Teacher change:
Individual and cultural risk perceptions
in the context of ICT integration

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Author's Declaration

This is to certify that:

1) This thesis comprises only my original work towards the PhD in Education
2) Due acknowledgement has been made in the text to all other material used
3) The thesis does not exceed the word length for this degree.
4) No part of this work has been used for the award of another degree.
5) This thesis meets the University of Sydney's Human Research Ethics Committee (HREC) requirements for the conduct of research.

Signature(s): _____

Name(s): _____

Date: _____

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Abstract

This study investigates teachers' perceptions of risk and risk-taking behaviours in the context of ICT-related educational change. Perceptions and behaviours are examined through teachers' talk about risk: their individual perceptions of risk-taking, and how perceptions relate to risk perceptions in the wider school culture. When teachers implement new teaching practices and experiment in the classroom they are taking risks. Without the risk-taking, change is not possible. The research presented in this thesis examines teachers' perceptions of risk in the area of ICT integration – utilizing ICT in the classroom to support student learning effectively. The research was carried out in Australia and the United States. A two-phase, mixed-method strategy was employed in the study. The first phase was primarily questionnaire-based, and captured data from both secondary and primary-level teachers, concerning aspects of teaching-efficacy, computer-efficacy, measures of playfulness & anxiety, and school culture. This phase made it possible to explore some of the relationships between these variables, develop and test instrumentation to distinguish between more and less risk-averse teachers and then select some contrasting teachers for further investigation. Phase two involved observation of these eight teachers' teaching, several rounds of in-depth interviews, and the gathering of field notes from school visits.

The thesis shows that risk-taking needs to be understood as an interaction between personal (teacher) and cultural (school) variables. Findings revealed that a primary area of concern in teachers' perceptions of risk was risk to student achievement. Teachers who showed more potential to take risks talked about student achievement in terms of intrinsic motivation and engagement, while teachers with less potential to take risks saw achievement in terms of quantifiable results and test scores. Depending on a teacher's risk-taking habits, perceived risks had more or less impact on the decision to integrate ICT into the classroom. Risk-taking behaviours related to teachers' perceptions of the teacher role and school expectations of ICT-integration.

Teachers' risk perceptions proved to be related to their school's cultural type, categorized using a grid-group typology. The two case study schools were found to be hierarchical cultures. In hierarchical cultures, technology is viewed as low-risk, as long as the manner in which it is used is approved by an expert. The findings have significant implications for the introduction of new technologies into school cultures, particularly in relation to the impact of school leadership and trust when schools are introducing ICT-related change initiatives.

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1 Introduction

This study investigates teachers' risk-taking habits and risk perceptions in the context of information and communication technology (ICT)-related educational change. Risk-taking in the classroom is explored through teachers' talk about risk and how their own risk-taking behaviours relate to those of the wider school culture. In the research literature, and in individuals' talk about ICT-related educational change, terms such as *worth*, *value*, and *benefit* are often employed. These types of judgements show that individuals are assessing the benefit of change, as well as the relative costs. This type of language illustrates a natural tendency of individuals to assess outcomes in terms of maximum benefit.

In the past two decades, risk theorists have identified an increasing public awareness of technological, natural, and social risk (Beck, 1992; Giddens, 1991a). They argue that this trend has emerged from the individual's and cultures' desire to control and manage risky outcomes. In the current educational climate, numerous ICT-related changes are taking place in schools, and for every change, there are associated risks. In fact, risk and change are inextricably linked – without taking risks, change and innovation are not possible.

Previously, it had been suggested that teachers do not integrate technology into their practice because they do not have the appropriate training or access to technology (e.g. Clarke & Robinson, 2005; Cohen, 1993). While this is still true in many schools, research has shown even when teachers have access to training and technology, they still do not, in any significant numbers, integrate technology into their teaching (e.g., Ertmer, 2005; Mueller, Wood, Willoughby, Ross, & Specht, 2008). This trend has led researchers to consider that low levels of ICT-related change in schools could be a result of schools' cultural contexts, rather than being simply an issue of teachers' access to resources or training.

