Holloway and Todres, 2003; Creswell, 2007) thought defines ethnographic research is prolonged observations or emersion; this was not present in this study. However, certain Ethnographic characteristics were involved in this study such as the utilisation of field notes and research journals (Emerson, Fretz and Shaw, 2001), having a theoretical framework set up prior to fieldwork (Alvesson and Skoldberg, 2000) and applying the concept of 'reciprocity' (Creswell, 2007) each of which, the researcher thought, have added strength to this research.

4.4.1.2 This Research and Case Study

With regards to case study research, after reading around the topic, the researcher came to the realisation that case study is not a methodology but a choice of 'what/who to study'; an idea which has long been voiced by Stake (1978). Those who claimed that case study is a methodology identified characteristics that were general and not

necessarily specific to case study research. For instance such characteristics as ‘in-depth view into social problems’, ‘importance of context’, ‘providing descriptions gathered through observations’ (Yin, 1994, Hammersley and Gomm, 2000; Gerring, 2007; Thomas, 2011) cannot distinguish case study research from ethnography. In this study, case study was an instrument to identify who/what to study and to organise the data collection and analysis processes. Moreover the researcher of this study thought that in studying cases in their totality one can better localise or identify the causes and states of affairs (in critical realism terms; structures and mechanisms) since these are assumed to be interlinked in one single case (Stake, 1978).

4.4.1.3 This Research and Action Research

Reason and Bradbury (2008) defined action research as a family of practices aiming to link theory with practice for the purpose of improvement. Action research attempts to study one’s own situation, clarifying what the organisation is trying to achieve and working on removing obstacles (Kemmis and McTaggart, 2005). The approach involves setting out a plan for the aspired change, implementing the plan or ‘acting’ out the plan, then observing the consequences, then reflecting on these consequences, the cycle then could start again with re-planning, acting, observing and reflecting (Smith, 2007).

In the preliminary stages of this research, the researcher asked the following question: how best to teach computer ethics in Bahrain? Action research would have been the best approach to answer such a question. The researcher could have put the theoretical framework of this study into practice and taught it since it provided a plan to how the scholars in the field recommend the teaching of the subject, however the research question evolved because the literature forced certain other interests. The researcher moved to ask: how computer ethics is actually being taught in Bahrain? Action research, as a result, became incompatible with this type of question. With the current question the researcher wanted to explore perceptions and practices and identify struggles. The foci, as such, shifted from the more focused sphere of self/organisational development to the wider sphere of societal and individual struggle and aspiration to transform. The issue of religion vs. ethics which was forced by the review of literature

changed the direction of this thesis and the researcher became preoccupied with this idea. If the preliminary research question remained, and if Action research was put into practice in this study it would have solved the problem of access to participants and as a result it would have provided richer data but the approach would have remained demanding and perhaps not possible to implement since the University of Bahrain was not teaching computer ethics at that time. Action research requires the actual act of 'teaching'. This would have required that the researcher moves back to Bahrain after being settled in the UK, stays in Bahrain for 4 months (the duration of the course), re-arranges accommodation and arrange for transportation and prior to this all think about how or from within which course she can possibly teach computer ethics, this if the university was to authorise her to do so.

Nevertheless, this study shares with action research its aspiration for improvement and for combining theory with practice; however critical researchers and action researchers have different ideas about how improvements are to be realised and how theory is to inform practice. Critical researchers think that descriptions are incapable of pushing for change therefore they encourage realism, critiques and normativity in the production of research (Popkewitz, 1990; Mingers, 2009). This sort of discourse in their view is no longer theoretical but rather practical. Their idea of realising emancipation and improvement is still theoretical and through engaging in discourse (Stahl, 2008). Action researchers, on the other hand, are more practical; their idea of improvement resides in the actual act of an 'action' implemented on a system; this in their view is how theory informs practice.

4.4.1.4 This Research and Grounded Theory

Bryant and Charmaz (2007) provided the following definition of the grounded theory approach:

The Grounded Theory Method (GTM) comprises a systematic, inductive, and comparative approach for conducting inquiry for the purpose of constructing theory (p. 1).

Several other definitions (perceptions and applications) of the approach, in addition, exist but certain characteristics are assumed to define what is perceived to be a grounded theory. According to Holloway and Todres (2003), Charmaz (2006), Mills, Bonner and Francis (2006) and Lingard, Albert and Levinson (2008) grounded theories aim for theory development; they are (or rather are perceived to be) inductive; are considered to be iterative; are expected to utilise the memoing technique; use the concepts of theoretical sampling and theoretical saturation; delay literature reviews; and are expected to exhibit the concept of progressive focusing. Moreover, codes in grounded theories are expected to emerge from the field data instead of emerging from theoretical frameworks.

This study took inspirations from the grounded theory approach. Coding, iteration, theoretical sampling and memoing were involved in this study but these were not used in the same way grounded theorists would use them. Codes in this study emerged from the literature review whereas codes in grounded theories emerge from field data. Iteration was not continued in this study, the point of saturation, as such was not reached or was not aimed for. Theoretical sampling in this study was not aimed at achieving theoretical saturation but rather was to enrich the analysis after each round of data collection. Memoing in this study was inspired from the general literature on data analysis and did not strictly come from grounded theorists' conception of what memoing is/is not. This study also does not share with grounded theories the notion of inductivism or more precisely it does not claim that it is purely inductive; rather, it claims that it is inductive-deductive. This study also does not share with the grounded theory approach the idea of delaying the literature review or the development of the codes from field data. In this study, codes emerged from the literature review and the review of the literature was conducted before the data collection and analysis.

4.4.1.5 This Research and Hermeneutics

Hermeneutics has been defined as the “theory and practice of interpretation” (Hitchcock and Hughes, 1995, p. 227). It is both, a philosophy and a mood of analysis (Schwandt, 2007). In this study hermeneutics is involved as a mood of analysis. Central to hermeneutic analysis is the hermeneutic circle of interpretation; the hermeneutic circle

was involved in this study. With hermeneutics, the researcher enters a dialectical circle with the text where descriptions are guided by anticipated explanations and where there is a movement, a cognitive movement, from the whole (i.e. from the entire corpus of text) to the part (i.e. to part of the text) and back from the part to the whole and this fuels the interpretation (Alvesson and Skoldberg, 2000). Therefore, parts of the texts can only be understood in terms of their connection to the entire text (Holloway and Todres, 2003). The analysis in this study, as such, involves back and forth movements between particular meanings and the meanings of the entire text. A piece of information gathered from the field, therefore, does not have to have a certain number of occurrences in order to gain worth or validity because, with hermeneutics, single pieces of information add value and give meanings when viewed in the light of other pieces of information (Holloway and Todres, 2003).

4.4.1.6 This Research and Critical Theory

Critical theory is a philosophy not very far from critical realism; indeed they both operate from within the critical paradigm. According to Danermark et al. (2002), critical theorists whose line of thinking is similar to critical realists are Anthony Giddens and Jürgen Habermas. The philosophy of critical theory overlaps that of critical realism in many ways. For instance, both are emancipatory and both involve a critique of the social world (Schwandt, 2007; Mingers, 2009). Also, both are interventionist, taking a dialogic approach to encourage adopting one point of view; the view which is assumed to be the true or best one (Guba, 1990; Collier, 1994). Both critical theorists and critical realists are sceptical about the taken-for-granted assumptions and the accepted conventions for doing things (Popkewitz, 1990; Danermark et al., 2002). They both use a hermeneutic approach to critique social problems (Gallagher, 1992; Carter and New, 2004). These features are all applicable to this study.

4.4.2 A Summary

The approach which was perceived best for this study was to use a mixture of methods combining techniques, philosophies and methods from ethnography, case study research, critical theory studies and hermeneutics; taking inspirations from grounded

theories, action research and from the general qualitative research approaches. This multi-method approach operated under the philosophy of critical realism. This study drew from ethnography the utilisation of field notes, research journals, reciprocity and having a theoretical framework set up prior to fieldwork. From case study research, the researcher adopted the idea that case study is not a methodology but a choice of what/who to study. As such, case study was used as a sampling technique and to organise the information during the writing up of the thesis. This study shares with action research its aspiration for improvement and for combining theory with practice however put these into practice in a different way. This research also took inspirations from the grounded theory approach. Coding, iteration, theoretical sampling and memoing were involved in this study but not in the same way grounded theorists would use them. Hermeneutics worked as the backdrop for the analysis process providing the means for a dialectical circle with the text where descriptions were guided by anticipated explanations. This research overlaps with the philosophy of critical theorists in several ways for instance they both provide critiques of the social world, they both are emancipatory and both use hermeneutic approaches.

4.5 RESEARCH DELIMITATION

The reason why this study targeted Bahrain in particular and not any other country is because Bahrain is the home country of the researcher and the aim was to improve the teaching of computer ethics in Bahrain. The reason why the study delimited itself to stand-alone (i.e. separate) courses as opposed to ‘across-the-curriculum’ teachings of computer ethics is because the researcher thought that in studying cases or courses in their totality one can better localise or identify the causes and states of affairs since these are assumed to be interlinked in one single case (Stake, 1978). The reason why the study delimited itself to undergraduate computing programmes as opposed to post graduate programmes is practical, in the sense delimitation was necessary so that the research becomes achievable within the capacity of a PhD researcher.

4.6 SAMPLING

Mason (2005) defined ‘sampling’ as the methods by which data sources (people or otherwise) are identified for the purpose of studying. There are two main sampling

methods: probability and non-probability sampling and within each there are a number of strategies (Robson, 2004). Probability sampling is associated with quantitative research. With this method, an estimate of a representative sample is calculated and drawn from a wide range within a population; the ultimate aim is to achieve representativeness in order to generalise the findings across the population (Marshall, 1996). Non-probability sampling is equated with qualitative research. With this method a sample is selected based on the judgment of the researcher in the sense that a sample is chosen based on certain characteristics essential to answering the research questions (Seale et al., 2004). Since this study did not aim for representativeness, the sampling technique was not of a probability type. The purposive sampling, which is a non-probability sampling, was deemed the most suitable for this study along with the theoretical sampling technique and case study method.

4.6.1 Why Purposive, Theoretical and Case Sampling?

According to Marshall (1996), with purposive sampling, the researcher selects the most productive and relevant sample, as opposed to the most representative, to answer the research questions. According to Robson (2004), Cohen and Crabtree (2006) and Johnson and Christensen (2012) all of the qualitative sampling techniques work within the philosophy of purposive sampling since they all depend on the judgment of the researcher to choose the most productive sample as opposed to the most representative, however each technique has its own purpose. For instance, with 'time sampling' the researcher samples evidences across time; with 'snowball sampling' the researcher allows one or more individuals from the population of interest to identify other members of the population (Robson, 2004). With regards to this study, the groups/cases which were to be studied were more obvious to the researcher than to the participants, the snowball sampling, as such, did not fit and nor did any other technique. What was fitting was to work within the general philosophy of purposive sampling and to utilise, in addition, the theoretical sampling technique and case study method.

According to Charmaz and Mitchell (2001), theoretical sampling means multiple visits to the field in order to inform the knowledge of the researcher about the categories which are being investigated and in order to elaborate the analysis. In this study

theoretical sampling was not aimed at achieving theoretical saturation as in grounded theories but rather was aimed at enriching the analysis after each round of data collection. On the other hand, case study, as mentioned above, was involved to identify the targets for this study. The universities involved in this study are considered cases (each separately) and within each there are one or two cases of computer ethics teaching identified by the name of the teacher (Table 5.2 on page 146 provides a visual representation of the cases involved). The original plan was to select one or two cases of computer ethics teaching in order to study them in depth but then full access to information for any case was never possible; the researcher, as a result, emerged with bits and pieces of information from multiple cases.

4.6.2 The Recruitment Procedure

The recruitment for this research started with telephone calls and e-mails to university managements and computer ethics teachers; contacts for these were located from the internet (Appendix 7.4 contains samples of both the English and Arabic versions of the letter which was sent to the universities to negotiate access). The researcher tried to locate and contact the teachers well in advance of the fieldwork in order to negotiate access, select the cases, and arrange for 'when and how' to conduct the observations and interviews; however, no one was responding to e-mails and telephone calls. Even when receptionists and secretaries answered, it was difficult to trace the teachers who were in charge of the computer ethics courses over the phone; it seemed that face-to-face communication was a must in order to fulfil any query. The researcher, as a result, had to wait until she commenced the fieldwork.

At the outset, and in order to plan for the selection of the cases, the researcher visited all of the Bahraini universities with the exception of the Medical University of Bahrain and the Arabian Gulf University because these were not relevant to this study; the former is a medical university and the latter is a postgraduate university whereas this study was aiming for computer ethics courses taught to undergraduate computing students. Please note that only 'universities' were involved in this study; training centres and colleges were excluded. The researcher searched for computer ethics courses in the computing programmes of the targeted universities. The search was for stand-alone (i.e. separate)

courses as opposed to ‘across-the-curriculum’ elements and the search was guided by the key terms: ‘ethics’, ‘society’, ‘professionalism’ or one of their equivalents in any of the course titles within the computing programmes. Once a computer ethics course was identified, the researcher tried to locate and contact the course teacher in order to negotiate access. If a course with one of the above terms was not found, the researcher asked to meet the head of the computing department to find out if a separate course on computer ethics was being taught or not. .

4.6.3 A Summary

Because this study is qualitative, the purposive sampling was deemed the most suitable for this study. With purposive sampling the researcher selects the most suitable and relevant samples on the basis of judgment. This was used in conjunction with the theoretical sampling technique which requires multiple visits to the field in order to inform the knowledge of the researcher about the topics which are being investigated and to enrich the analysis. The samples in this study were cases of computer ethics teaching from Bahrain. The original plan was to select one or two cases and study them in depth but due to the problem of access multiple cases were involved.

4.7 DATA SOURCES

According to Brewer (2000), ethnographic data take the form of quotations from in-depth interviews, quotations from casual conversations, quotations from fieldnotes and from documents. In this study, data came from different sources: from fieldnotes, in-depth interviews, casual conversations, questionnaires, documents which the participants provided, and from the internet. For example, when relevant, information from the internet was used in the analysis to illuminate understanding. An example of this is the case of using the ACM/IEEE Software Engineering Code of Ethics (2012) to elaborate the analysis. Furthermore, the internet was used to identify the sources of some of the materials which the teachers provided and to search for background information about the universities. Data also came from the researcher of this study, from her reactions and from her past and present experiences. ‘Data’, as such, is viewed in its broadest sense in this study. Rapley (2007) shared this view and thought that data can range from academic papers, books, leaflets and research journals to the

traditional sources of data such as interviews and observations. This was also reflected in Myers and Avison's (2002) discussion on the nature of qualitative data, they said:

Qualitative data sources include observations and participant observations (fieldwork), interviews, and questionnaires, documents and texts, and the researcher's impressions and reactions (p.4).

4.7.1 Why Perceive 'Data' in a Broad Sense?

The answer to 'why perceive 'data' in a broad sense and not focus or utilise one single source such as for instance relying on interviews alone' is because the researcher of this study believes that triangulation is important to dig deeper into the layers of reality and triangulation is possible only when multiple sources are involved.

4.7.2 Which Data Sources Were Involved in This Study and Why?

This study utilised fieldnotes, observations, questionnaires, documents and interviews to collect data. There was, in addition, a plan to utilise focus groups, but this was not possible due to the problem of getting access to lecture rooms and students. The answer to the question 'why these methods in particular and not any other' is because these methods seemed the most suitable to capture perceptions and practices of teaching computer ethics in comparison to the rest of the available methods. For instance, collecting information through data archives did not fit this study because there was no need for searching through archives. On the other hand, conducting tests and simulations on the participants did not appear qualitative and surveys and experiments were very far from the aim that was set out for this study.

The following sub-sections discuss the data collection methods involved in this study each separately but first, the following two paragraphs will provide information about: a) the issue of translation and b) the instruments in light of the fieldwork visits.

Concerning the issue of translation, the instruments used in this study were translated into the Arabic language for the convenience of the participants and to encourage participation. These instruments are as follows: the access letter (available in Appendix 7.4), the teachers' questionnaire (available in Appendix 7.7), the students' questionnaire

(available in Appendix 7.8), Mr. Ameer's questionnaire (available in Appendix 7.9) and the informed consent sheet (available in Appendix 7.12). Some participants preferred the Arabic version whilst others preferred the English version. The researcher of this study tried her best to make the translation as accurate as possible.

Concerning the instruments in light of the fieldwork visits, this study involved two rounds of data collection. The instruments in the first round were open-ended and fuzzy and the questions asked in the first round were exploratory. This was because the conceptual framework was not clear at this point. The instruments in the second round became more focused because the conceptual framework by the time of the second round was clearer. In the second round, it was possible to build the instruments around categories or topics of interest which were inspired from the theoretical framework. Nevertheless, during the data collection, the researcher kept an open mind concerning anything interesting or relevant to the conceptual framework. The instruments, as such, acted as guides rather than measurements.

4.7.2.1 Fieldnotes

According to Schwandt (2007), fieldnotes are written reports of fieldwork. Schwandt (1997) defined fieldwork as:

All those activities that one engage in while in the *field*, including watching, listening, conversing, recording, interpreting, dealing with logistics, facing ethical and political dilemmas, and so on (p.54, emphasis in the original).

Fieldnotes have been defined as “narrative accounts of what goes on in the lives of study subjects” (Berg, 1995, p.107). In this study, fieldnotes were recorded in a Research Journal. The Research Journal contains hunches, hypotheses, plans and records of what was happening in the field (Appendix 7.1 contains the fieldnotes).

At the start of the research project, the Journal served as an idea generator. Plans, ideas and some of the literature search results were recorded in the Journal (Appendix 7.6 contains a sample of such logs). Then, when fieldwork commenced, the Journal served as a log of the fieldwork (this is depicted in Appendix 7.1). Fieldnotes, such as

incidents happening in the field and the casual conversations with the participants, were kept in a log (in the Journal) instead of being kept in the memory of the researcher. This improved data accuracy. Alaszewski (2006) thought that keeping a journal improves data accuracy because events are recorded at a time close enough to the time when they occurred and this guards against distortion. Furthermore, fieldnotes in this study provided valuable information about the research context; the information added meanings to the interpretations. A digital voice recorder was used to record incidents or reflections which occurred in the field. This made it easier and quicker to register what was happening. Then, on the same day or one day later, the recordings were transcribed and expanded into the Research Journal.

Fieldnotes also were made during observations and kept in a separate log called 'Reports of Observations' (Appendix 7.3 contains a sample). The initial plan was to use an observation sheet with somewhat structured questions but then the sheets failed to provide rich data and information came instead from the Research Journal and from the descriptions which were recorded on the sheets. As a result, the sheets then became supplementary. They were there to remind the researcher of the questions/points to look for in the observations but the data collection method instead became to describe what was relevant and important in the observations; these were recorded in the Reports of Observation logs. A Net Book (a small portable computer) was used for typing in the descriptions during the observations.

4.7.2.2 Observations

Marshall and Rossman (1995, p.79) defined observations as "the systematic noting and recording of events, behaviours and artefacts (objects) in the social setting chosen for study". The process of observation was also described as an immersion into the social setting in order to witness the incidents as they occur naturally (Robson, 2004). In this study, an immersion or a prolonged observation was never possible. In the case of University (A), the fieldwork visit coincided with the University's mid semester break. As a result, it was possible to conduct only one observation session; this was in the first round of data collection. In the second round the researcher had very limited access. She was allowed to attend three sessions only (the reader can refer to the Research

Journal which is in Appendix 7.1 and to the entry made on 14th of April). In the case of Universities (B and C), in both rounds, the course was not being taught when the researcher visited; observations, as such, were not possible. And in the case of the remaining universities, there was the problem of gaining authorisation to access the lectures and meet the students; observations in these universities, as a result, were not possible. The issue of access is discussed separately.

Observations range from being highly structured to less structured (Babbie, 2001). Highly structured observations are often used in quantitative studies to produce numbers or count the number of occurrences of a certain incident or behaviour. On the other hand, less structured observations aim to gain an understanding of underlying social meanings (Robson, 2004). In this study, less structured observations proved more effective than the structured ones.

Reports of Observations, as seen in Appendix 7.3, were less structured and contained headings to guide the researcher in the insertion of information under the headings; at the same time, they allowed ample space for descriptions and fieldnotes. Descriptions in the Reports of Observations were kept separate from the fieldnotes. Under the 'Notes/Research Journal' section, the researcher registered fieldnotes; her reactions, hunches, questions, informal conversations with the students and incidents surrounding the context of the observation. Brewer (2000) said that positivists do not accept that the researcher becomes a variable in the research yet the nature of some qualitative studies requires involvement or even auto-observation whereby the researcher reflects on and analyses his/her own experiences. In this study, auto-observation was involved. Whenever necessary, the researcher reflected on, analysed or used her own experiences to illuminate the analysis of the data.

The philosophy which inspired the conduct of the observations (and the data collection in general) in this study was that participants would act naturally and would be open and sincere when researchers approached them with humility and when they portray to participants that they are equals, with the difference that the researcher is on a mission to investigate and improve the realities which the participants are living in. The main

idea is to avoid approaching participants with a class and sub-class mentality, with the researcher acting as the ‘powerful scientist’ who wants to conduct his/her ‘experiments’ *on* them instead of *for* them. This philosophy is borrowed from the followers of the participatory research paradigm (Heron and Reason, 2001) provided an excellent overview of the participatory research paradigm).

The role of the researcher in observations may range from ‘complete participation’ to ‘an observer only’ (Robson, 2004). Researchers can also choose either to reveal their identities (and conduct their observation overtly) or conceal their identities (i.e. observe covertly) (Babbie, 2001). When researchers take up the ‘complete participation’ role they join the group and participate in the activities of the group (Miller and Brewer, 2003). In this study, there was no need to conceal the identity of the researcher; the researcher asked the teachers to introduce her to the students. With regard to the role of the researcher of this study in the observations, it fell in between the ‘complete participation’ and the ‘observer only’. Berg (1995) suggested that some commentators think that observers should try to participate as little as possible so that they disappear into the surroundings and thus minimise the effect of their presence on those whom they are observing. Other commentators think that observers should work to become closer to participants, involving themselves in the same activities which the participants are involved in so that they become less of a focal point. Brewer (2000) thought that a balanced role is the best because remaining an ‘outsider’ who is cold and distant does not encourage participants to become open and sincere. On the other hand, ‘going native’ and becoming an ordinary member of the group can detach the observer from his/her critical frame of mind. The researcher of this study attended the lecture rooms as an observer only but tried to become as close to the participants as possible, especially to the students. For instance, she dressed in casual clothes, which imitated the students’ style of dressing, and also sat next to the students instead of sitting far from them.

Burgess (1982) suggested that observers watch the people as they behave in their natural setting and talk with some or all of them, often to discover their own interpretations of the events they observe; the main instrument, as such, is the observer.

This was mirrored in this study. The researcher was attending the teaching sessions and, whenever necessary or possible, she attempted to ask questions to explore opinions and reactions.

4.7.2.3 Questionnaires

Within the qualitative domain, researchers believe that questionnaires are not restricted to quantitative studies yet qualitative-type questionnaires are believed to be less structured, aiming to gather textual rather than statistical data (Wellington, 2000; Fairbrother, 2007; Pole and Lampard, 2002). In this study, questionnaires were utilised to gather background information and to explore students' opinions. Two sets of questionnaires were used: teachers' questionnaire and students' questionnaire. The former was used to collect background information about the teachers and about the course which they were teaching (Appendix 7.7 contains samples of both the English and Arabic versions). The latter was to provide the researcher with an idea of how the students felt about their course (Appendix 7.8 contains a sample of both the English and Arabic versions).

The teachers received their questionnaires via their e-mails after their interview. The questionnaires contained somewhat personal questions and the researcher did not want this to influence the teachers or their answers during the interview, which is why the questionnaires were sent after the interviews. Not all of the teachers responded to the questionnaire; Dr. Fawzeah, Dr. Jude and Dr. Saeed did not return their questionnaire. With regard to the students' questionnaire, only the students of University (A) and, in particular, Ms. Leena's students answered the questionnaires. The remaining universities were not running the computer ethics course at the time when the researcher was visiting and so students were not available to fill in questionnaires. Dr. Fawzeah of University (A), on the other hand, whose students were present during the fieldwork did not seem to want to grant access to her students (the reader can refer to the Research Journal which is on Appendix 7.1 and to the entry made on 24th of March 2009).

The questions in the students' questionnaire were in no way comprehensive. The researcher was planning to conduct focus groups with the students and explore their

opinions through casual conversations during observations but focus groups were never possible (due to the issue of access). The questionnaire contained open-ended questions and this allowed the students to provide descriptions in the empty spaces. However, the information provided was still shallow. This is typical of questionnaires and it was documented in the literature that questionnaires cannot provide rich data (Walliman and Baiche, 2001).

Mr. Ameer of University (D) provided his answers to the interview questions through a questionnaire. The teacher did not agree to an interview and therefore the interview questions were incorporated into the already existing teachers' questionnaire (Appendix 7.9 contains the Arabic and English versions of Mr. Ameer's questionnaire).

4.7.2.4 Documents

Stringer (1996) said that documents, such as official reports, policy statements, plans and reports, can provide valuable information to aid in the analysis of data. This proved to be true in this study. Documents which the teachers provided, such as course outlines and course materials, provided an additional dimension alongside the dimensions which the other sources of data provided.

The researcher of this study asked the computer ethics teachers to provide her with the following:

1. Course outline.
2. Course description.
3. Title of the textbook(s) used.
4. Sample of the materials used, for example, case studies, articles, websites etc.
5. Sample of students' work, such as exam papers or cases which they had solved.
6. Information about software used, if any, in the teaching of the subject.

In relation to the course outline, course description and textbooks, four teachers responded: Ms. Leena, Dr. Fawzeah from University (A) and Dr. Jude and Mr. Mustafa from University (B). The remaining did not provide the information. With regard to course materials, only the teachers from Universities (A and B) responded. Dr.

Mamood of University (C) did not provide any materials but provided the researcher with the name of the textbook used. With regard to samples of students' work and information about using/not using software in teaching, none of the teachers responded.

4.7.2.5 Interviews

The following sub-sections provide information about the type of interviews involved in this study in terms of their structure and in terms of formality. They also consider interview schedules, the recording of the interviews, rapport and empathy.

Type of Interviews

According to Wilson and Sapsford (2006), interviews can range from the highly structured to the unstructured. In highly structured interviews, the questions are carefully laid down so that the interviewer does not depart from them (Robson, 2004). Also, the questions need to be asked in the way they were worded and written in the Interview Schedule (Marshall and Rossman, 1995). Unstructured interviews can range from informal encounters with participants to formal dialogue or conversations (Fontana and Frey, 2000). With semi-structured interviews, researchers maintain an Interview Schedule with a set of questions or themes to investigate. However, they are not bound to question wordings or the sequence of the questions and they can improvise or add additional questions during the interview (Robson, 2004). The literature demonstrated that unstructured and semi-structured interviews are associated with the qualitative paradigm whereas the structured types are associated with the quantitative paradigm. With regards to this study, the informal interviews were unstructured and the formal ones were semi-structured. Structured interviews were not involved in this study.

Interview Schedules

In the first round of data collection, the conceptual framework was not yet clear therefore some of the questions asked during the interviews in the first round were fuzzy or without a definite direction. The questions nonetheless revolved around the teaching of computer ethics and around the categories which were emerging at that time from the review of the literature (Appendix 7.10 contains a sample of the Interview

Schedule used in the first round). In the second round, the Interview Schedule became more focused on a set of themes or questions (Appendix 7.11 contains a sample of the Interview Schedule used in the second round). The schedule nonetheless remained less structured.

Formal vs. Informal Interviews

Qualitative interviews were portrayed in the literature as somewhat informal. For instance, to ethnographers such as Werner and Schoepfle (1987, p.302):

Any conversation between an ethnographer and a member of the culture being studied is an interview.

Burgess (1982) Werner and Schoepfle (1987) and Rapley (2007) all agreed that both formal and informal interviews can provide valid and important data. Burgess (1982) said that, with the formal type, the starting of the interview is obvious; tape recorders can mark the beginning of an interview. With informal interviews, these can happen as part of a personal encounter and thus appear more casual. In this study, both formal and informal conversations were considered interviews and both were considered to be valid data sources, especially the informal conversations which proved to be useful and valuable. For instance, answers which were missing from the formal sources (questionnaires, formal interviews, etc.) were often available in the informal conversations. Also, as in the case of Mr. Ameer, the informal conversations played a major role in the analysis of his case and provided an additional dimension to the answers which he had provided in the questionnaire.

The Role of the Interviewer

Silverman (2001) suggested that the conduct of interviews is influenced by two main schools of thought: the positive and the emotionalist. With the positive type, interview data are assumed to provide facts about the social problem under study. Therefore, and in order to reach these facts without distortion, interviewers are advised to minimise their influence on interviewees' answers. With the emotionalist kind, there is no direct access to reality; reality instead is constructed through interaction with the interviewees. Interviewers, as such, are advised to interact with their interviewees. Fontana and Frey

(2000) provided a somewhat similar description. They said there are two main roles for the interviewer. One is to remain as passive as possible a role in order to reduce the researcher's influence on participants' answers. The basic assumption which underlies this role is that, under controlled interview conditions, uncontaminated answers can be captured and the answers gained can represent objective truths. The other role is to engage with the participants, show empathy and share feelings. The main idea here is that the closer the interviewer is to the participants, the closer he/she is to the real stories. The researcher of this study concurs with Angrosino and Perez (2003) who thought that a balanced approach is the best in the sense that the researcher needs to achieve both empathy and objectivity. The researcher of this study recognises that answers which come from interviews do not provide mirrors to reality. This is because:

People sometimes lie, they can be inconsistent by not doing what they say they do, they can seek 'social approval' and say things in interviews that are socially accepted and approved rather than what they actually believe, feel or do (Brewer, 2000, p.65).

The researcher agrees with Garrett (1982), Brewer (2000) and Charmaz (2006) who thought that answers in interviews rarely reflect the reality which the social scientist is looking for; instead they are indexes to meanings unheard and unseen in the interview and these are the objects of the investigation. Moreover, it is worth repeating here that critical realists do not extract reality from the empirical domain (i.e. merely from participant's answers); therefore, controlling the researcher's effect on the participants is of little importance in the critical realist's thought since reality does not reside in the empirical domain. On the contrary, critical realists believe in experiments and in observing reactions (Hartwig, 2007 and Bhaskar, 1998a). Therefore, it would instead be informative to present the interviewees with loaded questions just to observe their reactions. The researcher agrees with Hammersley and Atkinson (1995, p.18) who said that:

The fact that as researchers we are likely to have an effect on the people we study does not mean that the validity of our findings is restricted to the data elicitation situations on which we relied. We can minimize reactivity and/or monitor it. But we can also exploit it: how people respond to the presence of the researcher may be as informative as how they react to other situations.

Indeed rather than engaging in futile attempts to eliminate the effects of the researcher completely, we should set about understanding them.

The interviews in this study, as such, were used to dig deeper into the layers of reality, to shed light on the remaining sources of information, and to identify perceptions and connect meanings.

The researcher of this study, however, disagrees with the postmodernists' approach to interviews. The researcher recognises that an interviewer's race, gender, age, religion, educational background, etc. inevitably influence the interviewee's responses, but this does not warrant subjectivity in the conduct of the interviews. The researcher tried not to lose her focus and 'go native'; she did not attempt to make friends with the participants or talk to them at length about certain issues or stories; this is what postmodernists do (Rapley, 2007). The researcher of this study thinks that these moves can undermine the interviewer's ability to maintain his/her critical faculty. However, rapport and empathy were important in the conduct of the interviews in this study.

Rapport and Empathy

Rapport was described as a humanistic approach to interviewing, encouraging the interviewer and interviewees to become peers in the interview and to show empathy (Rapley, 2004). Ely et al. (2003, p. 136) defined empathy as "the ability to empathize, to look at, and understand the world from another person's point of view". Thompson and Thompson (2008), in distinguishing between empathy and sympathy, wrote the following:

Sympathy involves sharing someone's feelings. That is, if they are sad, we become sad. If they are disappointed, we become disappointed. Empathy, by contrast, is where we recognize someone's feelings but we do not necessarily share them (p.40).

Empathy, as such, is to show interest and understanding in what the participants are saying or feeling and this appears to be central in establishing rapport. Garrett (1982) thought that the absence of rapport results in mechanical and monotonous interviews which are relatively valueless. Rapley (2004) said that, in order to establish rapport, the

interviewer must communicate trust, reassurance, and even likeableness to the participants. And Garrett (1982) thought that rapport is established when interviewers create a type of natural conversation. The underlying philosophy behind rapport is that the researcher needs to gain the trust of the participants so that the participants become open and truthful (Fontana and Frey, 2000). Also, rapport is believed to be capable of removing the adverse effect of the class/sub-class mentality in the sense that researchers will no longer view or treat their participants as objects or as means to an end (Marshall and Reason, 2007). The researcher of this study strived for rapport. She approached the participants with humility and showed them that she was interested in listening to them and in hearing about their teaching approaches and their perceptions. This was to improve the teaching of computer ethics in Bahrain, in the sense that if they cooperated with her and participated in the study, they, in due course, would benefit since the research would provide them with an idea of what was needed to improve their teaching. This proved to be useful but some of the participants still had certain fears and, as a result, the rapport vanished from their interviews. During the interviews, their answers were short in spite of the efforts to probe them for elaboration.

Recording the Interviews

In the first round of data collection, the researcher tried to record the interviews with a digital voice recorder but not all of the participants agreed. The researcher, as a result, tried to take notes then expand on them right after the interviews. However, this was extremely difficult and much of the information was lost because the researcher was slow at note-taking. It was possible to obtain rich information from the interviews from those who allowed voice recording but very little information was captured from those who did not allow voice recording. To counteract this, in the second round, a Net Book was used.

Net Books are small portable computers. The researcher is a touch typist; this made it easier to record the answers during the interviews. Also rich data, as a result, was possible to capture as opposed to the data captured by the traditional 'pen and paper' note-taking. In the second round of data collection, sometimes the only method used was the voice recorder, sometimes both the voice recorder and the Net Book were used,

and sometimes the Net Book was the only method in use. This depended on the participants' choices and the situations in which the interviews were conducted.

The transcription of the interviews which were recorded by the voice recorder took longer than the transcription of the interviews which were recorded by both the voice recorder and the Net Book. In the latter case, transcription was faster because much of the conversation was already typed in. The researcher had only to correct some of the misspelled words which were typed in quickly or add what was missing through listening to the audio clips. In the former case, the researcher had to start from scratch, converting the audio-recorded conversation into text. It took approximately five to six hours to transcribe a single interview when there was no interview typed in already whereas it took two to three hours to amend an interview which was already typed in and saved in the Net Book.

4.7.3 A Summary

Data in this study was viewed in its broadest sense. Data came from different sources: from fieldnotes, in-depth interviews, casual conversations, questionnaires, documents which the participants provided, and from the internet. The data collection methods were fieldnotes, observations, questionnaires, documents and interviews. Fieldnotes were recorded in a research journal. This improved accuracy. Fieldnotes in this study ranged from hunches and plans to observations and casual conversations with participants. Due to the problem of access, an emersion into the research setting was not possible, but a few observations were conducted. Questionnaires in this study were distributed on both the teachers and students; on the teachers to obtain background information, and on the students to explore their opinion about the course. The researcher further examined documents relevant to the courses, such documents as course outlines, textbooks and handouts. In addition, interviews were conducted with the teachers. The interviews were semi-structured. This was deemed more suitable for this type of study. Both casual conversations and formal interviews were considered valuable sources of data. The interviews were recorded through an audio recorder or through typing in the conversations in a Net Book.

4.8 FIELD ISSUES

The following sub-sections will provide information about: a) the concept of reciprocity; b) the difficulties faced in getting access to information; and c) the ethical considerations observed in this study.

4.8.1 Reciprocity

According to Schwandt (2007), reciprocity in field studies mean paying respondents or doing small favours for them. When it comes to reciprocity, the general belief amongst field study commentators (e.g. Johnson, 1975 and Berg, 1995) was that it is natural of the participants to ask for something in return of their participation and it is acceptable, even desirable, to attend to their demands as long as they are not raising ethical concerns. For instance, Garrett (1982) thought that interviewees often have motives for participating and therefore interviewers must try to fulfil these motives. Stokrocki (1997) said that some reason should be given to participants for their cooperation; these reasons can vary from a feeling of importance for being involved in the study to gaining money or assistance in certain tasks. The researcher of this study tried to accord with the needs of her participants. In general, they wanted her assistance because they assumed that she was an expert in the teaching of computer ethics. They asked her for resources and materials on how to teach the subject and she responded to their requests (Appendix 7.5 contains a list of the resources which the researcher provided). To avoid biasing the participants, the list was sent after the data collection phase. The effect of providing the resources to the teachers on the second round of interviews was traced and discussed in the analysis of the data. Only one teacher (Dr. Saeed) was present in both rounds of data collection; teachers who were teaching the subject in 2008 were no longer teaching it in 2009. The effect of providing Dr. Saeed with the resources was taken into consideration when his case was analysed. However, the researcher could not reveal to the participants what she had read or understood about computer ethics in order not to bias them; she tried politely not to answer some of their queries.

4.8.2 Gaining Access to Research Sites and Participants

The researcher of this study tried to negotiate access to research sites and participants two to three months in advance of the fieldwork but the attempts were not successful.

The targeted people either did not respond to their e-mails or they were difficult to locate and talk to by telephone. The researcher, as a result, had to wait until she commenced the fieldwork. On the other hand, the only single teacher who responded to the e-mail and agreed to participate did not keep his promise when the fieldwork commenced. He wanted favours from the researcher but was not willing to cooperate (the reader can refer to the case of Dr. Saeed in the Research Journal which is on Appendix 7.1 and to the entries made on: 26th of February (the first two lines), 1st of April (the third bullet point) and the most important incident which was on 7th of April (the second bullet point); then the first bullet point on 9th of April shows how frustrated the researcher was).

It was mentioned in the literature that participants will often want something in return or will want a good reason to participate in research (Foster, 1996). The researcher anticipated this. When the participants asked for help with materials, the researcher provided them with a list of resources. Also, she mentioned in the Access Letters, and when she met the participants, that her research would benefit them in the long run in the sense that the study was aiming to improve the course which they were teaching. Some of the teachers responded well to this and showed a good degree of cooperation; the information which they provided, as a result, was rich in content. However, some others still had fears and their interview answers, as a result, were short and, in some extreme circumstances, their answers were doubtful (the reader can refer to the case of Mr. Ameer in the Findings and Discussion chapter (chapter 5)). The most difficult case was that of Mr. Ameer who did not agree to an interview even when the researcher secured permission to interview him from the Vice-president of the University. The teacher kept saying that he would love to participate but that his participation would not be of any benefit. He also kept saying that he had a busy schedule and therefore could not participate in an interview even though the researcher offered to meet with him at any time anywhere for only 15 minutes (for more on this refer to Appendix 7.1, and to the 26th of February entry (the second bullet point) and the 3rd of March entry (the third bullet point)). Mr. Ameer did not want to participate but he did not say so outright. This caused delays to the research project and its agenda because the researcher kept hoping that he would eventually agree. A similar case was that of Dr. Fawzeah; she did not

want to participate but did not say so directly. Instead, she tried to separate the researcher from the students and intercept any attempt to observe her lectures. This also caused delays and frustration (for a closer look at Dr. Fawzeah's case, refer to the Research Journal in Appendix 7.1 and to the entries made on the; 24th of March, 29th of March, 30th of March and refer to the third and fourth bullet points in the Report of Observation available in Appendix 7.3). Hammersley and Atkinson (2007) mentioned that:

The problem of resistance may be especially acute, of course, where the people being studied are academics, or even sociologists, themselves (p.64).

This was indeed the case in this study.

Much has been mentioned about the importance of establishing trust between the researcher and participants, the importance of developing a relationship between the researcher and participants, and the importance of interpersonal skills to succeed in gaining access (e.g. Johnson, 1975; Stringer, 1996; Brewer, 2000). The researcher made every attempt to establish a positive climate for the participants but still some of the participants were fearful and resistant.

It is worth mentioning here that, from the start of the fieldwork, the researcher kept trying to secure a full-scale case study in order to focus on one or two cases and study them in depth (to visualise this, refer to the Research Journal; Appendix 7.1, and to the entries made on: 23rd of February (the flag shaped bullet point), 26th of February (the fourth bullet point), 8th of March (the entire section) and 7th of April (the second bullet point)). However, two months of fieldwork was not enough to secure a full-scale case study. During these two months the researcher visited ten universities, conducted formal and informal conversations, collected some documents, talked to some of the students and attended three observational sessions; and she emerged with fragmented pieces of information on the status of computer ethics teaching in Bahrain.

4.8.3 Ethical Considerations

'Informed consent' and 'anonymity' are the most frequently mentioned concepts when it comes to research ethics in the social sciences. Informed consent means that

participants need to make an informed decision about participating in the study and need to have the right to withdraw from the study at any point in time and without having to explain the reasons (BERA, 2004). Anonymity, on the other hand, means that the identities of the participants need to be kept confidential and that the information which is reported about them must not expose their identities (SRA, 2003). In this study, the initial contacts with the participants and gatekeepers included information about the research ethics of this study. Whether the contacts were made by e-mail or face-to-face, the participants received a copy of the Access Letter in which there is a section on research ethics (Appendix 7.4 contains the Access Letter). The participants were informed that their participation was voluntary and that they had the right to withdraw from the study at any point in time and without having to explain why. They were also informed that their information would be kept confidential and that their identities would be kept hidden. Furthermore, they were informed that written reports of the observations and interviews would be sent to them and that they would have the freedom to delete, add or make corrections to the information.

To protect the anonymity of the participants, pseudonyms were used instead of real names. Moreover, any data which had the capacity to expose the participants were omitted from this study. For instance, in the case of University (E), in order to protect the anonymity of the participants, the year of its establishment was not mentioned (the reader can refer to the Findings and Discussion chapter (chapter 5) and to the case of University (E) under 'Context and Settings' section). Certain information was also removed from the documents which the participants submitted (the document in Appendix 7.14 provides an example).

With regards to informed consent, the teachers were provided with an Informed Consent Sheet to sign prior to the formal interviews (Appendix 7.12 contains the Informed Consent Sheet). All of the teachers agreed to be quoted and signed the sheets; however, it was not possible to obtain consent for the informal conversations. Hammersley and Atkinson (2007) and Chambers (2003) suggested that the principle of informed consent is simply not applicable to studies which follow an informal method to data collection.

With regard to allowing the participants to view, delete, correct or add to the written reports of the formal interviews and observations, this procedure was intended to encourage participation, to encourage trust in the researcher, and to observe what sort of changes the participants would make. However, the procedure (which is also called ‘member check’) was not intended to demonstrate that the findings accurately represent the opinions of the participants or represent the truth about the teaching of computer ethic. This is because reality or truth does not reside in the empirical domain. Furthermore, people can change their opinions or harbour misconceptions. According to Schwandt (2007), member check is claimed to be capable of strengthening the validity of the data captured from the interviews and observations however, there is a consensus that member check cannot validate or refute any findings; it can rather serve as a way of generating more data or as a way of honouring the participants who have a right to know what sort of information has been gathered about them. It is worth mentioning here that only two teachers made changes to the interview transcripts and their changes were minor. The changes did not yield any interesting meanings in relation to why the teachers had made such changes.

Another ethical concept that was mentioned in the literature and which is relevant to this study is ‘non-maleficence’. It means that researchers should avoid harming their participants (Fontana and Frey, 2000). The researcher of this study tried not to impinge on the participants. For instance, when the researcher of this study sensed that her attendance to observe the lectures of Dr. Fawzeah might badly influence the students, in the sense that the teacher was uncomfortable with the researcher observing, she decided that if this continued she would withdraw and stop the observations (the reader can refer to the third bullet point in the ‘Notes’ section in the Report of Observation located in Appendix 7.3).