Risk theory offers a way to examine these types of cultural interactions, by providing a useful conceptual framework for understanding "why things have gone wrong" (Lupton, 1999, p. 3); but, risk perceptions are not only about negative results or fears. Risk-taking can be in the form of positive exploration, with potentially questionable results. Whether results are positive, negative, or even worth fearing is relative to specific groups and cultures. The argument to be advanced in this thesis considers risk from a sociocultural, structuralist perspective through which the interactions between individual and cultural risk judgements can be better understood. The discussion examines teachers' perceptions of risk in the area of ICT integration – utilizing ICT in

the classroom to effectively support student learning in Australia and the United States. At the time of this study, there had been very little research in this area, and no prior research considering perceived risks in relation to ICT-integration.

1.1 Teaching with ICT

At the federal level, Australia and the United States have both identified ICT and information literacy[1] as essential skills for functioning in contemporary society (International Society for Technology in Education [ISTE], 2008; Ministerial Council on Education Employment Training and Youth Affairs [MCEETY], 2008b). At the state levels, ICT literacy has been written into subject level curricula (e.g., Board of Studies [BOS], 2007b; Florida Department of Education [FLDOE], 2006). At the individual school level, this priority has manifested itself as an expectation that students will be taught to use ICT tools, and that technology will be integrated into the curriculum (Ertmer, 2005). Teaching students explicit technology skills (such as using word processing software) and teaching ICT literacy are very different activities, but they are often grouped together in discussions. In a complex change process, such as learning to integrate technology into teaching, necessary technology skills, changes in belief systems, and strategies are all part of implementation, and it can be difficult to separate the activities when looking at overall educational change (Davis, 2002; Fullan, 2001).

In the context of ICT-integration, it is possible to identify some areas of uncertainty about educational outcomes that could influence how a teacher perceives ICT-integration. The greatest unknowns are the possible impacts of technology on student learning. While results in the research literature are generally positive, they are neither uniformly positive nor guaranteed (Lawless & Pellegrino, 2007). Evidence does show that ICT can be used to enhance critical and creative thinking skills, and can support creativity, communication, and knowledge building in the classroom (Loveless, 2007). These types of curricular considerations are often associated with student-centred, or constructivist, approaches to teaching. Research has shown that teachers who are more open to changes in their practice and ICT-integration, are also more likely to have a student-centred approach to teaching (e.g., Baylor & Ritchie, 2002).

[1] ICT literacy is defined as "the ability of students to use ICT appropriately to access, manage, integrate and evaluate information, develop new understandings and communicate with others in order to participate effectively in society" (Ministerial Council on Education Employment Training and Youth Affairs [MCEETYA], 2008a). Information literacy is defined as "the set of skills needed to find, retrieve, analyze, and use information" (Association of College and Research Libraries [ACRL], 2008). The term information literacy tends to be used in literature from the United States, while the term ICT literacy is used more frequently in Australia. In this discussion, the term ICT literacy will be used to cover both ICT and information literacy.

It is generally understood that teachers who value technology will be motivated to integrate it into the curriculum, and make long-lasting changes to their teaching practice. Variations in the perceived value of, and beliefs about, technology in teaching have been related to teachers' personal technology use, standards within their curriculum areas, and positive prior experiences teaching with technology, just to name a few examples. It has also been shown that teachers working in schools that actively support technology use and change are more likely to integrate technology into their teaching (Hew & Brush, 2007). While there are many reasons explaining some teachers' willingness to integrate ICT into their teaching, there is not a clear understanding of why many teachers do *not* integrate ICT into their teaching. It *is* understood that, similar to high levels of ICT integration, low levels of integration are probably best explained by a complex mixture of personal and contextual influences (Mueller et al., 2008).