4.8.4 A Summary

The participants in this study asked for resources and materials on how to teach computer ethics; the researcher responded by sending them a list of links and papers; this cooperation with the participants is known as ‘reciprocity’. Gaining access to research sites and participants was extremely difficult. The researcher tried to secure

access two to three months in advance of the fieldwork but it seemed that people in Bahrain preferred face-to-face conversations. But even when the researcher travelled to Bahrain and met the people in person, most of them were reluctant to provide a full access. The researcher spent two months in the field moving from one university to the other trying to secure access to, at least, one single case but this did not happen. She emerged at the end with fragmented pieces of information about multiple cases. Any initial contact with teachers and gate keepers included providing them with Access Letters. These included information about the nature of the research and information about research ethics.

4.9 QUALITATIVE DATA ANALYSIS

Qualitative data analysis is a set of processes and procedures for organising and interpreting data (Lewins, Taylor and Gibbs, 2010; Brewer, 2000). A range of methods exist for analysing qualitative data and they often come with an underlying philosophy (Lewins, Taylor and Gibbs, 2010). The researcher of this study chose to use a mixture of techniques and philosophies.

4.9.1 The Analysis Approach of This Study

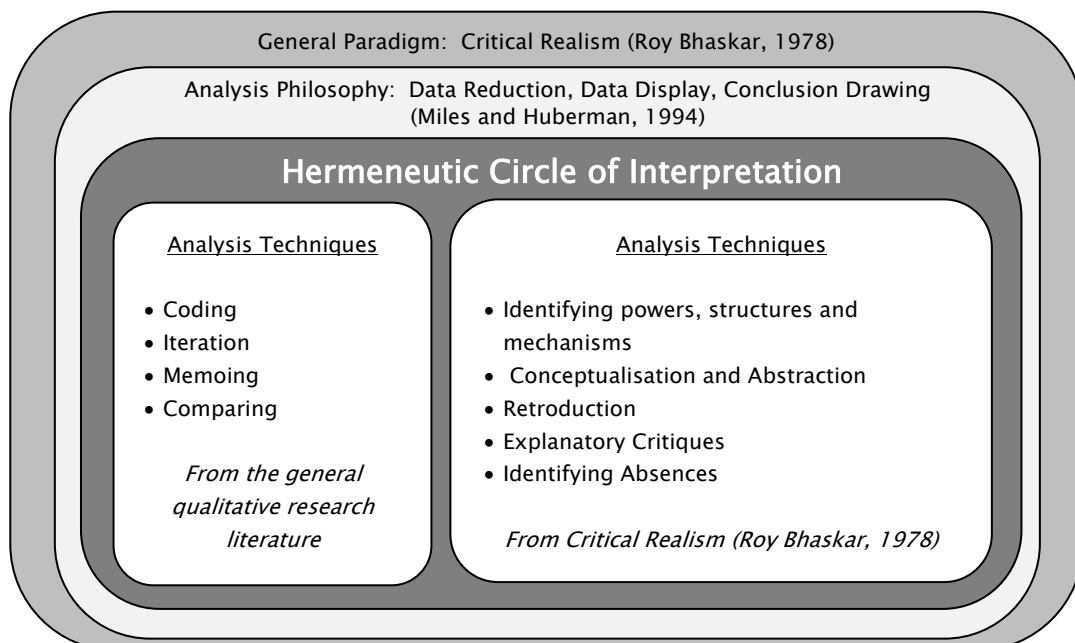
Miles and Huberman (1994) thought that analysis involves three major activities: data reduction, data display and conclusion drawing; this was adopted in this study as a general philosophy towards how to analyse. Miles and Huberman (1994) conception is explained in detail under section 4.9.5.1 ‘Data Analysis Activities: Miles and Huberman (1994)’ in one of the following pages. The analysis *techniques* of this study or the actual ‘process’ of analysis involved a search for structures, powers and mechanisms applying conceptualisation and abstraction, providing retroductive arguments, explanatory critiques and identifying absences. These were extended from the philosophy of critical realism. In addition, *interpreted conceptions* of ‘coding’, ‘iteration’, ‘memoing’ and ‘comparing’ were involved in this study and these were extended from the general literature on qualitative data analysis including, but not limited to, the literature which talked about grounded theories. These all were used in light of the hermeneutic circle of interpretation. The analysis techniques are explained in detail under the section 4.9.5.2 ‘Data Analysis Techniques’ in the following pages

and the hermeneutic circle was discussed previously under section 4.4.1.5 titled ‘This Research and Hermeneutics’.

4.9.2 Why A Mixture of Techniques and Philosophies?

The researcher of this study thought about the possible alternatives to the analysis approach adopted here but none of the existing approaches *in their entirety* appeared suitable. This study required the application of the philosophy of critical realism and none of the existing approaches employed critical realism. Critical realism, further, required a hermeneutic and dialectical approach and not all of the existing approaches embraced a dialogic style with the text. As such, an analysis approach had to be constructed. The hermeneutic circle provided the means for a dialectical and a reflective approach whilst Miles and Huberman's (1994) conception provided a general view towards how to analyse. The techniques of ‘coding’, ‘iteration’, ‘memoing’ and ‘comparing’ along with the critical realism's techniques of ‘identifying powers, structures and causal mechanisms’, ‘conceptualisation and abstraction’, ‘retroduction’, ‘explanatory critiques’ and ‘identifying absences’ provided the mechanisms to the actual analysis process. The following diagram (Figure 4.3) illustrates the analysis approach of this study.

Figure 4. 3: The analysis approach of this study



4.9.3 This Study's Analysis Approach in Comparison to Some Other Approaches

There is a degree of overlap between this study's approach and some other approaches to data analysis that are mentioned in the literature. The following will show on what level a selection of approaches relate to this study's analysis approach and on what level they do not relate. The following is not a comprehensive list of analysis approaches but rather it is a selection of some of the most frequently mentioned ones. Please note that hermeneutics was discussed earlier under section 4.4.1.5. And the same applies to grounded theory; it was discussed earlier under section 4.4.1.4 and contrasted with this study's approach. However what can be added here in relation to grounded theories is that the researcher thought that they were too prescriptive prohibits creativity in analysis and research. They further did not match the paradigm of this study in the sense that none of the existing grounded theories came with a critical realist underpinning.

4.9.3.1 This Study and Phenomenology

Phenomenological analysis is concerned with participant's descriptions of their life experiences (Creswell, 2007). This type of analysis is used to identify the essences of experiences, such experiences as going through an illness or experiencing grief. Different methods exist for conducting phenomenological analysis however in general it seems that with phenomenology the analyst will take the descriptions of the participants at face value and without questioning their legitimacy (Starks and Trinidad, 2007). For this reason, the researcher thought that phenomenology is incompatible with this study's paradigm. Critical realists are sceptical; participants' accounts, as such, do not constitute mirrors to reality, instead, they are indexes to meanings and reflections of ideologies. Phenomenology was not involved in this study because it did not seem to match the paradigm of the critical realist.

4.9.3.2 This Study and Thematic Analysis

With thematic analysis the researcher looks for interesting and common themes emerging from the data gathered from the field (Gomm, 2004). Thematic analysis was defined as a form of pattern recognition or a process which encourages identifying codes and categories (Fereday and Muir-Cochrane, 2006). Beyond this it seems that thematic analysis is used differently by different researchers and with accordance to the

philosophy which underlay the analysis. For instance grounded theorists put too much emphasis on codes and drive inferences directly from them whilst in this study the emphasis was more on trying to search for causes and links which the themes signified. Thematic analysis, as such, was involved in this study and was reflected in the search for codes but coding or thematic analysis was neither the main nor the only analysis method used in this study.

4.9.3.3 This Study and Content Analysis

Content analysis is to look for recurrences of a particular theme or idea within the entire corpus of the text (Denzin and Lincoln, 2000). Given this, the logic of content analysis is based on *counting* (Silverman, 2001). However, beyond this it seems that there are different ways or procedures to conduct content analysis (Berg, 1995; Silverman, 2001). With regards to this study, the number of occurrences of a particular idea gave strength to its relevant inference, but in general, the emphasis in this study was not directed at 'counting' therefore the essential logic of content analysis was not involved in this study. A piece of information gathered from the field, did not have to have a certain number of occurrences in order to gain worth but rather a single pieces of information was of value in itself when it was being tied to the overall picture which was emerging.

4.9.3.4 This Study and Conversation Analysis

The underlying assumption behind conversation analysis is that utterances, turn taking and pauses during conversations give meanings (Hutchby and Wooffitt, 1999). According to Silverman (2001) conversation analysts take seriously the social interaction between the interviewee and the interviewer and set about to meticulously analyse utterances and nuances of talk. As in the previous analysis techniques, conversation analysis is conducted differently by different researchers. Conversation analysis was not involved in this study; the researcher was not convinced that meticulous analysis of utterances is necessary to understand how computer ethics is being taught in Bahrain; the approach perhaps is suitable for some other topics.

4.9.3.5 This Study and Discourse Analysis

With discourse analysis the researcher look beyond the utterances and nuances of the speech. The discourse becomes an image of how participants interpret or see the world (Gomm, 2004). With discourse analysis language is not neutral or transparent but rather it refers to a certain ideology or meaning (Rapley, 2007). Different applications of discourse analysis exist. Discourse analysis was involved in this study but not in a certain particular way. Simply, the discourses were considered indexes to meanings of how the participants were interpreting and seeing their world.

4.9.4 A Summary

A mixture of analysis techniques and philosophises were perceived to be the most suitable for this study since none of the existing analysis approaches in their totality catered for the requirements of this study. This study required the application of techniques exclusive to critical realism and none of the existing analysis approaches that are voiced in the literature employ critical realism techniques or philosophy. Critical realism, further, required a dialectical approach and not all of the existing approaches embrace a dialogic style with the text. The hermeneutics circle of interpretation, as such, had to be involved. The approach adopted, therefore, was as follows:

Critical realism (Bhaskar, 1978) was the backbone philosophy. Miles and Huberman (1994) conception of analysis provided a further more detailed philosophy towards how to analyse. And the analysis techniques of ‘coding’, ‘iteration’, ‘memoing’ and ‘comparing’ along with the critical realism’s techniques of ‘identifying powers, structures and causal mechanisms’, ‘conceptualisation and abstraction’, ‘retroduction’, ‘explanatory critiques’ and ‘identifying absences’ provided the actual mechanisms to the analysis process.

The approach overlaps with some of the existing approaches. It took inspiration from the general literature on qualitative research, and including but not limited to, the literature on grounded theories. This study overlaps with thematic analysis, discourse analysis and content analysis. But it does not follow these approaches strictly since it follows its own paradigm.

4.9.5 Discussions of Data Analysis Activities, Techniques and the Role of the Theoretical Framework in the Analysis Process

The following sections will elaborate on Miles and Huberman's (1994) data analysis activities, the techniques involved in the analysis process and the role of the theoretical framework in the analysis.

4.9.5.1 Data Analysis Activities¹¹: Miles and Huberman (1994)

In its broadest sense, analysis was viewed as an ongoing activity rather than a separate phase in the life of the research. For instance, some scholars, especially ethnographers (e.g. Wolcott, 1994; Emerson, 2004; Hammersley and Atkinson, 2007) suggested that analysis starts with the formulation of the research problem and continues throughout until the writing up of the report. The analysis activities in this study can be viewed in the light of Miles and Huberman's (1984) conception, which is somewhat similar to that of ethnographers. Miles and Huberman (1984) suggested that analysis consists of three major activities *that are not mutually exclusive*: 1) data reduction, 2) data display and 3) conclusion drawing; the following sub-sections elaborate on these.

Data Reduction

According to Miles and Huberman (1984), data reduction starts with the problem formulation stage when the researcher decides what questions to ask and who are the potential participants. Then, once data are collected, there is another type of data reduction; this is when data are summarised and coded, when memos are written and when categories emerge. This means that data reduction is of two types: one which involves reflection and focusing during the problem formulation stage and another which involves coding and categorising during the actual analysis phase. In this study, both types were involved. The one related to the problem formulation stage took the shape of reflections on and adjustments of the research question, strategy and literature review. This helped to decide who to target and what to include. Some of these reflections were recorded in the Research Journal and were reviewed from time to time

¹¹ Please note that data analysis 'activities' are different from data analysis 'techniques'. The former represents the overall general philosophy which underpins the analysis process; the latter represents the techniques or the actual analysis processes. Data analysis techniques are presented next in a separate section.

(Appendix 7.6 contains examples). The second type of data reduction, which is associated with coding, took effect after the first and second rounds of data collection. Also, data reduction took effect when the literature review was being developed because coding and categorisations were involved.

Data Display

Data display has been defined as “an organized assembly of information that permits conclusion drawing and action taking” (Miles and Huberman, 1984, p 21). Researchers whose analysis is mainly textual have perceived data display as the act of writing up the data in textual form using quotations, text summaries or descriptive paragraphs (see, for example, Brewer, 2000). It has been suggested also that the assembly of information can also take the form of graphs, networks, charts and tables (Ryan and Bernard, 2003). In this study, data display involved quotations, descriptions, tables and extracts from the Research Journal, screen shots of documents, summaries, syntheses, and diagrams. The process of coding always preceded any display of data so the data display, as such, was not merely descriptive; rather, it was interpretive.

Conclusion Drawing

According to Huberman and Miles (1998), with conclusion drawing the researcher becomes involved in interpreting the data, drawing meanings, comparing texts, and identifying patterns, themes and metaphors. The term ‘interpretation’ in qualitative data analysis involves reading the data then constructing meanings that are inferred from examining them (Davies, 2007). In this study, the descriptions gave way to meanings, patterns or interesting themes. Meanings also emerged from the process of coding, from summaries and syntheses, from constant comparison¹² with the literature review, with what the researcher knew from her own experiences, and from triangulations. When syntheses were linked with each other, they formed more solid inferences and moved progressively towards a general conclusion. Meanings (or rather more precisely interpretations), as such, were not kept in a separate chapter. Instead, they were either inserted under the descriptions in a separate section called ‘synthesis’ and used to aid an

¹² Please note that the constant comparison notion in this study is different from the constant comparison of Grounded Theorists. The latter roughly refers to the iteration process whereas the former refers to the process of triangulation.

understanding of the subsequent display of data, or were merged with the descriptions; this was when the text gradually entered the dialectical hermeneutic circle. This all means that 'data display', as an activity in this study, was not separate from 'conclusion drawing'. In other words, the descriptions in this study were not kept in a separate chapter from the interpretations. Instead, there was simultaneous interplay between the descriptions and the interpretations. It was mentioned earlier that a hermeneutic circle of interpretation was involved in this study where the researcher was constantly moving back and forth, reading and re-reading, adding some extra descriptions, removing excesses and thinking about the 'parts' in the light of the 'whole'. The parts are segments of information (paragraphs, patterns of meanings) and the whole is the rest of the research (the conceptual framework). This movement was used to generate meanings, syntheses or summaries. Wolcott (1994) suggested that interpretation can be approached by offering more analysis in the form of asking questions, or using theories to link ideas, or offering personal experiences and linking them with the analysis. These were all, in addition, implemented in this study.

4.9.5.2 Data Analysis Techniques

The general qualitative data analysis techniques of coding, iteration, memoing and comparing were involved in this study, in addition to techniques which are specific to critical realism; these all were used in light of the hermeneutic circle of interpretation. The following sub-sections explain each technique separately.

Coding

The literature on the subject of coding revealed that somewhat different approaches to, or conceptions of, coding exist. The most well known approaches are open and axial coding; these are closely linked to the grounded theory methodology. Open and axial coding were too prescriptive and extremely difficult to understand in comparison to the simple, straightforward and abstract conceptions of coding provided by scholars such as Miles and Huberman (1984), Berg (1995) and Basit (2003). The coding approach which was adopted in this study was inspired by the conceptions of Miles and Huberman (1984), Berg (1995) and Basit (2003). Coding in this study involved sifting through the data, highlighting segments of information and writing short comments

about these segments in the margins. In addition, certain other activities were involved such as abstracting, categorising and linking concepts with each other.

Miles and Huberman (1984) said that:

Codes... usually derive from research questions, hypothesis, key concepts, or important themes (p.56).

In this study, the codes were derived from the research problem, questions and from the literature review. Whilst coding, the researcher kept thinking about the data in the light of the research problem, questions and literature, looking for answers to the research question, and looking for patterns or interesting themes. The Theoretical Framework chapter (chapter 2), which contains the review of the literature, and the Findings and Discussion chapter (chapter 5) were both organised and constructed through this same process of coding.

At the beginning, and when there was only a research problem but no clear set of questions and no theoretical framework, the process of coding commenced with sifting through the literature review notes¹³ identifying segments of information that were relevant to each other. The aim was to form topics of interest or categories of information that were relevant to the research problem. When topics of interest emerged, such as ‘why teach computer ethics?’; ‘students’ attitude towards computer ethics’, these gave way to a draft of the Theoretical Framework chapter (chapter 2). These topics were used to decide on the questions for the instruments for the first round of data collection and were used to analyse the data that were collected from this first round. This, however, does not mean that the data collection and analysis were deductive. The researcher adopted an inductive attitude and looked for emerging issues/topics of interest; she was prepared to abandon less relevant or less important ones. The topics of interest, as such, served as guides in the fieldwork and in the

¹³ The ‘literature review notes’ consisted of a collection of quotations and rephrased paragraphs from articles and books about the teaching of computer ethics.

analysis, as well as a means to focus the research. This all means that the topics of interest used in the first round of data collection and analysis served as codes.

The first round of data collection and analysis emphasised the importance of certain codes/topics and dismissed the importance of others. Then, the Theoretical Framework chapter (chapter 2) was revisited, rewritten and some sections were added based on the findings from the first round of analysis. This gave way to a more focused view of the research, and a more focused theoretical framework, research problem and instruments. At this stage, the secondary research questions emerged; these were based on the topics of interest that were residing in the revised Theoretical Framework chapter. These questions guided the second data collection and analysis.

Iteration

The previous section demonstrated that this study developed through cycles of interaction with the conceptual framework, applying what Emerson (2004) called 'naturalistic retrodution' which is to move back and forth between observation and theory, modifying the original theoretical assumptions to fit observations and seeking observations that are relevant to the emerging theory. This is also known as an iterative design, a design that is central in grounded theory approaches. An iterative design, according to Lingard, Albert and Levinson (2008, screen 2), "entails cycles of simultaneous data collection and analysis, where analysis informs the next cycle of data collection". This iteration is expected to continue in grounded theory studies until the point of saturation is reached.

Charmaz (1997) defined saturation as an awareness that no new information is emerging from the process of data collection and analysis. To reach the point of saturation, the researcher is expected to continue his/her cycles of data collection and analysis until he/she realises that no new information is emerging (Bowen, 2008). With regards to this study, the researcher did not aim for achieving saturation since this study was not a grounded theory.

Memoing

Memos are described as ideas about the codes or about their relationships. They can be a paragraph or a few words and when they strike, one should stop and record them (Miles and Huberman, 1984). This applies to this study. Ideas were constantly emerging during the process of coding and analysis. Sometimes, the memos were in the form of a few words written in the margins (Appendix 7.13 contains an example) and sometimes, especially when the researcher was in the process of elaborating on the codes and making sense of them, the memos were in the form of paragraphs. Sometimes the paragraphs were kept in a separate document for later use to aid interpretation and sometimes they were directly inserted into the text as interpretations. Memos have also been described as private conversations with oneself, recording ideas, information, facts or conjectures (Charmaz and Mitchell, 2001). This also applies to this study. Ideas, hunches and information which the researcher thought are useful for the later stages of the research were all kept in the Research Journal.

Different opinions exist about when memoing should start and when it should end. For example, Grbich (2007) thought that memoing starts and ends with coding. However, Miles and Huberman (1984) thought that memoing starts with data collection and continues until the researcher has finished. In this study, memoing was continuous. Memos were recorded in the Research Journal from the start of the research; then, during data collection, the memos took the form of fieldnotes recorded in the Research Journal or in the reports of observation. Later, during the data analysis, the memos took the form of notes written in the margins next to the codes or took the form of interpretations.

Comparing

According to Mason (1996), comparison involves selecting one piece of data, for example an interview, a statement, a social process, and comparing it with similar or different pieces of data to develop meanings. Comparison, said Rihoux and Ragin (2009), encourages better understanding; we know that apples are not pears because we have compared them and identified their differences. In this study, the interpretations were fuelled by a 'constant' comparison between data and other data (e.g. one piece of

evidence vs. another), between data and the conceptual framework (e.g. evidence vs. research), between data and the theoretical framework (e.g. evidence vs. the literature review), between synthesis and other synthesis (e.g. summary vs. summary), between synthesis and data (e.g. summary vs. evidence) and between inferences and other inferences (e.g. conclusions vs. conclusions). During this, there was a search for similarities, differences, occurrences, absences and interesting meanings. The constant comparison technique, according to Thorne (2000), *is a general approach* yet it is often associated with the grounded theory methodology.

Retroduction

Retroduction is “a thought operation through which we can move from knowledge of one thing to knowledge of something else” (Danermark et al., 2002, p 96). According to Danermark et al. (2002), retroduction is similar to education, induction and abduction. With retroduction, arguments are built through moving from one premise to another using more than one mode of reasoning. Retroduction was involved in this study, in the Findings and Discussion chapter (chapter 5), to build arguments, interpretations and synthesis. The text in the chapter is interlinked like a story. In critical realism’s thinking, knowledge of social reality can better be approached through retroduction than mere deduction or mere induction (Bhaskar and Norrie, 1998). This is because retroduction is perceived as being capable of bridging the duality between the deductive and the inductive approaches because it links evidence (induction) with social theories (deduction) in a dynamic and evolving way (Saether, 1998).

Identifying Powers, Structures and Causal Mechanisms

To claim causal relationships in research is to invite two lines of argument: one is that the identification of causal relationships is restricted to the quantitative type of research and the other is that it is impossible to identify causal relationships because the social world is complex and unpredictable. The answer to the first line of argument is that, in social science research, there are two main approaches to causality: one is quantitative and the other is qualitative. According to Becker (2000), the quantitative approach uses Boolean Algorithms to determine relationships between variables and the qualitative uses narrative, story-telling, chain of events and context to determine such

relationships. Huberman and Miles (1998, p. 191) also argued that qualitative researchers “can understand not just that a particular thing happened, but how and why it happened”. This demonstrates that causality in qualitative studies is sought at a deeper level because, in quantitative studies, there is a focus on correlations (i.e. on the surface level of reality) but not on the powers which mobilise certain events (i.e. not on the deeper levels of reality). It was mentioned earlier that positivists focus on the surface level of reality by capturing events in the empirical domain through building correlations or identifying constant conjunctions of events; critical realists, on the other hand, look deeper for causes, powers and mechanisms. In this study, the search for causality followed the qualitative paradigm and, in particular, the critical realists’ conception which locates causal relationships at the level of generative mechanisms. In critical realists’ view, causal relationships are irreducible to events taking place in the empirical domain; hence, they are irreducible to the constant conjunctions of David Hume (Hartwig, 2007). According to Dykes (2003), Hume denied that there is a connection between cause and effect. Hume thought that, since powers which mobilise events are unobservable, all that remains is the constant conjunctions of events. Researchers, as such, can identify correlations but can never make claims about causality. However from the perspective of critical realists,

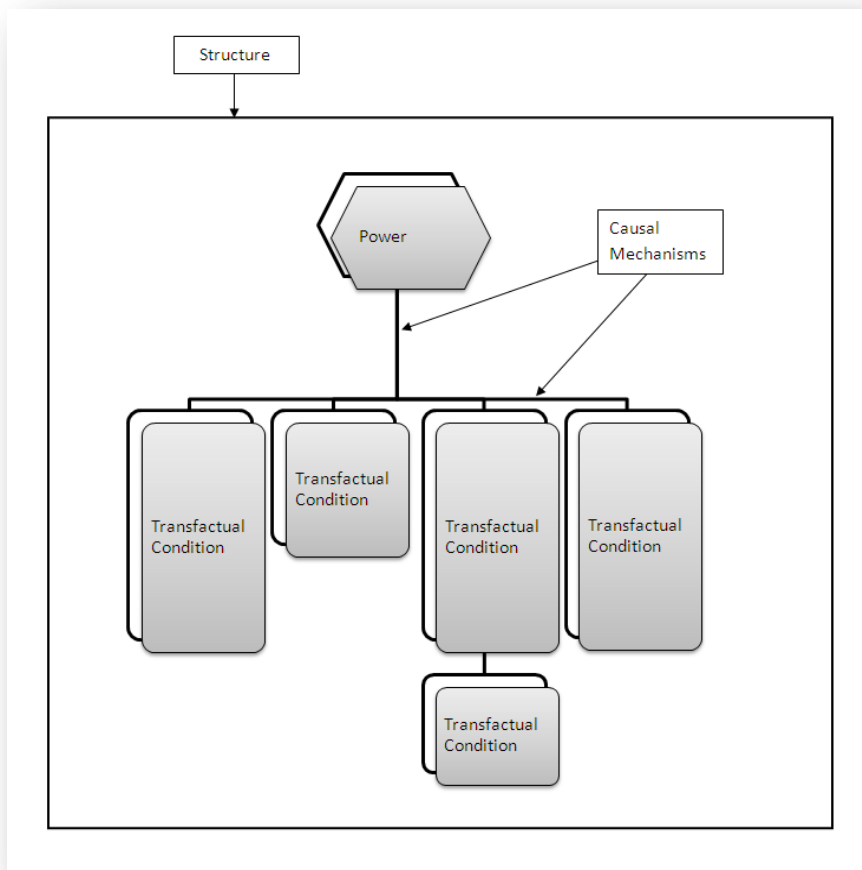
[Causal laws] are neither empirical statements (statements about experiences) nor statements about events. Rather they are statements about the ways of acting of independently existing and transfactually active things. (Bhaskar, 1998d, p. 38)

With regards to the second line of argument, which states that it is impossible to identify causal relationships, the answer, simply, is: it is true that it is impossible to ‘be certain’ about any causal relationship but causality is possible as long as it is recognised that research claims are *probable*. According to Lieberson (2000), there are two types of causal proposition: deterministic and probabilistic. The deterministic approach says ‘if x then y’ while the probabilistic approach says ‘if x then *probably* y’. Lieberson (2000) said that all research, even much research in the physical sciences, uses probabilistic causal propositions instead of deterministic ones. This is because probabilistic propositions allow for a margin of error and this is important because

sometimes variables which might have not been considered might have caused the phenomenon to be what it is.

Concerning how, in practice and during analysis, causality was being sought in this study, all of the analysis techniques mentioned above and the ones which are mentioned below helped in digging deeper into the layers of reality. However, the tree diagrams, which contained the transfactual conditions (the diagrams were the result of a final coding of the findings and discussion of every case), were the gateway to identifying the powers, mechanisms (i.e. the causes) and consequently the structures which maintained them (the diagrams are on pages 193, 194, 196, 197, 198, 199 and 200). According to Danermark et al. (2000, p. 77), transfactual conditions are “the more or less universal preconditions for an object to be what it is”. Transfactual conditions, also, are the building blocks of a single structure; the diagram in Figure 4.4 below explains this.

Figure 4. 4: The building blocks of a single structure



Conceptualisation and Abstraction

The analysis of a critical realist requires conceptualisation and abstraction. In this study, abstraction was applied to derive general concepts from the interpretations and from the constant comparisons. Conceptualisation, in this study, is demonstrated in utilising language as an important medium in making sense of the data.

Conceptualisation also meant using the conceptual framework as a platform for comparisons. As mentioned earlier, critical realism favours a hermeneutic/explanatory critique approach to the study of the social world and insists on conceptualisation as a medium to unearth the real. Danermark (2002) and his colleagues, who are critical realists, mentioned that “language, and consequently conceptualization, stands out as one of our most important instruments for scientific research” (p. 15). Furthermore, Sayer (1998), who is also a critical realist, has argued that conceptualisation in quantitative studies is marginalised and “made the slave of quantification” (p.140); this, he thought, can result in a flawed analysis. Conceptualisation is believed to be important for the identification of transfactual conditions and to enable the researcher to determine the nature of the object of the investigation. According to Danermark et al. (2002):

Abstractions should primarily aim at determining these necessary and constitutive properties in different objects, thus determining the nature of the object (p. 44).

In this study abstraction and conceptualisation played a major role in the analysis process.

With regards to the technicality of applying conceptualisation to the analysis, the critical realist is expected to start working from the empirical domain and by mixture of theoretical reasoning (i.e. conceptualisation) and examination of empirical evidences he/she is expected to work his/her way to the real domain where powers and mechanisms reside (Krauss, 2005). This was the technique used in this study. The researcher often took the empirical evidence as her starting point but then conceptualisation guided the interpretations. The empirical data were constantly examined in the light of a frame of reference. This frame of reference was the conceptual framework. It is worth mentioning here that the researcher of this study

found that too much conceptualisation can lead the analyst off the empirical track, whereas too much concentration on the data of the empirical domain can deny the analyst a chance to reason and think about the empirical findings in light of a frame of reference or in light of the overall context of the investigation; a balance, as such, was needed between conceptualisation and empiricism.

Explanatory Critique

The analysis involved in this study drew on the explanatory critique theory of Roy Bhaskar (1998a). Cruickshank (2003) suggested that explanatory critiques expose the social problems which hinder emancipation and progress such as oppression, misconceptions, unused resources and inequalities in the distribution of powers. Cruickshank (2003) also said that explanatory critiques explain how and why a false belief is generated and maintained and then continue to clarify what would be the consequences of maintaining such beliefs. In critical realists' thought, the justification for moving from critiquing social situations to advocating social changes is that suffering should be prevented for the purpose of human flourishing (Mingers, 2009). This all applies to this study. The analysis was not merely descriptive; it was, in essence, critical. Not critical in the judgmental sense but critical in the sense of providing a critique of the teaching practices; a critique of the conditions which appeared to be capable of hindering progress in the path of computer ethics education in Bahrain. To critical realists, the critical element in science is perceived to be the 'Sine qua non' of any research project:

An indispensable part of any such project is explanatory critique. By bringing to consciousness hidden or unsuspected sources of determination of false or inadequate beliefs about social objects, explanatory critique facilitates action directed at removing them (Bhaskar, 2009, p. xxvii).

According to Brown, Fleetwood and Roberts (2002) critical realists do not restrict themselves in pure explanations or pure descriptions but rather provide critiques; as a result, they maintain normative grounds on what they perceive to be good for society and human flourishing. Yet because critical realists maintain normative grounds, their critiques are considered by those who subscribe to relativist ideologies as positivistic or

judgmental. Brown, Fleetwood and Roberts (2002) rightly suggested that critical realists are aware that, although their critiques maintain certain normative grounds, their critiques and the grounds which support them are all socially and historically constructed and, as such, they are subject to falsification, yet this does not warrant the abandonment of the critical project because, according to Bhaskar (2009), the critical element is essential to science so that science becomes an agent of change. It is worth mentioning here that critical realists consider the naturalistic fallacy to be a fallacy. Naturalistic fallacy means that it is a fallacy to believe that what is good or bad have meanings that are independent of our thoughts of them (Hartwig, 2007). Explanatory critique shows that good and bad have intrinsic meanings apart from the meanings we hold of them or give to them. This, Cruickshank (2003) suggested, is a precondition to explanatory critique.

Identifying Absences

Brown, Fleetwood and Roberts (2002) suggested that one of the basic tenets of Roy Bhaskar's (2008) 'dialectical' critical realism is the concept of Real Absence in the sense that whenever Real Absence is involved, the explanatory critique provided is considered dialectical. The dialectical concept was extremely difficult to understand but it seems that the concept of Real Absence encourages explanatory critiques to move into the moral dimension.

In Bhaskar's (2008) view, absence is real and can have real consequences. For example, the absence of vitamin C in the human body can have negative consequences. This absence has an entity and an effect; it is therefore a finding rather than nothingness. As such, critical realists are expected to identify, not only what is present in the data, but also what is *absent* because the absence of certain elements can reveal the causes of hindrances or negative consequences. The concept of absence was involved in this study however Real Absence is a concept that is more complicated and Bhaskar (2008) dedicated an entire chapter to explaining it in his book 'Dialectic: The Pulse of Freedom'. Therefore, only *the spirit* of the concept was involved in this study.

4.9.5.3 The Role of the Theoretical Framework in the Analysis Process

A number of researchers, especially those who support the 'Glaserian' (Glaser and Holton, 2004) and the 'classical' (Glaser and Strauss, 1967) grounded theory approaches to research, prefer delaying literature reviewing until after the data collection and analysis. This, in their view, can guard against seeing (or analysing) field data through the lenses of the literature and this, subsequently, is expected to maintain the element of inductivity in grounded theory studies and maintain what is perceived to be an objective ground in carrying out research (Charmaz, 2006). A literature review is conducted after entering the field and after analysis rather than before so that preconceived ideas do not contaminate the data and force a theory out of the data, said Glaser and Holton (2004). On the other hand, researchers such as Hitchcock and Hughes (1995), Yin (1994), Miles and Huberman (1994) and Strauss in his later writing with Corbin (Strauss and Corbin, 1990) encouraged reviewing the literature before entering the field and before analysis; they thought that an early review of the literature could stimulate theoretical sensitivity, stimulate research questions and direct theoretical sampling. Mason (1996) and Miles and Huberman (1994) also thought that conceptual frameworks provide lenses to look at the data and this, they thought, is important in order to operationalise the analysis and encourage an inductive deductive interplay between the theoretical and the empirical.

In this study, the review of the literature was carried out before the first round of data collection and analysis and from the start of the study; the literature continued to develop into a framework in light of the iteration process. The review of the literature, which is embedded in the Theoretical Framework chapter (chapter 2), guided the research; it provided clear and more focused directions. After the second round of data collection and analysis, the main topics in the theoretical framework acted like codes and helped in the development of a set of clear-cut secondary (or fieldwork-related) research questions. The framework also guided and focused the sampling procedure. It inspired the questions which were asked in the instruments and played a major role in the analysis of the data. It provided the normative ground for the explanatory critique approach and the platform for interplay between theory and field data, or in other words, it provided the platform for interplay between induction and deduction.

With regard to the issue of inductivity and data contamination, a number of researchers had speculations about the classical grounded theorists' approach of delaying the literature review, as well as its capacity to eliminate bias from pre-knowledge. For instance, Miles and Huberman (1994, p.17) said: "any researcher, no matter how unstructured or inductive, comes to fieldwork with some orienting ideas". Silverman (2001) said that the idea of not being influenced by preconceived theories is a myth. And Cruickshank (2003), Emerson (2004) McGhee, Marland and Atkinson (2007) all agreed that being inductive means being reflective, open-minded and prepared to abandon some or all of the preconceived ideas, as well as to modify others over the course of the research; they thought that inductivity does not mean approaching the research with no literature or concepts. Being inductive, they said, is a state of mind and a mode of reasoning as opposed to reading or not reading the literature and being influenced or not influenced by pre-existing ideas. McGhee and his colleagues (2007), who investigated the role of literature reviews in grounded theory studies, concluded that delaying the literature is not the answer for reducing distortions from prior knowledge but rather, what can reduce prior knowledge distortions are the constant comparison method and the element of reflexivity in research. The researcher of this study agrees.

4.9.6 A Summary

Miles and Huberman's (1994) data analysis activities provided a conception for 'how to analyse'. Analysis was viewed as three major activities. The first would involve focusing on what is important in the data; the second would involve organising and displaying the data through graphs, quotes and tables to name just a few methods; and the third would require interpreting the data through drawing meanings, patterns and metaphors. This was, in general, the view towards analysis, but in particular, certain techniques were, in addition, involved. These were: 'coding', 'iteration', 'memoing', 'comparing', 'identifying powers, structures and causal mechanisms', 'conceptualisation and abstraction', 'retroduction', 'explanatory critiques' and 'identifying absences'. Codes were derived from the research problem and from the literature, then they were used to gather data, then the data were used to amend the literature and new codes emerged, these then were used for the second round of data

collection and analysis. This shows that the research was building itself up through cycles of interaction with the data and with the literature; this is known as 'iteration'. 'Memoing' in this study ranged from recording hunches to recording questions and ideas, they helped to enrich the analysis. Sometimes they were inserted directly in the text during interpretation sometimes they were kept in separate documents for later use. During interpretations the researcher constantly was 'comparing' evidence with evidence, evidence with the literature, summary with summary to name just a few moves in order to elaborate the analysis. The logic of the analysis involved 'retroduction'. Retroduction involved building arguments through moving from one premise to another utilising both induction and deduction thinking. The aim throughout the study was to 'identify powers, structures and causal mechanisms'; this simply means trying to search beyond events to identify causes and structures which maintained certain conditions and states of affairs. In critical realists understanding, the technique of 'conceptualisation and abstraction' is important in order to search on a deeper level. The researcher should start with the empirical but by mixture of conceptualisation and examining evidences can explore the problem at depth. Two more techniques that were involved in this study are 'explanatory critiques' and 'identifying absences'. The former means to maintain a normative/critical stance during interpretation and to clarify what would be the consequence of maintaining certain beliefs or states of affairs. The latter is to identify what is relevant but absent from the situation being examined and to clarify the consequence of such absence. The literature review in this study developed into a framework through cycles of interaction with the data that was collected. The framework, then, provided lenses to look at the data, guided the sampling procedure, inspired the questions which were asked in the instruments and provided the normative ground for the explanatory critiques.

4.10 CONCEPTS OF VALIDITY, RELIABILITY AND GENERALISATION

The following sub-sections provide information about the criteria used for judging research. The criteria perceived as the most suitable for this study is defended.

4.10.1 Validity and Reliability

Validity and reliability are criteria against which research is judged. Within the interpretive domain there is, in general, certain unease with these two concepts. The

main argument which is put forth is that reliability and validity are rooted in the positive paradigm; as such, they are incompatible with the interpretive type of research (Eisner and Peshkin; 1990; Wolcott, 1994). The researcher of this study agrees to some extent. She attempted to explore the concepts but they appeared rather distant from the qualitative domain and were perhaps relevant only to the experimental designs. For instance, reliability is understood to be the ability to replicate a study. In other words, “an account is judged to be reliable if it is capable of being replicated by another inquirer” (Schwandt, 2007, p. 262). However, qualitative research deals with an open system consisting of people, perceptions and social settings and these cannot be controlled by the researcher in order to achieve replicability. Schofield (2000) wrote something similar to this. He said that reliability requires replicability of results; however, the assumption which underlies qualitative research is that inquiries are influenced by individual researchers, by the theories which they bring to their research, by the circumstances which surrounded their research, and by social settings and actors which are often in a state of flux; this all means that replicability is an impossibility in the mind of the qualitative researcher. Furthermore, the researcher of this study thinks that the nature of qualitative research in being unstructured does not allow replicability in its literal sense. Gomm (2004) suggested that qualitative research is often accused of being subjective and lacking rigour because such work follows flexible designs in the sense that a lot of decisions, including the analysis process, involve intuition and decisions taken on the spot; this all makes it difficult to meet the criterion of reliability.

With regard to validity, Schwandt (2007) suggested that validity is rejected by interpretivists for epistemic reasons. Validity can hold in its meaning a naïve perception of reality. To say that an account is valid is to claim that it is true; interpretivists often reject this simplistic view. Some even reject the notion that a true or a valid account can exist. In their view, research provides multiple subjective constructions of realities; as such, there is no such thing as valid research nor is there such a thing as validity. Denzin (1997) identified four main views on the concepts of validity and reliability:

1. **The positive view:** supporters of this view maintain that there is no difference between the qualitative and the quantitative type of research and, as such, the same set of criteria needs to be applied to both types of research; these criteria (in their simplest forms) are validity and reliability.
2. **The post-positive view:** proponents of this view argue that alternative standards to validity and reliability that are more suitable to the interpretive/qualitative type of research need to be developed and adopted.
3. **The post-structural view:** followers of this view argue for emotionality, feelings and other criteria which, in their view, are radically different from the positive and post-positive standards.
4. **The postmodern view:** this view holds that there needs to be no criteria to judge research since research provides constructions.

This study's conception for judging qualitative/interpretive type research falls in between the post-positive and the post-structural conceptions.

4.10.2 Standards for Judging Interpretive Research

A number of criteria were proposed as alternatives to the concepts of validity and reliability and they appear rather to be centred on the trustworthiness concept of Lincoln and Guba (1985).

Trustworthiness was defined as the quality of an investigation (and its findings) that made it noteworthy to audiences (Schwandt, 2007, p. 299).

Criteria which Lincoln and Guba (1985) thought are capable of establishing trustworthiness in research are credibility, transferability, dependability and conformability. Credibility was proposed as an alternative to validity and this refers to the assurances of fit between participants' views and the researcher's representation of these views; an example of assurance of fit is quoting. Transferability was proposed as an alternative to the concept of generalisation; it addresses the need for rich descriptions so that the reader can decide if the conclusions of one case are transferable to another.

Dependability was proposed as an alternative to reliability; it refers to the process of inquiry and to the extent to which the process was logical, traceable and documented. And conformability was proposed as an alternative to objectivity; it is concerned with the data and interpretations of research and to the extent to which the interpretations are grounded in evidence and logic. A number of elements or procedures were recommended to meet these standards, examples of which are triangulation, auditing and rich descriptions.

Triangulation was involved in this study. Denzin (1997) suggested that a text is valid (credible) if it is sufficiently grounded and triangulated. According to Berg (1995), triangulation means using multiple research strategies, multiple data collection methods and/or multiple data analysis techniques. The main point, said Schwandt (2007), is to examine an account from more than one vantage point. Berg (1995) thought that triangulations can reveal different dimensions of reality and, in combining them, the researcher can have a better picture of reality. In this study, multiple methods were used to investigate one single problem: the research problem. Also, the analysis process involved triangulation, drawing data from different sources to shed light on one single situation, action, perception or conclusion.

Yet another element which was involved in this study was 'auditing'. Creswell (2007) suggested that auditing means asking experts to audit or review the research process and product. Armour, Rivaux and Bell (2009) suggested that an audit allows outside readers to examine the evidence and ensure that the findings are reliable. Creswell (2007) thought that auditing can strengthen the dependability and conformability of research. With regards to this study, all of the phases of this study were subject to scrutiny and review by a team of research supervisors who looked for rigour and offered recommendations to make this research robust.

Another procedure which was present in this study is 'reflexivity'. Hiles and Cermak (2007) suggested that reflexivity means being explicit about the assumptions held by the researcher and being clear about the methods used in research; this, they thought, add rigour and objectivity to research. Brewer (2000) thought that reflexivity is an attempt

to identify and acknowledge the limitations of research. The researcher of this study tried to be as reflective as possible and clear about the methods used, the assumptions which underlay the study, her past experiences and what instigated her to conduct this study.

Involved in this study, also, is the element of rich descriptions. According to Hiles and Cermak (2007) and Armour, Rivaux and Bell (2009), rich or thick descriptions allow readers to determine if the findings are transferable to other cases/settings. Creswell (2007) thought that rich descriptions support the criterion of transferability because with detailed descriptions, the reader can decide whether or not the conclusions are transferable (generalisable) to other settings. Charmaz (2006) also advocated rich descriptions; she said: the quality and credibility of a piece of research rests on the depth and breadth of its descriptions. Charmaz (2006) was referring to the quality of the descriptions and their ability to ground the data in evidence.

Some other elements which were present in this study and were thought capable of adding rigour to the research were obtaining a research journal and documenting incidents, reflections and methods, and providing rational arguments supported by evidence (Guba, 1990; Creswell, 2007). The researcher of this study adds here that the criteria for good research must also rest on the ability to provide critiques of the social problems, to dig deeper into the layers of reality and ground theories into the real, and to provide solutions to real world problems.