The argument to be advanced in this thesis considers teachers' potential to engage in ICT-integration and risk-taking through examining four variables (and their associated indicators): teaching-efficacy, computer-efficacy, playfulness & anxiety, and school culture. Each of the variables is defined as the following. Teaching-efficacy is a teacher's perception of how well they are able to fulfil the tasks associated with teaching (Ertmer, 2005), such as facilitating student learning. Computer-efficacy is how well a person feels they are able to complete computer-related tasks (Compeau & Higgins, 1995), such as conducting an internet search. Teachers' perceived levels of playfulness or anxiety when using technology are mutually exclusive. Computer-anxiety is defined as apprehension or fear when an individual faces the possibility of using ICT (Hackbarth, Grover, & Yi, 2001). Anxiety is a limiting factor in technology use (Webster & Martocchio, 1992). Playfulness represents an individual's degree of cognitive spontaneity in microcomputer interactions (Webster & Martocchio, 1992). School culture includes students, teachers, and school leadership, as well as expectations of the school throughout the wider community. The discussion particularly considers how school culture can support a culture of experimentation and innovation, which supports risk-taking (Baylor & Ritchie, 2002).

While there are many possible ways to examine teachers' values and behaviours in the context of ICT-related educational change, these four indicators were selected because they have often been identified in the literature as related to teachers' potential to engage in change and experimentation (e.g., Baylor & Ritchie, 2002; Mueller et al., 2008). For the purposes of this discussion, teachers who are willing to engage in change would be highly likely to be risk-takers. Therefore, teaching-efficacy, computer-efficacy, and playfulness & anxiety consider the risk-taking

potential of individual teachers, while school culture encompasses their perceptions of experimentation in the wider school.

In the context of ICT-related educational change, teachers are confronted with two sets of risks: those related to teaching and those related to technology. For many teachers, teaching and technology represent different sets of beliefs and values. Individual and cultural perceptions of risk will be judged in both of these areas.

1.2 Individual attitudes to risk

Individual perceptions of risk are often based upon experiences and expected personal benefit. Personal benefit can be understood as *gains* supporting something a person values. The following discussion explains individuals' processes of risk judgement and assessment through a combination of rational and affective analysis (Slovic, Finucane, Peters, & McGregor, 2004). For example, teachers who value technology are more likely to take risks and integrate it into the classroom. Teachers' perceptions of the benefits of technology integration are based upon their perception of the value of technology in teaching. They would perceive a positive *gain* from integrating technology, such as increased student engagement. This preference has little to do with the actual risks associated with ICT integration in the classroom. In this context, technology integration presents a variety of unpredictable outcomes that may not justify the effort of changing teaching practices. Some teachers will decide that the *benefit* outweighs the risks and ICT-integration is *worth* pursuing. Others will perceive that the *costs* are too high, such as lost teaching time if a lesson does not go well. They would see the risks as limiting factors and not integrate ICT into their teaching. Often, if a person is unsure of a risk they will anticipate anxiety, and will be less likely to engage in the activity.

In an educational setting, anxiety can strongly influence how teachers adopt new teaching methods and skills (Darby, 2008). Prior research has identified insufficient access to computers, teachers' lack of knowledge and skills, and difficulty when trying to integrate technology into the curriculum as three of the biggest problems associated with technology integration (Pelgrum, 2001). In the context of ICT-related change, changes in teaching or technology use could produce anxiety in individuals. Anxiety can be a result of individuals having low levels of perceived teaching-efficacy or computer-efficacy. Often, if people do not feel confident using technology or new teaching practices the change will not be worth the risk; because, it is too difficult to learn, could jeopardize their teaching, or they are unsure of their ability and therefore do not try (Hackbarth, Grover & Yi, 2001). This attitude could limit a person's potential to change. In addition

to personal limitations, individuals are influenced by contextual factors, such as school expectations, curriculum guidelines, as well as the general culture of the school.

1.3 Cultural attitudes to risk

Educational change is a complicated process, and it has been shown that change requires more than helping teachers learn how to use new tools or methods, often a change in beliefs is necessary (Ertmer, 2005). Research has also shown that schools supporting a culture of experimentation are better suited to support teachers as they take risks and change their teaching practices (Roehrig, Kruse, & Kern, 2007). A culture supporting experimentation would include helping teachers learn to think in new ways, take risks in the classroom using new teaching methods, and being tolerant of (rather than punishing) occasional failures.