4.10.3 Generalisation

According to Ryan and Bernard (2003, p. 284), “Generalizability refers to the degree to which the findings are applicable to other populations or samples”. Lincoln and Guba (2000) suggested that there are two main approaches to generalisation in the social sciences: one which is based on probabilities and sampling (and is often used in statistical research), and another which is based on observations of the particular (and is used in qualitative research). The former is termed ‘empirical generalisation’ and the latter is termed ‘theoretical generalisation’ (Schwandt, 2007). Lincoln and Guba (2000) suggested that both are legitimate approaches since each is better suited to the type of

research which it serves; the researcher of this study agrees. Qualitative research generalises theoretical propositions to unknown populations/groups on the basis of fit or, more precisely, on the basis of the transferability of the propositions to other groups (Lincoln and Guba, 1985). Furthermore, the responsibility for generalising can comfortably lie with the reader, not necessarily with the researcher (Donmoyer, 2000). The researcher will have to provide rich descriptions though to enable better judgments to be made about the transferability of the findings to other cases (Lincoln and Guba, 1985). On the other hand, quantitative research can be generalised to known populations on the basis of representation because the sample is expected to represent the entire population from which it came from (Schwandt, 2007).

With regard to case study research and the concept of generalisation, Gomm, Hammersley and Foster (2000) reported that case study research is often accused of being incapable of generalising its findings across a population because, in case studies, often only a few cases are involved. Gomm and his colleagues (2000) thought that the answer to this, simply, is that case study research provides theoretical generalisations, not statistical ones. Brewer (2000), in defence of generalisability in case study research, said that case studies provide theoretical inferences and this in itself is a form of generalisation. Similarly, Stake (1978) said that case studies provide rich or 'vicarious' experiences and these in themselves are generalisations. Furthermore, Donmoyer (2000) thought that the experiences offered by case studies are better than generalisations, especially to those operating in the fields of education and social work. However, some scholars from the interpretive domain reject the idea of generalising altogether. Schofield (1990) reported that these scholars do not pay much attention to the concept of generalisation because they view it as a positivistic device and deem it incompatible with social science research. The researcher of this study concurs with Stake (1978), Guba (1985) and Brewer (2000), amongst others, who thought that the concept of generalisation does not have to be abandoned but rather altered to suit the qualitative paradigm. As such, in this study, the type of generalisation made is theoretical.

4.10.4 A Summary

This study adopted the ‘trustworthiness’ concept of Lincoln and Guba (1985). There are four criteria within the ‘trustworthiness’ concept: credibility, transferability, dependability and conformability. Credibility refers to the assurances of fit between participants’ views and the researcher’s representation of these views; an example of this is quoting. Transferability refers to the availability of rich descriptions so that the reader can decide if the conclusions are transferable to other cases/settings.

Dependability refers to the process of inquiry and to the extent to which the process was logical, traceable and documented. And conformability refers to the extent to which the interpretations are grounded in evidence and logic. Procedures which helped achieved these are triangulation, documentation of evidences, auditing and rich descriptions.

Brewer (2000) suggested that case study research provide theoretical inferences and this in itself is a form of generalisation and Stake (1978) said that case studies provide rich or ‘vicarious’ experiences and these in themselves are generalisations; the researcher of this study believes that the case studies presented here along with the inferences provide ‘lessons to learn from’ and issues to reflect upon for future research but beyond this, generalising, or more precisely transferring, the lessons or experiences from this study to other cases lay on the shoulder of the reader because he/she is more knowledgeable about the cases to which he/she is transferring.

4.11 SUMMARY OF THE CHAPTER

This study operated from within the critical paradigm. Critical research encourage questioning the taken for granted conventions of doing things, this in order to instigate change. The researcher thought that the critical paradigm is the most suitable for this study since the ultimate aim was to improve the teaching of computer ethics in Bahrain. Furthermore, critical realism was the main philosophy which underpinned this research. Critical realism encourages looking deeper at social structures and causal mechanisms. The philosophy further enables researchers to maintain a stance towards what is perceived best for social and individual transformation; the researcher thought that this goes in line with the nature of this study and with its desire to push for improvement.

The research type was qualitative. The aim was to investigate perceptions and identify social structures, the qualitative approach, as such, was perceived the most suitable.

This study used a mixture of methods or a multi method approach combining techniques, philosophies and methods from ethnography, case study research, critical theory studies and hermeneutics; taking inspirations from grounded theories, action research and from the general qualitative research approaches.

With regards to the samples, this study involved all of the Bahraini universities with the exception of two universities which were irrelevant to this study. The universities were considered cases and within each there were one or two cases of computer ethics teaching identified by the name of the teacher. The study is limited to undergraduate computer ethics courses taught at a university level. The sampling technique was purposive, theoretical and case based with which the most suitable individuals were targeted and the data was collected through multiple visits to the field.

The data collection methods in this study were fieldnotes, observations, questionnaires, documents and interviews. During fieldwork the researcher applied the concept of reciprocity in the sense that the researcher tried to reimburse the participants for their cooperation. Reciprocity is a concept very well known to ethnographers. Gaining access to research sites and participants was not easy. The researcher faced difficulties and the data, as a result, was not rich. Research ethics which were observed in this study were anonymity, informed consent and non-maleficence. These were the most relevant to this study.

The analysis approach of this study consisted of a mixture of analysis techniques and philosophies; critical realism (Bhaskar, 1978) was the backbone philosophy. Miles and Huberman (1994) conception provided a more detailed philosophy towards how to analyse. And the analysis techniques of 'coding', 'iteration', 'memoing' and 'comparing' along with the critical realism's techniques of 'identifying powers, structures and causal mechanisms', 'conceptualisation and abstraction', 'retroduction',

‘explanatory critiques’ and ‘identifying absences’ provided the actual mechanisms to the analysis process.

This study adopted the ‘trustworthiness’ concept of Lincoln and Guba (1985). This was perceived as the most suitable for this study since it provided an alternative to the more positivist conceptions of validity, reliability and generalisation.

4.12 REFLECTIONS

Critical realism requires explanatory critiques of social problems. This in turn requires a theoretical framework set up in advance of the fieldwork so that the researcher can provide normative critiques of the findings. This introduced two predicaments in this research. First, the researcher felt that she got sucked up into the literature. The research problem emerged from the literature than from fieldwork. The reader will notice in the following chapters that when the researcher was confronted with the data of the real world certain other issues emerged as more important and the research problem emerged as not much of an issue. This is elaborated in the conclusions chapter. The main point is that the researcher decided that in the future, research problems need to emerge from the real world, from the concerns of society and individuals, their questions and struggles, their worries than from inferences emerging from reading around the literature.

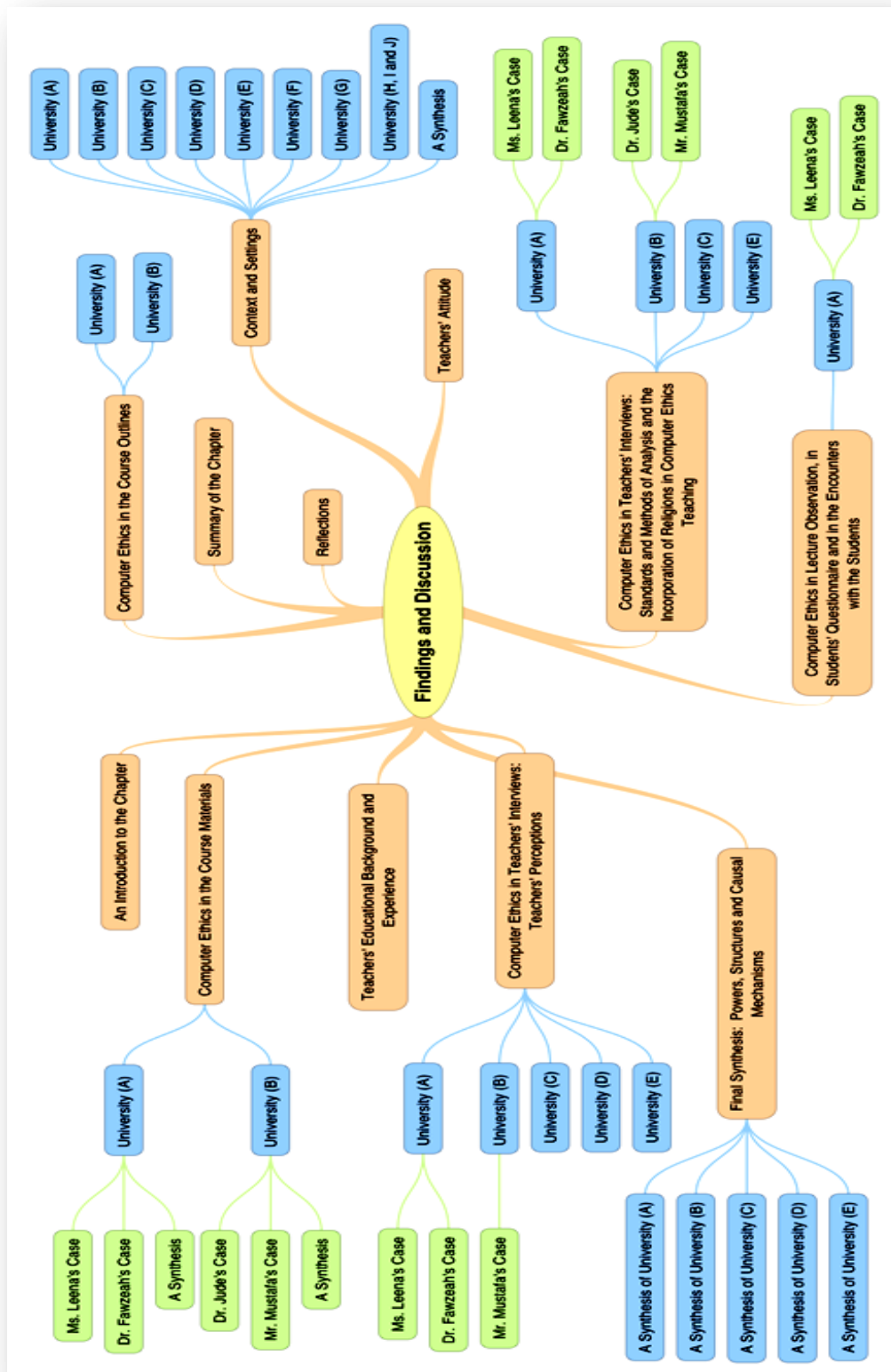
The second predicament was that critiques by their nature compel the researcher to evaluate, question and disagree with certain situations/performances. This can give the impression that the researcher is arrogant or judgmental and this in turn can halt any attempt of improvement because even if the research was to provide valuable recommendations, the audiences of that research might reject it at face value. A lesson which can be learned from this and from going through the PhD Viva correction stage is that reflexivity can lessen the appearance (and perhaps also the actual effect) of bias and arrogance in critiques. However, normativity in research might still remain objectionable; researchers therefore need to consider how to present their critiques to their audiences.

Access to research participants especially to students and lecture rooms was difficult. This had an impact on the quality and richness of the analysis and the conclusions reached in this study. For instance, the researcher could not identify clearly the role of religion in the teaching of computer ethics. Opinions came from the teachers only and this gave one sided view of the issue. Also, in some of the cases information about the teaching cases in general was limited, the diagrams of the structures which emerged at the end after analysis, as a result, were lacking complexity. This all means that critical realism requires rich data and good amount of access. Those who want to adopt critical realism might want to reflect on such an issue.

This chapter described the techniques and concepts adopted in this study and argued for a realist approach. The next chapter provides the findings of this study. The mind map (Figure 5.1) on the next page provides a visual representation of the topics involved.

5. Findings and Discussion

Figure 5.1: A map of this chapter



5.1 AN INTRODUCTION TO THE CHAPTER

The 'Context and Settings' section in this chapter provides information about the universities involved such as the year of the establishment and the titles of the computer ethics courses. The section also provides information about the participants and reports on the dialogues with key informants. The section on 'Teachers' Educational Background and Experiences' present results of the questionnaires which were distributed on the teachers to capture the extent of their knowledge of the field of computer ethics and whether they taught computer ethics in the past, the section also provides information about teachers' research interests. 'Teachers' Attitude' section talk about teachers' opinion of their courses and their enthusiasm towards the course. 'Computer Ethics in the Course outlines' section analyses the course outlines of the teaching cases trying to answer 'how computer ethics was being perceived and taught' and identify what sort of topics, standards and methods of analysis were being used. Following this is a section on course materials. The handouts, examples of tests, slides and books used in the teaching of the courses are analysed and discussed in this section. The results of the interviews are presented and discussed in the sections 'Computer Ethics in Teachers' Interviews: Teachers' Perceptions' and in 'Computer Ethics in Teachers' Interviews: Standards and Methods of Analysis and the Incorporation of Religion in Computer Ethics Teaching'. Results of the observations and students' interviews are presented in 'Computer Ethics in Lecture Observations, in Students' Questionnaire and in the Encounters with the Students'. The chapter ends with a summary and a reflection.

Please note that the sections in this chapter are not unanimous because not all of the teachers participated in the interviews or not all of them provided documents in the sense that some of the sections emerged with an analysis of one or two cases whilst others emerged with an analysis of all of the cases.

To remind the reader, this study set out to examine perceptions and practices in relation to computer ethics teaching and to capture experiences. Furthermore, because the researcher believed that research needs to inform practice and push for improvement, the analysis in this chapter was in the form of critiques. This was done through

presenting descriptions and critiques of the teaching practices in Bahrain then comparing them with the computer ethics concepts and practices reported in the literature.

The universities and individuals who participated in this study asked for their identities to remain hidden. Therefore, letters were used instead of real names to refer to the universities (as in University (A), University (B), etc.) and pseudonyms were used to refer to individuals. To remind the reader, the universities involved in this study are considered cases and within each there are one or two cases of computer ethics teaching identified by the name of the teacher (as in Ms. Leena's case, Dr. Fawzeah's case, etc.).

5.2 CONTEXT AND SETTINGS

The following sections provide introductory descriptions of the universities involved, together with some of the relevant encounters or dialogues which took place between the researcher and participants

5.2.1 University (A)

University (A) was established in 2001. A course entitled 'Professional Software Practice' was found in this university. When the university was visited in February 2008, Ms. Leena was teaching the course and when the university was visited in February 2009, Dr. Fawzeah was teaching it. Both of the teachers were Arab Muslim women.

5.2.2 University (B)

University (B) was established in 2004. A course entitled 'Computer Ethics' was found in this university. When the university was visited on 2008, Dr. Jude was teaching the course and when the university was re-visited in 2009, Mr. Mustafa was teaching it. Both of the teachers were Muslim Arab men.

5.2.3 University (C)

University (C) was established in 2005. During the fieldwork in February 2008 the computer ethics course, which was entitled 'Professional, Legal and Ethical Issues', had

not been running since the inception of the university; however, in 2009, the course started to run for the first time and was taught by Dr. Mamood. He was an Asian (non-Arab) Muslim man.

5.2.4 University (D)

University (D) was established in 2001. A course entitled ‘Information Technology in Society’ was found in this university. The course was not running yet in 2008 but in 2009 the course started to run for the first time and was taught by Mr. Ameer. He was an Arabic Muslim man.

5.2.5 University (E)¹⁴

This study aimed to focus on separate computer ethics courses, as opposed to across-the-curriculum themes. Computer ethics did not exist as a separate course in University (E) but Dr. Saeed, who was teaching in the computing department in this university and who was integrating computer ethics into one of his courses, was involving religion, or more precisely, involving Islam in his teaching. This teacher also promised full access to his course and students. The researcher, as such, sought to investigate this study. However, when the fieldwork commenced, full access was never possible. (The reader can refer to the case of Dr. Saeed in Appendix 7.1 to examine the difficulty faced by the researcher in getting access to this case). The issue of access in general is discussed in the Methodology chapter (chapter 4) of this thesis.

The computer ethics topics in Dr. Saeed’s course were allocated 2 weeks (6 hours) from a total of 16 weeks (48 hours). On both visits (the 2008 and 2009 visits) Dr. Saeed was teaching the course. He was an Arabic Muslim man.

It is worth mentioning here that in February 2009 the researcher met the faculty head of the computer science department at University (E) and asked her whether the department was teaching or was planning to teach a separate course on computer ethics. She said that, although a separate course on computer ethics was not being offered,

¹⁴ In order to protect the anonymity of the participants from University (E), the researcher decided not to mention the year of the establishment of this university. The omission does not affect the research outcomes or syntheses.

ethical issues were being discussed in every lecture by every teacher because ethics is central in people's everyday lives. The researcher tried to explain that there is a difference between computer ethics (the field of study) and morality but the faculty head did not appear to have grasped the difference.

5.2.6 University (F)

University (F) was established in 2003. When the computing programmes were examined, it appeared that there were no computer ethics-related courses at this university. But, to make sure, the researcher asked to meet with the faculty head, Dr. Ajlan. He said that, even though computer ethics was not being taught as a separate course, elements of ethics were being taught across the curriculum. Dr. Ajlan appeared satisfied that since all of the teachers were covering ethics in their lectures there was no need for a separate course. To find out which topics were being discussed and how computer ethics was being integrated, the researcher asked Dr. Ajlan to arrange for her to meet with the teachers who, he thought, were most likely to discuss ethics or ethical issues in their courses. A meeting was arranged with Ms. Amal. The conversation with Ms. Amal revealed that she was not integrating computer ethics. The teacher was not even aware that IT could have a negative impact. The following is an extract from the conversation which the researcher had with her:

- | | |
|-----------------|--|
| The Researcher: | Do you discuss issues such as the effect of technology on society? For example, how automation replaced human labour, or what are the impacts of technology on people? |
| Ms. Amal: | No, I don't talk about automation from a negative viewpoint, I teach the students how computers evolved from mainframes to computers, how Microsoft started up, but not what you said. |
| The Researcher: | What about the fact that information can be used to harm people in such cases as identity theft or internet stalking? Are there any reflections about ethical issues? |
| Ms. Amal: | No, we don't teach this stuff. Actually, it never crossed my mind that we should view technology with suspicious eyes; I take it for granted that technology is a good thing (?). |

Given the conversation with Ms. Amal, Dr. Ajlan had confused computer ethics (the field of study) with morality and this led him to think that computer ethics was already being integrated and discussed across-the-curriculum when it was not. A search for a computer ethics course in the computing curriculum of this university was repeated in 2009 but no computer ethics related courses were found.

5.2.7 University (G)

University (G) was established in 2002. A course entitled ‘Professional Ethics in Information Technology Education’ was found in this university. Ms. Mona, who was teaching this course and who was also the head of the IT faculty, refused to participate in this study. Access was re-negotiated on the 2009 visit but the teacher refused to participate.

5.2.8 Universities (H, I and J)

Universities (H, I and J) were established between the years 2001 and 2002. When investigated on both occasions (i.e. on the 2008 and 2009 visits) it appeared that none of them were teaching computer ethics. It is worth mentioning here that when the IT faculty head from University (J) was asked if computer ethics was being taught or not at his university, he said that he had never heard about ethics in computing and that his university was not teaching a separate course on this but since ethics is part of people’s everyday life and part of one’s own religion then it is inevitable that every teacher would talk about ethics in his/her lectures.

5.2.9 A Synthesis

The IT faculty heads from Universities (E, F and J) confused computer ethics with morality or religion. They thought that, since morality (or religion) is part of people’s everyday lives, then computer ethics is part of people’s everyday discussions and so computer ethics was inevitably being discussed by every teacher in every lecture room; accordingly, they felt there was no need for a separate course on computer ethics. This, however, is a fallacy because computer ethics is a field of study encompassing certain specific topics, issues and pedagogies and this bounded system cannot be reduced to morality, customs or religions. When the researcher searched for computer ethics topics

at University (F), she found that computer ethics was not being integrated although the faculty head was convinced that computer ethics was being integrated into every lecture by every teacher. The faculty heads of Universities (E and J) appeared to have maintained the same line of thinking and it is very likely that they too were not teaching computer ethics across the curriculum. However, this is not certain because the researcher did not investigate this further as she opted to focus on investigating the separate courses. Nonetheless, it is possible to make an inference here, at least in relation to University (F).

When computer ethics got confused with religion and morality, it faded away, not only as a concept but also as a subject for teaching. In other words, when computer ethics had no identity or when computer ethics was not being perceived as an independent field of study that is separate from religion and morality, it lost its place in the curriculum and lost its importance as a subject for teaching.

The descriptions of the universities which are mentioned above provide information about when computer ethics was introduced in Bahrain. Computer ethics as a topic for teaching was only introduced in Bahrain with the inception of the new universities around the years 2001 to 2005. When fieldwork was last conducted in February 2009, computer ethics as a separate course was being taught at five universities (A, B, C, D and G) from a total of the ten universities that were involved in this study. This is illustrated in Table 5.1 below.

<i>Table 5. 1</i>		
Universities which taught a separate course on computer ethics		
University	Year of establishment of the university	The title of the course
A	2001	Professional Software Practice
B	2004	Computer Ethics
C	2005	Professional, Legal and Ethical Issues
D	2001	Information Technology in Society
G	2002	Professional Ethics in Information Technology Education

Universities which did not teach a separate course on computer ethics		
E	<i>Information is withheld to protect the anonymity of the participants</i>	-
F	2003	-
H	2001 - 2002	-
I	2001 - 2002	-
J	2001 - 2002	-

Since only Universities (A, B, C, D, and G) were teaching separate courses on computer ethics, the focus in the fieldwork was on these universities and the focus henceforth will be on these universities but with:

1. the exception of University (G) because it refused to participate;
2. the inclusion of Dr. Saeed's case from University (E) because the researcher considered it a special case.

The focus, as such, is on (A, B, C, D, and E). The following table (Table 5.2) lists the cases and their corresponding courses and teachers.

University	The title of the course	Fieldwork of 2008 Teachers (Pseudonyms)	Fieldwork of 2009 Teachers (Pseudonyms)
A	Professional Software Practice	Ms. Leena	Dr. Fawzeah
B	Computer Ethics	Dr. Jude	Mr. Mustafa
C	Professional, Legal and Ethical Issues	<i>Course was not yet running</i>	Dr. Mamood
D	Information Technology in Society	<i>Course was not yet running</i>	Mr. Ameer
E	<i>Not a separate course but contained 2 weeks of computer ethics teaching</i>	Dr. Saeed	Dr. Saeed

5.3 TEACHERS' EDUCATIONAL BACKGROUND AND EXPERIENCE

The computer ethics teachers were asked six questions (questions 6 -11 from the teachers' questionnaire which is in Appendix 7.7) to identify their educational

background; the length of their experience teaching computer ethics; whether they had done any training or research; readings, seminars, conferences, courses or any other type of education or training in the area of computer ethics; and to find out if they had any training or education in teaching computer ethics. The following tables (Table 5.3, 5.4, 5.5 and 5.6) display the findings:

Table 5. 3

University	Teachers' educational background	
A	Ms. Leena	Computer Science
A	Dr. Fawzeah	Software Engineering
B	Dr. Jude	Software Engineering
B	Mr. Mustafa	Computer Science/Management of Information System
C	Dr. Mamood	Computer Science/Engineering
D	Mr. Ameer	Computer Science/Software Engineering
E	Dr. Saeed	Computer Science

Table 5. 4

University	Length of experience teaching computer ethics (in years)	
A	Ms. Leena	4
A	Dr. Fawzeah	0
B	Dr. Jude	0
B	Mr. Mustafa	0
C	Dr. Mamood	0
D	Mr. Ameer	0
E	Dr. Saeed	N/A (Information is Not Available)

Table 5. 5

University	Training or education in computer ethics?	
A	Ms. Leena	Yes (Reading around the field of computer ethics)
A	Dr. Fawzeah	No
B	Dr. Jude	No
B	Mr. Mustafa	No
C	Dr. Mamood	No
D	Mr. Ameer	No
E	Dr. Saeed	Yes (Reading around the field of computer ethics)

University	Training or education in teaching computer ethics?	
A	Ms. Leena	No
A	Dr. Fawzeah	N/A
B	Dr. Jude	N/A
B	Mr. Mustafa	No
C	Dr. Mamood	No
D	Mr. Ameer	No
E	Dr. Saeed	N/A

The above tables show that all of the teachers came from a computing background. The teachers were new to computer ethics and had no experience with teaching the subject, with the exception of Ms. Leena who had taught computer ethics for four years and with the exception of Dr. Saeed who did not provide information about his experience. In relation to teachers' knowledge of the field, only Ms. Leena and Dr. Saeed said that they read around the field; the remaining teachers had no training or education in computer ethics. In relation to teachers' training, four teachers stated that they had no training on teaching the subject whilst the remaining three did not provide information on this. Furthermore, and based on personal communications with the teachers, all of them, with the exception of Dr. Mamood, asked the researcher for advice on materials for the course and expressed that they were not sure if they were teaching the course in the best possible way. In addition, from a personal communication with the teachers, it appeared that all of them, with the exception of Ms. Leena, were given the course as opposed to them being interested in teaching it.

5.4 TEACHERS' ATTITUDE

Teachers' attitudes towards computer ethics varied. Ms. Leena was asked in the interview how important she thought the course was; she said: "Very important". Dr. Mamood equally said in the interview that the course was important for the students and for society. On the other hand, Dr. Saeed and Mr. Mustafa had a somewhat negative attitude, even though Dr. Saeed thought that computer ethics was very important. Dr. Saeed, even though appeared interested in the field, expressed, in a personal communication, that he had shifted his interest from the practical to the theoretical side of IT because, in his view, computer ethics is easier to teach since it does not involve

being up-to-date. This shows that computer ethics was not being valued for what it was but valued because it was perceived to provide benefits for the teacher. Parallel to Dr. Saeed's view was Mr. Mustafa's. He said:

I don't think I want to teach this course in the future because I am more interested in the technical side of IT than the theoretical side. Also, teaching this course requires a lot of lecturing and discussions with the students.

Here the teacher was planning to avoid computer ethics because he thought it was difficult to teach. A similar attitude existed in University (A). Dr. Fawzeah mentioned that no one from the IT department at her university wanted to teach the course because they thought it was theoretical and very far from their main specialisation. Ms. Leena also mentioned (Research Journal, 3rd March 2009, available in Appendix 7.1) that Dr. Fawzeah herself did not want to teach the course because she thought she did not have the experience to teach it. However, Dr. Fawzeah and Dr. Jude expressed neutrality in their interview. They did not provide a specific answer or view regarding the course but their attitude in the interview reflected their neutrality. Nevertheless, they showed interest in learning how to improve their teaching. It was not possible to capture Mr. Ameer's attitude because the teacher did not agree to an interview.

In conclusion, even though there was a willingness from the majority of the teachers to improve their teaching, there was a sense of disinterest in taking up the teaching of the course. Computer ethics was being perceived as an outsider to the computing discipline, as theoretical rather than practical, and as difficult to teach. There was also this misconception: 'computer ethics is easy to teach because it does not require being up-to-date'.

5.5 COMPUTER ETHICS IN THE COURSE OUTLINES

The computer ethics teachers were asked to provide a copy of their course outline. Four teachers responded: Ms. Leena and Dr. Fawzeah from University (A) and Dr. Jude and Mr. Mustafa from University (B). The following is an analysis of the course outlines.

5.5.1 University (A)

Ms. Leena and Dr. Fawzeah provided identical course outlines. The only difference between the two was in the distribution of marks regarding the course assessment. The remaining sections in both of the documents were identical. As such, both of the documents are considered as one and are referred to in the following paragraphs as one unless stated otherwise. Appendix 7.14 contains the course outline.

The course description and objectives of the Professional Software Practice course projected an emphasis on professionalism. For example, the term ‘professional’ appeared more than once in the following relatively short course description:

This course provides skills and knowledge involving legal, social and ethical issues involved in *professional* software practice. It underscores rules of *professional* conduct to which *professional* software bodies subscribe to prepare students for a career in *professional* software practice. (Emphasis added)

The course objective also contained the term ‘profession’ and ‘professional’:

- Objectives:
- Learning the ethics of a *profession*
 - Explore IEEE and BCS ethics with case studies.
 - Study different issues of *professional* employment, rights and laws. (Emphasis added)

This, however, was not reflected in the list of topics: (see ‘Contents’ in the course outline in Appendix 7.14). In the list of topics (the topics listed under the heading ‘Contents’), there was an emphasis on organisational and legal topics rather than on professionalism or ethics. For example, other than codes of ethics, there was no mention of ethical theories, professional ethics, philosophical concepts or skills of analysis anywhere in the list of topics although learning about the ethics of the profession and exploring cases were listed as objectives (see the objectives above).

In credit hours terms, 56 hours out of a total of 59 were dedicated to topics which were centred on law and business, 3 hours out of the total 59 were dedicated to the history of the software engineering profession and codes of conduct, and apparently 0 hours were dedicated to philosophical concepts and skills of analysis (to examine this refer to the

list of topics in the course outline in Appendix 7.14). If the legal and organisational topics were linked to professionalism and ethics during lecture discussions, then the course was about professionalism and ethics, even if these were not mentioned in the course outline; however, if the topics were not being linked, then the course perhaps was about organisation and law than about anything else. Further analysis of University (A)'s case might provide some answers.

As mentioned earlier, the teachers provided a largely identical course outlines. The difference between them was a minor difference in the distribution of marks, as illustrated in the screen shots in Figure 5.2 below:

Figure 5.2: Screen shots of the 'assessment' sections from the course outlines of Ms. Leena and Dr. Fawzeah.

Assessment	
Quizzes, Tests, Exams:	(35%)
Class Participation, Assignments, Projects:	(25%)
Final Exam:	(40%)
Overall:	100%

Assessment	
Quizzes, Tests, Exams:	(30%)
Class Participation, Assignments, Projects:	(30%)
Final Exam:	(40%)
Overall:	100%

In both of the documents there was, in general, emphasis on exams and tests rather than on constructivist activities since 70% of the marking scheme was dedicated to tests and exams. This reflects a behaviouristic pedagogy where emphasis is on the end results in education as opposed to the process of learning. It is too soon, however, to make an inference in relation to the pedagogical philosophy used in teaching. Further retroductions are needed to provide more insight into this.

5.5.2 University (B)

Dr. Jude and Mr. Mustafa provided identical course outlines and there was no difference at all between them; as such both of the documents are considered one and referred to in the following paragraphs as one (Appendix 7.15 contains the course outline).

The course outline of the 'Computer Ethics' course taught at University (B) reflected contradictions. For example, the course description quoted below implied that the course was aimed to develop students' ability to make decisions:

The course concentrates on the theory and practice of computer ethics. The aim of the course is to study the basis for ethical decision making and the methodology for reaching ethical decisions concerning computing manners...

However, there was no mention of ethical theories, analysis methods and there was no mention of case study/scenario discussions anywhere in the course outline. Also, there was no mention of any other decision-making theories. The Ten Commandments of Computer Ethics, however, was mentioned amongst the list of topics and this might have been the standard used for analysis.

Furthermore, whilst the first half of the course description quoted above appeared in line with computer ethics, the remaining description quoted below implied that the course was to teach basic IT skills and good internet manners rather than computer ethics:

[Students] will also learn about how to protect their information and computers from hackers and thieves. They will learn about viruses, their types, the way of protection their files, and how to use ethical ways via Internet.

However, good manners and good IT practices, as in avoiding viruses or observing Net Etiquettes, are not computer ethics domain-specific topics and are not why teachers teach computer ethics (given the review of the literature).

When the course objective was examined, it appeared that computer ethics might have been perceived as a set of rules rather than a subject which can encourage thinking:

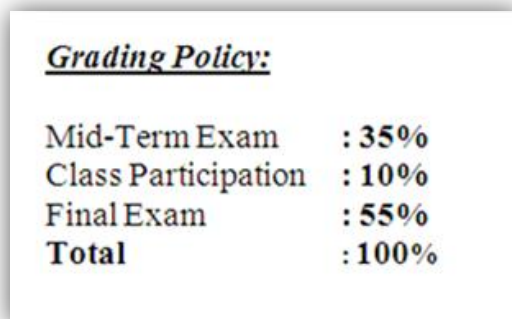
By the end of this course, the students will be able *to know* the ethical *rules* that *have to be followed*. (Course objective, emphasis added)

The quotation above also exposes something about the pedagogical philosophy which the teachers might have maintained. The sentence “the students will be able to know the ethical rules that have to be followed” from the above quotation projects a behaviourist/positivist philosophy where knowledge of the ethicality of situations are assumed to exist ‘out there’ or rather exist as ‘rules’ and, hence, can easily be captured and known rather than the idea that students can learn or ‘construct’ knowledge of what is ethical/unethical.

When the course topics were investigated in the course outline, it appeared that some of them related to basic IT skills whilst others related to compute ethics (to examine the course topics, refer to Appendix 7.15 and to the topics under the heading ‘Course Contents’). For example, topics such as backing up the system, understanding the type of viruses and the core rules of Netiquettes were amongst the topics which reflected the view that the course was designed to teach basic computer practices and not necessarily computer ethics whereas topics such as the Ten Commandments of Computer Ethics, Privacy, Access and Security were within the computer ethics circle of topics.

The course assessment depicted in the screen shot in Figure 5.3 below reflected an emphasis on testing rather than on constructivist evaluation methods:

Figure 5.3: A screen shot of the ‘assessment’ section from the course outline of University (B).



<u>Grading Policy:</u>	
Mid-Term Exam	: 35%
Class Participation	: 10%
Final Exam	: 55%
Total	: 100%

It is too soon, however, to determine what the pedagogical philosophy was. Further analysis is needed to elaborate on this.

5.5.3 A Summary of Meanings

<i>Table 5. 7</i>	
University	Meanings projected by the course outlines
A	<ul style="list-style-type: none"> • Emphasis on legal and organisational issues. • No mention of ethical theories or the skills of analysis. But codes of ethics mentioned. • Emphasis was on exams and tests.
B	<ul style="list-style-type: none"> • Computer ethics was either basic IT skills or a set of rules. • No mention of ethical theories or the skills of analysis. But the Ten Commandments of Computer Ethics mentioned. • Emphasis was on exams and tests.

5.6 COMPUTER ETHICS IN THE COURSE MATERIALS

The computer ethics teachers were asked to provide a copy of their course materials and provide the titles of any software or textbooks used. The teachers from Universities (A and B) responded. Dr. Mamood from University (C) did not provide any materials but said that the course which he taught was based mainly on the book “Ethics for the Information Age” written by Michael J. Quinn and the analysis standards which he used in his teaching were the ethical theories mentioned in Quinn’s book in addition to Islamic standards or what Islam deems as right and wrong. The following is an analysis of the course materials of Universities (A and B).

5.6.1 University (A)

The textbook used by both Ms. Leena and Dr. Fawzeah was the ‘Professional Issues in Software Engineering’ book by Frank Boot, Allison Coleman, Jack Eaton and Diane Rowland published in 2001. When the table of contents of the book was examined and compared with the list of topics in the course outline, it appeared that they were almost identical (Appendix 7.16 contains a scan of the table of contents of the book and Appendix 7.14 contains the course outline). This means that the contents of the course, and hence the discussions, were based on the textbook. The textbook, however, drew heavily on UK and US legislation. Since the book focused on legal standards rather than on philosophical ethics, much of the legal-related discussions were irrelevant to Bahrain because they either did not apply to Bahrain or were not yet introduced in

Bahrain. It is not clear if the teachers were localising or making relevant the topics during their discussions or not, but based on the information which exists thus far, there are no signs that they were making the material relevant. Given this, there is a chance that professionalism (or computer ethics) was being taught as a foreign concept.

The first chapter of the book contained philosophical concepts and how to analyse cases, in addition to a historical overview of professionalism in the UK and in the US. The philosophical concepts and how to analyse cases were, in particular, excluded from the course outline; only the historical overview was included. This raised questions because the excluded parts are considered fundamental by computer ethics educationalists. Ethical theories are thought to provide a foundation for ethical discussions and make ethics objective. Analysis skills, on the other hand, are thought to provide computer ethics learners with the skills necessary to formulate ethical judgments. Yet if ethical theories and skills of analysis were excluded from the discussions, then what was the foundation for ethical discussions and how were the students being encouraged to think rationally or objectively about the issues? The following pages might provide some answers.

Other than the textbook, Ms. Leena and Dr. Fawzeah provided different sets of materials. The following sections present the materials of each of the teachers separately.

5.6.1.1 Ms. Leena's Case

Ms. Leena provided a copy of the following documents:

1. The British Computer Society (BCS) code of ethics and the Software Engineering Code of Ethics and Professional Practice (identified by Ms. Leena as the IEEE code).
2. An article from the internet by Knutson and Carmichael (2000). The article discussed the importance of safety and testing of software. The focus was on the technical rather than the ethical aspects. For example, the article discussed topics such as safety procedures, characteristics of software and hazard analysis rather

than, for instance, the consequential implications of not testing software or virtue/vices related concepts.

3. An article by Mohamed (2004) describing how to use certain technologies to monitor employees. The emphasis was on revealing the benefits rather than the drawbacks in the sense that the article revolved around the technologies and how they could be of benefit to employers as opposed to how surveillance could impinge on the privacy of employees.

From the above list, documents number 1 provided a strong link to professionalism/computer ethics, document 2 was more in line with the technical side of IT than the theoretical/computer ethics side, and 3 was more business/profit-oriented than computer ethics-oriented since the main message was that surveillance technologies are good for organisations.

5.6.1.2 Dr. Fawzeah's Case

Dr. Fawzeah provided a copy of the following documents:

1. A case study entitled “Case Study 1: Who is Peter Ward?” (Available in Appendix 7.23). This means that case studies were involved in the teaching of Dr. Fawzeah even though case studies were not mentioned in the course outline. It is not clear, though, how the teacher was encouraging the analysis of the cases.
2. A document entitled “Assignment 1: Software Process Models” (available in Appendix 7.17). The assignment contained two questions. One was to describe and discuss the advantages and disadvantages of two software development models, namely the Agile models and Rapid Application Development models. The other was to decide which of the models was suitable for systems such as university registration and online auctions. There was no indication that the assignment was focusing on the ethical dimension of the Agile or the Rapid models; the focus, instead, appeared to have been on the technical dimension of software development.

3. A document entitled “Assignment 2: Professional ethics and S/W Engineering” (available in Appendix 7.18). The assignment contained five questions. In question 1 the students were asked to write a definition of the meaning of the term ‘profession’ then, in question 2, they were to discuss their definitions in pairs asking this question: “Do they [the definitions] capture what you want to capture?” The question was obscure; what did the teacher mean by ‘do the definitions capture what the student want to capture?’ However, this proved not to be an issue because all of the subsequent questions followed this line. For instance, question 3 requested that if the students found that their definitions were different, they should “keep both [definitions] and refine them, otherwise produce a single refined definition”. Then question 4 instructed the students to form a group of four students to “combine the definitions into at most two definitions: main and alternate”. Then the last question instructed them to form a group of eight students *and yet in order to* “combine [the definitions] into at most two definitions”. It is not clear what the point of the exercise was and why there was a huge interest in refining the meaning of the term ‘profession’; however, the only thing that can be inferred from examining this document was that it was not involving the students in genuine questions of ethics or professionalism.

4. A document titled “Quiz 1” (available in Appendix 7.19). In the essay-type question (question 10 in the quiz) students were asked to list four points out of the total eight points that were relevant to the ‘Public Interests’ part of the IEEE code of ethics. This means that the students had to memorise the entire code in order to anticipate such specific a question. However, memorising the codes do not negate students’ need for cognitive thinking and the skill of analysis because codes of ethics do not provide straightforward answers to particular ethical problems because they are not lists of what to do/what not to do. Indeed, even the IEEE code itself warned that:

The Clauses should not be read as separating the acceptable from the unacceptable in professional conduct in all practical situations. The Code is not a simple ethical algorithm that generates ethical decisions. In some situations, standards may be

in tension with each other or with standards from other sources. These situations require the software engineer to use ethical judgment to act in a manner that is most consistent with the spirit of the Code of Ethics and Professional Practice, given the circumstances. (ACM/IEEE Software Engineering Code of Ethics, 2012, screen 2).

The fact that the sections of the book which contained the skill of analysis were, in particular, excluded, and the fact that the students were encouraged to memorise the code rather than analyse a scenario in their quiz, supports the idea that the code was, perhaps, being used as an end in itself rather than as a tool for thinking.

Another observation in relation to the quiz was that questions 6, 7 and 9 were almost identical to certain sentences that existed in the handouts. The handouts are a series of chapters prepared by Goldfinch (2008) (these chapters are available online). For example, question 6 was as follows:

The British Computer Society – BCS – is the professional Engineering Council body for Information System Engineers

T F

And the sentence in Goldfinch (2008, screen 11) was:

The British Computer Society – BCS – is the professional Engineering Council body for Information System Engineers

Question 9 was as follows, and its correct answer was expected to be “False” hence the minor alteration from the word ‘internal’ to ‘external’:

The Technical Role is mainly external, for the benefit of members to determine new standards

T F

And the sentence in Goldfinch (2008, screen 8) was:

The Technical Role is mainly internal, for the benefit of members.

Question 7 was:

The Code of Conduct embraces the duties of care due by the professional to various areas of society...

T F

And the sentence in Goldfinch (2008, screen 11) was:

The Code of Conduct embraces the duties of care due by the professional to various areas of society...

Because the sentences were taken out of their context and were used with minimum alterations, they did not pose as meaningful questions in the quiz document. Therefore, the questions did not appear to have been testing valuable knowledge in the memory of the computer ethics students other than testing them for their ability to memorise or recognise sentences from their handouts.

Further examination of the quiz revealed also that the quiz was not restricted to professionalism or computer ethics because questions 4, 5 and 8 were purely business related. For example, question 8 was as follows:

Employees Motivation characteristics: Circle the correct answers(s)

Self-Esteem
Esteem of teammates
Satisfaction of social needs
Job security
Financial rewards
Application of code of conduct and code of ethics

Question 4 was as follows:

Centralization, decentralization, organization by product are types of organizing an organization.

T F

And question 5 was as follows:

The role of the central quality management function is to establish a quality plan for the whole organization.

T F

5. A selection of chapters from the internet written by Paul Goldfinch (2008). Dr. Fawzeah was referring to them as the handouts. They carried the following titles and subtitles:

I. Professionalism & the Engineering Institutions

Professionalism
Emergence of Professional bodies
Engineering Institutions
Role of Engineering institutions
British Computer Society

II. Company Structure & Management

Introduction
Management Structure
Management Technique

III. Basics of Company Organization

Motivation
Partnerships
Companies
Company Organization

IV. Finance: Costing and Cash Flow

Introduction
Costs
Pricing
Investment Proposals
other Considerations

V. Finance: Funding & Legal Requirements

Necessitates!
Sources of Funding
Legal Requirements

The chapters contained business/organisation-related information for software engineers whether they worked independently as entrepreneurs or worked as employees in organisations. This explains why there were business-related questions in the quiz. However, whilst Goldfinch's (2008) business-related chapters made sense regarding why they were integrated into the overall discussion of professionalism/computer ethics, the business-related questions which appeared in the quiz did not give the impression that they were relevant to the knowledge of a software engineer.

Furthermore, the handouts had UK students in mind. Specifically in chapter (I) there were a lot of references to places, institutions, individuals and incidents

related to the UK (to examine these handouts/chapters, refer to Paul Goldfinch's site in the references under Goldfinch (2008). This would not have been out of place if the chapters were being used in a course taught in the UK but the course was being taught in Bahrain. Therefore, if the material was being used as it was and without any additional materials relevant to Bahrain then computer ethics was being presented as a foreign concept.

5.6.1.3 A Synthesis

Some of the supplementary materials which the teachers provided did not make it clear how ethics and professionalism are tied to the technical and organisational aspects of computing. The materials focused on either the technological aspects or the organisational aspects and when it came to the ethical or professional aspects, genuine questions of ethics were not being asked. Instead, the students were being involved in some superficial terminology-related type of questions. This means that the teachers were struggling to make ethics or professionalism centre stage or tying ethics with the technological and organisational topics. Moreover, fundamental topics, such as philosophical concepts and the skills of analysis, were eliminated from the discussion and codes of ethics, apparently, were being used as ends in themselves rather than as tools for thinking. In general, there were traces of a didactic style of teaching in Dr. Fawzeah's material.

5.6.2 University (B)

Dr. Jude and Mr. Mustafa provided different items of material; firstly presented is Dr. Jude's material:

5.6.2.1 Dr. Jude's Case

Dr. Jude provided a copy of a chapter named 'Computer Ethics' from a book entitled 'Computer Skills: Microsoft Windows XP/Office 2003- Hardware and Software'. When the titles of the topics contained in the chapter were examined and compared with the list of topics in the course outline, it appeared that the titles and the list of topics were the same and that the majority of the topics listed in the course outline were contained in or sourced from the chapter (Appendix 7.20 contains the chapter and

Appendix 7.15 contains the course outline). This means that the majority of the topics discussed in the course were based on the chapter. It is not clear whether or not Dr. Jude included information from other sources in his discussions but the researcher asked for all of the materials used for the teaching of the course and Dr. Jude provided her with one chapter only. Therefore, it is not clear if materials other than the chapter were being used but if the teacher was depending on one single chapter for the teaching of the course then the course content was shallow. This is because the chapter contained brief explanations rather than discussions in the sense that the entire chapter consisted of only 12 pages.

Furthermore, although the chapter was titled 'Computer Ethics', it was about computer skills rather than computer ethics, hence the title of the book: 'Computer Skills: Microsoft Windows ...' For example, included in the chapter were issues such as 'Uninterruptible Power Supply', 'Protecting from Viruses' and 'Backups'; these are related to computer skills rather than computer ethics. On the other hand, topics such as 'Privacy' and 'Software Copyright', which were expected to contain discussions on computer ethics, actually contained the following:

1. Short and to the point information, or rather more precisely, instructions on what to do/not do in matters related to technology, as in the following example:

Software Copyright

Commercial software is covered ... you have to pay for it and register to have the license to use it. You should do the following according to the copyright principle:

Software should be copied only for back up.
Sharing or lending software is not allowed.
Copying the software over the network should be under the terms of...

2. Mere definitions of terminologies, such as the following:

Computer Crimes

Are the unlawful uses of any component of a computer system. The use of computer Fraud, Theft, Espionage, Forgery and Sabotage are types of computer crimes.

3. Material not relevant to Bahrain. For example, the Data Protection Act mentioned in the chapter was relevant to Ireland:

Data Protection Legislation
The following is an extract from The IRELAND Data protection Act. (Emphasis in the original).

In general, the chapter either engaged the reader in terminology-related topics, or portrayed computer ethics as if it revolved around a set of rules or procedures. Indeed, computer ethics was defined as follows:

Computer Ethics consists of a set of laws which govern computer users and information produced by computers. The Computer Ethics Institute (CEI) established the following laws:

Do not use computers to harm people.
Do not interfere in other people's business and do not hack into other people's files.
Do not use computers for theft.
Do not use computers to commit forgery.
Do not use other people's software without paying for it.
Do not hack into other people's machines without their permission.

(The above is a translation made by the researcher of this study of the definition which was provided in the chapter for computer ethics).

Certain inconsistencies were identified on the page which contained the definition of computer ethics. However, firstly the reader needs to know that the pages in the chapter were designed in such a way that they would provide descriptions in both the Arabic and the English languages, where the Arabic and English texts would simultaneously emerge next to each other discussing the *same* topics. This, however, was not the case with the page which contained the computer ethics definition (this page is depicted in Appendix 7.21). The Arabic and its equivalent English text were revolving around *different* topics. The above quotation (the definition of computer ethics) was mentioned in Arabic only whereas its English equivalent discussed Data Protection Legislation. The Arabic text which provided a definition of computer ethics should have led to a definition of computer ethics but in English however this was not the case. This implies inconsistencies, contradictions and a struggle to project one coherent conception of

computer ethics. This means that computer ethics, as a concept, was vague in the understanding of the authors of the book and, as a result, computer ethics (as the computer ethics scholars know it) did not take centre stage in the discourse of the book, and perhaps neither in the teaching of the teacher.

5.6.2.2 A Synthesis

Based on the above, the chapter which Dr. Jude used for the teaching of his course, the chapter which apparently was the core material (if not the only material) used in his teaching, contained conflicting definitions of computer ethics and portrayed computer ethics as if it revolved around a set of rules and procedures; in addition, the chapter was inaccurate on some occasions. Apparently, the authors of the material themselves, in addition to Dr. Jude, did not appear to have had a coherent or a stable view of computer ethics. Computer ethics, as mirrored in both the course outline and material, was either a set of rules on computer manners or a set of topics on computer skills. The book which contained the material was essentially about computer skills, as depicted in its title and contents, therefore the material was perhaps sufficient as computer skills and to guide IT users on what to do/what not to do with regards to technology however, it is doubtful that the material could, sufficiently, prepare the future generations of IT professionals for the ethical controversies which lie ahead them. This is because computer ethics education, as illustrated in the review of the literature, strives to teach analysis skills and make the students aware of the existing points of view, issues and controversies so that they engage with them and think, *independently and by themselves*, about them and in due course be capable of making ethical judgments when faced with different competing moral choices. All of these were 'absent' in both the course material and outline. Furthermore, computer ethics discourses, as experienced through reading computer ethics books, strive to encourage ethical thinking rather than mere memorisation of procedures, strive to present competing arguments as opposed to one-sided arguments, and aim to present controversies for reflection; these were also 'absent' from the material.

5.6.2.3 Mr. Mustafa's Case

Mr. Mustafa provided the researcher with PowerPoint slides. The teacher did not say if the slides were prepared by him or not. The diagrams in the slides appeared too well-presented to have been made by the teacher himself. The researcher searched for traces of the slides on the internet. The search results revealed that the slides belonged to a CD which contained resources for teachers who teach from the book 'Introduction to Information Systems' by James A. O'Brien and George Marakas. The slides were relevant to a chapter from the book: 'Security and Ethical Challenges'. The chapter and the slides aimed to discuss ethical issues related to the use of IT in businesses, as well as to discuss security measurements (Appendix 7.22 contains the slides). Half of the chapter and a portion of the slides were dedicated to the technical issues of security and even though the slides included ethical concepts, these were business-oriented. Concerning the standards of analysis, these too were, in general, business-related. The reader will notice the mention of business ethics and corporate social responsibility theories through referring to the slides (Appendix 7.22). It is not clear if any other materials other than the slides, and presumably the chapter, were being used in the teaching of the course but if no other materials were being used then the course was shallow since it depended on one single chapter.

5.7 COMPUTER ETHICS IN TEACHERS' INTERVIEWS: TEACHERS' PERCEPTIONS

The following section contains teachers' perceptions of the courses which they were teaching. Please note that it was not possible to capture Dr. Jude's perception because the teacher did not agree to an audio recorder and a Net Book was not being used at the time when Dr. Jude was interviewed.

5.7.1 University (A)

5.7.1.1 Ms. Leena's Case

Ms. Leena said:

The course covers more than just ethics, we first introduce the students to professionalism as a concept and then establishments of companies ... we do touch upon the legal aspects which are related to behaviour ... we cover finances...employee's rights in companies, the laws that apply, so all of these

are taught beside the basis which is definitely to teach them about the codes of ethics and how even each company would have its own code of conduct...

Ms. Leena's description mirrored what was found from the examination of the course materials and outline. They too indicated that the course involved 'more than just ethics'. And they too sent a contradictory message in relation to the 'essence' of the course. In the course materials and outline, the focus was either on business, on law or on professionalism each individually and without tying ethics with the topics or making it central. This is mirrored in Ms. Leena's description; she mentioned a variety of different topics and these in general appeared more in line with the field of business than the field of computer ethics. To make sure what the focus of the course was, the researcher asked:

The course seems like it is more about organisations than anything else?

Ms. Leena replied:

Yes it is not only about ethics but ethics takes a big part of the course content, because at the end you can relate many topics; you can relate them back to ethics.

If Ms. Leena was really linking ethics with the organisational and legal topics then the course was on computer ethics yet there are no evidence thus far that she was making the connection. Also, ethics did not make up a big part of the course content since, according to the course outline, it was assigned only three hours out of a total 59 hours of teaching. Indeed, ethical concepts were eliminated from the course content and only a historical discussion of the concept of professionalism was included. Therefore, and at this stage of analysis, only a tentative retroductive inference is possible:

Ms. Leena valued computer ethics, as illustrated earlier in the Teachers' Attitude section; therefore, in her description, she tried to portray that ethics was taking centre stage yet there are no evidence thus far to support this. On the contrary, evidence showed that ethics was not being tied with the course content. Also, the description which she provided projected a sense of confusion in her understanding about the

essence of the course; she could not express what the focus of the course was; she was capable of pointing out that the course was ‘not only about ethics’, she said: “The course covers more than just ethics ... Yes it is not only about ethics”, yet she could not provide an answer to what the course was about. She also reduced the entire field of computer ethics to codes of ethics; she said:

... so all of these are taught beside the basis which is definitely to teach them about the codes of ethics ...

Moreover, she could not identify the higher order purpose from teaching computer ethics. She was asked, “what do you expect your students to know at the end of the course?” and she gave a general answer:

I expect them to remember the essential concepts from the course.

Yet computer ethics is typically taught to raise students’ ethical sensitivity, to make them aware of the ethical and social dimensions of computing, and equip them with the skills which can enable them to make better decisions in relation to IT. Therefore, the teacher perhaps was imprisoned by her misconception and hindered by not knowing what computer ethics is; computer ethics the field of study which is interdisciplinary, revolves around IT yet focuses on human values rather than on business or on any other fields of study; computer ethics the discipline which cannot be reduced to mere codes of conducts. Her misconception might have resulted in her inability to make ethics centre stage and resulted in her focusing on IT, business and codes of ethics, each separately.

5.7.1.2 Dr. Fawzeah’s Case

Whilst Ms. Leena’s description made a lot of references to the field of organisation and management, Dr. Fawzeah’s description made a lot of references to the field of software development, even though Dr. Fawzeah and Ms. Leena were teaching the same course and were following the same course outline.

Dr. Fawzeah gave the following description and the reader can notice how many times the teacher mentions the word ‘software development’:

The course discusses all of the concepts which are related to *software development*. The course comes as a seal or a capstone to some topics which

were discussed in the earlier courses, such topics as methodology and other technical topics. I discuss with the students the environment of *software development* and topics which are related to organisations, such as management and those which are related to *software development*. Therefore, *ethics take only 10% from the total topics discussed.* I am going to discuss with the students, later in the course, about the financial issues relevant to *software development* and human resources, then I will discuss intellectual property and safety and security. (Emphasis added).

Contrary to Ms. Leena, Dr. Fawzeah put it bluntly that ethics was not taking centre stage and that it accounted for only 10% of the course. The course clearly focussed on software development rather than on professionalism or ethics.

On the other hand, given that Ms. Leena's research interest (as she mentioned in a personal communication) was in Management and IT and Dr. Fawzeah's educational background was in software engineering, the teachers, as evidenced (transfactually and retroductively), were focusing on what they knew best or what they aspired to know rather than focusing on computer ethics. However, teaching computer ethics (or perceiving it) as something else can nullify the teaching of computer ethics and this, in turn, can have negative consequences in relation to the education of future generations of IT professionals.

5.7.2 University (B)

5.7.2.1 Mr. Mustafa's Case

Mr. Mustafa provided the following description of the course:

The course is related to ethics and Information Technology. We discuss such topics as privacy, intellectual property, security related procedures, business ethics, computer crimes and types of crimes such as hacking, electronic theft and unauthorised uses.

The description above does not give an indication of the focus of the course and whether the topics were discussed from a broader computer ethics perspective or from the perspective of a particular business information system. Also, it is not clear if the security-related topics were discussed from an ethical dimension or from a purely technical dimension. This is because, in the course material, the focus appeared more

towards business information systems. Further analysis of Mr. Mustafa's case might provide some answers.

5.7.3 University (C)

Dr. Mamood's view of the course was similar to the Literature Review's view of computer ethics and his description was relevant to the field of computer ethics. He said:

The course deals with some specific questions that are related to the problems in the information age, issues related to e-mail, spam, wireless connections, copyright materials which are related to Computer Science. Therefore, we address these issues in the context of Information Technology.

He also said:

We cover theories such as subjectivism, cultural relativism, the divine command theory, Kantianism ... Divine command theory...

To Dr. Mamood computer ethics did not appear confusing or overlapping with other fields of study. Computer ethics, however, was not separate from Islam. The incorporation of religion in the teaching of computer ethics is discussed in a separate section.

5.7.4 University (D)

Mr. Ameer provided his answers to the interview questions through a questionnaire. The teacher did not agree to an interview; therefore, the interview questions were incorporated into the already existing teachers' questionnaire.

When the answers in the questionnaire were examined and compared with what Mr. Ameer said in the informal conversation with the researcher, contradictions emerged. In the informal conversation (Research Journal, 3rd March 2009, available in Appendix 7.1) Mr. Ameer expressed that he did not understand why the researcher was investigating the teaching of ethics in relation to his course; he said that the course which he taught was technical. When asked about standards of analysis and if he was using any, he said that the course had no specific standards of analysis but he used common sense, the standards of Islam and legal standards. When asked whether or not

he incorporated philosophical theories in his teaching, he said he did not use philosophy. However, Mr. Ameer's description of the course in the questionnaire was of a course on computer ethics or at least on social impacts. He even mentioned the word 'ethical' when he wrote the following:

The aim from the course is to introduce the students to the impacts of technology on institutions, individuals, society and the quality of life and the *ethical* and social considerations including security, privacy, piracy and freedom. The students will also learn about regulations and IT and laws, computer crimes, intellectual property rights, software standards, protection of information, health and safety at work ... (Emphasis added).

In the informal conversation, Mr. Ameer did not say much about the course and did not exhibit such an understanding of what his course contained; his description also was not of a course which covered social impacts or computer ethics. In fact, he said that the course was technical and not related to ethics.

Mr. Ameer's answers in the questionnaire did not give the impression they were written in an expressive free way but rather gave the impression that they were bits and pieces of computer ethics-related jargon that were put together to form sentences. He wrote the following, and it is possible to notice that the parts which are marked in italic in the description below make no sense to the text that comes before it:

The aim from the course is to introduce the students to the impacts of technology on institutions, individuals, society and the quality of life and the ethical and social considerations including security, privacy, piracy and freedom. The students will also learn about regulations and IT and laws, computer crimes, intellectual property rights, software standards, protection of information, health and safety at work. *Information Technology and this includes the internet, the world wide web, search engines such as (Google, Yahoo, Lycos) and information retrieval systems, electronic publishing and distribution on media including newspapers, books, music and how to adopt and adapt technology in creative ways.* (Emphasis added).

It is worth mentioning here that Mr. Ameer kept telling the researcher (Research Journal, 3rd March 2009, Appendix 7.1) that she would not benefit from his participation, that he had a busy schedule and therefore he could not participate in an interview, even though the researcher offered to meet with him at anytime, anywhere,

for only 15 minutes. Also, when the researcher asked if it would be possible to attend his lectures for the purpose of observation, he said he had finished covering the content of the course although the semester was at its mid-point, not at its end. When asked how it was that he was capable of covering the material in such a short amount of time, he said he had a small number of students and that the course was not heavy.

The teacher appeared not wanting to participate but did not make this explicit, this casted doubt on the information received from him. To eliminate inaccuracies, the answers which he gave in the questionnaire, henceforth, are going to be excluded and considered invalid because they could have been copied and pasted from the internet and the analysis will rely on what was said in the informal conversation. Given this, the course, as described by Mr. Ameer, was a technical course, not related to ethics, and had no specific standard for analysis other than general common sense, legal standards and the standards of Islam. The course was also perceived not to be heavy since it was possible to cover it in half a semester; a description which contradicts the typical (literature review) view of computer ethics. Computer ethics courses are viewed as heavy because they are interdisciplinary; they are seen as revolving around ethics, or at least social impacts, rather than being technical in nature. This means that the teacher did not maintain the typical view of computer ethics. Computer ethics was being perceived as something else and, as a result, was not being taught in the sense that some other subject was being taught, some other subject with some other meaning, and possibly also with some other aims and objectives for the students other than developing their ethical judgment.

5.7.5 University (E)

Dr. Saeed was asked what sort of topics he discussed in the two weeks of computer ethics. In the interview of 2008, he said he starts with the topic ‘what is ethics?’ then introduces topics related to ethics in the work environment, then discusses ‘research ethics’. This means that what he dubbed computer ethics was not exclusively computer ethics since business and research ethics are not domain-specific to computer ethics. However, in the interview of 2009, the teacher said he starts with ‘what is ethics?’ then introduces computer ethics scenarios and encourage the students to think about them

using the Association for Computing Machinery (ACM) code of ethics. It is worth mentioning here that on 2008 Dr. Saeed asked the researcher for guidance or materials on how to teach computer ethics and the researcher sent him a list of key papers and links after the interview (Appendix 7.5 contains the list). This might have shaped his decision on which topics to involve and perhaps also shaped his perception of the field of computer ethics. However and even so, computer ethics was still being perceived as something else in 2009. The teacher thought that computer ethics was business ethics. He said in the interview of 2009:

The course focuses on business ethics in relation to IT to make the students aware of what they are going to produce and their effect on the organisation and customers. (Emphasis added).

It is worth mentioning here that Dr. Saeed's students were majored in computer science; they were not business or Information System students.

Perceiving computer ethics as business ethics can have implications for the identity of the field of computer ethics in the sense that, if computer ethics continued to be perceived as 'something else', then computer ethics will no longer exist in the curricula and this absence, in turn, could have implications for the education of future generations of IT professionals.

5.8 COMPUTER ETHICS IN TEACHERS' INTERVIEWS: STANDARDS AND METHODS OF ANALYSIS AND THE INCORPORATION OF RELIGION IN COMPUTER ETHICS TEACHING

The following section contains what the teachers said about standards and methods of analysis, as well as what they said about the incorporation of religion in their teaching. It is worth mentioning here that Islam was the only religion that was being referred to in the interviews in the sense that the teachers used the words 'religion' and 'Islam' interchangeably.

5.8.1 University (A)

5.8.1.1 Ms. Leena's Case

Ms. Leena was using case-based analysis as the analytical method in her teaching. When asked which methods she was using she said:

I let them read the case many times, try to list the actions taken, describe each event and what was the action taken, then for each action analyse and study if they were ethical or unethical, based on, or referring to specific categories or principals which are in the codes of ethics.

When asked about the analysis standards, she said, “It was mainly the codes of ethics”. The term ‘mainly’ implied that there were some other standards other than the codes. In order to identify these other standards, the researcher asked if the teacher was using any legal standards in her teaching. The teacher said:

We didn’t have access to any Bahrain related legal documents... the course was based on Brunel programme and probably it was taught based on the British law *and I taught what was presented in the book*. Of course we tried to link it with the current country, but we did not have any documentation of the local laws. (Emphasis added)

Prima facie, the above implies that, in the absence of Bahraini legislation in relation to IT, the teacher was left with no choice but to adhere to the book and teach British legislation to Bahraini students. However, computer ethics courses are essentially about human values as opposed to legislation. The contents of the course could have been taught from an ethics-related perspective rather than from a legislation-related perspective.

Ms. Leena could not make ethics take centre stage. This might have led her to, strictly, adhere to the book and this, in turn, introduced a didactic style of teaching where a textbook posed as the main source used for knowledge construction and teaching. This also must have resulted in a waste of resources since the students were taught legislation which they will never use. This, also, might have had an impact on how they perceived the course and how relevant they thought computer ethics is to them as Bahrainis.

With regard to ethical theories, Ms. Leena said she was not using them. When the researcher probed further and asked more specifically if she was using such theories as Deontology or Utilitarianism, she said she had never heard about them. This explains why ethics or human values in general were not taking centre stage. This also explains

why the philosophical concepts were eliminated from the course outline. The teacher perhaps did not know what they were and this might have led her to exclude them.

As for the involvement of religion, Ms. Leena said:

I use Islam to introduce the concept of ethics to the students but I don't use it all of the time. It helps because it is something which they are familiar with and when ethics is tied to Islam the course becomes more appealing to the students.

Ms. Leena was using Islam, the dominant religion in Bahrain, to make the subject more appealing to the students but was not using it as a standard for analysis; she said:

They [the students] already come with religion at the back of their mind to judge situations or people, but I try to make it of more professional judgments, since we are dealing with professional situations here ...

This means that ethical theories in general, including the religious ones, were not being involved in the subject. This leads to the conclusion that codes of ethics were indeed the main, if not the only standard used in analysis. Given this, the 'professional judgment' which Ms. Leena referred to in the quotation above was then most likely based on the codes of ethics since no other obvious standards were being used. However, since there was no variety in the standards used for analysis, since ethics was reduced to mere codes of ethics, and since there was a focus on the codes (as illustrated earlier from the examination of the course outline and from the description of the teacher), then these codes, which served as the 'be all and end all' standard, were most likely enforcing a didactic style of learning/teaching where there was a focus on only one source for knowledge construction.

As for the role of religion in teaching computer ethics, Ms. Leena said:

I felt that participation of the students and their input came directly from their religion ... whenever we discuss a case, most of the students take it back and relate it with their religious belief of ethics.

This means that religion had an important status in the mind of the students or a powerful influence on the students since they were prioritising it as a standard for analysis. Ms. Leena, however, was not in favour of this; she said:

Because we live in a culture or a region where religion is really interfering with every aspect of our life, socially, politically and sometimes economically, we do really focus on religion ... I try to encourage them [the students] to look at the big picture than a narrow point, some students are more receptive but religious students probably would need longer time to convince.

Ms. Leena thought that religion represented a narrow point of view. She said she tried instead to encourage the students to look at the big picture. She thought that religion could dominate students' thinking. She gave an example: she said that she once brought a case study to the students and the lengthy discussion between her and the students surrounding the case made it clear how religion was dominating students' thinking. The case, in short, was about an IT professional who worked for Tesco and who deleted his grandfather's account from Tesco's databases in order to prevent the grandfather from receiving extra discounts on drinks. The grandfather was supposed to reduce his consumption of alcohol to recover from a drinking addiction. Ms. Leena said that the students argued that the IT professional did the right thing since the consumption of alcohol in Islam is forbidden and Muslims are obliged to change the *Munkar* (i.e. wrong doings) as part of the Islamic golden rule 'Commanding Right and Forbidding Wrong', but Ms. Leena argued that what the IT professional did was wrong because, according to codes of ethics, deleting the grandfather's account without his permission was an intrusion of his privacy. The teacher said:

We had a lengthy discussion on that day and the only way out was that the grandfather was not a Muslim hence it would not be possible to apply the Islamic standards to him!

Firstly, the teacher appeared to have assumed that it was necessary for her to reach a consensus with the students or to reach a judgment with them in the form of what was right or wrong. Yet computer ethics education, as understood from the literature, is essentially about ethical or social analysis and *the process* of reaching judgments rather

than about the judgments themselves since different competing ethical theories can provide different answers to the same moral problem.

Secondly, the teacher, as mentioned above, avoided incorporating religion because she thought they represented a narrow point of view and because she wanted her students to look at the big picture. Yet the example which she gave illustrated that she appeared to have fallen into the same narrowness trap when she focused on what the codes could say about the case without recognising or referring to the context of the case and those features which related to culture/religion and which appeared important and worth stressing to the students.

Thirdly, the religion of the students was indeed dominating their thinking. The students, in focusing on what their religion could say about the case, overlooked the importance of people's right to privacy, which could also have come from their religion. An analogy could have been drawn from the story of the Islamic Caliph, the ruler of the Islamic states, Umar who was a religious figure and who once, when he was touring the roads of Bagdad at night, heard a man singing. Umar suspected that the man was drinking so he jumped over the fence and confronted the man, but the man said:

O ruler of the believers, do not pass a judgment in haste. If I have committed one sin, then you have committed three!

Umar asked how and the man said:

[God] ... says one should not spy ... and you have spied on me. Then, [God] ... says enter houses through the proper doors ... and you jumped over the wall. Finally, [God] ... says enter houses of others only with the permission of the householders ... and you came in without asking permission. Umar said: You have spoken the truth. If I forgive you, will you repent? [The man] said: Yes. (Al Qaradawi, 2012, screen 46)

This analogy might have helped the students to assimilate and accommodate¹⁵ the teachers' preferred standard of analysis (the codes of ethics) and accept them as

¹⁵ Assimilation and accommodation are knowledge adaptation processes through which people make knowledge their own, in the sense that through assimilation and accommodation students are not passive

valuable and applicable; or they might have assimilated and accommodated the concept of privacy with their own familiar or preferred standard of analysis (their religion). This, however, did not take place and the students and the teacher, instead, continued to view the case from their own preferred standards.

Fourthly, the teacher in declaring that,

... the grandfather was not a Muslim hence it would not be possible to apply the Islamic standards to him!

sent contradictory messages to the students because, what if the grandfather was a Muslim? Would it then be permissible to infringe on his privacy? Also, in taking this route, the teacher gave the impression that the case which was being discussed and the codes of ethics which were being used were not relevant to the students since they were applicable only to non-Muslims.

5.8.1.2 Dr. Fawzeah's Case

In relation to Dr. Fawzeah, it is worth mentioning at the outset that the interview was conducted in a hurry. The teacher appeared hesitant to participate; the interview, as such, was carried out in ten minutes in the lecture room and without prior arrangement. Due to this, the researcher had little chance to ask for elaboration. The short answers, therefore, resulted in shallow meanings. Also, there is no information about the methods of analysis that were being used, if the teacher was using any.

In relation to the standards of analysis, the following dialogue took place:

The Researcher: How do you encourage the analysis of the ethical cases?
What are the standards?

Dr. Fawzeah: The standard is the ACM code of ethics.

receptors of knowledge but rather creators of knowledge; they receive new knowledge and accommodate it to fit their own mental schema. This is part of Jean Piaget's developmental theory. Piaget studied the development of children's understanding and his theory became influential in the field of educational theory. (Mcleod, 2009)

- The Researcher: What about religious standards? Do you encourage the students to use them?
- Dr. Fawzeah: I instruct them to not follow this path and to rely only on the codes.
- The Researcher: The religion of the students, is it having a good or a bad impact?
- Dr. Fawzeah: It is having a very bad impact, and sometimes a good impact; bad because it does not allow them to make the correct decisions but sometimes it can give quality to their answers.
- The Researcher: What about the legal standards? Do you refer to any local legal standards?
- Dr. Fawzeah: Only in the Intellectual Property topic and the legal standards are general standards.

The above dialogue confirms that the codes of ethics were the only standard used for analysis in Dr. Fawzeah's teaching besides some general laws on property rights. With regard to the involvement of religion, Dr. Fawzeah said, "I instruct them to not follow this path and to rely only on the codes". This means that the students either had a tendency to use their religion for analysis or attempted to use their religion and that is why the teacher was instructing them not to 'follow this path'. Furthermore, the teacher thought that students' use of religion could have both negative and a positive impact; she thought students' use of religion could prevent them from making the correct decisions yet it could also add to the quality of their answers. Dr. Fawzeah did not elaborate on how such impacts were taking effect.

5.8.2 University (B)

5.8.2.1 Dr. Jude's Case

Dr. Jude did not agree to the use of a digital recorder therefore little information was possible to retain from his interview. Information does not exist in relation to the methods of analysis if any particular methods were in use. With regard to standards of analysis, the teacher was encouraging the use of general shared values, cultural values and the values of Islam. Dr. Jude, as such, appeared in favour of using Islam in his teaching. However, information does not exist about the role of religion in his teaching and how this incorporation impacted on students' learning.

5.8.2.2 Mr. Mustafa's Case

When Mr. Mustafa was asked: 'How are the ethical issues analysed in your lectures? What sort of methods are you using?' he said:

Through discussions; we discuss from a human perspective, from the perspective of society, from the Islamic perspective.

In relation to the standards of analysis, the following dialogue took place:

The Researcher: Do you use philosophy or philosophical theories in your teaching?

Mr. Mustafa: No, the course is short; it is one credit hour only.

The Researcher: Do you use legislation or law?

Mr. Mustafa: No, I don't discuss the topics from a legal perspective.

The Researcher: Then do you use religion in your discussion?

Mr. Mustafa: No, I don't think that religion has a connection to the course.

The Researcher: Is it a technical course??

Mr. Mustafa: Yes, it is a technical course. We are supposed to teach some legal standards but...

The above tells that the method of analysis was to rely on discussions of shared values and to examine issues from an Islamic point of view. This, however, contradicts with the fact that the course was being perceived as technical.

Other representations of the nature of the course also existed. In the course material, the course appeared to be focused on business information systems. Yet another representation was that the course was being associated with business ethics but business ethics is not computer ethics as per the understanding of the concept of computer ethics in this study.

Mr. Mustafa's educational background must have influenced his choice of material and this, in turn, must have shaped the identity of the course. Mr. Mustafa's Master's

degree was in the management of information systems. The material was business information system-oriented. The course, as a result, was being identified as technical, information system-related or business ethics-related.

As for the involvement of religion, Mr. Mustafa, as shown in the dialogue above, was not sure if religion had any connection to the course, yet he also said that he used Islam in the analysis of computer ethics issues. In general, the above reflects contradictions.

5.8.3 University (C)

Dr. Mamood was using case study analysis as an analysis method and the secular ethical theories and the ethics of Islam as analysis standards. The teacher was aware that the author of the course textbook which he was using for his teaching was not in favour of using religion as a standard for analysis but Dr. Mamood, nonetheless, thought that the incorporation of Islam was important; he said:

The methods or the methodologies which are being used by the western institute are not perfectly suitable for Bahrain because they have different religions and different values ... the subject can be taught in a better way if we have our own moral values incorporated into the text and syllabus ...

It is not perfectly clear what Dr. Mamood meant by the term ‘methods’ and the term ‘methodologies’ but, since the conversation was about standards of analysis, there is a chance that he was referring to either one of the following or both of the following:

- The ethical theories that were mentioned in the textbook because they were western (an example of which is the Kantian theory).
- The ethical analysis method mentioned in the textbook because it required that religion be kept separate from the analysis process, an idea which clashed with Dr. Mamood’s understanding of ethics:

Ethics is religion ... we cannot separate ethics from religion especially for Muslims (Dr. Mamood, Interview Transcript)

Dr. Mamood, when asked about the impact of the incorporation of Islam, said:

It had a good impact, I think [because] they [the students] would have a theory then so that they can come up with a conclusion. They do not have to be confused with what theory to use.

The teacher, in the quotation above, thought that the students were better off using one single theory or one single ethical view (the Islamic view) instead of wrestling with a number of theories. Yet it was mentioned in the review of the literature and in one of the above sections, that students' ethical sensitivity and their skill of analysis cannot be sharpened if they depend on one single source of knowledge construction and if they are presented with straightforward answers or are asked to look up answers from a code or a set of rules. Only behaviourists would encourage focusing on the end results in education (i.e. focusing on the answers) as opposed to focusing on knowledge construction and the process of learning. On the other hand, what Islam deems to be right or wrong is not as straightforward as Dr. Mamood might have thought. Many issues in Islam fall within a gray area and, as such, require *Ijtihad*, which means reasoning and interpretation. Cognitive thinking and the possibility of facing confusion and struggle in trying to reach ethical judgments, as such, are inescapable, even when Islam is used. The actual impact of the incorporation of Islam in the teaching of Dr. Mamood remains unknown since full access to students and lecture rooms was never possible.

When Dr. Mamood was asked about his students' reaction to the incorporation of Islam, he said:

We had no problems; all of them or most of them were following Islam and practicing Muslims, so they preferred the Islamic point of view when they had to choose between the different theories.

He also said:

They prefer to use the Islamic theory because they have a background in Islamic *Hadith* and *Quran* and understand what are the Islamic views are about these issues.

If the students were really being offered the choice between Islamic standards and secular ethical theories and they were willingly choosing Islamic standards, then this means that religion has a strong link to computer ethics. However, there is a chance that the reason why the students preferred the Islamic standards is because their teacher preferred them or prioritised them.

5.8.4 University (E)

Dr. Saeed, in the interview of 2008, said that he uses codes of ethics and Islam as standards for analysis. The teacher did not mention any particular method of analysis. However, in the interview of 2009 he said he uses codes of ethics and the Bahraini Data Protection Act; he also mentioned scenario discussions. However, the researcher found that a Data Protection Act does not yet exist in Bahrain (Personal communication with Mohammed Al Amir, The Undersecretary of the Bahraini Central Informatics Organisation, 11 March 2010). It is not clear, as such, what sort of document was being used or confused with what was assumed to be a Data Protection Act.

In relation to religion, the teacher in the interview of 2008 said that he used Islam in his teaching but in 2009 he said:

No, I don't use Islam in a formal sense and do not include it as part of the content yet it emerges on the surface whenever verses from the *Quran* or *Hadith* are used in explanations.

It is somewhat likely that Dr. Saeed's answer, as quoted above, was perhaps influenced by the researchers' question in 2008 regarding the effect of the incorporation of Islam on students' learning and whether the incorporation alienated certain groups of students. It is possible that the teacher in 2009 attempted to demonstrate that Islam and religion in general were no longer the formal standards of analysis. However and even so, Islam was still 'emerging on the surface' of discussions, as he put it, and this indicates that Islam had a strong presence in the teaching of the subject (or was important to the teacher) whether that presence (or preference) was intentional or unintentional.

Concerning the role or impact of the incorporation of Islam, the teacher said:

The incorporation of Islam makes the students interested in ethics and it has a positive impact even on those who are not religious because I noticed that they are open to the idea of using verses from the *Quran* or *Hadith*.

The teacher also added that the students liked “the idea of tying ethics to their religion”. This supports what was mentioned in the literature in that ethics, in the conception of an Arabic person, is tied to Islam. How the incorporation was impacting the pedagogy of computer ethics is not clear, though. Information in relation to this is not available.

With regards to ethical theories, the teacher was asked if he was incorporating them in his teaching; he said:

No, because there is not enough time for this, the focus in the course is on the theoretical rather than anything else.

The teacher in the above quotation appeared to have assumed that ethical theories are not theoretical. He said he did not incorporate them because "the focus in the course [was] on the theoretical rather than anything else"; but ethical theories are theoretical. This may indicate that the teacher perhaps did not know what ethical theories were or that he was focusing on some other theories other than the ethical theories, and this means that the focus, perhaps, was not on ethics but on some other theories or topics.

5.9 COMPUTER ETHICS IN LECTURE OBSERVATIONS, IN STUDENTS’ QUESTIONNAIRE AND IN THE ENCOUNTERS WITH THE STUDENTS

The researcher tried to gather information about computer ethics teaching through lecture observations, questionnaires and through informal conversations with the participants; however, access to lecture rooms and to students was extremely difficult. The following is an analysis of what was possible to access.

5.9.1 University (A)

5.9.1.1 Ms. Leena’s Case

In Ms. Leena's case, it was possible to conduct only one observational session because the fieldwork visit coincided with the University’s mid semester break. One session appeared enough at that time since this was the first round of data collection and the

researcher was planning for a second extended round. But then in the second round Dr. Fawzeah was teaching the course.

Nevertheless, the session attended for Ms. Leena yielded interesting data. The topics mentioned during the session were purely management-related. Also the topics were not being linked to ethics or professionalism. The teacher talked about organisational structure, ISO and quality management, motivation, promotion and training. This supports the inference reached from the previous findings: that Ms. Leena was teaching computer ethics as some form of management course where ethics was not being made central.

In Ms. Leena's case, it was possible to distribute a questionnaire to explore students' opinions of the course (a copy of the questionnaire is in Appendix 7.8). Six students were present when the questionnaire was distributed and they all participated but some of the questions were left blank. Please note that the total number of students who were attending this course was seven.

In the questionnaire, the students were asked to describe their course; only three students provided an answer. The following is what they said:

- The course is about ethics *at work* and how to treat each others *at work*.
- The course provides ideas about ethics *at work* ...
- I thought at first it is common sense but I have learned many new things and how to deal with difficult situations *at work*. (Emphasis added).

The above demonstrates that the students thought that the course was about ethics *at work*. This confirms, once again, that the course was management-centred.

The students were asked how much important they thought their course was: five students answered; they said:

- It is very important and very interesting but ...
- I think it is an interesting subject and important to have ...

- I don't think that the course is important. It should not be taught as a course, perhaps only as lectures for students who are interested in attending them.
- I don't think it is important.
- I don't think that the course can add anything new.

There were differences in opinion about the importance of the course. What is significant here is that half of the students thought that the course was *not important*. This means that the course, and consequently computer ethics as a concept, was being underappreciated.

In the questionnaire, two students made comments about some sort of disconnection between the course and their cultural or religious backgrounds; they said:

- It is very important and very interesting but it lacks reality in terms of the cultural society that I am living in.
- I had some different opinions when certain cases were discussed and I don't think I will change my opinions. The reason perhaps is because I am a Muslim.

It was evidenced from the examination of the course materials that irrelevant UK- and US-related legislation were being involved in the teaching of the course. Also, the case study which was discussed with the students and which was mentioned earlier was being made irrelevant to the Muslim audiences. The students, in the above quotation, perhaps were referring to such irrelevances, and, perhaps, that is why one of them thought that the course was disconnected from the reality in which they were living.

5.9.1.2 Dr. Fawzeah's Case

In Dr. Fawzeah's case, the circumstances surrounding the case which were documented in the Research Journal, suggest that Dr. Fawzeah did not want to participate in this study and was trying to separate the researcher from her students. This gave an indication of fear. The teacher did not tell the researcher that she did not want to participate and so the researcher continued trying to get access to information and participants but this proved to be difficult. The following is an extract from the Research Journal demonstrating the context of Dr. Fawzeah's case:

24th March 2009

As agreed with Dr. Fawzeah, I visited the university today to attend her lecture. When I reached the class I asked the students who were in the class to confirm if I am in the right place (i.e. attending the course taught by Dr. Fawzeah) but it appeared that I was not! I called Dr. Fawzeah ... she told me she gave me an incorrect number for the lecture room by mistake... she then told me that she is giving her students a quiz today therefore it might not be of benefit for me to attend the lecture, but I said I wanted to attend, at least to meet the students. I felt from the tone of her voice that she is not comfortable with me attending her lecture (?) When I reached the lecture room, I met the students and introduced myself and sat at the back of the room. Then Dr. Fawzeah entered the room. She distributed the papers then asked me to sit at the front of the room and insisted that I sit on the teacher's chair (?) I was not happy with this arrangement because I was afraid that this might send a negative message to the students - that I am not one of them but one of the academics - which, in itself, could make my attempts to approach them difficult, but I had no choice! I sat where I was told to ... Then I asked to leave on the hope to attend the next session. Dr. Fawzeah said that she is cancelling the next session because the students are ahead of their schedule. The next observation, then, automatically is to take effect on 29th March.

29th March 2009

Dr. Fawzeah called me on the phone prior to the session starting and asked if I could come to her office. When I arrived she said that she had bad news for me. She said the registrar sent the faculty a letter; they are warning that no one other than the students registered in the course should attend the lectures and that any one wanting to attend should get permission from the registrar. I asked who I could contact to get permission from. She said she will contact the people in charge and will call me (!)

I have the feeling that Dr. Fawzeah does not want to participate in the study but for some reason is not telling me so. I have had experience with teachers not wanting to participate and making all sorts of excuses yet trying to look cooperative...

14th April 2009

After many phone calls and 2 weeks of waiting for permission to access the lecture room of Dr. Fawzeah, I went personally to Dr. Waleed's office in University (A). The secretary said she just got the answer. She told me that I can attend only 3 sessions and if I want to attend more than 3 sessions I have to register and pay for the course. (??) I left shocked...

In Dr. Fawzeah's case, the researcher was allowed to attend only three observational sessions. This, of course, was not enough to gain an insight into how computer ethics was being taught. Nevertheless, these few visits and encounters yielded interesting insights when viewed in the light of the previous findings.

In the first and second sessions¹⁶ the teacher talked about Cash Flow, Budgeting and Return on Investments. The topics were not relevant to ethics, professionalism or social impacts. Also, the topics were not being linked in to ethics or professionalism. Moreover, although the researcher of this study, whose Bachelor's degree was in Management, was familiar with such topics as Cash Flow and Return on Investments, she could not understand the explanations of them made by Dr. Fawzeah. The students also appeared puzzled. This strengthens the inference reached in relation to Dr. Fawzeah's case: that ethics was not being made central. This was also demonstrated by the fact that Dr. Fawzeah struggled with teaching computer ethics and this struggle, in turn, had an impact on the students. The impact on the students is demonstrated in the following extract. The extract is from the Report of Observation which related to the first observation session, the first one which occurred after securing permission from the management:

I arrived 2 minutes early and there were students sitting there. I started some general conversations with them.

I asked: So how do you find this course? Are you learning anything interesting or new so far?

One student said: I feel it is all about reading and memorising. We want some case studies and activities. I like thinking and searching on the internet.

I said: So no new information so far?!

She said: Not really, I mean ethics is easy, isn't it, every one knows what is right and wrong, so basically the course is providing some general information.

Another student said: I don't know. We are now at the middle of the semester with this course but I still don't know what this course is all about and what is the purpose or the meaning of this course! And we have been given only one case study yet

¹⁶ There was no third session. For more information on this, refer to Appendix 7.1 and to the entry made on 23rd April 2009.

we were not given the answer for that case, so we don't know what would be the right answer.

Firstly, what the student said about the course in being mainly about memorisation mirrors what was found earlier. There were traces of memorisation in the course material. What the student said supports that the teaching methods were limiting students' independence as learners.

Secondly, the students appeared to have had a misconception. They thought that ethics was a matter of common sense. This misconception must have led the students to underappreciate the importance of their course and consequently the importance of ethics in computing.

Thirdly, the students did not know why they were studying the course or what the course meant, even though they had reached the middle of the semester. This meant that computer ethics was not being made central or its importance was not being made clear.

5.10 FINAL SYNTHESIS: POWERS, STRUCTURES AND CAUSAL MECHANISMS

The following table (Table 5 .8) which is on the next page and which extends to the next few pages was used to help in the construction of the final synthesis provided in the following sub-sections.

Table 8

University	Standards of Analysis	Absent or Eliminated	Other Meanings	The Incorporation of Religions
A	<ul style="list-style-type: none"> • Codes of ethics. • UK and US Legislation (irrelevant to Bahrain). 	<ul style="list-style-type: none"> • eliminated : ethical theories and philosophical concepts. 	<ul style="list-style-type: none"> • In Dr. Fawzeah's case students were encouraged to memorise the codes. Codes were being used as ends in themselves. • In Ms. Leena's case computer ethics was reduced to codes of ethics. 	<ul style="list-style-type: none"> • Ms. Leena was using Islam to make the subject more appealing but not as a standard for analysis. • Dr. Fawzeah was not using Islam. She thought Islamic standards can add quality to students' answers but can restrict the students from make the correct decisions. It was not clear what the teacher meant by this.

University	Standards of Analysis		Absent or Eliminated	Other Meanings	The Incorporation of Religions
B	Dr. Jude <ul style="list-style-type: none"> • Ten commandments of computer ethics. • General shared values, cultural values and the values of Islam. 	<ul style="list-style-type: none"> • Absent: ethical theories. 	<ul style="list-style-type: none"> • Computer ethics was a set of rules embedded in the ten commandments. 	<ul style="list-style-type: none"> • Both of the teachers mentioned that they were using Islam as standard for analysis but what role it played and what impact it had was not clear. • Mr. Mustafa said that he did not think that religion has any connection to the course but then he used Islam as a standard for analysis (contradiction). 	
C	Mr. Mustafa <ul style="list-style-type: none"> • Business ethics. • Islam. 			<ul style="list-style-type: none"> • The teacher used Islam as standard but the impact is not known. • A possible implication is that the learning turned didactic. Students' cognitive thinking was restricted because they were using only one single source to construct their knowledge. 	