Sociocultural risk theory suggests that some cultures are better suited to supporting experimentation and change than others. As perceived risks are specific to groups and cultures, it is necessary to determine school cultures' beliefs and values, in an effort to establish what is important to the group. Risk theory has shown that groups perceive risks associated with change and innovation differently, depending on their hierarchical structure and individuals' freedom within the group (Douglas, 2006).

The structure of a group will affect perceptions of leadership, power, trust, and social deviance. For example, in a school context teachers may feel it is important to have a high level of trust in the principal to be satisfied with school leadership. In other schools, trust in leadership may not be as important. In the context of ICT-related change, cultural perceptions of power and leadership can influence how well change can be initiated in a school. If the principal mandates technology integration, the effectiveness of this mandate will be related to the power teachers perceive the principal to have in the school culture. Depending on the culture's hierarchy, teachers could be more effectively motivated to change through other channels.

Sociocultural risk theory specifically addresses cultures' perceptions of technology-related risks. Depending on the cultural type, technology can be viewed as very high risk and avoided, or very low risk and embraced unconditionally. Individuals' perceptions of group leadership have proven to be particularly influential in the acceptance of new technologies in some cultural types. In the context of this study, perceptions of risk associated with technology will help answer some of the sociocultural questions surrounding teachers' low levels of ICT-integration into teaching. Additionally, it will help explain why some school cultures are better able to support ICT-related experimentation and changes in teaching.

1.4 Research statement

Teachers' personal and cultural values and beliefs influence their risk perceptions and risk-taking behaviours in the context of ICT-related educational change.

The current research is concerned with teachers' risk-taking behaviours on an individual and sociocultural level. Studying risk on a sociocultural level illuminates broad values and beliefs. On an individual level, it is necessary to understand how culture influences personal perceptions and judgements. The argument advanced in this thesis uses four indicators to gain a better understanding of teacher's potential risk-taking behaviours and sociocultural influences: teacher-efficacy, computer-efficacy, playfulness & anxiety, and school culture. The indicators are intended to help explore teachers' *potential* to take risks, and they represent preliminary themes in the examination of *perceived* risks. The research is guided by the following three questions:

1) Do the indicators predict secondary-level teachers' risk-taking behaviour and their potential to integrate ICT into the curriculum?
2) What risks do secondary-level teachers associate with integrating ICT into the curriculum?
3) How does school culture interact with secondary-level teachers' risk-taking when they are integrating ICT into the curriculum and changing their teaching practice?

With globalisation, and the increasing possibilities for people to communicate with each other using a wide variety of communication and networked media, it is important to understand the commonalities surrounding how individuals and cultures interact during times of change. This is particularly important when considering how ICT-related tools are used to support collaboration in knowledge building, communication, and creative work across schools and cultures. The study looks at teachers' risk-taking behaviours in two locations: New South Wales (NSW) in Australia and Florida in the United States. The education systems of the two locations share several common features, including the use of standards based curriculum and standardised testing. Looking at educational change in two contexts presents similarities and differences between schools, groups of teachers, and individual teachers.

1.5 Structure of the dissertation

The structure of the dissertation is as follows. It begins with a literature review (Chapter 2), followed by a methods chapter (Chapter 3). The next chapter (Chapter 4) presents results from Phase 1 of the study, and participant selection for Phase 2. Teacher narratives from Phase 2 are presented in Chapters 5. Chapter 6 presents teachers' perceptions of risk through the idea of spheres of control as a conceptual framework to structure and understand teachers' risk

perceptions. Application of the overarching theoretical sociocultural risk framework is presented in Chapter 7. Chapter 8 combines findings presented in the spheres of control with the theoretical risk framework. In this chapter, interactions between individual teachers' risk perceptions and risk-taking behaviours (spheres of control) and schools' cultural risk perceptions (theoretical framework) are explored. Chapter 9 presents a summary of the findings, conclusions, and implications for future research.