University	Standards of Analysis	Absent or Eliminated	Other Meanings	The Incorporation of Religions
D	<ul style="list-style-type: none"> • Legal standards, common sense and the standards of Islam. 	<ul style="list-style-type: none"> • Teacher said he was not using ethical theories. 		<ul style="list-style-type: none"> • Was using Islam as a standard for analysis but the impact is not known.
E	<ul style="list-style-type: none"> • Codes of ethics. • Islamic standards. 	<ul style="list-style-type: none"> • Teacher did not know what ethical theories were. He was not using them. 		<ul style="list-style-type: none"> • In 2008 the teacher said he was using Islam in his teaching but in 2009 he said he was not using it nonetheless it was 'emerging on the surface' as he said whenever he was using verses from the Quran or Hadith. This shows that the teacher was using Islam because he was using sacred verses but he seemed to have thought that this was not a formal incorporation.

5.10.1 A Synthesis of University (A) Cases

Because computer ethics, as a concept and a course for teaching, was not clear in the minds of Ms. Leena and Dr. Fawzeah, the teachers adhered strictly to the book to the point that they were teaching irrelevant UK/US legislations to Bahraini students. They also taught the course based on what they knew from their background experiences evidence to this is Ms. Leena's focus on business and Dr. Fawzeah's focus on software engineering. However this resulted, not only in portraying computer ethics as a foreign concept, it also introduced traces of didactic teaching because there was a focus on one single source to knowledge construction (the textbook, and in analysis, the ACM codes of ethics). The teachers' misconception of computer ethics led to several disadvantages and the most important of all was that ethics was not taking centre stage in their teaching.

Ms. Leena's case, as an example, can be visualised through the Layers of Reality Diagram which is on page 69. A number of transfactual conditions were identified in Ms. Leena's case (and in all of the other cases). They appeared to must have had a chain of reactions (or interplay of cause and effect) where certain transfactual conditions must have led to other conditions and perhaps, in some cases, both of the conditions were aggravating each others. For example, Ms. Leena's inability to make ethics take centre stage led to a strict adherence to the book and this, in turn led to three conditions: (a) teaching irrelevant materials (UK and US legislations), (b) refusing to make the material culturally relevant to the students as in the case of focusing on what the codes could say about privacy than what the religion of the students could say about privacy and (c) relying on one source for knowledge construction and analysis. Point (c), in turn, led to a behavioural learning environment where the students had a lesser chance to draw on different sources to formulate their ethical judgments.

For a diagram of the transfactual conditions that were pulled in to provide synthesis for Ms. Leena's case, refer to Figure 5.4 on the next page (page 193). The transfactual conditions relevant to Dr. Fawzeah's case are depicted in Figure 5.5 on page 194. The transfactual conditions, however, are only indications or symptoms of underlying

powers, and causal mechanisms that are governed by a structure, a structure which maintained poor conditions and negated improvement.

Figure 5. 4: A diagram of the transfactual conditions which were isolated from Ms. Leena’s case (the structure of Ms. Leena’s case).

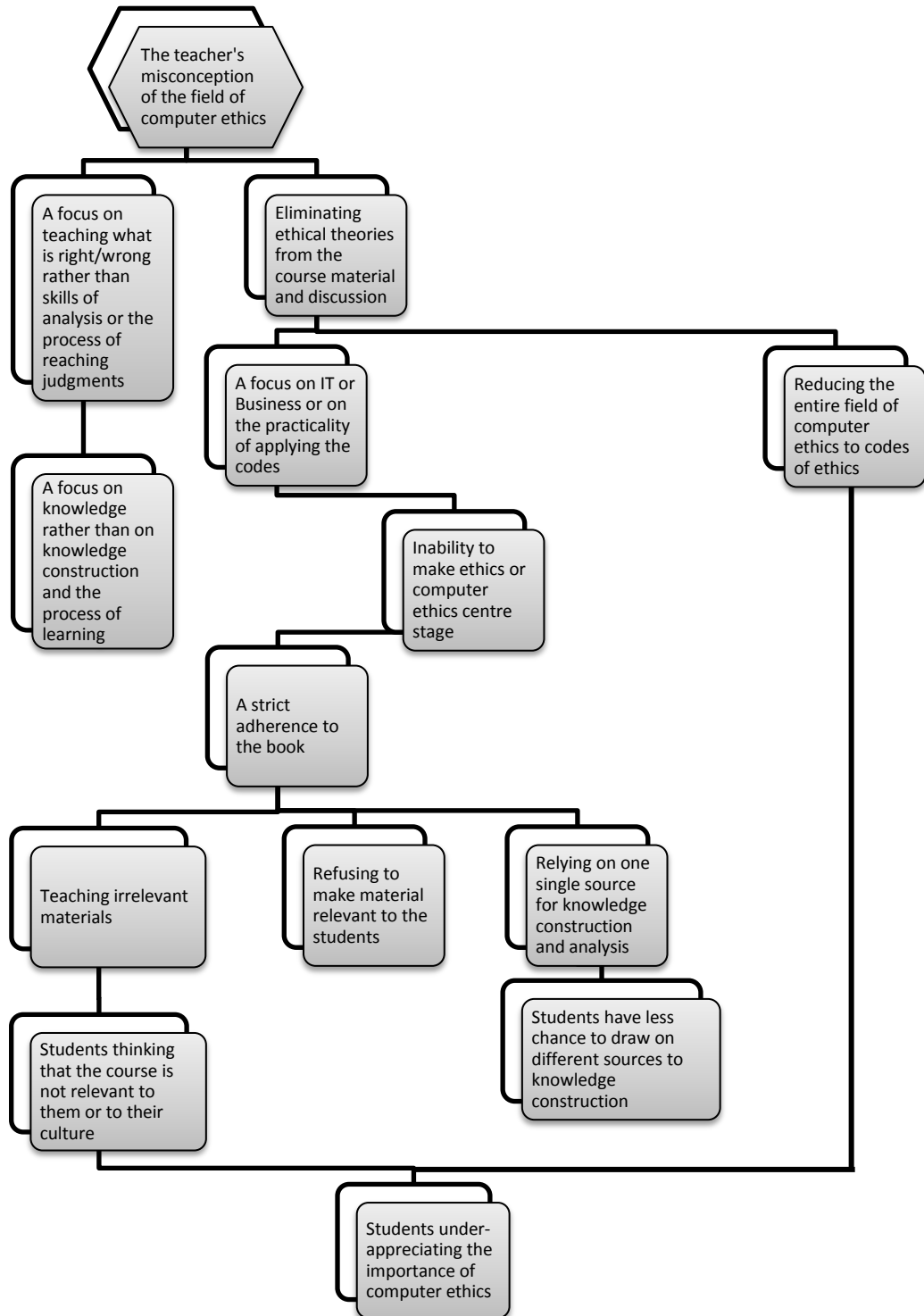
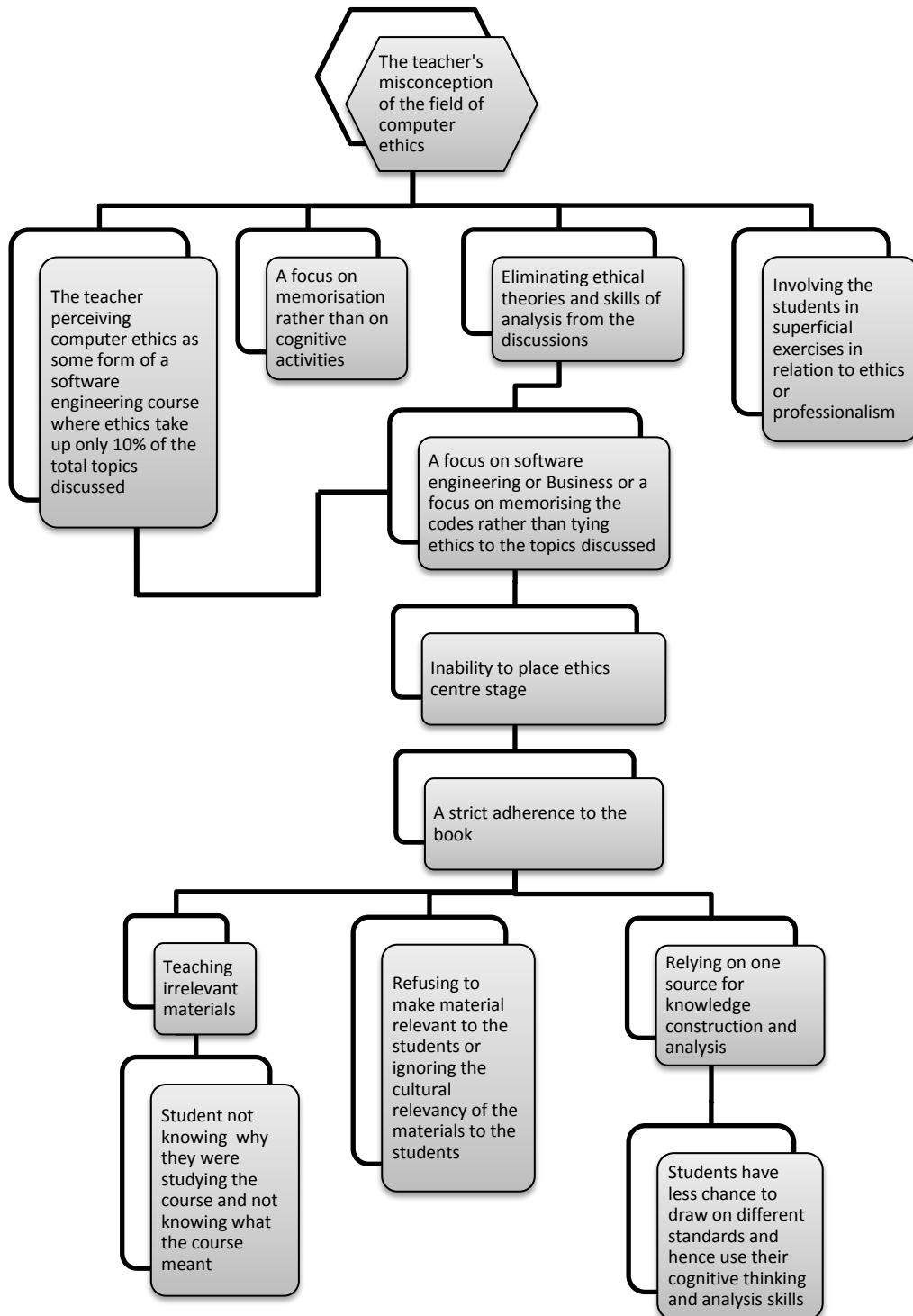


Figure 5.5: A diagram of the transfactual conditions which were isolated from Dr. Fawzeah's case (the structure of Dr. Fawzeah's case).



5.10.2 A Synthesis of University (B) Cases

Mr. Mustafa and Dr. Jude's course materials and outline reflected contradictions. Computer ethics had no stable identity, and possibly no real presence, in their courses. In the case of Dr. Jude, computer ethics was, at times, about basic IT skills and at other times was a set of rules while, in the case of Mr. Mustafa, computer ethics was either about basic IT skills, business ethics or was a technical course related to business information systems.

The teachers claimed that they were using general shared values and the values of Islam as standards for analysis but there were no traces of scenario discussions or ethical analysis in the course materials or outline. The course materials of both of the teachers were shallow and ethical theories which encouraged ethical deliberations were absent from both of the cases.

This all indicates that the teachers were confused, they were not teaching computer ethics, the one which is capable of building students' ethical analysis. The evidence or the transfactual conditions extracted from examining the cases of Mr. Mustafa and Dr. Jude point to an obvious underlying power.

Mr. Mustafa and Dr. Jude were confused; they didn't know what computer ethics is nor how to teach it. They taught, instead, what was familiar or convenient to them but this resulted in a shift in the core of the course; computer ethics and its concepts were substituted by other subjects or entities.

The transfactual conditions related to Dr. Jude's case are depicted in Figure 5.6 and the ones related to Mr. Mustafa's case are in Figure 5.7; these are in the following pages.

Figure 5 .6: A diagram of the transfactual conditions which were isolated from Dr. Jude's case (the structure of Dr. Jude's case).

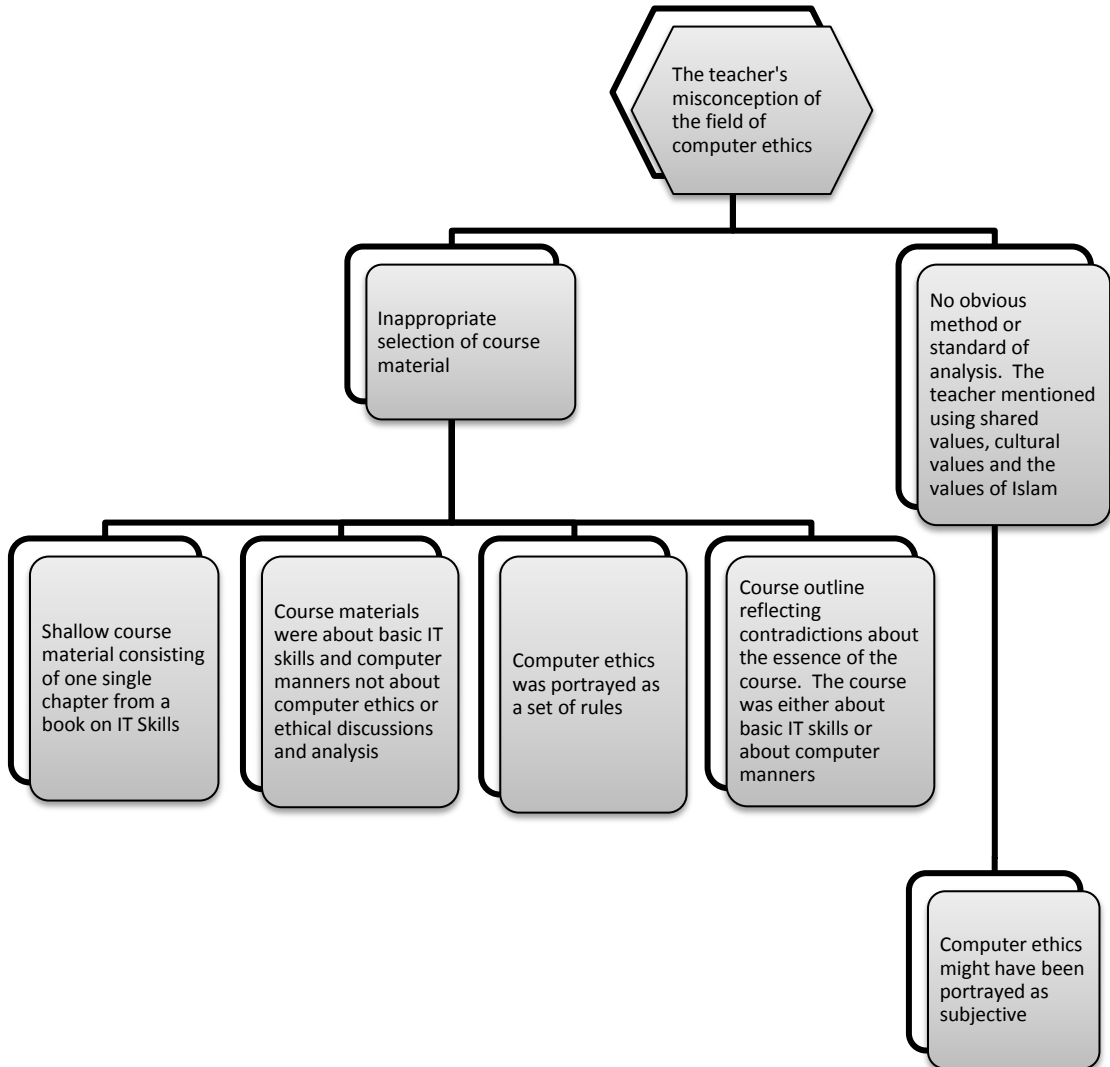
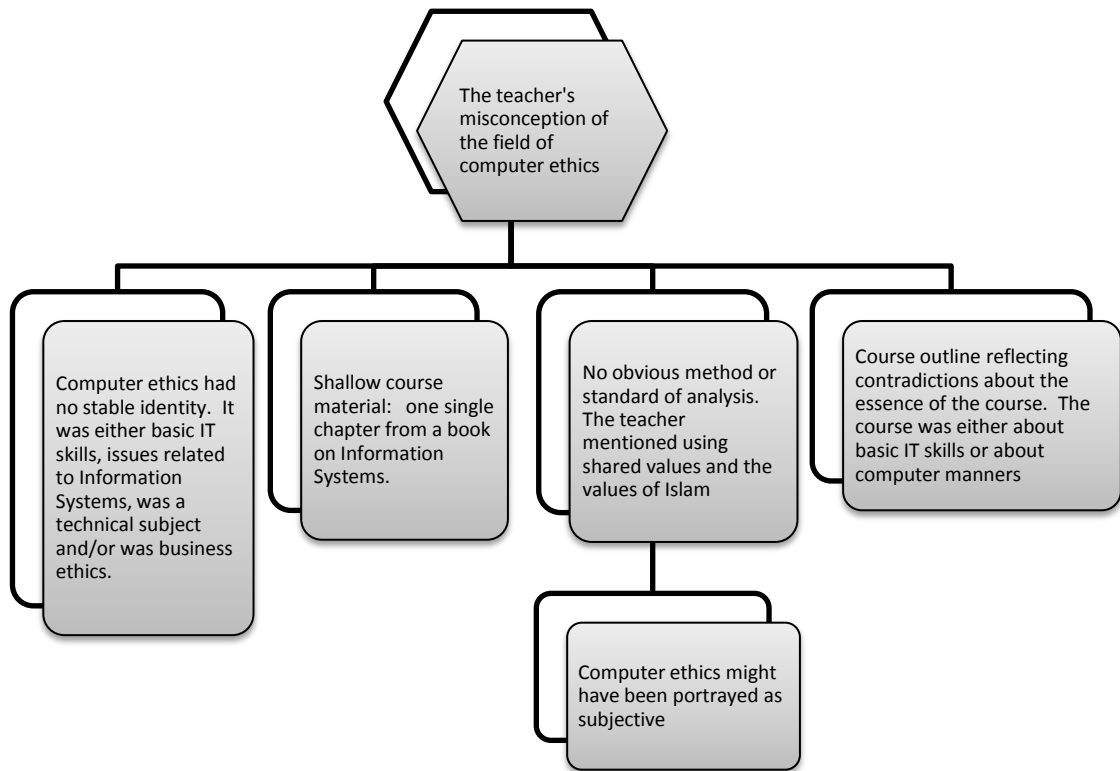


Figure 5. 7: A diagram of the transfactual conditions which were isolated from Mr. Mustafa’s case (the structure of Mr. Mustafa’s case).



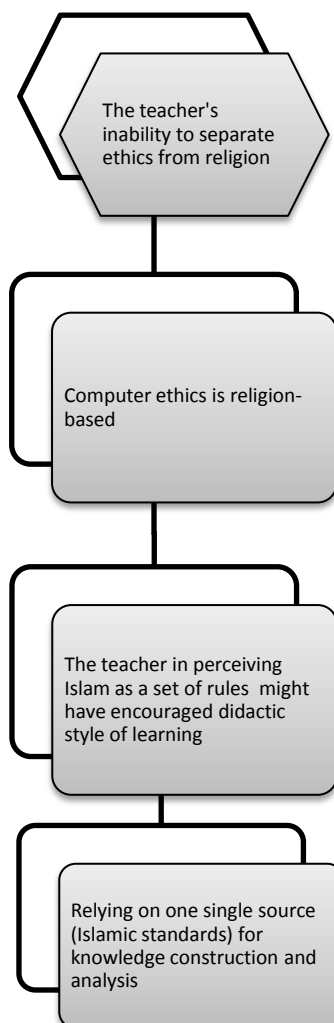
5.10.3 A Synthesis of University (C) Case

In Dr. Mamood’s case, computer ethics was not separate from religion. The teacher thought that the incorporation of Islam was important because of the cultural differences between countries of the west and Bahrain. However, the teacher appeared to have encouraged the use of Islam as the only source of ethical judgment and, although the teacher mentioned using ethical theories, he appeared not in favour of them. This means that the teacher was possibly restricting his students’ cognitive thinking and introducing didactic learning because his students would draw from one single source (Islamic standards) to form ethical judgments. Moreover, the teacher’s inability to separate ethics from religion shifted the core of the course from the realm of science to the realm of faith where ethics is a set of rules that are not open for questioning. Also, in perceiving computer ethics as a set of rules, students’ cognitive abilities is substituted with a mechanical application of the rules to the cases and this imposes a behavioural philosophy/pedagogy. It was not possible to capture the extent of the impact of the

incorporation of religion on the teaching of computer ethics due to a shortage of information but some predictions that are based purely on theory than on empirical evidences are possible here for reflection.

For instance, teaching computer ethics as a religion nullifies computer ethics (the discipline) because ethical analysis and judgments will then be the domain of religious scholars as opposed to the domain of philosophers or computer scientists. Furthermore, when reducing computer ethics to the ethics of one single religion, ethical judgements are never going to be inclusive because no one single religion is universal. The transfactual conditions related to this case are in Figure 5.8 below.

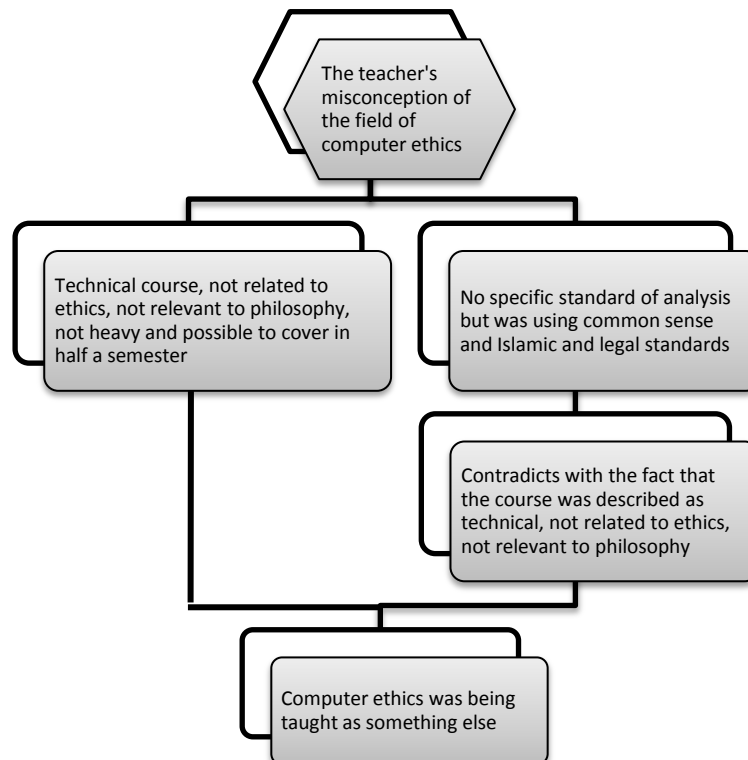
Figure 5. 8: A diagram of the transfactual conditions which were isolated from Dr. Mamood’s case (the structure of Dr. Mamood’s case).



5.10.4 A Synthesis of University (D) Case

Mr. Ameer was not teaching computer ethics even though the course was entitled ‘Information Technology in Society’. The teacher identified the course as: technical, not related to ethics, not relevant to philosophy, having no specific standards of analysis, not heavy and possible to cover in half a semester; a description which contradicts the typical computer ethics, or ‘computers and society’ type of courses. Such courses are portrayed in the literature as heavy because they are interdisciplinary and they revolve around human values; as such, they are theoretical in nature. The teacher claimed that he was using common sense, legal standards and the standards of Islam for the analysis of ethical issues. However, there was no evidence to support that ethical discussions or scenario analyses were taking place. In Mr. Ameer’s case, the computer ethics course was being perceived as something else. The transfactual conditions related to this case are in Figure 5.8 below.

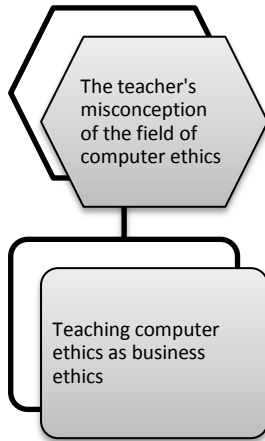
Figure 5.9: A diagram of the transfactual conditions which were isolated from Mr. Ameer’s case (the structure of Mr. Ameer’s case).



5.10.5 A Synthesis of University (E) Case

In Dr. Saeed's case, even though the teacher was using case studies and codes of ethics, computer ethics was being confused with business ethics. The transfactual conditions are in Figure 5.10 below.

Figure 5 .10: A diagram of the transfactual conditions which were isolated from Dr. Saeed's case (the structure of Dr. Saeed's case).



5.11 SUMMARY OF THE CHAPTER

Computer ethics was introduced in Bahrain around the years 2001 to 2005. It was being taught (as a separate course) at 5 universities out of a total 10 that were relevant to this study. During the initial searchers, when the researcher was trying to find out if the universities maintained courses on computer ethics or not, the researcher found that the IT faculty heads, whom she met in the universities, did not grasp the difference between computer ethics (the field of study) and morality/religion. They did not see why ethics would need to be allocated a separate course when ethics (i.e. religion/morality) is part of our everyday life/discussions. They thought that their teachers are already involving ethics in their teaching. Misconceiving computer ethics led the faculty heads to think that ethics is not worth involving in the computing curriculum.

The review of the literature demonstrated that the involvement of ethical theories in computer ethics education is fundamental. Ethical theories make ethics objective, they

provide a platform for ethical thinking and provide a ground for constructionist approaches to education. This is because when there are multiple sources to knowledge construction, as in the use of ethical theories, students are encouraged to use their cognitive thinking and view the process of ethical decision-making as knowledge construction. However, if there is only one source to knowledge construction, as in the case of depending on one single ethical theory, the cognitive thinking of the learner is restricted. At University (A), ethical theories and philosophical concepts were excluded. At University (B) there were no traces of ethical theories. At University (D) the teacher said he was not using such theories. At University (E) the teacher did not know what ethical theories were. And at University (C) ethical theories were not being utilised properly. This *absence* or under utilisation of ethical theories was linked in this study with the teachers thinking that the ethicality of situations existed ‘out there’, in codes of ethics, in the legal standards, in Islamic laws, in the ten commandments of computer ethics, but not constructed by the learners themselves. This could impede the development of the future generations of IT professionals as independent thinkers. This could also shift the identity of computer ethics; computer ethics will no longer be about cognitive thinking and analysis but rather about the memorisation of codes and standards.

Certain fundamental elements were absent from the courses examined. Ethical theories were not being taught and there were no evidences that the teachers were involving the students in proper ethical analysis. On the other hand, certain other evidences showed that the teachers struggled with teaching the course. There existed contradictions in the course materials provided by the teachers of University (A) and (B) in the sense that ethics did not appear to have been the central issue. The observations showed the teachers were teaching topics irrelevant to ethics. The majority of the students involved in this study underappreciated the importance of learning computer ethics and some had no clear understanding of what the course was really about. Some of the teacher put it bluntly that they were not teaching ethics. All of the teachers had little or no experience with teaching computer ethics, and had little or no education or training in the field of computer ethics. And almost all of them asked for advice on materials and expressed that they were not sure if they were teaching the course in the best possible way. This

all indicated that the teachers did not know what computer ethics was, to begin with, and so they struggled with teaching it. *The issue, as such, was not of a (conception) but rather of a (misconception and struggle).*

Computer ethics was being perceived as a set of rules, confused with religion, confused with business ethics or was not being perceived at all. At University (A) computer ethics was reduced to codes of ethics. There was a focus on the codes and the students were to memorise them. At University (B) computer ethics was reduced to the Ten Commandments of Computer Ethics. At University (C) computer ethics was reduced to Islam. Islamic ethics were the preferred standards and Islam was perceived as a set of clear cut rules. At University (E) computer ethics was confused with business ethics. And at University (D) the teacher said that he was not teaching computer ethics, hence computer ethics was not being perceived at all.

With regards to religion, it was clear that religion was important to both the teachers and students. Islam was being mentioned, or identified as a standard for analysis, even when the teacher, as in University (D), claimed that he was not teaching computer ethics, and even when the teachers, as in (A) and (B), did not want their students to use religion in analysis. Religion was ‘emerging on the surface’ as one of the teachers has put it even when there was no intention of involving it. How the involvement of religion impacted the pedagogy is not clear though. Empirical data were short on this due to the problem of access. However certain reflections are possible and these are provided in the next chapter but further research is needed to measure the impact of the incorporation of religion on the teaching of computer ethics and to ground any theories into the empirical.

In general, computer ethics did not appear to have been taking a central position in teaching in Bahrain, not even in their own dedicated courses. And the teachers who were assigned to teach ethics did not appear to have had a good understanding of what computer ethics was. This misconception or confusion seemed to have impacted the teaching of the subject. Pedagogical impacts were not possible to ground empirically

though due to shortage of information. But the consequence of confusing computer ethics with other subjects was possible and these are provided in the next chapter.

A pattern which can be traced here throughout this study is that computer ethics can run the risk of disappearing from the curriculum (as in the case of the IT faculty heads' perception of ethics) or disappearing from its own dedicated course (as in the perception of the computer ethics teachers) if misconceived or confused with other subjects. Computer ethics educators and policy maker might want to reflect on such an inference reached from this study.

5.12 REFLECTIONS

The application of retroduction (moving from knowledge of one thing to knowledge of another) made organisation and presentation of the findings unsymmetrical. The findings and discussion chapter materialised as a story. This might cause confusion to the reader who is accustomed to the more traditional approach of presenting the findings and discussion.

The fragmented pieces of information that were gathered from multiple cases did not help build proper structures and did not help solidify the transfactual conditions and causal mechanisms. The inferences, as a result, might appear more speculative than grounded. It was mentioned elsewhere that proper conceptualisation requires a balance between empirical evidences and interpretations. Proper conceptualisation was not possible in this study due to the problem of access. The reader need to consider this when reading the conclusions reached in the following chapter.

6. Conclusions and the Way Forward

This thesis was written at a time in which the Arabs are revolting against their oppressive governments and in the course of this the meaning of freedom and democracy is questioned; this study is an extension of this political atmosphere. The researcher thinks that Arabs need an intellectual transformation; one which will enable them to dare to question concepts that are strongly related to their religion; the concept which was being questioned in this study was ‘ethics’.

This study should not be taken as a war waged against Islam or the Arabic culture. The researcher of this study herself is a Muslim and an Arab; what she aspires for is ‘improvement’, but this, in her view, cannot happen unless the traditional ways of doing things, including the traditional way of perceiving ethics, are questioned. This study was fuelled by the researcher’s view on the importance of philosophy to emancipate the Arab mind from rigid thinking and from the restricting approaches to education.

The problem which instigated this study was that ethics is understood and interpreted differently in each of the Arab world and in the west. In the Arabic literature ethics is very much tied to Islam or to what Islam deems as right/wrong whereas in the western literature ethics is a form of practical philosophy which encourages exploring a variety of different moral standards (including religious ones) to reach ethical judgments. With the former, ethics is reduced to a set of rules on what is forbidden and allowed. With the latter, ethics is much wider a concept, it emerges as a cognitive tool which sharpens one’s own moral awareness and, in doing so, enables independent and free ethical thinking. This contrast in the understanding of ethics introduced the assumption that, in much the similar way, computer ethics might have a different meaning in the Arab world and this difference in perception might have introduced a different pedagogical style to computer ethics education in the Arab world.

The literature was short of papers on how computer ethics is being perceived and taught in the Arab world. This study set about to remedy this through examining computer

ethics' perceptions and teaching practices which were occurring in universities in Bahrain (Bahrain is an Arab country).

When the data were examined the researcher realised that the issue was not about a particular perception through which computer ethics was being taught, but rather it was about the basics. The courses were not designed properly because the teachers did not know what a course on computer ethics could entail and how computer ethics could possibly be taught. Topics which were about basic computer skills, net etiquettes and how to protect computers from viruses passed as computer ethics whilst ethical theories, skills of analysis and philosophical concepts were absent from these courses. Also certain evidences showed that there were inconsistencies in how the teachers perceived computer ethics and how they were teaching the subject. The issue, as such, was of a misconception and a struggle to comprehend a coherent conception of computer ethics.

Whilst the literature highlighted a certain problem (the problem that Arabs perceive ethics as religion and hence computer ethics teaching might be different in Bahrain), reality put forth a totally different answer (with the teachers not knowing what computer ethics is to begin with). The reader, as such, might have noticed a fracture between the first part of the thesis, where the researcher dwelled passionately on the research problem, and the second part, where the empirical findings were forcing unexpected answers to questions which were not asked in the first place. A lesson to learn from this is that research problems need to emerge from the real world, from the concerns of society and individuals, their questions and struggles, their worries (i.e. from the empirical), than from inferences emerging from reading around the literature (i.e. from the theoretical).

This study demonstrated that computer ethics was a concept that was misunderstood in Bahrain even by the teachers who taught computer ethics. This misconception resulted in the teachers not knowing how to teach computer ethics and not knowing how to make ethics central in their courses. Pedagogy might have suffered because the teachers were not involving the students in proper ethical analysis and were not incorporating a variety

of ethical theories in their teaching. Pedagogical impacts were not possible to ground empirically though due to shortage of information. But the consequence of confusing computer ethics with other subjects was possible to present here.

The IT faculty heads whom the researcher met during her initial searches did not grasp the difference between computer ethics and religion. This made them think that ethics is already being discussed by every teacher in every class and hence there is no need for a separate course on ethics. The researcher thinks that the misconception of computer ethics could threaten the existence of the subject in the computing curricula. Computer ethics might disappear from the computing curricula and the ethical sensitivity of the future generations of IT professionals might suffer. Bahrain, in particular, is working towards establishing an information society and important to any information society is the ethical sensitivity of its members. Policy makers, faculty heads and teachers from Bahrain might need to re-think about the importance of avoiding confusing ethics (the scientific discipline) with religion (a particular standard).

In perceiving ethics as religion, ethics is forced to become a relative concept and hence alienating to groups who might not agree to the set of rules/codes that are being held as ideals. Religions will always enforce a culturally relative version of ethics on students who might come from a variety of different backgrounds and faiths. This could be in particular a problem in Bahrain because Bahrain is a multicultural society. But empirical data from this study was short on whether religion was in reality alienating certain groups of students or not, therefore further research is needed to investigate this.

The researcher had a chance to attend classes on computer ethics for a course taught at De Montfort University, UK. In the UK, in a class which consisted of students from different backgrounds and faiths, religion appeared irrelevant and offending to both; Muslims and non-Muslims. Muslim students from the UK, however, are living in a cultural, political and social context that is different from that of the students from Bahrain. Indeed, whilst the students from the UK were capable of separating ethics from religion, both, students and teachers from Bahrain were not being able to do so even when they deliberately were attempting to set aside religion when discussing

ethics. Students from Bahrain voiced their disengagement with the course and attributed it to the fact that they were Muslims. Ms. Leena from University (A) wished if she could encourage her students to think outside of the boundaries of their religion but she did not know how. She kept focusing on what the codes of ethics could say about the ethical issue at hand but without integrating other ethical standards and without, at least, involving Islam or trying to reconcile it with the codes. The answer might have been in introducing other sorts of ethical theories in addition to the codes and trying to reconcile them with Islam in an attempt to assimilate and accommodate new ethical perspectives with what the students perceive as sacred or ideal. This, however is a hypothetical solution therefore further research is needed to know how best to teach computer ethics to Muslim/Arab audiences and how to encourage the students to think beyond their religion, and at the same time, to not feel disengaged when using other sorts of standards/theories. But the issue of involving or not involving religion would remain. The involvement of religion might offend certain groups of students but this might be different in different countries. A reconciling approach is therefore needed and perhaps also an Action Research through which the teacher would document the actual teaching approaches and study what suites the students best.

The literature demonstrated that the status of education in the Arab world was not up to the expectations of the Arab educationalists; shallow and out of date curricula with didactic teaching as the mainstream; one of the main objectives which they were striving for was to promote cognitive thinking. The teachers who participated in this study did not demonstrate that they were promoting cognitive thinking. Rather in contrary, the students were being asked to memorise the ethical codes and in one of the cases the teacher thought that his students are better off identifying what is forbidden and allowed in Islam than struggling with a mired of theories. The researcher attributed this to 'confusing ethics with ethical standards' (i.e. confusing ethics with religion; confusing ethics with codes of ethics, etc.). Or in other words, this was the result of the absence of a proper conception of computer ethics; the conception which is capable of building students' cognitive thinking.

Religions, morality and codes of ethics are mere standards; they provide straight forward answers to what is right/wrong. These standards, if used mechanically and on their own, can foster didactic teaching/learning because knowledge of ethicality of situations in this case is assumed to exist 'out there'; in codes of ethics, in books, in the minds of certain individuals. The cognitive activity of the learner, as a result, is restricted. On the contrary, the philosophy-based conception of computer ethics is aimed at fostering cognitive thinking and analysis. In a class where ethics is considered a science, students practice drawing from a mired of different 'competing' ethical theories as opposed to drawing from one single ethical standard to reach ethical judgment and in doing so students learn that ethical judgment is not a matter of locating right/wrong from an ethics code, but rather ethical judgment is a knowledge that is *constructed*. This should work on building students' ethical thinking and provide, in the same time, a more democratic learning environment.

The literature demonstrated that computer ethics scholars were against the idea of indoctrinating the students into a set of moral, political, personal or religious beliefs. Essential to this then was the idea of democracy and free thinking; in giving the students the space and tools to use their cognitive thinking and this all was perceived possible under the constructionist philosophy in education. The Arab nation in particular is trying to emancipate itself from all sorts of domination and oppression. Adopting the free more democratic conception of ethics; one which separates ethics from ethical standards, as such, would serve its aspirations to a more democratic and free society.

It was mentioned earlier in this thesis that Arabs have in their capacity to view ethics as separate from religion without having to feel that this is an imposition on Islam. Ibn Rushd the Arab philosopher and theologian thought that philosophy encourages reasoning and this is essential even in trying to find the truth about God or to better understand concepts in life (Knight, 2009). He argued that philosophy alone can enable us to make ethical decisions and this need not to be taken as an imposition on Islam because both can lead us to truths while each has its own way (Knight, 2009). Ibn Rushd's view is thought to have been the precursor of the secular thought and enlightenment in Europe during which the Islamic Empire was starting to regress

(Pasnau, 2011). This means that Arabs will only have to revive what is good in their tradition in order to face the intellectual and political challenges which lay ahead them.

The literature demonstrated that Arab educationalists are searching for clues on how to improve education in the Arab world. This study, as such, is not an emancipatory project imposed on them or on their culture but rather a critique of the traditional ways of doing things/perceiving things in an attempt to engage educationalists in reflection and hopefully empowering them to improve their methods of teaching and emancipate themselves from the restricting approaches to education. Emancipation in this study, therefore, is not an actual act of changing the realities of the people through an actual interference. The simple act of writing up this thesis and publishing it and making it available to the public *is* emancipation in action.

In summary, both, misconceiving and not perceiving computer ethics may lead to computer ethics disappearing from the curricula and this could impede attempts to develop the moral thinking of the future generations of IT professionals. Further, computer ethics can run the risk of being a repressive tool if continued to be confused with religion, morality or personal opinions. Computer ethics teaching, therefore, should not be a tool in the hands of those who aspire to indoctrinate the masses or be a synonym to religion, morality or personal opinions.

A practical solution to counteract the problem of misconceiving computer ethics in Bahrain is to educate the teachers, to spread awareness of the proper conception of computer ethics and to engage in a dialogue with the teachers and the public on how best to teach ethics in Bahrain. The researcher is planning to contribute to this with disseminating a summary of this study's findings and with holding seminars in universities around Bahrain to engage in discussions about ethics, religion, morality and computer ethics and how these could fit into the question 'how best to teach compute ethics in Bahrain?' However, in the meantime, policy makers and faculty heads need to

train their teachers in how best to teach computer ethics and source the information from the literature because the literature provides a cogent source since it provides arguments that are backed by evidences and empirical studies on what researchers perceive are the best methods for teaching ethics. Furthermore, faculty heads and policy makers need to make their teachers aware of the conception which would empower them and empower their learners and ultimately empower their society; this conception, as far as this study is concerned, is that ethics is philosophy-based.

The surrounding context and conditions of this study surely must have shaped the outcomes of this research. For instance, this study might have been different if; the data collected for this study were richer, if the researcher was ideologically and culturally different. This, however, does not mean that research outcomes are purely subjective and that there is no research claim that is better than the other. Researchers need to hold steadfastly with the aim of getting it right on the hope that what they are providing are advancing understandings of what is true, valid, correct and fair for human flourishing.

This research adopted the philosophy of critical realism. Critical realism enables researchers to maintain a stance towards what is perceived best for social and individual transformation; the interpretive and positive approaches were perceived incompatible with the critical project in this respect because critiques requires some form of realism. From the point of view of critical realists, research aims to transform and improve; accordingly, it is inherently or inescapably evaluative and critical; not merely descriptive (Mingers, 2009). However, the normative stances and the grounds which support them are all socially and historically constructed and hence subject to error. The researcher believes in the complexity of the social world and that research does not provide mirrors to reality but rather provide an image of the reality in question. Sometimes the images emerge as distorted and incomplete and more often than not research provides fragments of information and partial pictures about the phenomenon under study.

Access to research participants especially to students and lecture rooms was difficult. This had an impact on the quality and richness of the analysis and the conclusions

reached in this study. For instance, the researcher could not identify clearly the role of religion in the teaching of computer ethics. Opinions came from the teachers only and this gave one sided view of the issue. Also, in some of the cases information about the teaching cases in general was limited, the diagrams of the structures which emerged at the end after analysis, as a result, were lacking complexity. This all means that critical realism requires rich data and good amount of access. Those who want to adopt critical realism might want to reflect on such an issue.

Yet another limitation is that critiques by their nature compel the researcher to evaluate, question and disagree with certain situations/performances. This can give the impression that the researcher is arrogant or judgmental and this in turn can halt any attempt of improvement because even if the research was to provide valuable recommendations, the audiences of that research might reject it at face value. A lesson which can be learned from this and from going through the PhD Viva correction stage is that reflexivity can lessen the appearance (and perhaps also the actual effect) of bias and arrogance in critiques. However, normativity in research might still remain objectionable; researchers therefore need to consider how to present their critiques to their audiences.

Furthermore, the application of retroduction (moving from knowledge of one thing to knowledge of another) made organisation and presentation of the findings unsymmetrical. The findings and discussion chapter materialised as a story. This might cause confusion to the reader who is accustomed to the more traditional approach of presenting the findings and discussion. Those who want to adopt critical realism need to bear in mind that their presentation will be different and perhaps objectionable to those who are accustomed to a certain method which they might consider as more scientific or valid.

The fragmented pieces of information that were gathered from multiple cases in this study did not help build proper structures and did not help solidify the transfactual conditions and causal mechanisms. The inferences, as a result, appeared rather more speculative than grounded. It was mentioned elsewhere that proper conceptualisation

requires a balance between empirical evidences and interpretations. Proper conceptualisation was not possible in this study due to the problem of access. The reader need to consider this when reading the conclusions reached from this study.

7. Appendices

Appendix 7.1

A scan of the Research Journal pages (the pages relevant to the fieldwork). The comments in the margins are made by the researcher of this study. All of the names mentioned in the Journal are pseudonyms.

7th Feb 2009

Arrived Bahrain

16th Feb 2009

- Commenced the field work after spending last week trying to accommodate myself in Bahrain; getting hold of a car and an office with an internet connection.

- Today I visited University (C) after trying to contact them for several times through the internet and the phone since I was in the UK. I took an appointment with Dr. Fatima because I was told that she is in charge of the computing department. I was told that the ethics course is not running this semester. I asked to interview the teacher but first meet Dr. Fatima to get her approval. I thought even if the course is not running this semester it might still be a good idea to interview the teacher and to get hold of the students, if possible, and get copies of the course materials. But now that University (C) would not provide me with a *full scale* case-study, I am thinking about University (D) and the 'Information Technology in Society' course which they offer.

Searching for a full scale case study.

University (C) is a young university established in 2005. The university is situated on quite a large campus but when I visited the university I saw very few people [students or staff].

Context-related info

- I visited University (D). The university is situated on the 4th floor of a commercial building. The university was not that type of university where one

context info

Appendix 7.1

Continuing from the previous page

would find a campus and buildings with plenty of offices and lecture rooms. University (D) is a young university established on 2001 and has not yet moved to a campus. Given this, it is obvious to the observer that there are few students, staff and academics and that only a few physical spaces exist to accommodate them.

context .

I asked at the reception for direction to the office of the Dean and the receptionist walked to one of the computer labs near the reception area and informed the professor that someone wanted to speak with him. I was quite embarrassed that his session was interrupted but he didn't seem upset or anything. I tried to briefly explain who I am and what I want. He agreed that I could interview the teacher. I decided later after leaving the university and on my way home to approach the president of the university with the access letter through people who know him personally and who know me.

mobalising
connechions

18th Feb 2009

- Today I have translated the consent forms and the interview sheets and questionnaires. I have changed some of the entries to fit the participants in Bahrain. For example, under the Research Purpose title in the Teachers' Questionnaire, I added some texts which might encourage people in Bahrain to participate. For example, I wrote that such a study might help understand how to teach computer ethics in Arabic and Muslim countries such as Bahrain. In the Students' Consent Form I tried to abbreviate some of the information which was related to the ethical

Reciprocity ...
to encourage
participation .

Appendix 7.1

Continuing from the previous page

aspects. For example, I removed the entry which stated that I have received ethical approval from De Montfort University because I thought students in Bahrain might not fully understand what ethical approval is or why this is important. But the essential parts were kept, and these are the right to withdraw from the study and the right of the participants to anonymity and confidentiality.

- I met Dr. Fatima. She, perhaps, had the chance to look at the Access Letter which I left with her secretary. As I moved to talk about the importance of teaching computer ethics she appeared to enjoy listening but when I explained that I would like to interview some students, if possible, and get hold of samples of their work or the case studies which the teacher used to distribute at the lectures, she appeared uncomfortable with my request. I explained that she could allow me access to some but not all of the data and I would be grateful for any type of data. I explained that my purpose is not to spy on them but to develop, at the end, a theory for teaching ethics in Bahrain and I promised that I will not mention any names in my research. But she said that she needed to check the policies and regulations of the university. She said that she is afraid that if she allowed me access she will be held responsible for allowing people to get hold of information that belongs to the university. She said she will get back to me on this matter.

Gatekeeper worried about the reputation of her university.
Access Issue -

Some of the information which she gave me and might be good to make a note of is that the course is

context info

Appendix 7.1

Continuing from the previous page

a third level year course and was offered for the first time last semester. This is because the university is newly established and their students have just entered their third year.

23rd Feb 2009

- I was planning to contact the person who knows the president of University (D) today, but he is travelling! But he will come back on Wednesday. So I guess I will be behind in this matter! [disappointed and afraid] All I know is that the course is running this semester but the students are in week 6!

Gaining access is taking time!

- I contacted Dr. Saeed of University (E) by e-mail. He teaches a 2-week slot of computer ethics and he incorporates Islam into his teaching. I hope he answers tomorrow but if he doesn't I will go to his office. The University is on week 1 and Dr. Saeed said that he will not start teaching the 2-week slot until the beginning of April.

Negotiating and re-negotiating access ..

- ☞ If Universities (D, C and E) allowed me full access then I will have succeeded in securing case studies from Bahrain plus a collection of some data from Universities A and B which were gathered last year. It is not possible to adopt University (B) as a full-scale case study because they are approaching the end of their semester. However I am not excluding any alternatives. Also if I have the chance I will try to contact the teachers of other universities, even if the course is not running and I don't

Hoping to secure full scale case studies.

Appendix 7.1

Continuing from the previous page

have the chance to observe. But I would like to focus on at least 2 universities.

26th Feb 2009

➤ I met Dr. Saeed [University (E)] today and he seemed interested in knowing about teaching computer ethics and asked me to help him develop the material for the 2 weeks in which he teaches computer ethics to the students. He said that students get bored when he teaches them ethics because it has a lot of theory in it while students' minds, as he put it, are "scientific". He also thought that computer ethics teachers should be better versed in the technical aspects of computing so that they can better teach computer ethics. This is interesting information which I might explore further with him in the interview.

Interview-related
infos.

➤ I also met Mr. Ameer today at the University. I noticed that he was afraid to cooperate with me and thought that he needs to check with the university. He also said that time is short and he needs to spend more time with the students to keep up with the schedule in the course outline. I tried to explain that I will be attending as a passive observer and will not participate but he was still reluctant to cooperate. And even though I secured acceptance from the University's vice president, I was facing difficulty with the teacher. I am planning to talk again with the vice president so that he calls the teacher and urges him to cooperate with me and inform him that the university's management have granted me access.

Participant is
afraid...

Access Issue.

Appendix 7.1

Continuing from the previous page

- I still didn't get any answers to the voice message which I sent to the secretary of Dr. Fatima and haven't got any e-mails from them yet.

} Delays in getting responses from gatekeepers.

- I called Ms. Leena from the University (A) who cooperated with me when I came to Bahrain last year. I thought she is the last resort since University (C) doesn't appear to want to cooperate, and Universities (G and B) are not suitable to study since they are at their end of their academic year and since Mr. Ameer doesn't appear to want to cooperate either. Ms. Leena said if she will be teaching this course, she will cooperate with me, but this will be clear next week. If Ms. Leena and Mr. Ameer cooperate, I will have 2 and a half cases to study: University (A and D) and University (E).

} Still hoping to secure full scale case studies.

3rd March 2009

- I met Ms. Leena, a computer ethics teacher from University (A) to establish a connection with her and give her the paper which explains the ethics and methods of my research. She told me that she is not teaching this course this semester and the teacher who is going to teach it is reluctant to take the course since she has no experience in teaching it.
- I received an e-mail from Dr. Fatima, accepting that I could interview their computer ethics teacher.
- I spoke to Mr. Ameer the computer ethics teacher from University (D) on the phone. He seemed, yet again, reluctant to cooperate and explained that he has a busy schedule hence he can not spare time for

Appendix 7.1

Continuing from the previous page

the interview. He kept saying I will not benefit from his participation. I suggested a questionnaire with some open ended questions and he agreed to fill in the questionnaire. With regards to observing his lectures, he explained that only two lectures remain and then he will be giving the students their final exams. He explained that I would not benefit if I attended his lectures at this point in time. I told him but the semester is not yet finished. He said the course is not that heavy and there are a few students in his class. I asked if I could interview the students. The teacher said that he needs to have a look at the questions. I told him that I will send him the questions along with the questionnaire by e-mail then I will wait for his permission to interview his students.

Adapting the method to suit the participant.

Access Issue

- [Some information from my conversation with Mr. Ameer]. While talking with Ameer he said that he doesn't understand why in my questions there is much emphasis on ethics. He said that IT in Society which he teaches is more technical in nature and even though there are discussions about laws and regulations he emphasises the technical aspects. He also mentioned that he doesn't in particular use philosophy but he uses common sense and some concepts from Islam in addition to legal standards.

Interview-related infos

4th March 2009

- I got an e-mail from Dr. Mamood from University (C) and he agreed to participate in the interview.

Appendix 7.1

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- Today I made a questionnaire for Ameer. I have integrated some of the interview questions in-to the questionnaire which was originally intended to gather basic information about the teachers.

8th March 2009

- There are no observations yet! And no contact with the students yet! It seems that the only chance for observations and contacts with the students is to wait for the 2-week computer ethics slot which is taught by Dr. Saeed and hope that University (A) allows me access.

still hoping to
secure full
scale cases.

⇒ So far:

- **Universities B and G:** are towards the end of their semester or doing their final exams, that is why I can't do observations, but I am thinking about contacting the teachers for an interview and hopefully to get access to some documents related to the course.
- **University C:** is not teaching computer ethics this semester. I have just done an interview with Dr. Mamood (today is 8th March 09). I need to collect documents about the university.
- **University D:** is done with the course and are not holding any classes so there is no observation. I hope Mr. Ameer sends me back the questionnaire and some documents!

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Continuing from the previous page

- **University A:** [I am waiting for access]

- **University E:** as promised by Dr. Saeed, I am waiting for him to e-mail me or call me when he starts his 2-week slot of computer ethics.

16th March 2009

- I contacted Dr. Fawzeah and made an appointment with her for tomorrow. She did not seem to mind me attending her lectures or anything.

- I still didn't visit the library! I am getting bugged up with family/friends/social obligations.

17th March 2009

- I met Dr. Fawzeah today. She appeared very cooperative but she said that she realised that the course is not only about professionalism and ethics, she said that the course is about other elements that are related to organisation and finances. I also got the feeling when I attended for Ms. Leena last year; I felt that it was not purely computer ethics. Fawzeah also said that she covered the ethics part with her students last week and she is now done with the ethics part! I am planning to attend her lecture even if she has already covered the ethics part. I might get the chance to talk to the students and see what they can say about the part of ethics which they covered and how it is contributing to the rest of the topics in the course.

Ⓢ Here it started to become slightly clear that there is no full scale case.. but there was still hope with Uni(A) & (E).

Appendix 7.1

Continuing from the previous page

24th March 2009

➤ As agreed with Dr. Fawzeah, I visited the university today to attend her lecture. When I reached the class I asked the students who were in the class to confirm if I am in the right place (i.e. attending the course taught by Dr. Fawzeah) but it appeared that I was not! I called Dr. Fawzeah ... she told me she gave me an incorrect number for the lecture room by mistake... she then told me that she is giving her students a quiz today therefore it might not be of benefit for me to attend the lecture, but I said I wanted to attend, at least to meet the students. I felt from the tone of her voice that she is not comfortable with me attending her lecture (?) When I reached the lecture room, I met the students and introduced myself and sat at the back of the room. Then Dr. Fawzeah entered the room. She distributed the papers then asked me to sit at the front of the room and insisted that I sit on the teacher's chair (?) I was not happy with this arrangement because I was afraid that this might send a negative message to the students - that I am not one of them but one of the academics - which, in itself, could make my attempts to approach them difficult, but I had no choice! I sat where I was told to ... Then I asked to leave on the hope to attend the next session. Dr. Fawzeah said that she is cancelling the next session because the students are ahead of their schedule. The next observation, then, automatically is to take effect on 29th March.

Teacher appeared to want to separate the researcher from the students
(?)

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29th March 2009

- Dr. Fawzeah called me on the phone prior to the session starting and asked if I could come to her office. When I arrived she said that she had bad news for me. She said the registrar sent the faculty a letter; they are warning that no one other than the students registered in the course should attend the lectures and that any one wanting to attend should get permission from the registrar. I asked who I could contact to get permission from. She said she will contact the people in charge and will call me (!)

R I have the feeling that Dr. Fawzeah does not want to participate in the study but for some reason is not telling me so. I have had experience with teachers not wanting to participate and making all sorts of excuses yet trying to look cooperative. One example is the case of Ms. Mona from University (G) who cancelled 2 attempts for an interview with her and cancelled them just when I reached the door of her office and when I had had to drive for 2 hours from my home to the city centre during rush hours. On the first occasion she said she had an emergency meeting to attend and she was very busy. On the second occasion she said she could not do an interview with me because I needed to contact the president of the university first and that she was afraid that she might expose some confidential information. And even though I wrote a letter for the president and asked her if she could try to secure permission from him, she didn't answer my phone calls or

Access Issue--

Appendix 7.1

Continuing from the previous page

e-mails to tell me what had happened with the matter. Another example is the case of Mr. Ameer who constantly was saying that he wants to cooperate with me but he is very busy and can not spare time for an interview. He also made every attempt so that I didn't meet the students or attend his lectures.

This shows a lack of appreciation of the value of research amongst some academics in Bahrain. And it is unfortunate that such ignorance is stemming from university-level teachers who are supposed to know the value of research and that a researcher is not a spy but someone who is collecting information for the sake of knowledge development. No wonder Arabs are suffering from knowledge stagnation!

frustration..

30th March 2009

- I have contacted Dr. Fawzeah on the phone to ask what she has done concerning getting access to the lecture room and she told me that she didn't have a chance to call the people in charge. She asked if I could do this by myself. I have tried to call the Dean of the IT Dept. but no one was answering.

further delays to gain access to lecture rooms.

1st April 2009

- I called the Dean of the IT College at University (A) and asked if I could get access to the lecture room for the purpose of my research. He said that he is not authorised to give permission and that I should contact Dr. Waleed, the Dean of Students Affairs. I called him but his secretary told me that he is away

Appendix 7.1

Continuing from the previous page

from Bahrain and will be back next week! I e-mailed him and hope that he answers soon!

- I took up an appointment with Dr. Mustafa from University (B) for an interview tomorrow.

- As agreed with Dr. Saeed, I was supposed to have an interview with him at 11:00. I called him at 10:50 to find out if we are having the interview at 11:00 or sometime later during the day. He said he is out of the university now but I can come to his office after half an hour. I told him to call me once he is in his office. He called at 11:40. I went to his office, started the interview, but there were a lot of interruptions from the students who kept coming to ask some questions about their exam. I managed to finish most of the questions but there were still a few left. Dr. Saeed excused himself to leave for his lecture which was supposed to start at 12:00.

I noticed during the interview that Dr. Saeed was afraid!?! Even though before the interview he was talking to me with confidence and we were talking about the students and the university in general, I am not sure why he became afraid during the interview? I noticed also that his answers were a little short. He mentioned during the interview that I might not benefit from interviewing him because he is not teaching a full-blown course of computer ethics.

2nd April 2009

- I went for the interview as I agreed with Dr. Mustafa and I was there at 10:00. I waited for 20 minutes;

Appendix 7.1

Continuing from the previous page

Dr. Mustafa was not in his office. I was about to give up but then I asked the secretary to call him and see if he is coming or not. She called him and 5 minutes later he came to his office. I then had the chance to do an interview with him and asked if I could have copies of the documents required.

7th April 2009

- I haven't yet received an e-mail from Dr. Waleed regarding access to the lecture rooms in University (A). I am planning to call him tomorrow!!

Delays in getting Permission.

- Dr. Saeed from University (E) told me that he is going to start his 2 weeks of computer ethics teaching on April, but it seems that he changed the plan. I met him today and he will not be starting the ethics part now but after the mid-term break!!!!!!!!!! By this time I have arranged to go back to the UK!!!!!!!!? **I just don't know what to do??** But I have made an appointment with him for an interview.

Participant changing his teaching plan without regards to promises made to the researcher!

9th April 2009

- I am very disappointed and angry and helpless today!! I mean.. Why there is no respect for promises here in Bahrain? I just recalled that I have been in contact with Dr. Saeed by e-mail since Jan 2008 and since I was in the UK!! And he has been saying YES I will cooperate with you, and YES come and do any sort of study with me etc. etc. and when I came here to Bahrain the first thing I did is that I went to his office and told him that I will be leaving on the 25th of April and that I am ready to attend his lectures but he, all he wanted from me is to

← ⊙
At this point it became clear that observations are not possible in any of the cases and a full scale is not possible.
2 months was not enough to gain access to a full scale case!

Appendix 7.1

Continuing from the previous page

sit and talk about what *I know about computer ethics*, in the sense he wanted information from me, but didn't want to cooperate with me!!!! And even though he was promising all the times that he is going to help!!!! I am not going to wait for him and cancel my schedule to go back to the UK, not even wait one more day for him, because what guarantee is there that he will teach the 2 weeks of ethics immediately after the mid-term break? What if he actually does not want to cooperate, just like the rest of the other teachers, but he doesn't want to tell me he doesn't want to participate in the study? What if this procrastination continued until June? Until the last weeks of the semester? Am I going to delay my PhD for people who do not respect promises? I mean, if Dr. Saeed wanted to cooperate with me he would have done that by now because I have contacted him regarding my study long before the beginning of the semester! He constantly was asking me about how he can benefit from Prof. xx and xx if he came to the UK! He constantly wanted to meet with me and ask me what I have learned so far????!!!! As if he wanted someone to teach him about computer ethics! And even though I sat with him on more than one occasion for more than an hour after the interview, talking with him about teaching computer ethics, he didn't make any efforts to help me in return. I am totally disappointed by such people who are supposed to be examples?!!

- I am still chasing Dr. Waleed of University (A) so that I can get permission to attend the lectures of Dr. Fawzeah! He never answered my e-mail and the

Delay in securing access

Appendix 7.1

Continuing from the previous page

secretary said she will call me about my issue but I am still waiting. It is not practical to do everything face to face but it seems that I am forced every time to waste a huge amount of time for small jobs because people don't use technology.

14th April 2009

- After many phone calls and 2 weeks of waiting for permission to access the lecture room of Dr. Fawzeah, I went personally to Dr. Waleed's office in University (A). The secretary said she just got the answer. She told me that I can attend only 3 sessions and if I want to attend more than 3 sessions I have to register *and pay for the course*. (??) I left shocked by the attitude towards researchers and the mentality of the Drs who are supposed to help researchers like me. !!

Access

16th April 2009

- I had my first (out of 3) observation sessions at University (A). The details are in the Report of Observation.
- Today I called all of the teachers who were supposed to send me the questionnaire and some materials such as the course outline as they had promised. They all said that they will send me these but they haven't got the time. Ameer said that he has sent me the questionnaire but it seems that I have not got it. I told him that I will send him another e-mail address.

Appendix 7.1

Continuing from the previous page

19th April 2009

- I have received a questionnaire today from Mustafa and from Ameer. But Ameer didn't send me the course outline or any other materials. I am not going to contact him again and ask for materials because maybe he doesn't want to give me the information. I have already sent him a list of what is required in terms of the documents and asked him twice to send me any information which he wished to provide on the e-mail. I have also reminded him of the materials on the phone so I don't want to impinge on him.

ethical considerations.

23rd April 2009

- I went today for the third and last observation session at University (A). It was 5 minutes past the starting time of the lecture and no one showed up. Then the teacher came and she found that no one had attended. I asked if we should wait any longer. She said 2 students had already asked her if she could excuse them from the lecture this morning so she doesn't expect that the others will come. I was disappointed because I brought the questionnaires with me and was planning to distribute them. I had already told Dr. Fawzeah in the last session that I would take 10 minutes out of her lecture time at the end to distribute the questionnaire and she accepted.
- I went today to the archive department of the Ministry of Education in Bahrain. I was told that they have a library in which they hold information about pedagogy and Bahrain. The problem was that they did not have a list of the library holdings in a computerised database. They told me I can search

Appendix 7.1

Continuing from the previous page

for what I want from the shelves but this required at least 3 weeks since there were at least 10 shelves stacked with books, papers and dissertations. I tried to search for what I was looking for through the shelves and recorded some information which I thought might be good for my literature review but I didn't find the information which I visited the Archive for, such as computer ethics in Bahrain, pedagogy and Bahrain, the educational system or teaching philosophy in Bahrain.

24th April 2009

➤ Fieldwork ended

Appendix 7.2

Observation Sheet (a sample): this document contains information relevant to University (A)'s case. This was used in the second round of data collection. Appendix 7.31 contains a sample of the Observation Sheet used in the first round.

GENERAL INFORMATION		Teacher's Name	Topic of discussion
Type of lesson	Assessment	Date	16 April 2009
Lecture	Seminar	Duration	15 m
Lab	Other	University	A
Tutorial		Class size	5 students
Describe/add notes about the teaching and learning ENVIRONMENT			
<p>Students set in rows... there's a whiteboard... datashow... the teacher is using PP slides to explain some points.</p> <p>Revision for the med term exam.</p>			
B3.1 Notes/descriptions			
<p>-the teacher told the students about the topics included in the exam... then explained cash flow and return on investments.</p> <p>there is no mention of ethics or professionalism. (?)</p>			
KNOWLEDGE UNITS/TOPICS OF DISCUSSION			
<input checked="" type="checkbox"/>			
Topics or issues discussed			
Privacy			
IT and Society			
Business, IT and ethics			
Media and computer ethics			
Computer crimes/computer abuses			
Intellectual property rights/legal issues			
Artificial intelligence and ethics			
Healthcare and computer ethics			
Cyberspace issues (e.g. freedom of speech, e-voting)			
Bioethics			
Education and computer ethics			
Ethical aspects of ambient intelligence, bioinformatics and nanotechnology			
Professional ethics, codes of conduct and responsibility			
The history of computing: the social and ethical dimensions			
Philosophical concepts, e.g.			
<ul style="list-style-type: none"> Ethical choices cannot be avoided (i.e. ethics will not always be someone else's problem) Why be ethical? Ethics can and should be discussed rationally 			
Ethical theories			

Appendix 7.2

Continuing from the previous page

<p>Social concepts, e.g.</p> <ul style="list-style-type: none"> • The social context influences the use of technology • Social values and assumptions are embedded in technology <p>Skills of ethical and social analysis (ethical analysis methods)</p> <p>Other (Specify) <i>Financial topics</i></p>	<p>STUDENTS' ATTITUDE AND ENGAGEMENT * Include any FACTORS affecting engagement and include the TIME at which the observation was recorded</p>
<p>* Low engagement: Most of the students are not focusing on learning. They might be doing irrelevant learning activities or appear bored. Moderate engagement: At least half of the students are focusing on learning and are paying attention. High engagement: Almost all of the students appear interested in learning, are paying attention and appear interested in the learning tasks.</p>	<p>TEACHING TECHNIQUES</p> <p>TEACHING TECHNIQUES used in this session (tick only the techniques which were used) ✓</p> <p>Case studies</p> <p>Sharing personal experiences of computer ethics cases</p> <p>Codes of ethics</p> <p>Guest speakers</p> <p>Essay writing</p> <p>Discussions: face to face</p> <p>Role play</p> <p>Utilising the white board</p> <p>Games</p> <p>Term projects such as the Impact Statement Report</p> <p>Movies</p> <p>Stories</p> <p>Lecturing</p> <p>Other (Specify)</p> <p style="text-align: center;"><i>Not applicable</i></p>

Appendix 7.2

Continuing from the previous page

TEACHING STYLES	
TEACHING STYLES used (tick only the ones which apply to this lesson)	Evidence
Critical thinking	
Cognitive activities	
Class discussion (students' face to face discussions such as in groups)	
Cooperative learning	
Students' participation	
The teacher presents the problems from different perspectives	
Students are passive, give little response and receive information as it is	
Evidence of student-centred learning	
Evidence of teacher-centred learning	
Student are active in constructing meanings	
Other (Specify)	
Describe/add notes on the TEACHING STYLES used or descriptions of teaching/learning events	
BARRIERS (Cultural or Pedagogical)	
C5.1 Describe any visible signs of BARRIERS in teaching/learning computer ethics	FACILITATORS (Cultural or Pedagogical)
CULTURAL	C5.1 Describe any visible signs of FACILITATORS to teaching/learning computer ethics CULTURAL
PEDAGOGICAL	PEDAGOGICAL
Ethical Analysis FRAMEWORK	
Describe, if any, the Ethical Analysis FRAMEWORK used	

3

Appendix 7.2

Continuing from the previous page

Ethical Analysis THEORIES	Describe/add notes on the THEORIES discussed
Which THEORIES are mentioned/discussed?	<p style="text-align: center;">No theory.. No concept of ethics or professionalism</p>
Utilitarianism	
Deontology - Divine Command Theory	
Deontology – Kant/Categorical Imperative	
Virtue Ethics	
Theory of Justice/John Rawls	
Relativism	
Egoism	
Rights theories	
Common morality	
Other (Specify)	

FOUNDATION for Ethical Analysis	B1.1 Notes/descriptions
B1.1 Which FOUNDATION is used for discussion?	
Secular <input type="checkbox"/>	
Religious <input type="checkbox"/>	

METHODS OF ANALYSIS	B2.2 Describe the ETHICAL ANALYSIS METHODS used:
B2.2 Ethical ANALYSIS METHOD(s) used	<p style="text-align: center;">Not applicable.</p>
Casuistry	
Value Judgment	
Rational discussions	
Qiyas (reasoning by analogy) Islamic method	
Impact study	
Applying codes to situations	
Identifying the social context of a particular implementation or design	
Evaluating, empirically, a particular implementation or design	
Identifying stakeholders in concrete situations	
Arguing from example, analogy and counter example	

Appendix 7.3

Report of Observation (a sample): this document contains information relevant to University (A)'s case. This instrument was used in the second round of data collection.

Report of observation

16 April 2009

A University

Type of lesson: Revision

Actual duration of the class: Around 15 minutes

Class size: 5 students

Teaching and Learning Environment: Class room, chairs were arranged in rows. There was a white board, a data projector. PowerPoint was used.

Description: At the start of the session the teacher mentioned to the students what would be included in the exam. Then Cash Flow and return on investments were explained.

Teacher asked many times: do you have any questions? Students appeared reluctant to ask but did not ask any questions, the session as a result ended.

Notes / Research Journal:

- There was no mention of ethics or professionalism in this session.
- I arrived 2 minutes early and there were 2 students sitting. I started some general conversations with them then asked one of them: "So how do you find this course? Are you learning anything interesting or new so far?" The student said, "I feel it is all about reading and memorising. We want some case studies and activities. I like thinking and searching on the internet." I asked: "So no new information so far?!". The student said, "Not really, I mean ethics is easy, isn't it, every one knows what is right and wrong, so basically the course is providing some general information." The other student said: "I don't know. We are now at the middle of the semester with this course but I still don't know what this course is all about and what is the purpose or the meaning of this course! And we have been given only one case study yet we were not given the answer for that case, so we don't know what would be the right answer." I tried to explain a

Continuing from the previous page

little of the importance of ethics in computing but the teacher arrived.

- When the teacher entered the room she appeared relaxed but when she saw me she became angry. I signalled to her that I wanted to talk to her outside the classroom. I explained that I had permission to attend her lectures and I was allowed to attend 3 sessions and so I would be attending 3 sessions only. She told me that the head of the department had heard that I had contacted her for research and he was very upset, she said, but she told him that she didn't give me any information. She said: "I didn't want him to know that I am cooperating with you." She asked from whom I got permission. I told her that I contacted her Dean first then he referred me to another person at the top level. She then let out a deep heavy sigh and signalled with her hand for me to enter the class. But I noticed that she continued to be uncomfortable and upset until the end of the session and I did not feel that proper revision was given to the students. I was concerned about the ethicality of my presence and its effect on the students since the teacher did not appear herself. I decided that in the next observation session, if the teacher continued to be uncomfortable, I would withdraw.
- At the end of the session I was planning to sit there until the teacher left so that I had another chance with the students to ask if they felt that I had a bad effect on the session or not and why they asked only a few questions. But the teacher signalled to me to follow her on her way out and she talked to me about some general issues until I reached the stairs; then she left. This was the second time that I missed the opportunity to talk to her students at the end of the session and for the same reason. I am not sure if this was a deliberate attempt to separate me from the students or if it was just a coincidence.

Appendix 7.4

Access Letter (a sample): letter sent to university gatekeepers and teachers to negotiate access. The sample on the next page is the Arabic version of the letter.

Dear Ms. [REDACTED]

The special knowledge of computing provides programmers and users with the power to do things that would have never been possible in the past; *but with power comes responsibility*. The inclusion of *ethics* into the computing curricula came out of a necessity to ensure that future generations of IT practitioners are capable of making sound ethical decisions when it comes to the design, development or deployment of IT.

Computer ethics is a well established subject of study in the US and the UK but there is little information about the status of teaching this subject in Bahrain. I am a Teaching Assistant from the University of Bahrain and currently a PhD scholar at the Centre for Computing and Social Responsibility at De Montfort University, UK. I am conducting a study in order to understand how best to teach computer ethics in Bahrain. *I would be grateful if you would cooperate with me for the purpose of research*. The outcomes expected from this study could greatly enhance our understanding of how best to teach computer ethics to Arabs and Muslims.

The following are the research ethics:

Participants to this study are reminded that:

- Their participation is voluntary and therefore participants can withhold their answers to any or all of the questions asked; they can withdraw from the research at any point in time.
- The information is kept confidential, and only the researcher and her supervisors can view the data.
- Names (including the name of the teacher, the name of the university, students and others) will be anonymised when the research is turned into a thesis (a written format).
- Written reports of observations and interviews are sent to the teachers to view them. The teachers can delete, add or make corrections to data which they think were not recorded correctly.
- Information provided by the students is confidential and is not passed to their teachers or anyone else, and the information provided by the teachers is not passed to the students or someone else.

The following are the research methods:

1. **Observation** - observing the lessons and in particular the teaching and learning processes. I attend as an observer only.
2. **A questionnaire to be filled by the course teacher** to collect demographic data about the teacher - questions includes research interests and years of experience in teaching.
3. **An interview (40-50 minutes) with the teacher** - to explore issues related to: the teacher's understanding of ethics/computer ethics; why teach ethics? and how students react to the course.
4. **A questionnaire to be filled by the students** to explore their attitude towards the course and to the delivery/pedagogy of the course teaching.
5. **A focus group session with 4 - 6 students.**
6. **Document examination** - examining the course outline, the course textbook and, if possible, getting access to the course VLE and examples of students' work.

Best Regards,

Suad Almualla

Tel (UK): +44 (0) 7760124929 - Tel (Bahrain): 36114977

Email: almualla@dmu.ac.uk - Email: suadalmualla@gmail.com

Continuing from the previous page

الي السيد الفاضل الدكتور / [REDACTED] المحترم

تحية طيبة وبعد

شكرا لك علي تعاونك معي ومساندتك للبحوث العلمية

يتميز علم الحاسوب اليوم بخاصية منفردة اذ أنه يعطي مبرمجي ومستخدمي الحاسوب قوة للقيام بأعمال خيرة ذات نفع وفائدة أو القيام بأعمال شريرة ذات أذى وضرر، وبالتالي أصبح تدريس مادة الأخلاقيات في تقنية المعلومات والتي تسمى عادة بـ Computer Ethics ضروره ملحة لتمكين الأجيال القادمة من مبرمجين ومستخدمين من اتخاذ قرارات أخلاقية صائبة عند تصميم، تطوير أو ادارة تقنية المعلومات.

وبينما توجد معلومات ودراسات كثيرة عن تدريس هذه المادة في الدول المتقدمه مثل بريطانيا وأمريكا، لا توجد حاليا معلومات أو دراسات كافية عن كيفية تدريس هذه المادة في الدول العربية والإسلامية وما اذا كانت طرق التدريس الفلسفية التي تستخدم في الدول الغربية تتناسب مع العادات والتقاليد والموروثات العربية الإسلامية. لذلك اقوم، عن طريق بحثي، بمقابلات مع مدرسي الاخلاقيات بالجامعات في البحرين لمعرفة طرقهم في تدريس هذه المادة ومعرفة أثر الثقافة العربية والإسلامية علي تقبل الطالب للماده و أثر الثقافة علي طرق التدريس.

البنود الأخلاقية المتعلقة بهذا البحث:

سيقوم الباحث باخطار المنتسبين الي هذا البحث بالبنود الأخلاقية التالية:

- انتساب الجامعات والمدرسين والطلاب الي البحث تطوعي وبالتالي لهم الحق في أن يمتنعوا عن الرد علي أي من أسئلة الباحث ولهم الحق في الانسحاب الكلي، هذا من دون الحاجة الي تقديم عذر.
- الأسماء الحقيقية للمنتسبين لن تستخدم في البحث ولن تنشر في الأطروحة. سيستخدم الباحث الحروف الأبجدية أو أسماء مستعارة لا توحى بأي شكل من الأشكال الي الأسماء الحقيقية.
- سيحتفظ الباحث بالمعلومات في مكان آمن وستبقي سرية ولن يطلع أحدا علي تلك المعلومات ماعدا مشرفي البحث.
- المعلومات التي ستجمع بعد حضور المحاضرات وبعد المقابلة الشخصية مع المدرس ستسجل كتابيا و سترسل الي المدرس للاطلاع عليها. بإمكان المدرس أن يضيف، يعلق أو يشطب علي المعلومات أو يصحح ما يعتقد أنه قد سجل بشكل غير دقيق. سيستخدم الباحث النسخة المصححة التي أرسلت من قبل المدرس.

طرق جمع المعلومات:

- مقابلة مع مدرس المادة: تستغرق 50 الي 40 دقيقة. الغرض هو تحديد أثر شخصية وثقافة الطالب في فهم المادة، تعريف المدرس للمادة، تحديد المنظومة التدريسية للمادة وغيرها مما يتعلق بتدريس المادة.
- استبيان لمدرس المادة: الغرض من الاستبيان هو جمع معلومات عامة عن المدرس مثل الاهتمامات البحثية، سنوات خبرته.
- وثائق: الاطلاع علي الخطة الدراسية، الكتاب المقرر، وإذا كان متوفرا، الاطلاع علي البيئة التعليمية الإلكترونية للمادة.
- استبيان لطلاب المادة: الغرض هو جمع معلومات عن فهم الطالب للماده وردة فعله للمادة.
- استطلاع رأي مجموعه: 4 الي 6 طلاب.
- الملاحظه عن طريق حضور المحاضرات.

و تفضلوا بقبول فائق التحية والاحترام

سعاد المعلا

هاتف (البحرين) 36114977 (بريطانيا) 7760124929 (0) +44

بريد الكتروني: almualla@dmu.ac.uk

بريد الكتروني: suadalmualla@gmail.com

Appendix 7.5

A list of resources for teaching computer ethics sent to the teachers who participated in this study.

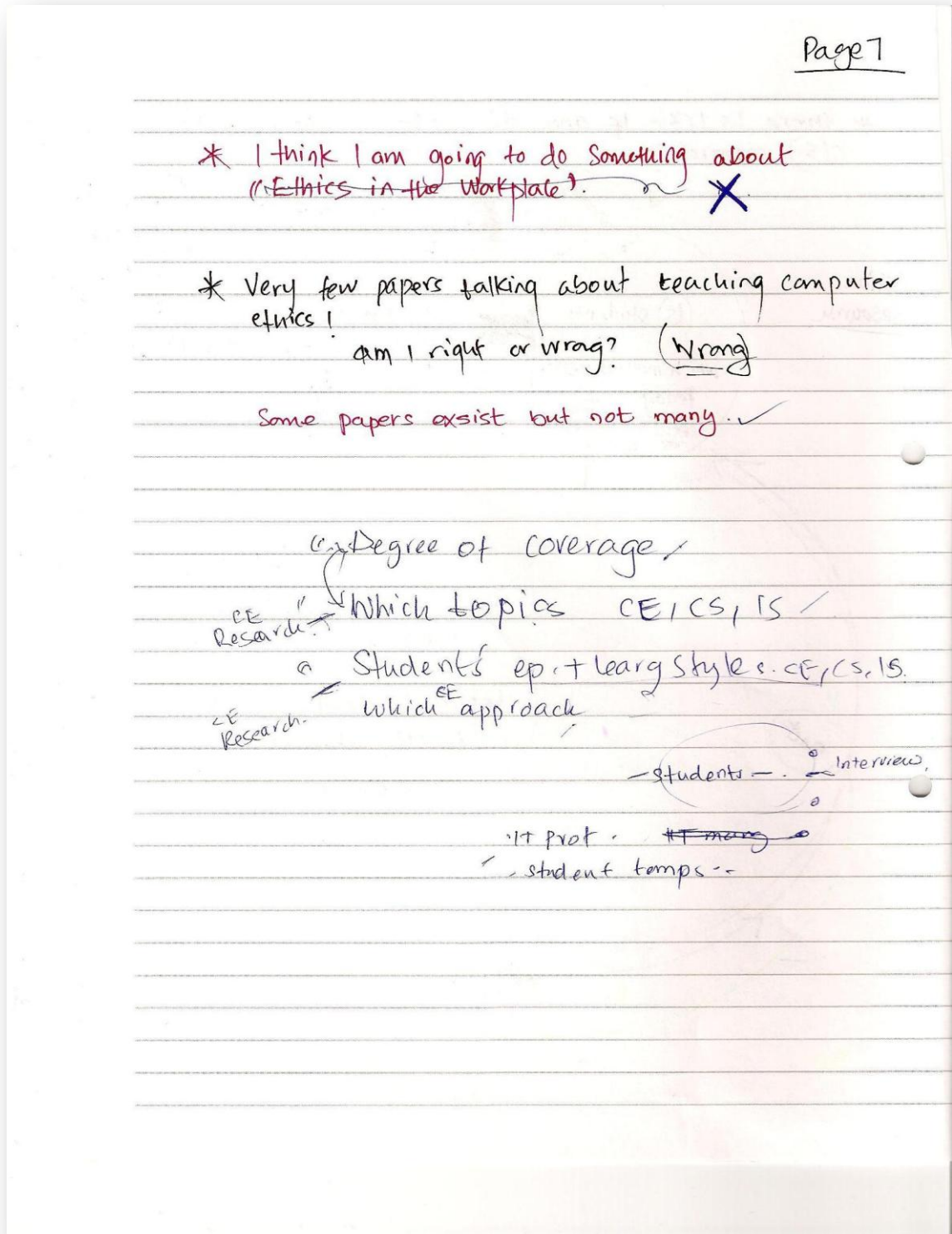
Resources to teaching computer ethics:

- BARNARD, A., RIDDER, C. D., PRETORIUS, L. & COHEN, E. (2003) Integrating Computer Ethics into the Computing Curriculum: A framework for implementation. Information Science + IT Education Conference Proceeding, June 24-27 2005, Pori, Finland.
- MARTIN, D. C. & WELTZ, E. Y. (1999) From Awareness to Action: Integrating Ethics and Social Responsibility into the Computer Science Curriculum. *Computers and Society*, 29 (2), pp. 6-14.
- RAHANU, H. (1999) Teaching Professional and Ethical Aspects of Computing: A case study approach. *Computers and Society*, 29 (4), pp. 32-37.

- <http://computingcases.org/>
- <http://seeri.etsu.edu/Ethics/teach.asp>
- http://www.micsymposium.org/mics_2005/papers/paper15.pdf

Appendix 7.6

A scan of the Research Journal pages (the pages relevant to the initial stages of the research involving plans, ideas and literature search results).



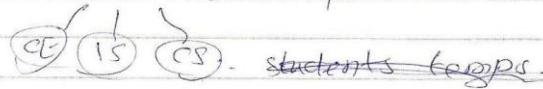
Continuing from the previous page

* CE Issues/ Topics.

currently a group of topics to all: CE, IS, CS.

→ which [Topics] to which CE, IS, CS.

IT Prof.? which Issues experienced. Questionnaire.



→ which [CE approach] with students?

Interviews with students (Religion, Personality, ...)

→ which method [techniques]?

questionnaire will do. UOB students.

The Degree of coverage, approaches,

topics, approach, techniques.

in Bahrain.

CE education: Topics, approaches, and

→ techniques -

Topics:

Approaches: Applied ethics tech + case study. Religion tech + IT Professional mixture of etc.

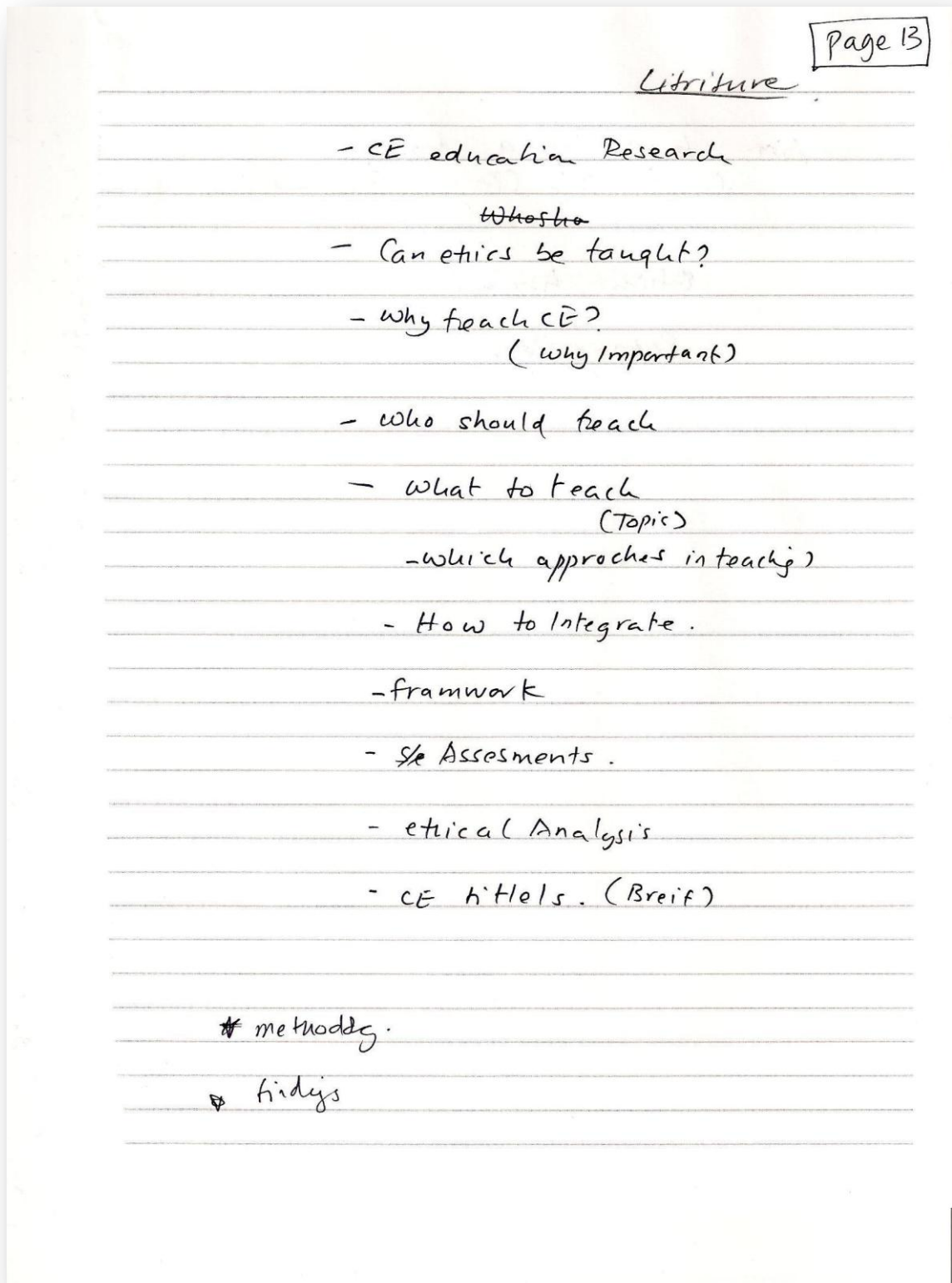
Techniques:

→ the CE analysis

the Degree of coverage, the approaches, and techniques.

used in teaching ethics to com

Continuing from the previous page



Continuing from the previous page

Page 14

Integration: how to Integrate?

(Computer ethics education)
analysis approaches, Integrative
and techniques
↑
Teaching

- CE History
- CE Analysis approaches
- CE Topics/Issues
- CE Pedagogies.

Action Research

Analysis Approaches

- ① Applied ethics
- ② case app
- ③ Behaviour-Action.
- ④ mix

Appendix 7.7

The English version of the teachers' questionnaire

Towards a Computer Ethics' Pedagogy

Thank you for your interest in this study

Research Purpose

To understand how best to teach computer ethics in Bahrain.

Approximate time to administer this questionnaire

40 minutes



Research Ethics

- Your participation is voluntary.
- Your name and that of your university will be anonymised in the publication of this study.
- Only the researcher and research supervisors will have access to the information which you provide.
- Ethical approval was obtained for this study from the Research Ethics Committee at De Montfort University.