The following overview presents a more detailed description of each chapter.

In Chapter 2, the theoretical risk framework and reviews of current ICT-integration and educational change literature are presented. In this section, the rationale for conceptualizing interactions between individual teachers and school culture, in the context of ICT-related change, through sociocultural risk theory is outlined. This discussion is followed by a description of the current context of ICT-related change in education. Finally, Chapter 2 presents the four risk-taking indicators, their theoretical foundation, and rationale for their use in this study.

Chapter 3 presents a discussion of the methods. The rationales supporting the ethnographic approach to the research and the two-phased mixed method data gathering approach are explained. The development and implementation of the Phase 1 quantitative questionnaire and the selection of Phase 2 qualitative case studies are presented. Sampling and data collection strategies for both phases are presented, followed by analysis strategies for Phase 1 and Phase 2 data, as well as the final data analysis. Chapters 4 and 5 present results from the two research phases. Chapter 4 presents questionnaire results from the whole sample, risk-taking potential scale (RTPS) creation, and Phase 2 participant questionnaire results. In Chapter 5, results from Phase 2 teacher interviews, observations, and researcher field notes are presented in the form of narrative descriptions. First, the United States (Florida) case study school is presented, followed by a narrative description of each of the four teachers at the school; then, the Australian (NSW) case study results and teacher descriptions are presented. Each teacher narrative is divided into six sections. The first section describes the teacher and their classroom. This is followed by a presentation of the teacher's interview and observation data in relation to each of the four risk-taking indicators. Each teacher description is concluded with a brief summary of their overall experience with ICT-integration in the context of educational change.

Chapter 6 presents the combined results of the eight participating Phase 2 teachers. In this chapter the Phase 2 teachers' risk perceptions and risk-taking behaviours are discussed in relation to their risk-taking potential scale (RTPS) score. Teachers' perceived risks are conceptualized

through the idea of spheres of control: individual (primary), classroom (secondary), and school culture (tertiary). Risks associated with the individual and the classroom are examined in depth. The third sphere presents a preliminary discussion of teachers' perceptions of school culture. Teachers' perceptions of school culture are analysed in greater detail in Chapters 7 and 8.

In Chapter 7, the theoretical risk framework is introduced into the discussion. The chapter first presents teachers' perceptions of school leadership, peer relations, and students. Teachers' perceptions of the school cultures are analysed through the theory of structuration, specifically through the concept of institutional reflexivity. Conclusions from this discussion are then used to support the classification of each school culture, using ideas from cultural theory[2]. Perceptions of risk are discussed relative to cultural groups' way of life, social deviance, and technology. Chapter 8 presents a full analysis of school cultures' perceived risks, structured within the three spheres of control. Teachers' potential to take risks in the context of ICT-integration, and the sociocultural influences on their perceptions, are examined. The discussion specifically focuses on differences that exist between teachers indicating more or less risk-taking behaviour in the context of ICT-related educational change.

Finally, Chapter 9 revisits and summarizes the research findings in terms of the research questions and the main research aim, providing a concise statement of the original contribution to knowledge that is made by the study. Implications and innovative aspects of the research are summarised, and some suggestions are made for future research in this area.

[2] Mary Douglas' (1992) cultural theory derived from anthropology.

2 Literature review

According to the Oxford English Dictionary, *risk* is the possibility that something unpleasant will happen, while *change* is the act of becoming something different (OED, 2006). Change is an inherently risky endeavour. In prior risk research, individuals have described risk as "...fear, nervousness, and discomfort," and "something that could turn bad" (Tulloch & Lupton, 2003, p. 17).

The following research questions guided this literature review:

1) Do the indicators predict secondary-level teachers' risk-taking behaviour and their potential to integrate ICT into the curriculum?
2) What risks do secondary-level teachers associate with integrating ICT into the curriculum?
3) How does school culture interact with secondary-level teachers' risk-taking when they are integrating ICT into the curriculum and changing their teaching practice?

The literature review first presents an overview of selected risk analysis theories (Section 2.1). The risk analysis field is a broad topic area, covering many disciplines. The conceptual theories presented in this study have been selected to answer the research questions, but they are not the only possible approach. In addition to introducing risk analysis, the first section will establish terms and concepts used throughout the study. In the second section (Section 2.2-2.4), the discussion's theoretical framework is explained. Again, the theories presented are wide-ranging sociological and anthropological theories, and are not presented in total.

After establishing the broad theoretical framework, the discussion addresses the application of risk theory in an educational context (Section 2.5). The interaction between individual teachers and the school culture will be presented in this section. Section 2.6 presents a discussion of the school context in educational change. In this section, individual teachers' considerations, as well as possible school culture influences on teachers' ICT-related change. Considerations and influences are discussed in relation to the four risk-taking indicators: teaching-efficacy, computer-efficacy, playfulness & anxiety, and school culture, in the context of ICT-related change. The conceptual relationships between the four indicators are presented, as well as a discussion of how they are able to create a preliminary understanding of teachers' potential to take risks in the context of ICT-related change.

Throughout the presentation of literature, it is important to keep the guiding research statement in mind: Teachers' personal and cultural values and beliefs will influence their risk perceptions and risk-taking behaviours in the context of ICT-related educational change. The following discussion will present a theoretical framework grounded in well established theories, and will extend the theories to consider new areas of educational change and ICT-related risk.

2.1 Introducing risk

When researchers discuss *risk* they often mean *perceived risk*: people's evaluations of possible hazards (Rohrmann, 2000). What one person or culture considers a risk may not be a concern for another; therefore, risk is based in culture and context (Lupton, 1999; Sjoberg, Koaroa, Rucai, & Bernstorm, 2000; Slovic et al., 2004; Wildavsky & Drake, 1990; Wilkinson, 2001; Yates & Stone, 1992). Risk perceptions are based upon what individuals and groups perceive as undesired outcomes, thus guiding choices.

Despite the simplicity of the Oxford English Dictionary definition, *risk* is a contested and protean concept. Rohrmann and Renn (2000, p. 13) state, "there is no commonly accepted definition for the term risk – neither in the sciences nor in public understanding." While there has not been a common definition for the term, in most contexts *risk* refers to "the possibility of unwanted events"; *perceived risk* refers to peoples' "judgments and evaluations of hazards they (or their facilities, or the environment) are or might be exposed to" (p. 14). Actual risk can only occur from actual risk-taking behaviour, perceived risk is a prediction or estimation of risk (p. 15). While the previous risk and perceived risk definitions are more typical, in some groups, risk itself is perceived as a *thrill.* Individuals may seek risk-taking opportunities through sports, games, speculation, or investment. In these situations, individuals will take risks to triumph over natural forces or other risks (Renn, 2004, p. 407). It is possible that the desire to take risks is a response to living in a risk-averse society, in which individuals' instinctual need to take risks has been unsatisfied. Risk-takers do not derive satisfaction from taking risks, but it is the risk itself that is a benefit (Machlis & Rosa, 1990). Risk can be seen as a hazard or as a thrill, differences between perceived risks is the contextual nature of perception.

Two camps of risk perception research exist, the theoretical and the psychometric (empirical). Fundamentally, both approaches are grounded in common assumptions: risk-taking and perceived risks are influenced by a combination of social, institutional, and cultural elements (Rohrmann & Renn, 2000; Slovic, 2000a). Theoretical research into risk has been generally classified in three areas: social/cultural (e.g., Douglas, 1992; Wildavsky & Drake, 1990); modern context/risk society, (e.g., Beck, 1992; Giddens, 1991a); and, governmentality (e.g., Dean, 1982;

Foucault, 1991). In the theoretical traditions, risk has generally been assessed from a macro-social perspective. Sociologists and anthropologists in these perspectives discuss risk in terms of cultural context, norms, and value systems. Studies have generally been qualitative, rather than quantitative, tending to be more philosophical than empirical (Rohrmann & Renn, 2000, p. 18).