1) What is your nationality?	
2) What is your native language?	
3) Do you have a religion? <input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Other (Please Specify):	
4) Select the religion to which you subscribe: <input type="checkbox"/> Christianity <input type="checkbox"/> Islam <input type="checkbox"/> Hinduism <input type="checkbox"/> Judaism <input type="checkbox"/> Sikhism <input type="checkbox"/> Other (Please Specify):	
5) In matters related to politics and society, which viewpoints do you support? <input type="checkbox"/> Liberalism: An individual's liberty is most important and therefore I support broad social freedom. <input type="checkbox"/> Conservatism: Traditional values such as religion and national beliefs need to be maintained. <input type="checkbox"/> Liberal/conservative: A viewpoint which is somewhere between Liberalism and Conservatism. <input type="checkbox"/> Other (Please Specify):	
6) For how long you have been teaching the ethics of computing?	
In this university?	
In other institutions?	
7) Provide an overview of your academic/university-level degrees and your current research interests: <i>If you have this information on the internet, please provide the link.</i>	

Appendix 7.7

Continuing from the previous page

8) Have you ever had any training or done any research (workshops, readings, seminars, conferences, courses etc) in computer ethics related topics?

Yes (Go to the next question) No (Go to question 10)

9) Which type of training have you had in computer ethics?

*If you have done extensive work around the area of computer ethics then mention some of your **earliest** work and some of your **recent** work and work which you consider to be the most **important***

10) Have you had any training (workshops, readings, seminars, courses, conferences, etc) in **teaching** computer ethics?

Yes (Go to the next question) No (Thanks, you are done with this form)

11) Which type of training have you had in the **teaching** of computer ethics?

If you have done extensive training in this area, highlight the key activities.

Thank You

Appendix 7.7

The Arabic version of the teachers' questionnaire



Towards a Computer Ethics' Pedagogy

شكرا للمشاركة

الغرض من البحث
لاستنتاج الطريقة المثلى لتدريس مادة الاخلاقيات في
البحرين

الوقت المقدر لاكمال الاستبيان
40 دقيقة

البندود الأخلاقية

- أعلم أن مشاركتك تطوعية.
- الأسماء الحقيقية للمشاركين في هذا الاستبيان لن تنشر في الأطروحة.
- سيحتفظ الباحث بالمعلومات في مكان آمن وستبقى سرية ولن يطلع أحدا علي تلك المعلومات ماعدا مشرفي البحث.

(1) اللغة الأم ؟	(2) الجنسية ؟
(3) الديانة؟ (ضع علامه هنا اذا كنت لا تتبع اي دين <input type="checkbox"/>)	
(4) بالنسبة للأمور المتعلقة بالحياة الاجتماعية والسياسية ، أي من الأشخاص انت؟ <input type="checkbox"/> ليبرالي : تؤمن بأن حرية الأفراد أهم من حرية الجماعات في المجتمع لذلك تؤيد مساحة أكبر من الحرية للأفراد <input type="checkbox"/> محافظ : تؤمن بأن العادات والتقاليد بما فيها الأديان والأعراف والموروثات الاجتماعية لها أولوية علي حرية الأفراد في المجتمع الواحد <input type="checkbox"/> ليبرالي/محافظ : وجهة نظر تقع بين الليبرالية وبين المحافظة علي الموروثات الاجتماعية <input type="checkbox"/> خيارات اخري : (انكرها)	
(5) كم عدد سنوات الخبرة التي قضيتها في تدريس مقرر الأخلاقيات في تقنية المعلومات؟	
في جامعتك الحالية	
في مؤسسات أخرى	
(6) اذكر-وبإيجاز- تخصصاتك ودرجاتك التعليمية ابتداء بالبيكالوريوس وانتهاء بأعلى درجة اكااديمية: إذا كانت هذه المعلومات متواجده علي الانترنت ، فقط اكتب العنوان الالكتروني لها:	

Appendix 7.7

Continuing from the previous page

7) هل حصلت علي تدريب أو هل قمت بعمل بحث أو المشاركة في ورشة عمل أو هل قمت بقراءات أو المشاركة في دورات أو مؤتمرات تتعلق بالمواضيع المتعلقة بالأخلاقيات أو بالمجتمع وتقنية المعلومات ؟

- اذا كانت اجابتك (نعم) ، اذكر بايجاز تلك الأنشطة التي قمت بها - اذا كانت انشطتك كثيرة اذكر فقط الأنشطة التي قمت بها مؤخرا والتي تعتبرها مهمة أو ذات أثر
- اذا كانت اجابتك (لا) ، ضع علامه في هذا المربع وانتقل الي السؤال التالي؟

8) هل حصلت علي تدريب أو هل قمت بعمل بحث أو المشاركة في ورشة عمل أو هل قمت بقراءات أو المشاركة في دورات أو مؤتمرات تتعلق بتدريس مقرر الأخلاقيات وتقنية المعلومات ؟

- اذا كانت اجابتك (نعم) ، اذكر بايجاز تلك الأنشطة التي قمت بها - اذا كانت انشطتك كثيرة اذكر فقط الأنشطة التي قمت بها مؤخرا والتي تعتبرها مهمة أو ذات أثر
- اذا كانت اجابتك (لا) ، ضع علامه في هذا المربع وانتقل الي السؤال التالي؟

شكرا جزيلاً

Appendix 7.8

The English version of the students' questionnaire

A Questionnaire for the Students Who Attend Computer Ethics Courses

The information which you will provide is intended to enhance understanding of how best to teach
computer ethics in Bahrain

1. Describe the course which you are studying

2. How important do you think the course is?

3. Please add any further comments here

Thank you

Appendix 7.8

The Arabic version of the students' questionnaire

استفتاء لطلاب مقررات الأخلاقيات في تقنية المعلومات

الهدف من هذا الاستفتاء هو معرفة أفضل الطرق لتدريس مقرر الأخلاقيات في تقنية المعلومات في البحرين

* خصوصيتك في الاجابة على الاسئلة التالية سنظل محفوظة *

1. قدم وصفا لمقرر الأخلاقيات الذي تقوم بدراسته

2. باعتقادك الشخصي ، ما مدى اهمية المقرر بالنسبة لتخصصك؟ اشرح اجابتك

3. اذا كان لديك تعليقات أخرى عن المقرر أضفها هنا في الاسفل

شكرا على مساهمتك

Appendix 7.9

The English version of Mr. Ameer's questionnaire

Towards a Computer Ethics' Pedagogy

Thank you for your interest in this study

Research Purpose

To understand how best to teach computer ethics in Bahrain.

Approximate time to administer this questionnaire

1 hr

Research Ethics

- Your participation is voluntary.
- Your name and that of your university will be anonymised in the publication of this study.
- Only the researcher and research supervisors will have access to the information which you provide.
- Ethical approval was obtained for this study from the Research Ethics Committee at De Montfort University.



1) Provide a description of the course which you are teaching?

2) What sort of topics do you discuss in this course?

3) Did the students ever give you the impression that the course is not important on the basis that they already have standards such as their religion for knowing what is right or wrong?

Appendix 7.9

Continuing from the previous page

4) What sort of analysis methods do you use with your students for analysing ethical situations?

5) How important do you think the course is?

6) Which analysis standards do you use for analysing ethical situations?

7) Do you use religion in the teaching of the subject? If yes, what is the impact of introducing religion into the teaching?

8) Did you ever face any obstacles in the teaching of this subject?

9) From your own perspective, what is ethics?

Appendix 7.9

Continuing from the previous page

10) What do you expect your students to know at the end of the course?

General Questions

1) What is your nationality?

2) What is your native language?

3) Do you have a religion? Yes No Other *(Please Specify):*

4) Select the religion to which you subscribe:

Christianity Islam Hinduism Judaism Sikhism
 Other *(Please Specify):*

5) In matters related to politics and society, which viewpoints do you support?

Liberalism: The individual's liberty is most important and therefore I support broad social freedom.
 Conservatism: Traditional values such as religion and national beliefs need to be maintained.
 Liberal/conservative: A viewpoint which is somewhere between Liberalism and Conservatism.
 Other *(Please Specify):*

6) For how long you have been teaching the ethics of computing?

In this university?

In other institutions?

7) Provide an overview of your academic/university-level degrees and your current research interests: *If you have this information on the internet, please provide the link.*

Appendix 7.9

Continuing from the previous page

8) Have you ever had any training or done any research (workshops, readings, seminars, conferences, courses etc.) in computer ethics related topics?

Yes (Go to the next question) No (Go to question 10)

9) Which type of training have you had in computer ethics?

*If you have done extensive work around the area of computer ethics then mention some of your **earliest** work and some of your **recent** work and work which you consider to be the most **important**.*

10) Have you had any training (workshops, readings, seminars, courses, conferences, etc) in **teaching** computer ethics?

Yes (Go to the next question) No (Thanks, you are done with this form)

11) Which type of training have you had in the **teaching** of computer ethics?

If you have done extensive training in this area, highlight the key activities.

Thank You

Appendix 7.9

The Arabic version of Mr. Ameer's questionnaire



Towards a Computer Ethics' Pedagogy

شكرا للمشاركة

الغرض من البحث
لاستنتاج الطريقة المثلى لتدريس مادة الاخلاقيات في البحرين

الوقت المقدر لاكمال الاستبيان
ساعة واحدة

البند الأخلاقية

- أعلم أن مشاركتك تطوعية.
- الأسماء الحقيقية للمشاركين في هذا الاستبيان لن تنشر في الأطروحة.
- سيحتفظ الباحث بالمعلومات في مكان آمن وستبقى سرية ولن يطلع أحدا علي تلك المعلومات ماعدا مشرفي البحث.

1) أعطي وصفا للمقرر الذي تقوم بتدريسه
2) عدد المواضيع التي يحتويها المقرر
3) الطلاب ، هل يعطونك انطباع ان المقرر غير مهم علي اساس ان لديهم ما يحتكمون اليه وهو دينهم؟
4) كيف يتم تحليل القضايا الاخلاقيه في مقرركم؟ ما هي الطرق؟
5) من وجهة نظرك ، ما مدى أهمية المقرر ؟

Appendix 7.9

Continuing from the previous page

6) كيف يتم تحليل القضايا الاخلاقية في مقرر كم؟ ما هي المعايير الاخلاقية؟	
7) هل تستخدم الدين في تدريس المقرر؟ اذا كانت الاجابه نعم ، ما أثر استخدام الدين في تدريس المقرر؟	
8) هل صادفتك معوقات تمنعك من تدريس هذا المقرر بشكل امثل؟	
9) من وجهة نظرك ، ماهو معني كلمة اخلاق؟	
10) لماذا تدرس الماده؟ ماذا تتوقع من طلبتك أن يتعلموا بعد التخرج؟	
معلومات عامة	
1) اللغة الأم؟	2) الجنسية؟
3) الديانة؟ (ضع علامه هنا اذا كنت لا تتبع اي دين <input type="checkbox"/>)	
4) بالنسبة للأمور المتعلقة بالحياة الاجتماعية والسياسية ، أي من الأشخاص انت؟ <input type="checkbox"/> ليبرالي : تؤمن بأن حرية الأفراد أهم من حرية الجماعات في المجتمع لذلك تؤيد مساحة أكبر من الحرية للأفراد <input type="checkbox"/> محافظ : تؤمن بأن العادات والتقاليد بما فيها الأديان والأعراف والموروثات الاجتماعية لها أولوية علي حرية الأفراد في المجتمع الواحد <input type="checkbox"/> ليبرالي/محافظ : وجهة نظر تقع بين الليبرالية وبين المحافظة علي الموروثات الاجتماعية <input type="checkbox"/> خيارات اخري : (انكرها)	

Appendix 7.9

Continuing from the previous page

(5) كم عدد سنوات الخبرة التي قضيتها في تدريس مقرر الأخلاقيات في تقنية المعلومات؟	
في جامعتك الحالية	
في مؤسسات أخرى	
(6) اذكر - وبايجاز - تخصصاتك ودرجاتك التعليمية ابتداء بالبالوريوس وانتهاء بأعلى درجة أكاديمية: إذا كانت هذه المعلومات متواجده علي الانترنت ، فقط اكتب العنوان الالكتروني لها:	
(7) هل حصلت علي تدريب أو هل قمت بعمل بحث أو المشاركة في ورشة عمل أو هل قمت بقراءات أو المشاركة في دورات أو مؤتمرات تتعلق بالمواضيع المتعلقة بالأخلاقيات أو بالمجتمع وتقنية المعلومات ؟	
<ul style="list-style-type: none">• إذا كانت اجابتك (نعم) ، اذكر بايجاز تلك الأنشطة التي قمت بها - إذا كانت انشطتك كثيرة اذكر فقط الأنشطة التي قمت بها مؤخرا والتي تعتبرها مهمة أو ذات أثر• إذا كانت اجابتك (لا) ، ضع علامه في هذا المربع <input type="checkbox"/> وانتقل الي السؤال التالي؟	
(8) هل حصلت علي تدريب أو هل قمت بعمل بحث أو المشاركة في ورشة عمل أو هل قمت بقراءات أو المشاركة في دورات أو مؤتمرات تتعلق بتدريس مقرر الأخلاقيات وتقنية المعلومات ؟	
<ul style="list-style-type: none">• إذا كانت اجابتك (نعم) ، اذكر بايجاز تلك الأنشطة التي قمت بها - إذا كانت انشطتك كثيرة اذكر فقط الأنشطة التي قمت بها مؤخرا والتي تعتبرها مهمة أو ذات أثر• إذا كانت اجابتك (لا) ، ضع علامه في هذا المربع <input type="checkbox"/> وانتقل الي السؤال التالي؟	

شكرا جزيلاً

Appendix 7.10

Interview Schedule used in the first round of data collection

Interview Sheet – Teacher

1. From your own perspective, how important do you think the course is?
2. What is the analysis framework used?
3. Which teaching techniques do you use?
4. What sort of barriers do you face in teaching computer ethics?
5. What is the attitude of the students towards the course?
6. Which topics from the course do you think are the most fundamental and important?
7. Which topics from the course do you think are secondary?
8. Which ethical analysis approaches do you use in teaching? For example, do you refer to the legal standards? Do you refer to the standards of a particular religion? Do you use ethical theories? Which ethical theories? Which ethical codes?
9. What do you think is the purpose from teaching this course?

Appendix 7.11

Interview Schedule used in the second round of data collection

Interview Form

1. Can you please describe the course which you are teaching?
2. What sort of topics do you discuss in this course?
3. Did the students ever give you the impression that the course is not important on the basis that they already have standards such as their religion to know what is right or wrong?
4. What sort of analysis methods do you use with your students for analysing ethical situations?
5. How important do you think the course is?
6. Which analysis standards do you use for analysing ethical situations?
 - Legal? Religious? Philosophical?
 - Do you use ethical theories?
7. Do you use religion in the teaching of the subject?
 - If yes, did you notice any benefits?
 - Any drawbacks?
8. Did you ever face any obstacles in the teaching of this subject?
 - Obstacles related to students' cultural background?
 - Obstacles related to education, such as shortage of information, materials etc?
9. From your own perspective, what is ethics?
10. What do you expect your students to know at the end of the course?

Information about the course

- Course name?
- In which academic year is the course being introduced?
- Is it a core or an elective subject?
- In which programmes of study it is being taught?
- Credit hours?

Appendix 7.12

The English version of the Informed Consent Sheet

De Montfort University
The Centre for Computing and Social Responsibility
Faculty of Computing Sciences and Engineering

Towards a Pedagogy for Teaching Computer Ethics

RESEARCH PURPOSE

To investigate the teaching of computer ethics in Bahrain.

INTERVIEW DURATION

Approximately 50 minutes.

RESEARCH ETHICS

Please bear in mind that:

- You can withdraw from the interview at any point in time without having to explain why.
- If there are any questions you would rather not answer please say so and the researcher will move on to the next question.
- Your name and that of your university will be anonymised in the publication of this study.
- Only the researcher and the research supervisors will have access to the information which you will provide.
- A written report of the interview will be sent to you within a week of the interview. You can use Track Changes in MS Word to review, comment on or eliminate information. The reviewed version will be used in the study.
- This research will be published by De Montfort University and held in De Montfort University's library.

PERMISSION FOR QUOTING

Please choose an option:

I give I don't give my permission to the researcher to quote anonymously from my answers in publications arising from this research.

CONSENT

I hereby certify that I have read and understood the above.

Name _____ Signature _____

The Arabic version of the Informed Consent Sheet

De Montfort University
The Center for Computing and Social Responsibility
Faculty of Computing Sciences and Engineering

Towards a Pedagogy for Teaching Computer Ethics

الغرض من البحث
البحث هو عبارة عن رسالة دكتوراة تهدف الي معرفة افضل الطرق لتدريس الأخلاقيات في تقنية المعلومات في البحرين.

الوقت المقدر للمقابلة
50 دقيقة.

البنود الأخلاقية المتعلقة بالمقابلة

- للمشارك في المقابلة الشخصية الحق في الامتناع عن الرد علي أي من أسئلة الباحث.
- للمشارك الحق في أن يمتنع عن اعطاء معلومات قد يطلبها الباحث.
- للمشارك الحق في الانسحاب من المقابلة او البحث ، هذا من دون الحاجة الي تقديم عذر.
- الأسماء الحقيقية لن تستخدم في البحث ولن تنشر في الأطروحة.
- سيحتفظ الباحث بالمعلومات في مكان آمن وسيتقي سرية ولن يطلع أحدا علي تلك المعلومات ماعدا مشرفي البحث.
- بعد الانتهاء من المقابلة ، سيسجل الباحث المحادثة الكلامية كتابيا علي ملف الكتروني (MS-WORD) و سترسل عن طريق البريد الإلكتروني الي المدرس المشارك للاطلاع عليها. بإمكان المشارك أن يضيف ، يعلق أو يشطب علي المعلومات أو يصحح ما يعتقد أنه قد سجل بشكل غير دقيق. سيستخدم الباحث النسخة المصححة التي أرسلت من قبل المدرس الا اذا لم يكن هناك تعليق من قبل المدرس علي سجل المعلومات.

ضع اشارته في احدي المربعين

تحويل للباحث في استخدام بعض من أقواله حرفيا في البحث المنشور لا أعطي أعطي

موافقة المشارك في البحث

لقد قرأت وفهمت ماجاء في هذه الورقة وعلي هذا الأساس أوافق علي المشاركة في البحث.

الاسم _____ التوقيع _____

Appendix 7.13

An example of memos written in the margins

Question 7 was:

The Code of Conduct embraces the duties of care due by the professional to various areas of society ...

T F

And the sentence in Goldfinch (2008, Screen 11) was:

The Code of Conduct embraces the duties of care due by the professional to various areas of society ...

Because the sentences were taken out of their context and were used with minimum alterations they did not pose as meaningful questions in the quiz document. Therefore, the questions did not appear to have been testing valuable knowledge in the memory of the computer ethics students other than testing them for their ability to memorise or recognise sentences from their handouts.

Further examination of the quiz revealed also that the quiz was not restricted to professionalism or computer ethics because questions 4, 5 and 8 were purely business related. For example question 8 was as follows:

Employees Motivation characteristics: Circle the correct answers(s)

- Self-Esteem
- Esteem of teammates
- Satisfaction of social needs
- Job security
- Financial rewards
- Application of code of conduct and code of ethics

Question 4 was as follows:

Centralization, decentralization, organization by product are types of organizing an organization.

T F

120

encouraging memorisation

Computer ethics was not Centre stage in the quiz

Focus on business dimension

Appendix 7.14

The course outline used at University (A).

Identity-related information were removed from this document to protect the privacy of the participants

COURSE SYLLABUS

Title: [REDACTED]: Professional Software Practice

Weight (3 - 0 - 3)

**Pre-
Requisite:** [REDACTED]

Description: This course provides skills and knowledge involving legal, social and ethical issues involved in professional software practice. It underscores rules of professional conduct to which professional software bodies subscribe to prepare students for a career in professional software practice.

Objectives:

- Learning the ethics of a profession
- Explore IEEE and BCS ethics with case studies.
- Study different issues of professional employment, rights and laws.

Topic 1: The engineering profession

Length: 3 hours

Contents:

- Introduction
- What makes a profession?
- Structure of the engineering profession
- Development of the engineering profession

Appendix 7.14

Continuing from the previous page

- Professional qualifications
- Ethics and software engineering(IEEE/ACM, BCS)
- Professional code of conduct

Topic 2: The structure of organizations

Length: 8 hours

Contents:

- Legal forms of organization
- Companies
- Organizing an organization
- Management

Topic 3: Finance and accounting

Length: 8 hours

Contents:

- The need for capital
- Source of funds
- Budgeting and monitoring
- Costing & Pricing
- Annual statements
- Auditing

Topic 4: Anatomy of a software house

Length: 4 hours

Contents:

- The company
- Company structure

Appendix 7.14

Continuing from the previous page

- Management of staff
- Monitoring financial performance
- Long-term planning

Topic 5: Computer contracts

Length: 8 hours

Contents:

- Types of software service contracts
- Liability for defective software

Topic 6: Intellectual property rights

Length: 4 hours

Contents:

- Confidential information
- Copyright
- Remedies for breach of copyright
- Licensing and assignment of copyright
- Moral rights
- Designs, Trade marks
- Domain names, patents

Topic 7: Employee Relations law and changing management practices

Length: 4 hours

Contents:

- Employee relations
- Labor law
- Individual employment law



Appendix 7.14

Continuing from the previous page

- Equal pay and sex discrimination

Topic 8: Human resource management and software engineering

Length: 4 hours

Contents

- A model of human resource management – salient features for SE
- Software factory
- Training and human resource management

Topic 9: Health and safety at work

Length: 4 hours

Contents

- The problem
- Historical background
- Health and safety Act
- Human factors
- Financial considerations
- Corporate liability

Topic 10: Software safety: Liability and practice

Length: 4 hours

Contents

- Introduction
- Regulatory issues
- Legal liability
- Competence, training and experience
- Factors affecting software safety

Topic 11: Computer Misuse and the criminal law

Length: 4 hours



Appendix 7.14

Continuing from the previous page

Contents

- Computing and criminal activity
- Categories of misuse
- Computer fraud
- Unauthorized access to computer
- Unauthorized alteration or destruction of information

Topic 12: Regulation and control of personal information data protection, defamation and related issues

Length: 4 hours

Contents

- Data protection and privacy
- Impact of internet
- Convergence of data protection practices
- Defamation and the protection of reputation

Teaching Materials

Textbook: Professional Issues in Software Engineering – Bott, Coleman, Eaton and Rowland

Handout(s): Professor's Handouts and Case studies

Reference(s):

Assessment



Appendix 7.14

Continuing from the previous page

Quizzes, Tests, Exams:	(35%)
Class Participation, Assignments, Projects:	(25%)
Final Exam:	(40%)
Overall:	100%



Appendix 7.15

The course outline used at University (B).

Identity-related information were removed from this document to protect the privacy of the participants.

██████████ UNIVERSITY
COLLEGE OF ██████████
COMPUTER SCIENCE DEPARTMENT

Course Title: Computer Ethics
Credit Hours: 1

Course Number: ██████████
Prerequisites: ██████████

Course Description:

The course concentrates on the theory and practice of computer ethics. The aim of the course is to study the basis for ethical decision making and the methodology for reaching ethical decisions concerning computing manners.

Course Objectives:

Appendix 7.15

Continuing from the previous page

By the end of this course, the students will be able to know the ethical rules that have to be followed. They will also learn about how to protect their information and computers from hackers and thieves. They will learn about viruses, their types, the way of protection their files, and how to use ethical ways via Internet.

Course Contents:

WEEK NO.	SUBJECT
WEEK 1	Introduction to computer ethics, why do we need computer ethics?
WEEK 2	General Guidelines for computing facility users
WEEK 3	The Ten Commands of computer ethics from the Computer Ethics Institute.
WEEK 4	Software copyrights, the intersection of copyrights and computers.
WEEK 5	Areas that need ethical guidelines: Privacy, Access.
WEEK 6	Information Security.
<u>WEEK 7</u>	MIDTERM EXAMINATION
WEEK 8	Licensing, Commercial Software, Shareware, Free S/W, Public domain S/W, Backups.
WEEK 9	Computer Crimes.



Appendix 7.15

Continuing from the previous page

WEEK 10	Viruses, Types of Viruses.
WEEK 11	Protecting from Viruses, Personal data.
WEEK 12	Hacking.
WEEK 13	Ethics and Internet Activities.
WEEK 14	The core Rules of Netiquette.
<u>WEEK 15</u>	<i>FINAL TERM EXMINATION</i>

Attendance:

- 1- The student should attend lectures according to the regulation of the university.
- 2- The student will be dismissed from participating the final exam if the student's absence exceed the limits which is 15% from the total hours of the course.
- 3- The student should not be late and attend the whole lecture.

Grading Policy:

Mid-Term Exam	: 35%
Class	: 10%
Participation	
Final Exam	: 55%
Total	: 100%

References:

Continuing from the previous page

- 1- Sara Baase, Social, Legal and Ethical Issues for Computers and the Internet (2nd ed.), 2003.
- 2- Tom Forester and Perry Morrison, Computer Ethics: Cautionary Tales and Ethical Dilemmas in Computing (2nd ed), MIT Press, 1993.

Appendix 7.16

A scan of the table of contents of the textbook relevant to University (A)

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Appendix 7.17

‘Assignment 1: Software Process Models’: document provided by Dr. Fawzeah.

Identity-related information were removed from
this document to protect the privacy of the
participants

IT ■ ■: Professional Software Practice

Instructor: ■■■■■■

2nd Semester 2008-2009

Assignment 1: Software Process Models

Due 7th March

Question 1 (Discussion in tutorial)

Give brief descriptions of the following models for software development and discuss their advantages and disadvantages.

- Agile models
- RAD (Rapid Application Development) models

Compare them with the models discussed in the literature using the criteria matrix.

Continuing from the previous page

Question 2 (Hand in)

For the following applications, identify the application type and choose the most appropriate model for developing these systems.

- A university registration system that replaces an existing system
- A small game (Monopoly)
- A system for artificial heart pacemaker
- A programming language compiler
- An online auction site
- A system that detects humidity level in a paper warehouse

Appendix 7.18

‘Assignment 2: Professional ethics and S/W Engineering’: document provided by Dr. Fawzeah.

Identity-related information were removed from this document to protect the privacy of the participants

ITCS ■■■: Professional Software Practice

Instructor: ■■■■■■■■■■

2nd Semester 2008-2009

Assignment 2: Professional ethics and S/W Engineering

Due 9th March

Q1:

1. On your own: write a definition of the meaning of “profession”(2 or three lines max).
2. In a pair:

compare and discuss your definitions –do they capture what you want to capture?

3. If they differ significantly keep both and refine them, otherwise produce a single refined definition
4. In fours: combine your definitions into at most two definitions: main and alternate
5. In eights: combine your definitions into at most two definitions.

Appendix 7.19

‘Quiz 1’: document provided by Dr. Fawzeah.

Identity-related information were removed from
this document to protect the privacy of the
participants

College of [REDACTED]
Department of Computer Science & Engineering

ITCS [REDACTED] – Professional Software Practice

Quiz 1

Instructor: [REDACTED]

Student Name: _____

Student Number: _____

Multiple Choice questions (10 marks)

1: Ethics is the study of right and wrong in human actions.

T F

2: The code of ethics is set to regulate the business process in an organization.

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Continuing from the previous page

T F

3: There are no consequences in case of violating the code of ethics or practice in a profession.

T F

4: Centralization, decentralization, organization by product are types of organizing an organization.

T F

5: The role of the central quality management function is to establish a quality plan for the whole organization.

T F

6: The British Computer Society - BCS - is the professional Engineering Council body for Information Systems Engineers

T F

7: The Code of Conduct embraces the duties of care due by the professional to various areas of society ...



Appendix 7.19

Continuing from the previous page

T F

8: Employees Motivation characteristics: Circle the correct answer(s)

- a. Self-Esteem
- b. Esteem of teammates
- c. Satisfaction of social needs
- d. Job security
- e. Financial rewards
- f. Application of code of conduct and code of ethics

9: The Technical Role is mainly external , for the benefit of members to determine new standards

T F

10: List the four different point of public interest ?.



Appendix 7.20

A scan of the chapter which Dr. Jude provided; only 7.1 - 7.16 in the table of contents below are the topics related to the chapter under investigation.

الفهرس			
95	Theft السرقة 8.12	6.4	برامج الحاسوب في المؤسسات Computer
96	Viruses الفيروسات 8.13	77	Applications in Business
97	Protecting from Viruses الحماية من الفيروسات 8.14	6.5	الحاسوب في الهيئات الحكومية Computer
98	Personal Data البيانات الشخصية 8.15	78	Applications in Governmental Institutions
98	Computer Ethics أخلاقيات الحاسوب 8.16	6.6	الحاسوب في المستشفيات ومراكز العناية الصحية
الباب الثاني : البرمجيات الجاهزة		78	Computer in Hospitals
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105	Windows النوافذ 9.1	80	Teleworking العمل عن بُعد
106	Starting Windows تشغيل (استدعاء) النوافذ 9.2	80	E- Commerce التجارة الالكترونية
106	Turning Off Your Computer إغلاق جهاز الحاسوب 9.3	الفصل السابع : الصحة والبيئة	
107	Using Mouse استخدام الفأرة 9.4	85	Ergonomics الهندسة الإنسانية
107	Desktop سطح المكتب 9.5	85	Health Issues المشكلات الصحية
108	Task Bar شريط المهام 9.6	7.3	Safety التدابير الوقائية عند التعامل مع الحاسوب
109	Start Menu قائمة ابدأ 9.7	86	Precautions When Using a Computer
9.8	Change the Start menu طرائق عرض قائمة ابدأ	86	The Environment البيئة
109	Style 9.9	الفصل الثامن : أخلاقيات الحاسوب	
110	Opening a Program تشغيل البرامج 9.9	8.1	حق ملكية البرمجيات Software Copyright
9.10	Minimize, Maximize, Close تصغير وتكبير وإغلاق النوافذ	8.2	ترخيص البرمجيات Licensing
111	Close 9.10	8.3	البرمجيات التجارية Commercial Software
9.11	Switching between Running التنقل بين البرامج	8.4	البرمجيات التجريبية Shareware
112	Programs 9.11	8.5	البرمجيات المجانية Free Software
9.12	Moving Windows نقل النوافذ من مكان إلى آخر	8.6	البرمجيات العامة Public Domain Software
9.13	Resizing التحكم بسعة (عرض وارتفاع) النوافذ	8.7	النسخ الاحتياطية Backups
114	Windows 9.12	8.8	سرية المعلومات وأمنها Information Security
9.14	My Documents المستندات 9.14	8.9	الخصوصية Privacy
9.15	My Recent Documents الملفات المستعملة مؤخراً 9.15	8.10	الوصول Access
		8.11	جرائم الحاسوب Computer Crimes

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أخلاقيات الحاسوب

Software Copyright

Commercial software is covered by copyright. Therefore you have to pay for it and register to have the license to use it.

You should do the following according to the copyright principle:

- 1- Software should be copied only for back up.
- 2- Sharing or lending software is not allowed.
- 3- Copying the software over the network should be under the terms of the license agreement.
- 4- Software piracy is a crime.
- 5- Copyright legislation also applied to shareware and free ware.

Licensing

When you buy software you purchase a license to use it not for copyright. There is a license agreement that is written on the package carton or in the software documentation or with the software itself.

There are two types of license:

- 1- **Single User:** The purchaser can install the software into only one computer.
- 2- **Site License:** The purchaser can install the software into multiple computers the number of which is specified by the license agreement.

1-8 حق ملكية البرمجيات Copyright

للبرمجيات التجارية حقوق ملكية Copyright ، لذلك عند شرائك للبرمجية عليك أن تدفع ثمنها وتسجلها ومن ثم تحصل على رخصة اقتناء تبعاً لشروط معينة ، يلزمك حق ملكية البرمجية بما يلي:

- 1- أن تنسخ أقراص البرمجية فقط لاستخدامها كنسخ احتياطية عند عطب أقراص النسخة الأصلية.
- 2- لا يحق لك إعارة البرمجية أو مشاركتها مع الغير لأن ذلك يكون عرضة لانتشار الفيروسات وبالتالي تخريب نسختك.
- 3- إن استخدام البرمجية في شبكة حواسيب لا يصح إلا بموافقة صاحب البرمجية تبعاً لشروط ترخيصها.
- 4- إن قرصنة البرامج بنسخها غير المشروع ومن ثم توزيعها وبيعها واستخدامها هي جريمة يعاقب عليها القانون.
- 5- إن تشريعات حقوق الملكية تطبق على البرمجيات التجارية وعلى البرمجيات المجانية وعلى تلك المجانية مؤقتاً.

2-8 ترخيص البرمجيات Licensing

إن شراء البرمجية لا يعني الحصول على حق الملكية وإنما الحصول على رخصة الاستخدام License ، ولهذه الرخصة شروط خاصة ينبغي على المستخدم أن يحترمها وينفذها ، تسمى مجموعة هذه الشروط والقيود المتعلقة بالاستخدام بـ Licensing agreement وهي تكون مكتوبة في توثيق البرمجية أو على العلبة الخارجية للأقراص أو تظهر على الشاشة عند تحميل البرمجية.

رخصة استخدام البرمجية توضح:

1. رخصة المستخدم الواحد: وهذا يعني أن مقتني البرمجية يجب أن يستخدمها على حاسوب واحد فقط.
2. رخصة متعدد المستخدمين: وهي تمكن المشتري من تحميل نفس البرمجية على عدة حواسيب يتحدد عددها في الرخصة ، وتعتبر هذه العملية أوفر من أن يقوم المشتري بشراء عدد من نسخ البرمجية المطلوبة.

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3-8 النسخ الاحتياطية Backups

هي نسخ من البرمجيات والملفات والبيانات يتم الاحتفاظ بها للاستفادة منها في حالة خراب النسخ الأصلية بسبب وجود فشل أو عطل في جهاز الحاسوب أو أخطاء المستخدم أو الحوادث الطبيعية أو بسبب الإهمال.

ويمكن عمل النسخ الاحتياطية بعدة طرق :

- 1- نسخ الملفات على الأقراص الممغنطة أو أقراص صلبة خارجية أو أشرطة مغنطة .
 - 2- نسخها على الخوادم Servers .
 - 3- طباعة البيانات على الورق .
- وفي جميع الحالات لا بد من :

- 1- إجراء النسخ الاحتياطية في أوقات منتظمة (كل أسبوع مثلا).
- 2- يمكن استخدام برامج خاصة تقوم بإجراء النسخ الاحتياطية أوتوماتيكيا في أوقات معينة.
- 3- حفظ النسخ الاحتياطية في مكان آمن بعيدا عن الأخطار والحريق والغبار وضوء الشمس والمجالات المغناطيسية
- 4- عمل عدة نسخ احتياطية وتوزيعها في أماكن مختلفة.
- 5- وضع ملصق على كل قرص يسجل معلومات عن محتواه
- 6- الاحتفاظ بالأقراص في وضعية تمنع التخزين عليها Write-protected .

They are copies of all software, files and information when you have in your computer system; use it when the original copies are damaged because of physical failure; user errors; accidents, or carelessness.

Backups can be made by different methods:

- 1- Copying onto floppies or external hard disk or magnetic tapes.
- 2- Copying onto remote servers.
- 3- Make a hardcopy.

In all cases:

- 1- Backup must be made on a regular basis.
- 2- The user can use back-up programs that make the operation automatic in special times.
- 3- Keep back-ups in a secure and safe place.
- 4- Make different copies and keep them in different locations.
- 5- Label each floppy.

Disks should be write-protected.

Personal Data

It is common for personal details to be entered and stored in computers.

Data held in computers is easily and quickly stored, copied, distributed and manipulated.

There is a continuing demand for up-to-date personal information to be use in market research, surveys and so on.

4-8 البيانات الشخصية Personal Data

بحوسبة جميع الأنظمة في هذا العصر أصبحت البيانات الشخصية لكل منا مخزنة في ذاكرة الحواسيب المتناثرة عبر جميع أنحاء الوطن ، فنجد لكل منا مثلا بيانات شخصية في البنوك وفي شركة الاتصالات والكهرباء والمياه وشركات الإنترنت وفي الجهات الحكومية والمستشفيات والمراكز الصحية، والرواتب وشركات التأمين والضمان الاجتماعي وغيرها الكثير. هذه البيانات كانت موجودة أصلا في السابق ولكن لم تكن مخزنة في أجهزة الحاسوب ، وأما اليوم ومع سرعة التخزين والنسخ والتوزيع والتحليل التي يوفرها الحاسوب فقد أصبح الكثير من الشركات يتنافس ويدفع للحصول على هذه البيانات الشخصية لإجراء بحوث

Continuing from the previous page

أخلاقيات الحاسوب

The company, which stores your personal data, can sell this data to organizations, which benefit them analyzing it.

So The Data Protection Commissioner made legislation for personal data:

The individual has the right to access his information and erase incorrect data.

Data controllers have to keep the data secure and safe.

Data processor has to use data in lawful purposes.

Privacy

Means that the data relating to individuals that you store or to which you have access on a computer, must be protected.

The following points you should follow to protect the privacy of others:

- 1- **Use of Data:** For one or more or for specified purposes.
- 2- **Not Excessive:** Relevant to purposes.
- 3- **Retention of Data:** shall not be kept for longer than necessary.
- 4- **Disclosing Information:** In any manner incompatible with purposes
- 5- **Security**
- 6- **Right of personal access.**

التسويق والمسوحات الاجتماعية والإحصائية مثلاً. وهذا يعني أن بياناتك الشخصية لم تعد ملكاً لك وحدك، كما أن إمكانية تزييفها وتغييرها من قبل الغير أمر وارد، ولذلك تم تسنين التشريعات التي تحمي البيانات الشخصية في بعض البلدان والتي تعطي المواطن حق الوصول إلى بياناته الشخصية في أي مؤسسة وتحديثها كما ينبغي، وأن على المحتفظين بالبيانات التأكد من سلامتها وصحتها ودقتها والمحافظة عليها وأن على الجهة الراغبة بالحصول على البيانات الشخصية أن تستخدمها لأهداف سامية لا تخرج عن القانون .

5-8 الخصوصية Privacy

تخزن أجهزة الحاسوب قدرًا هائلاً من البيانات التي تخص المؤسسات الحكومية والخاصة وكذلك الأشخاص. فهناك البيانات العسكرية التي تتمتع بمنتهى السرية. وهناك البيانات التي تبين حسابات الشركات وأرباحها وخسائرها. ثم هناك معلومات شخصية مخزنة تبين أرقام هواتف المواطنين، وتوقيعهم وأرقام بطاقاتهم المصرفية، وتحفظ المستشفيات بسجلات المرضى وتاريخهم المرضي. وتريد المؤسسات والأشخاص أن تبقى هذه البيانات سرية، وليس من حق أحد غير مسموح له بالدخول لهذه البيانات أن يصل لها لئلا تنعدم الثقة بين المؤسسات والأشخاص، ويدعى هذا الحق بالخصوصية، ولذلك كان لزاماً على المنشأة التي ستحتفظ ببيانات الأشخاص والمؤسسات:

- 1- أن تحدد هل سيتم الاحتفاظ بالبيانات لشخص واحد أو لعدة أشخاص أو لأغراض مشروعة.
- 2- يجب عدم الإفراط في البيانات وأن تكون متناسبة مع الغاية من وجودها.
- 3- يجب أن لا يتم الاحتفاظ بالبيانات لمدة أكثر من اللازم.
- 4- يجب أن تغلق البيانات أمام أي غرض ينافي الغرض من وجودها.
- 5- يجب وضع قيود للأمان والسرية على البيانات من الوصول غير المخول أو التدمير أو الحوادث.
- 6- حقوق الشخص في الوصول إلى بياناته كما ذكرناها سابقاً وهي حقه في الوصول إلى بياناته وحقه في إلغاء البيانات غير الصحيحة وحقه في منع نشر بياناته في قوائم البريد الإلكترونية mailing list وحقه في أن يشتكي للمشرع.

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Security

Involves not only the physical security of the computer equipment, but also the security of the data contained on the storage media.

- 1- The computer should be protected from damage (Hardware and Software)
- 2- Data should be backed up and protected from Viruses
- 3- Passwords must be used for hardware and software.
- 4- Back-ups are essential.

Viruses

Software programs, which are written with the intention of causing inconvenience and disruption or serious damage in a computer system.

Files on floppies can spread viruses, across a network or via E-mail and The Internet.

Types of Viruses :

- 1- **Worms:** Operate independently and spontaneously. They do not make any damage, but they spread very quickly in Networks and keeps computer system busy.
- 2- **Time Bombs:** It makes the damage at a specific time.
3. **Trojan Horse:** Can be carried onto a computer by other files to perform its illegal objectives.

6-8 سرية المعلومات وأمنها

لا تعنى فقط بتوفير الأمان للمعدات وإنما للبرمجيات والبيانات المخزنة في ذاكرة الحاسوب :

- 1- توفير الحماية للحواسيب والمعدات من الخراب قدر الإمكان.
- 2- عمل نسخ احتياطية للبيانات والبرمجيات واتخاذ الإجراءات اللازمة لحمايتها من الفيروسات.
- 3- استخدام كلمات السر للمعدات والبرمجيات. ويجب أن تتكون كلمة السر من أحرف وأرقام ، وأن تتغير من وقت لآخر ، وأن توزع على فئة محدودة من المستخدمين.
- 4- النسخ الاحتياطية أساسية وضرورية.

7-8 الفيروسات Viruses

تمثل فيروسات الحاسوب Computer Viruses نوعاً من الجرائم الحاسوبية. وفيروس الحاسوب عبارة عن برنامج يدخل للحاسوب ليهدم أو يشوه البيانات والبرامج المخزنة داخل الحاسوب. وينتقل فيروس الحاسوب إلى حواسيب أخرى عن طريق شبكات الحاسوب Computer Network واستخدام الأسطوانات الملوثة. هناك أنواع مختلفة من الفيروسات الحاسوبية منها:

1. الفيروسات الدودية Worms

الفيروس الدودي عبارة عن برنامج يعطي أوامر خاطئة أو مضللة لجهاز الحاسوب ، ويحتل هذه النوع من الفيروسات الذاكرة الرئيسة وينتشر بسرعة فائقة جداً في الشبكات .

2. القنابل الموقوتة Time Bombs

فيروس القنبلة الموقوتة عبارة عن برنامج يقوم بتفجير نفسه في وقت محدد أو بعد تنفيذ عدة مرات. ويستخدم هذه النوع من قبل شركات الحاسوب التي تعطي نسخاً مجانية على أمل شراء النسخة الأصلية لاحقاً. وإذا لم يتم المستخدم بشراء النسخة الأصلية، يقوم البرنامج بتفجير نفسه.

3. أحصنة طروادة Trojan Horses

فيروس حصان طروادة عبارة عن برنامج يدخل الحاسوب بشكل

Continuing from the previous page

أخلاقيات الحاسوب

Protecting from Viruses

It is important to keep Anti-Virus software up-to-date.

If there is not any up-to-date anti viruses software installed into your computer, then you should follow these guidelines:

- 1- Do not use floppies from unreliable sources
- 2- Use only registered software
- 3- Never open an E-mail attachment unless it is from reliable source.
- 4- Keep regular back-ups.

Power Cuts

If there is a power cut while the computer is on :

- 1- Unsaved information will be lost
- 2- Files and equipment may be corrupted.

To Minimize The Damaged That Can Be Caused Because Of Power Cuts:

- 1- The computer should be turned off and unplugged until the power is restored.
- 2- Use Surge protectors which protect your computer from the surge, It may damage your system when power is cut or restored.

شرعي يصعب كشفه، وبعد تركيبه داخل الجهاز يقوم بتدمير وتشويه البيانات والفهارس المهمة. وكثير من حصون طروادة تنتقل عبر البريد الإلكتروني E-mail.