The psychometric paradigm has, among other things, sought to "develop a method for weighing technological risks against benefits to answer the fundamental question 'How safe is safe enough?'"(Slovic, 2000a, p. xxii). Research in this tradition, such as studies by Slovic and Fischhoff (1978), have been primarily concerned with producing scale-based quantitative measures (Slovic, 2000a, p. xxiii). While the majority of psychometric risk studies are quantitative, there have been studies exploring the subjective meaning of risk concepts: Why do individuals differ in their perceptions of risk?

Elements from both traditions were employed in this study, based on the premise that individual perceptions cannot be separated from the cultural structures in which they exist. Giddens' (1984, 1990, 1991a, 1991b) theory of structuration (risk society) was applied to conceptualize the reflexive relationship between individuals' risk perceptions and culture (see Section 2.3). It has been argued that structuration does not adequately consider the specific cultural pressures and influences affecting individuals' behaviours and actions (Troman, 2000). For this reason, a second theoretical approach was employed. Mary Douglas' (1992, 2006; Harris, 1995; Spickard, 1989; Wildavsky & Drake, 1990) Cultural theory (cultural), using grid-group typology, was applied to understand cultural risk perceptions specifically related to technology and social deviance in school cultures (see Section 2.4). In addition to considering risk perception in the two theoretical traditions, scale measures similar to those used in the psychometric paradigm were employed (see Chapter 3, Section 3.5). In theoretical and psychometric risk theory, perceived risks tend to be discussed in terms of *semantic images*. These images act as guides, allowing individuals to reduce the complexity of risks through easily understood metaphors (Renn, 1998). The four primary semantic images in risk theory are:

1) Damocles' Sword: Risk as a pending danger
2) Pandora's Box: Slow killers
3) Athena's Scale: Cost-benefit ratio
4) Hercules' Image: Avocational thrill

The main semantic image employed in this discussion is Athena's Scale (cost-benefit ratio).

2.1.1 Cost-benefit analysis

According to Rohrmann (2000, p. 13), the term *cost-benefit* comes from economic theory, in which risks are perceived as a balancing of gains and losses. This semantic image is the closest representation of the technical understanding of risk (Rohrmann & Renn, 2000, p. 28). Renn (1998) states that the cost-benefit ratio is typically used to evaluate monetary losses such as gambling or the lottery. He limits use of the semantic image to monetary related decision making; but, the image has wider application.

For example, research examining factors affecting teachers' technology integration in schools has considered teachers' cost- benefit calculations in technology adoption (Zhao & Frank, 2003). Zhao and Frank identify *costs* as time and energy required to use technology in the classroom, while possible benefits were related to technology supporting teachers' pedagogical practices and beliefs. Wildavsky and Dake (1990) state that people make judgements based upon what will reinforce and continue their desired "way of life," and that a way of life is aligned with values. A person's values, goals, and expectations will influence their decision-making process (Slovic, Kunreuther, & White, 2000).

Table 2.1

Comparison of two ways of knowing

Experiential Systems	Rational Systems
1. Holistic	1. Analytic
2. Affective: Pleasure-pain oriented (what feels good)	2. Logical: Reason oriented (what is sensible)
3. Associationistic connections	3. Logical connections
4. Behaviour mediated by "vibes" from past experiences	4. Behaviour mediated by conscious appraisal of events
5. Encodes reality in concrete images, metaphors, and narratives	5. Encodes reality in abstract symbols, words, and numbers
6. More rapid processing: Oriented toward immediate action	6. Slower processing: Oriented toward delayed action
7. Slower to change: Changes with repetitive or intense experience	7. Changes more rapidly: Changes with speed of thought
8. More crudely differentiated: Broad generalization gradient stereotypical thinking	8. More highly differentiated
9. More crudely integrated: Dissociative, emotional complexes; context-specific processing	9. More highly integrated: Cross-context processing
10. Experienced passively and preconsciously: We are seized by our emotions	10. Experienced actively and consciously: We are in control of our thoughts
11. Self-evidently valid: "Experiencing is believing"	11. Requires justification via logic and evidence

Note. From Epstein, S. (1994). Integration of the cognitive and the psychodynamic unconscious. American Psychologist, 49(8), 709-724.