8-8 الحماية من الفيروسات

تستخدم برامج مضادة للفيروسات تنتجها شركات خاصة تقوم باكتشاف الفيروسات حين دخولها للحاسوب وتخبر المستخدم بوجود الفيروس ، وتقوم هذه البرامج المضادة بتنظيف البرامج أو الأجهزة من الفيروسات. وتسكن هذه البرامج عادة في الذاكرة وتكون في حالة نشطة دائماً لاكتشاف أي فيروس قادم. وينصح المستخدمون باستخدام البرامج المضادة للفيروسات للحفاظ على بياناتهم وعلى استخدام النسخة الجديدة منها دائماً. وإذا لم يكن موجوداً لديك النسخة الحديثة من مضادات الفيروسات فقم بما يلي:

- 1- لا تستخدم أقراصاً مرنة من مصادر غير موثوقة.
- 2- استخدم البرمجيات المسجلة فقط.
- 3- لا تفتح الملفات الملحقة بالبريد الإلكتروني إلا إذا كانت الرسالة من مصدر موثوق.
- 4- قم بعمل النسخ الاحتياطية بانتظام لتتجنب الضرر الواقع في حالة دخول الفيروس.

9-8 انقطاع التيار الكهربائي Power Cuts

عند انقطاع التيار الكهربائي عن جهازك أثناء العمل يحدث ما يلي :

- 1- تسمح المعلومات التي لم يتم حفظها من الذاكرة الرئيسية.
 - 2- قد تعطب بعض الملفات أو البرمجيات الأخرى.
- عندما تفتح جهازك مرة أخرى بعد عودة الكهرباء ينفذ برنامج لفحص القرص الصلب Scan Disk بشكل أوتوماتيكي ويخبرك عن الأخطاء والفشل الذي يجده ويسألك عن الإجراء الذي تريده بشأن هذه الأخطاء.

للتقليل قدر الامكان من حدوثه، المنطب عند انقطاع التيار

1. افصل الجهاز عن الكهرباء لأن عودة التيار الكهربائي والجهاز مفتوح قد تؤدي إلى خرابه.
- 2- استخدم محولات طاقة لها مصفيات خاصة تمنع حدوث

Continuing from the previous page

3- Use an uninterrupted Power Supply (UPS) that will keep the computer running for a little period , so you can save your work and shut-down your computer properly.

Security Systems

Security is a system of safeguards for protecting information technology against disasters, system failure, or unauthorized access that can result in damage or loss. To protect your system you need to:

1. Use Passwords.
2. Use Authentication Techniques
3. Use Authorization process.
4. Use Several Standard Encryption and Decryption Codes.
5. Change the passwords frequently.
6. Make backup of files.
7. Save storage media in a save place.
8. Use anti-viruses programs.

Computer Crimes

Are the unlawful uses of any component of a computer system. The use of computer Fraud, Theft, Espionage, Forgery and Sabotage are types of computer crimes.

عطب الجهاز عند انقطاع التيار أو عودته فجأة إذ أنها تصفي التموج في التيار الكهربائي.

3- استخدم بطارية احتياطية تجعل الحاسوب مستمرا في عمله بعد انقطاع الكهرباء لفترة محدودة يتمكن من خلالها المستخدم من حفظ عمله وإغلاق الجهاز بطريقة صحيحة.

10-8 أنظمة الأمن والحماية Security Systems

هناك قدر هائل من البيانات المهمة مخزنة في أجهزة الحواسيب. ولا بد من حماية هذه البيانات وخصوصاً من جرائم الحاسوب. ويشكل عام هناك عدة طرق لحماية البيانات منها:

1. استخدام كلمات العبور Passwords .
2. استخدام دلائل التأكيد Authentication .
3. إعطاء أولويات وصلاحيات دخول Authorization للبيانات والبرامج والملفات. وهذه الأولويات تنظم من قبل إدارة المؤسسة.
4. استخدام شيفرات Codes مختلفة ذات معايير عالمية ومحلية للتقيد بها مثل عملية التشفير Encryption التي من شأنها تحويل البيانات إلى نصوص غير مفهومة (مبهمة) للمتطفلين ولكن يفهمها الطرف الثاني عن طريق حل هذه الشيفرة Decryption. وتستخدم هذه الطرق في شبكات الحاسوب من أجل حماية البيانات أثناء تراسلها.
5. تغيير كلمات العبور من حين لآخر.
6. عمل نسخ احتياطية للملفات.
7. وضع وسائط التخزين الثانوية من أقراص وأشرطة مغناطيسية وغيرها في غرف خاصة آمنة.
8. استخدام البرامج الكاشفة للفيروسات وتحديث هذه البرامج لتواكب أنواع الفيروسات الجديدة التي قد تظهر.

11-8 جرائم الحاسوب Computer Crimes

يمكن القول أن جرائم الحاسوب Computer Crimes هي تلك القضايا الحاسوبية غير القانونية أو الدخول غير الشرعي للبيانات والملفات والبرامج مثل قضايا التحايل Fraud والسرقة Theft والتجسس Espionage والتزوير Forgery وقضايا التخريب Sabotage.

Continuing from the previous page

أخلاقيات الحاسوب

- وهناك الكثير من الأمثلة على قضايا جرائم الحاسوب ومنها:
- قضية الموظف الذي عدّل على برنامج الحاسوب ليسجل في حسابه مبلغ 160,000 دولار.
 - قضية المراهق الذي دخل على أجهزة شركة AT&T وسرق برمجيات تعادل قيمتها مليون دولار.
 - قضية الشخص الذي حول مبلغ 10,200,000 دولار من بنك أمريكي إلى رصيده في بنك سويسري .

12-8 الوصول Access

الوصول إلى البيانات المخزنة في أجهزة الحاسوب من قبل أشخاص غير شرعيين ليس بالأمر السهل، وذلك لأن الوصول لا يتم بشكل مباشر وإنما عن طريق عدد من الخطوات للتحكم بعمليات الوصول Access Control ومنها:

1. إدخال كلمات العبور User Password
كلمات العبور عبارة عن تشكيلة من الأرقام والأحرف يختارها المستخدم ويحتفظ بها ولا يطلع أحداً عليها.
2. إدخال دليل توكيدي User Authentication
هذا الدليل يمكن أن يكون بطاقة ذكية أو توقيع أو صوت المستخدم، وذلك للتأكد من هوية المستخدم المسوح له بالدخول للجهاز.
3. استخدام الصلاحيات User Authorization
يتمتع المستخدمون بصلاحيات محددة للتعامل مع البيانات المخزنة. فمثلاً يتمتع البعض بصلاحيات قراءة البيانات فقط، بينما يمكن لمستخدم آخر القراءة والتعديل على هذه البيانات. إلا أن تنفيذ هذه الخطوات لا يعني منع الوصول للبيانات أو حماية هذه البيانات من مرتكبي جرائم الحاسوب.

13-8 مشكلة العام 2000 Y2K Problem

Y2K Problem

Some old software and computers do not allow writing the year in four digits, but only in two digits. For example, the year 1998 is represented as (98). Therefore, when trying to enter the year 2000, only two zeros are entered. This caused many problems in different fields.

احتاج الكثير من الحواسيب القديمة لتحديث أجزاء الحاسوب الصلبة مثل ROM-BIOS ونظم التشغيل والبرامج لحل مشكلة عام 2000 والتي تكمن في عدم استيعاب بعض البرمجيات والأجهزة لكتابة السنة بأربع خانات ، فمثلاً تكون سنة 1998 بخانتين فقط وهما (98) . وعليه، يتم كتابة سنة 2000 بصفرين ، مما سبب ارباكات كثيرة على جميع المستويات.

Continuing from the previous page

Data Protection Legislation

The following is an extract from The IRELAND Data protection Act.

The Act gives a right to every individual, irrespective of nationality or residence, to establish the existence of personal data, to access any such data relating to him, and to have inaccurate data or erased. It requires data controllers to make sure that the data they keep are collected fairly, are accurate and up-to-date, are kept for lawful purposes, and are not used or disclosed in any manner incompatible with those purposes. It also requires both data controllers and data processors to protect the data they keep, and it imposes on them a special duty of care in relation to the individuals about whom they keep such data.

14-8 أخلاقيات الحاسوب Data Protection Act

أخلاقيات الحاسوب عبارة عن مجموعة من القوانين التي تحكم مستخدمي الحاسوب والبيانات التي تنتج. وقد أقر معهد أخلاقيات الحاسوب (CEI) Computer Ethics Institute القوانين التالية:

1. لا تستخدم الحاسوب لإيذاء الغير.
2. لا تتدخل في عمل الآخرين. ولا تدخل إلى ملفات الآخرين.
3. لا تستخدم الحاسوب للسرقة .
4. لا تستخدم الحاسوب في شهادة الزور .
5. لا تستخدم برمجيات الآخرين دون دفع ثمن هذه البرمجيات.
6. لا تدخل على أجهزة الآخرين دون إذن منهم

Continuing from the previous page

أخلاقيات الحاسوب

VIRUSES: Small programs that hide themselves on your disks and they have the ability to spread from one computer to another via infected floppy disk or e-mail

HOW TO PROTECT YOUR PC AGAINST VIRUS:

1. Installing software that check for viruses before enter the system (anti virus software: it can detect and remove viruses found on the computer and it can automatically check floppy disks and e-mail attachment
2. Set password on your computer
3. Avoid using floppy disk from unknown source
4. Use only original software (registered software)
5. Never open an e-mail from unknown person
6. Regular back up of your data

Back up: means taking copies of your data and programs that is stored on your computer on the floppy disk or other storage media.

Types of back up

1. **Complete back up:** to back up all the data on your computer
2. **Incremental back up:** once a week you can perform a complete back up, but every night for the rest of the week. You only back up files that have been newly created or modified since the last back up.

SECURITY, COPYRIGHT AND LAW.

Commercial software is covered by copyright similar to print media.

✦ Program disk should be copied

ملخص الفصل الثامن

الفيروسات

الفيروس عبارة عن برنامج صغير يدخل إلى الحاسوب ليهدم أو يشوه البيانات والبرامج المخزنة داخل الحاسوب

كيف يمكن الحماية من الفيروسات

1. استخدام برامج مضادة للفيروسات.
- 2- استخدم كلمة مرور خاصة بحاسوبك .
- 3- قم بعمل نسخ احتياطية بانتظام لتجنب الضرر الواقع في حالة دخول الفيروس.
- 4- لا تفتح الملفات الملحقة بالبريد الإلكتروني إلا إذا كانت الرسالة من مصدر موثوق .
- 5- استخدم البرمجيات المسجلة فقط .
- 6- لا تستخدم أقراصا مرنة من مصادر غير موثوقة .

النسخ الاحتياطية

هي نسخ من البرمجيات والملفات والبيانات يتم الاحتفاظ بها للاستفادة منها في حالة خراب النسخ الأصلية بسبب وجود فشل أو عطل في جهاز الحاسوب أو أخطاء المستخدم أو الحوادث الطبيعية أو بسبب الإهمال.

أنواع النسخ الاحتياطية

- 1- النسخ الاحتياطي الكامل: نسخ كل البيانات الموجودة على الحاسوب الخاص بك أكثر من مرة في اليوم الواحد وذلك لأهمية وقيمة البيانات وتقوم الشركات الكبيرة باستخدام هذا النوع من النسخ الاحتياطي .
2. النسخ الاحتياطي التزايدى: أن تقوم مرة أسبوعيا بنسخ كل بياناتك احتياطيا وتقوم في نهاية كل يوم بنسخ الملفات حديثة الإنشاء أو التعديل كما في المكاتب الصغيرة.

ترخيص البرمجيات

✦ رخصة متعددة الاستخدام Site License: تمكن المشتري من

Continuing from the previous page

only for the purpose of backup

- ✦ Transferring or coping software over network should only carried out under term software license agreement.

COPYRIGHT: most programs you purchase are copyrighted and you must not copy them or you are breaking the law

SITE LICENSE: the company purchase the license can make fixed numbers of copies to their aff via the network.

USER LICENSE: the person purchases the right for using the software and he shouldn't make copies of the software

To Secure Your Data And Protect Your Computer You Have To:

1. Use UPS
2. Use electrical surge protection device Take backup of your data
3. Put password on your PC to prevent others from accessing your data
4. Shut down your computer in correct sequence
5. Put the backup in "off-site" storage to protect it from dust and fire

Personal Data

Data Protect Act: if your computer holds information about individuals then you have a moral and legal duty to treat the information with respect.

Some uses of personal data

1. Police force
2. Doctors
3. Government department
4. Bank account

تحميل نفس البرمجية على عدة حواسيب يتحدد عددها في الرخصة.

✦ رخصة المستخدم الواحد User License: تعني أن مقتني البرمجية يجب أن يستخدمها على حاسوب واحد فقط

حقوق النسخ: اغلب البرمجيات التي تشتريها تكون محفوظة ولا يجب نسخها أو إعارتها فهذا يعتبر خرقاً للقانون.

لاسيكيات والحفاظ على الحاسوب

- 1- استخدام مزود الطاقة UPS: عبارة عن جهاز توصله بالحاسوب والذي يعمل على حمايته من مخاطر انقطاع التيار الكهربائي ، يحتوي على بطاريات تجعل الحاسوب يعمل لفترة كافية لكي تحفظ العمل وتستخدم أمر إيقاف التشغيل .
- 2- استخدام جهاز الحماية ضد الارتفاع المفاجئ للجهد
- 3- استخدام كلمات المرور لمنع المستخدمين الآخرين من الوصول إليه.
- 4- إيقاف تشغيل الحاسوب بشكل صحيح .
- 5- حفظ البيانات بشكل منتظم.

قانون حماية البيانات

إذا كان الحاسوب الذي تعمل عليه به بيانات عن أشخاص يجب أن تتعامل مع هذه البيانات بطريقة قانونية وأخلاقية. الأطباء، الهيئات الحكومية، أقسام الشرطة.

Continuing from the previous page

أخلاقيات الحاسوب

5. Payroll
6. Insurance companies

Implications of Data Protect Act:

1. The information should be treated fairly and lawfully
2. The information held should be used in compatible with purpose
3. Data should not be excessive in relation to that purpose
4. Personal data should be accurate and kept up to date
5. Personal data should not keep for longer than in necessary.

UPS (Uninterruptible Power Supply) is a battery powered back-up power supply that will keep the computer running in the event of a main failure. A Battery is kept fully charged while main supply is on. If the main fails the UPS allowing the user to save work and shutdown the computer

1. **Surge Protectors:** is a small filter unit designed to protect against variation in the electricity supply. It is often built into the main power socket.

أهم مواد قانون حماية البيانات

ينبغي الحصول على المعلومات في البيانات الشخصية والتعامل معها بنزاهة وبطريقة قانونية.

يجب الاحتفاظ بالبيانات الشخصية لأغراض محددة وقانونية يجب أن تكون البيانات الشخصية دقيقة وتحديثها باستمرار وحفظها في مكان آمن حفاظا على سريتها لا يجب الاحتفاظ بالبيانات الشخصية المخزنة لفترة أكثر من اللازم.

قدرة الأفراد على الوصول إلى المعلومات الخاصة بهم.

جهاز مزود الطاقة (UPS):

عبارة عن جهاز يوصل بالحاسوب تستخدم لجعل الحاسوب مستمرا في عمله بعد انقطاع الكهرباء لفترة محدودة يتمكن من خلالها المستخدم من حفظ عمله وإغلاق الجهاز بطريقة صحيحة.

جهاز الحماية من الارتفاع المفاجئ للجهد :

يستخدم لتجنب الارتفاع المفاجئ في الجهد وهي متوفرة بشكل كبير ورخيصة الثمن.

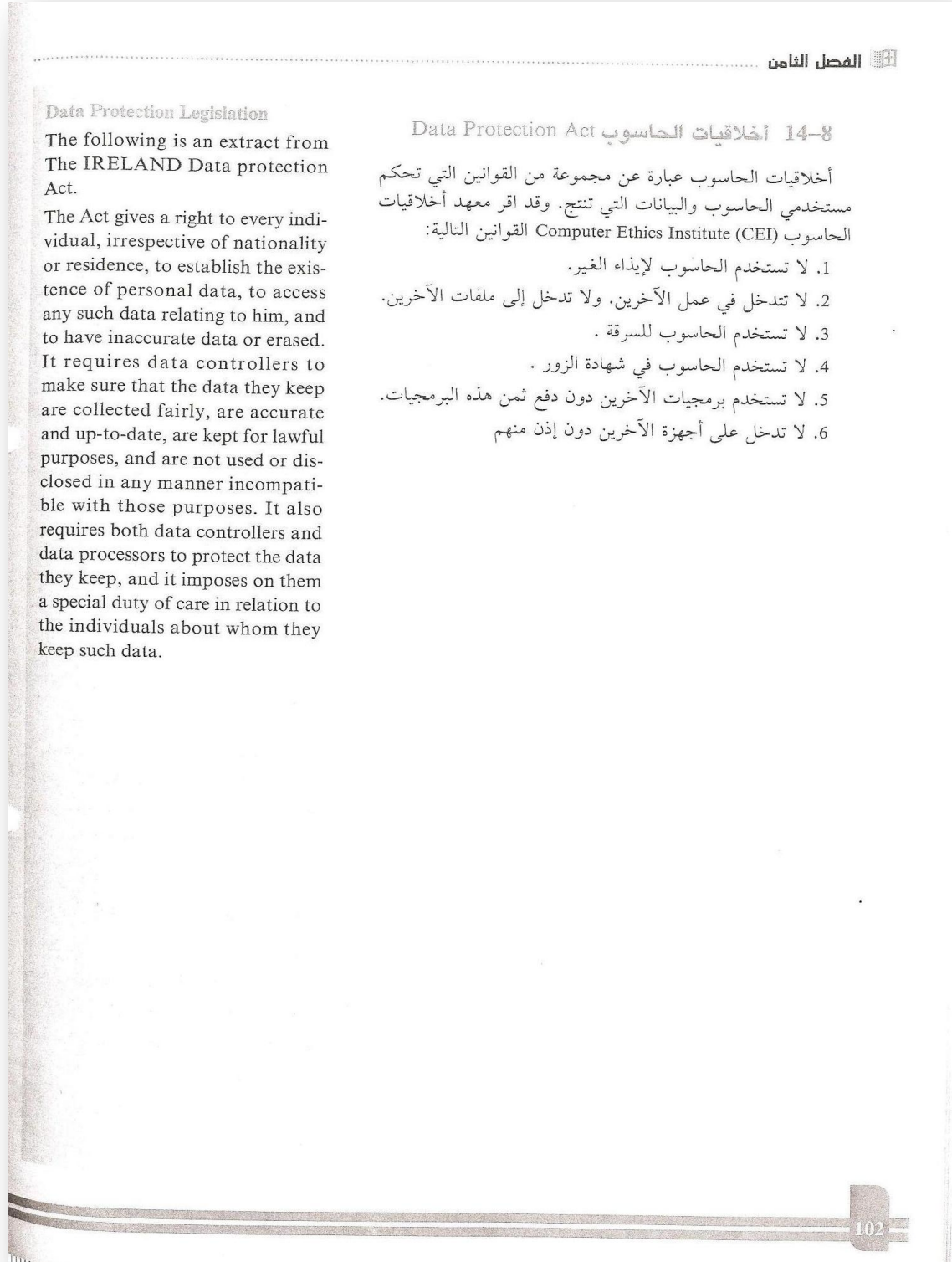
Continuing from the previous page

أسئلة

1. Why do you need to back up your data
2. Explain the problem "Year 2000" that occurred at the start of the millennium
3. Compare between complete and incremental backup
4. Why should you use off site
5. Why is it important to use passwords to protect your computer data
6. What is UPS
7. Why might electrical surge protection for your computer be a good idea
8. What are computer viruses
9. How do viruses infect PCs
10. How might you protect your PC against virus threats
11. List the main points of the ACT

1. لماذا تحتاج إلى إنشاء نسخ احتياطية من البيانات الموجودة على الحاسوب الخاص بك؟
2. ما الآثار المترتبة على "مشكلة عام 2000" التي حدثت في بداية هذه الألفية؟
3. قارن بين النسخ الاحتياطي الكامل والترايدي.
4. لماذا يجب عليك تخزين البيانات التي قمت بنسخها بشكل احتياطي خارج الحاسوب؟
5. لماذا يجب عليك استخدام كلمات المرور لحماية البيانات الموجودة على الحاسوب الخاص بك؟
6. ما المقصود بـ UPS؟
7. لماذا تعد الحماية ضد مخاطر الارتفاع المفاجئ في الجهد الكهربائي فكرة جيدة؟
8. ما هي فيروسات الحاسوب؟
9. كيف تصيب الفيروسات الحواسيب؟
10. كيف يمكنك حماية الحاسوب الخاص بك من أخطار الفيروسات؟
11. اعرض أهم مواد قانون حماية البيانات

A page from the chapter which Dr. Jude provided



The slides which Mr. Mustafa provided

Why Study Challenges of IT?

- Information technology in business presents major security challenges, poses serious ethical questions, and affects society in significant ways.
- The use of information technologies in business has had major impact on society, and thus raises ethical issues in the areas of crime, privacy, individuality, employment, health, and working condition.

IT Security, Ethics and Society



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Ethical Responsibility

- Business professionals have a responsibility to promote ethical uses of information technology in the workplace.
- For example, should you electronically monitor your employee's work activities and electronic mail?
- Should you let employees use their work computers for private business or take home copies of software for their personal use?

Business Ethics

Definition:

- Questions that managers must confront as part of their daily business decision making including:
 - Equity: intellectual property Rights
 - Rights: Customer Privacy
 - Honesty: Security of computer Information
 - Exercise of Corporate Power: Workplace safety.

Continuing from the previous page

Corporate Social Responsibility Theories

- **Stockholder Theory** – managers are agents of the stockholders, and their only ethical responsibility is to increase the profits of the business without violating the law or engaging in fraudulent practices
- **Social Contract Theory** – companies have ethical responsibilities to all members of society, which allow corporations to exist based on a social contract

Corporate Social Responsibility Theories

- **Stakeholder Theory** – managers have an ethical responsibility to manage a firm for the benefit of all its stakeholders, which are all individuals and groups that have a stake in or claim on a company

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Principles of Technology Ethics

- **Proportionality** – the good achieved by the technology must outweigh the harm or risk
- **Informed Consent** – those affected by the technology should understand and accept the risks

Principles of Technology Ethics

- **Justice** – the benefits and burdens of the technology should be distributed fairly
- **Minimized Risk** – even if judged acceptable by the other three guidelines, the technology must be implemented so as to avoid all unnecessary risk

Continuing from the previous page

Ethical Guidelines

- Acting with integrity
- Increasing professional competence
- Setting high standards of personal performance
- Accepting responsibility for one's own work
- Advancing the health, privacy, and general welfare of the public

Unauthorized Use

Definition:

- The unauthorized use of computer systems and networks can be called **time and resource theft** may range from doing private consulting or personal finances, or playing video games, to unauthorized use of the Internet on company networks

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Theft of Intellectual property

- **Software Piracy** – unauthorized copying of computer programs.
- **Piracy of Intellectual Property** – unauthorized copying of copyrighted material, such as music, videos, images, articles, books and other written works especially vulnerable to copyright infringement

Virus vs. Worm

- **Computer Virus** – a program code that cannot work without being inserted into another program
- **Worm** – distinct program that can run unaided

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Privacy on the Internet

- E-mail can be encrypted
- Newsgroup postings can be sent through anonymous remailers
- Internet Service Provider (ISP) can be asked not to sell your name and personal information to mailing list providers and other marketers
- Decline to reveal personal data and interests on online service and website user profiles

Computer Matching

Definition:

- Using physical profiles or personal data and profiling software to match individuals with data

Continuing from the previous page

Privacy Laws

Definition:

- Rules that regulate the collection and use of personal data by businesses

Computer Libel and Censorship

- **Spamming** – indiscriminate sending of unsolicited e-mail messages to many Internet users
- **Flaming** – sending extremely critical, derogatory, and often vulgar e-mail messages or newsgroup postings to other users on the Internet or online services

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Cyberlaw

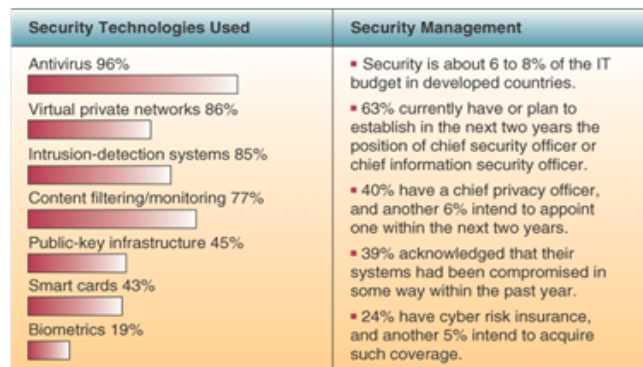
- Cyberlaw is the term used to describe laws intended to regulate activities over the Internet or via the use of electronic data communications. Cyberlaw encompasses a wide variety of legal and political issues related to the Internet and other communications technologies including intellectual property, privacy, freedom of expression and jurisdiction.

Computer Crime

- Computer crime includes
 - Unauthorized use, access, modification, or destruction of hardware, software, data, or network resources
 - The unauthorized release of information
 - The unauthorized copying of software
 - Denying an end user access to his/her own hardware, software, data, or network resources
 - Using or conspiring to use computer or network resources illegally to obtain information or tangible property

Continuing from the previous page

Cybercrime Protection Measures



Hacking

- Hacking is
 - The obsessive use of computers
 - The unauthorized access and use of networked computer systems
- Electronic Breaking and Entering
 - Hacking into a computer system and reading files, but neither stealing nor damaging anything
- Cracker
 - A malicious or criminal hacker who maintains knowledge of the vulnerabilities found for private advantage

Continuing from the previous page

Common Hacking Tactics

- Denial of Service
 - Hammering a website's equipment with too many requests for information
 - Clogging the system, slowing performance, or crashing the site
- Scans
 - Widespread probes of the Internet to determine types of computers, services, and connections
 - Looking for weaknesses

Common Hacking Tactics

- Sniffer
 - Programs that search individual packets of data as they pass through the Internet
 - Capturing passwords or entire contents
- Spoofing
 - Faking an e-mail address or Web page to trick users into passing along critical information like passwords or credit card numbers

Continuing from the previous page

Common Hacking Tactics

- Trojan House
 - A program that, unknown to the user, contains instructions that exploit a known vulnerability in some software
- Back Doors
 - A hidden point of entry to be used in case the original entry point is detected or blocked
- Malicious Applets
 - Tiny Java programs that misuse your computer's resources, modify files on the hard disk, send fake email, or steal passwords

Common Hacking Tactics

- War Dialing
 - Programs that automatically dial thousands of telephone numbers in search of a way in through a modem connection
- Logic Bombs
 - An instruction in a computer program that triggers a malicious act
- Buffer Overflow
 - Crashing or gaining control of a computer by sending too much data to buffer memory

Continuing from the previous page

Common Hacking Tactics

- Password Crackers
 - Software that can guess passwords
- Social Engineering
 - Gaining access to computer systems by talking unsuspecting company employees out of valuable information, such as passwords
- Dumpster Diving
 - Sifting through a company's garbage to find information to help break into their computers

Cyber Theft

- Many computer crimes involve the theft of money
- The majority are "inside jobs" that involve unauthorized network entry and alternation of computer databases to cover the tracks of the employees involved
- Many attacks occur through the Internet
- Most companies don't reveal that they have been targets or victims of cybercrime

Continuing from the previous page

Unauthorized Use at Work

- Unauthorized use of computer systems and networks is *time and resource theft*
 - Doing private consulting
 - Doing personal finances
 - Playing video games
 - Unauthorized use of the Internet or company networks
- Sniffers
 - Used to monitor network traffic or capacity
 - Find evidence of improper use

Internet Abuses in the Workplace

- General email abuses
- Unauthorized usage and access
- Copyright infringement/plagiarism
- Newsgroup postings
- Transmission of confidential data
- Pornography
- Hacking
- Non-work-related download/upload
- Leisure use of the Internet
- Use of external ISPs
- Moonlighting

Continuing from the previous page

Software Piracy

- Software Piracy
 - Unauthorized copying of computer programs
- Licensing
 - Purchasing software is really a payment for a license for fair use
 - Site license allows a certain number of copies

A third of the software industry's revenues are lost to piracy

Theft of Intellectual Property

- Intellectual Property
 - Copyrighted material
 - Includes such things as music, videos, images, articles, books, and software
- Copyright Infringement is Illegal
 - Peer-to-peer networking techniques have made it easy to trade pirated intellectual property
- Publishers Offer Inexpensive Online Music
 - Illegal downloading of music and video is down and continues to drop

Continuing from the previous page

Viruses and Worms

- A virus is a program that cannot work without being inserted into another program
 - A worm can run unaided
- These programs copy annoying or destructive routines into networked computers
 - Copy routines spread the virus
- Commonly transmitted through
 - The Internet and online services
 - Email and file attachments
 - Disks from contaminated computers
 - Shareware

Top Five Virus Families of all Time

- My Doom, 2004
 - Spread via email and over Kazaa file-sharing network
 - Installs a back door on infected computers
 - Infected email poses as returned message or one that can't be opened correctly, urging recipient to click on attachment
 - Opens up TCP ports that stay open even after termination of the worm
 - Upon execution, a copy of Notepad is opened, filled with nonsense characters

Continuing from the previous page

Top Five Virus Families of all Time

- Netsky, 2004
 - Mass-mailing worm that spreads by emailing itself to all email addresses found on infected computers
 - Tries to spread via peer-to-peer file sharing by copying itself into the shared folder
 - It renames itself to pose as one of 26 other common files along the way

Top Five Virus Families of all Time

- SoBig, 2004
 - Mass-mailing email worm that arrives as an attachment
 - Examples: Movie_0074.mpg.pif, Document003.pif
 - Scans all .WAB, .WBX, .HTML, .EML, and .TXT files looking for email addresses to which it can send itself
 - Also attempts to download updates for itself

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Top Five Virus Families of all Time

- Klez, 2002
 - A mass-mailing email worm that arrives with a randomly named attachment
 - Exploits a known vulnerability in MS Outlook to auto-execute on unpatched clients
 - Tries to disable virus scanners and then copy itself to all local and networked drives with a random file name
 - Deletes all files on the infected machine and any mapped network drives on the 13th of all even-numbered months

Top Five Virus Families of all Time

- Sasser, 2004
 - Exploits a Microsoft vulnerability to spread from computer to computer with no user intervention
 - Spawns multiple threads that scan local subnets for vulnerabilities

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The Cost of Viruses, Trojans, Worms

- Cost of the top five virus families
 - Nearly 115 million computers in 200 countries were infected in 2004
 - Up to 11 million computers are believed to be permanently infected
 - In 2004, total economic damage from virus proliferation was \$166 to \$202 billion
 - Average damage per computer is between \$277 and \$366

Adware and Spyware

- Adware
 - Software that purports to serve a useful purpose, and often does
 - Allows advertisers to display pop-up and banner ads without the consent of the computer users
- Spyware
 - Adware that uses an Internet connection in the background, without the user's permission or knowledge
 - Captures information about the user and sends it over the Internet

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Spyware Problems

- Spyware can steal private information and also
 - Add advertising links to Web pages
 - Redirect affiliate payments
 - Change a users home page and search settings
 - Make a modem randomly call premium-rate phone numbers
 - Leave security holes that let Trojans in
 - Degrade system performance
- Removal programs are often not completely successful in eliminating spyware

Privacy Issues

- The power of information technology to store and retrieve information can have a negative effect on every individual's right to privacy
 - Personal information is collected with every visit to a Web site
 - Confidential information stored by credit bureaus, credit card companies, and the government has been stolen or misused

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Opt-in Versus Opt-out

- **Opt-In**
 - You explicitly consent to allow data to be compiled about you
 - This is the default in Europe
- **Opt-Out**
 - Data can be compiled about you unless you specifically request it not be
 - This is the default in the U.S.

Privacy Issues

- **Violation of Privacy**
 - Accessing individuals' private email conversations and computer records
 - Collecting and sharing information about individuals gained from their visits to Internet websites
- **Computer Monitoring**
 - Always knowing where a person is
 - Mobile and paging services are becoming more closely associated with people than with places

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Privacy Issues

- Computer Matching
 - Using customer information gained from many sources to market additional business services
- Unauthorized Access of Personal Files
 - Collecting telephone numbers, email addresses, credit card numbers, and other information to build customer profiles

Protecting Your Privacy on the Internet

- There are multiple ways to protect your privacy
 - Encrypt email
 - Send newsgroup postings through anonymous remailers
 - Ask your ISP not to sell your name and information to mailing list providers and other marketers
 - Don't reveal personal data and interests on online service and website user profiles

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Privacy Laws

- **Electronic Communications Privacy Act and Computer Fraud and Abuse Act**
 - Prohibit intercepting data communications messages, stealing or destroying data, or trespassing in federal-related computer systems
- **U.S. Computer Matching and Privacy Act**
 - Regulates the matching of data held in federal agency files to verify eligibility for federal programs

Privacy Laws

- **Other laws impacting privacy and how much a company spends on compliance**
 - Sarbanes-Oxley
 - Health Insurance Portability and Accountability Act (HIPAA)
 - Gramm-Leach-Bliley
 - USA Patriot Act
 - California Security Breach Law
 - Securities and Exchange Commission rule 17a-4

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Computer Libel and Censorship

- The opposite side of the privacy debate...
 - Freedom of information, speech, and press
- Biggest battlegrounds
 - Bulletin boards
 - Email boxes
 - Online files of Internet and public networks
- Weapons used in this battle
 - Spamming
 - Flame mail
 - Libel laws
 - Censorship

Computer Libel and Censorship

- Spamming
 - Indiscriminate sending of unsolicited email messages to many Internet users
- Flaming
 - Sending extremely critical, derogatory, and often vulgar email messages or newsgroup posting to other users on the Internet or online services
 - Especially prevalent on special-interest newsgroups

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Cyberlaw

- Laws intended to regulate activities over the Internet or via electronic communication devices
 - Encompasses a wide variety of legal and political issues
 - Includes intellectual property, privacy, freedom of expression, and jurisdiction

Cyberlaw

- The intersection of technology and the law is controversial
 - Some feel the Internet should not be regulated
 - Encryption and cryptography make traditional form of regulation difficult
 - The Internet treats censorship as damage and simply routes around it
- Cyberlaw only began to emerge in 1996
 - Debate continues regarding the applicability of legal principles derived from issues that had nothing to do with cyberspace

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Other Challenges

- **Employment**
 - IT creates new jobs and increases productivity
 - It can also cause significant reductions in job opportunities, as well as requiring new job skills
- **Computer Monitoring**
 - Using computers to monitor the productivity and behavior of employees as they work
 - Criticized as unethical because it monitors individuals, not just work, and is done constantly
 - Criticized as invasion of privacy because many employees do not know they are being monitored

Other Challenges

- **Working Conditions**
 - IT has eliminated monotonous or obnoxious tasks
 - However, some skilled craftsperson jobs have been replaced by jobs requiring routine, repetitive tasks or standby roles
- **Individuality**
 - Dehumanizes and depersonalizes activities because computers eliminate human relationships
 - Inflexible systems

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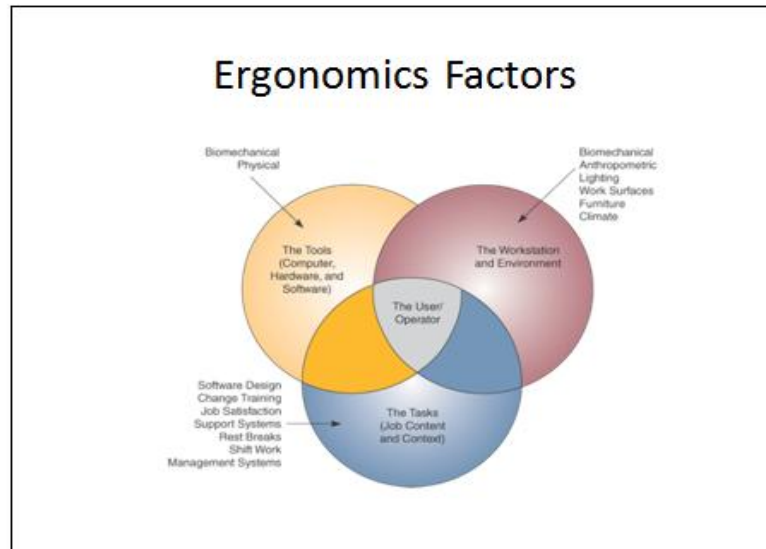
Health Issues

- Cumulative Trauma Disorders (CTDs)
 - Disorders suffered by people who sit at a PC or terminal and do fast-paced repetitive keystroke jobs
- Carpal Tunnel Syndrome
 - Painful, crippling ailment of the hand and wrist
 - Typically requires surgery to cure

Ergonomics

- Designing healthy work environments
 - Safe, comfortable, and pleasant for people to work in
 - Increases employee morale and productivity
 - Also called *human factors engineering*

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Societal Solutions

- Using information technologies to solve human and social problems
 - Medical diagnosis
 - Computer-assisted instruction
 - Governmental program planning
 - Environmental quality control
 - Law enforcement
 - Job placement

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Societal Solutions

- The detrimental effects of information technology
 - Often caused by individuals or organizations not accepting ethical responsibility for their actions



Security Management of IT

- The Internet was developed for interoperability, not impenetrability
 - Business managers and professionals alike are responsible for the security, quality, and performance of business information systems
 - Hardware, software, networks, and data resources must be protected by a variety of security measures

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Security Management

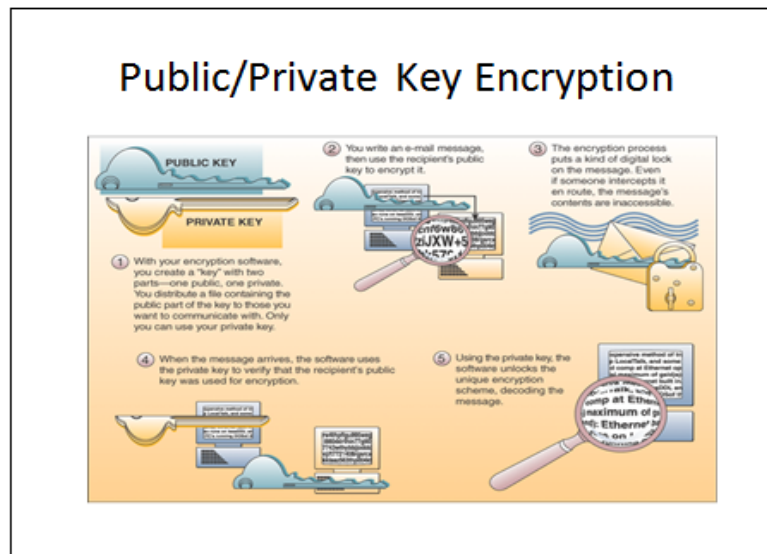
- The goal of security management is the accuracy, integrity, and safety of all information system processes and resources



Internetworked Security Defenses

- Encryption
 - Data is transmitted in scrambled form
 - It is unscrambled by computer systems for authorized users only
 - The most widely used method uses a pair of public and private keys unique to each individual

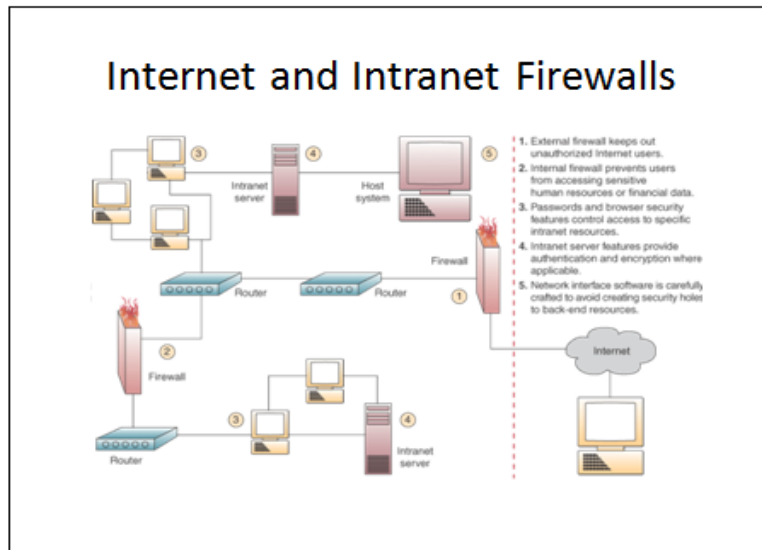
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Internetworked Security Defenses

- Firewalls
 - A gatekeeper system that protects a company's intranets and other computer networks from intrusion
 - Provides a filter and safe transfer point for access to/from the Internet and other networks
 - Important for individuals who connect to the Internet with DSL or cable modems
 - Can deter hacking, but cannot prevent it

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Denial of Service Attacks

- Denial of service attacks depend on three layers of networked computer systems
 - The victim's website
 - The victim's Internet service provider
 - Zombie or slave computers that have been commandeered by the cybercriminals

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Defending Against Denial of Service

- At Zombie Machines
 - Set and enforce security policies
 - Scan for vulnerabilities
- At the ISP
 - Monitor and block traffic spikes
- At the Victim's Website
 - Create backup servers and network connections

Internetworked Security Defenses

- Email Monitoring
 - Use of content monitoring software that scans for troublesome words that might compromise corporate security
- Virus Defenses
 - Centralize the updating and distribution of antivirus software
 - Use a security suite that integrates virus protection with firewalls, Web security, and content blocking features

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Other Security Measures

- Security Codes
 - Multilevel password system
 - Encrypted passwords
 - Smart cards with microprocessors
- Backup Files
 - Duplicate files of data or programs
- Security Monitors
 - Monitor the use of computers and networks
 - Protects them from unauthorized use, fraud, and destruction

Other Security Measures

- Biometrics
 - Computer devices measure physical traits that make each individual unique
 - Voice recognition, fingerprints, retina scan
- Computer Failure Controls
 - Prevents computer failures or minimizes its effects
 - Preventive maintenance
 - Arrange backups with a disaster recovery organization

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Other Security Measures

- In the event of a system failure, **fault-tolerant systems** have redundant processors, peripherals, and software that provide
 - **Fail-over capability:** shifts to back up components
 - **Fail-save capability:** the system continues to operate at the same level
 - **Fail-soft capability:** the system continues to operate at a reduced but acceptable level

‘Case Study 1: Who is Peter Ward?’ A document provided by Dr. Fawzeah.

Case Study 1: Who is Peter Ward?

James Black is a contract programmer who specializes in database integration problems. He has accepted a six-month contract with Meticulous Assurance (MA), a company which offers life, vehicle and property insurance services. James is assigned to work on the risk re-assessment module of their information system where the policies of individual clients are reconsidered in the light of data gathered from various sources over a period of time.

His first task is to use information gathered about the occurrence of some quite severe land subsidence in a particular zone of the Essex marshes. Using Ordinance Survey data he is able to identify MA clients whose houses are at risk and to up rate their premiums to cover this risk.

After several more assignments involving property and vehicle insurance, he is eventually given a task connected with the life insurance database. His manager gives him a floppy disk labeled 'Peter Ward' and containing a file which must be integrated with the database, identifying particular clients and up rating their risk assessments. The first thing he notices on opening the file is that his brother-in-law, Thomas Keegan, is one of the clients mentioned.

After performing the integration, he is amazed to discover that Thomas's risk has been increased to the point where the company will consider trying to withdraw its cover. Most of the other clients identified on the Peter Ward file suffer the same fate. He tries to discover what the new data is about but the systems manager is very evasive and fobs him off.

That evening in the pub, he is chatting to another contract programmer who tells him that the company has a "mole" in the local hospital that copies medical data off the hospital's computer and sells it to MA. Looking in the telephone directory, he finds that one of the numbers is for "Peter Ward" and on phoning the number he is told that it is the HIV diagnosis centre.

That weekend, James meets up with his sister, Janine Keegan, who tells him that she and Thomas are thinking of starting a family.....

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