An individual's decision-making process in risk evaluation and perception is both an affective and analytical assessment of consequences in relation to values (Slovic et al., 2004). Slovic derives

these two ways of thinking about risks from Epstein's (1994) ways of knowing: Experimental and Rational (see Table 2.1).

Slovic (2004)states, while analytical analysis is important in the decision-making process, experiential referencing based on affect and emotion is often a more efficient way to gauge situational outcomes and make behaviour choices. People constantly engage in both types of knowing and thinking (Epstein, 1994). Considering this assumption, three theories are presented orienting the two decision-making processes as they relate to risk assessment: Utility, Bounded Rationality, and Affect Heuristic.

2.1.2 Utility and bounded rationality

Utility theory is concerned with "probabilities, payoffs, and the merger of these factors – expectation" (Slovic et al., 2000, p. 6). Like cost-benefit, utility theory is derived from economics. It states that a person will choose the best outcome from of a set of possibilities, making a rational choice; defined as the maximization of expected utility. Utility theory is normative, and seeks to prescribe a course of action aligning with individuals' values and beliefs. It provides a foundational understanding of the decision-making process associated with risk-taking and perceived risk. The following discussion presents an introductory explanation of the basic theoretical concepts.

Determining the utility of a choice is an essential element when considering "wise behaviour" (Slovic et al., 2000). Von Neumann and Morgenstern (1947) developed axiomatic principals of rational behaviour. One of the principals is *transitivity*:

1) A person prefers outcome A to outcome B,
2) A person prefers outcome B to outcome C,
3) It would be irrational for him to prefer outcome C to outcome A.

A second principal of utility is the *extended sure-thing*. In this principal, if an outcome (X_i) were the same value for two risky actions, then X_i would be disregarded in the decision-making process. The outcome is not affected by the process, and therefore would not be considered in the decision-making process (Slovic et al., 2000). This axiom implies that no matter the sequence of events, the outcome of a decision or action will be the same. Utility theory operates on two basic assumptions: a) that individuals make rational decisions; and, b) that an individual is choosing between two consequences of equal scale. Research has shown that individuals have difficulty identifying equal scale in decisions. An example of this problem is presented in the following scenario from The National Science Foundation:

> *Individuals were asked to choose between two programs that addressed a public health threat to the lives of 600 people…Outcomes of the programs were described as (a) saving 200 lives for sure, or (b) a one-third chance to save 600 lives and a two-thirds chance to save no one, most respondents preferred the first option. (NSF, 2008)*

Mathematically, both consequences are equal (extended sure-thing), but individuals tended to choose the first option, perceiving that more people would be saved. This illustrates how individuals are affected by the presentation of a decision. Herbert Simon (Simon, 1955, 1959) hypothesized that individuals' perceptions and cognition needed to be considered in the decision-making process. He proposed that there were cognitive limitations that would force an individual to simplify the decision-making process. He argued that there are too many options for a person to calculate all possibilities, and truly maximize the outcome of decisions. Operating on this assumption, Simon presented the theory of *bounded rationality*. One of the key principals in bounded rationality is the concept of *satisficing*, in which an individual desires to achieve a satisfactory, not necessarily maximal, result in a given situation (Slovic et al., 2000).

The contemporary definition of satisficing states that individuals will identify a threshold of expected utility that would be satisfactory, and choose the first alternative whose expected utility exceeds the threshold (Byron, 2005). Byron pointed out that the contemporary definition of satisficing retains the concept of utility, while Simon's original definition did not. What is important, is that both rules indicate a *stopping point* when an individual will stop seeking alternatives for maximization.

Slovic (2000) states, in terms of bounded rationality and risk assessment, that individuals do not think probabilistically. They try to avoid the necessity of facing uncertainty directly, evaluating utility, and comparing incommensurable features. One of the ways that individuals simplify decision-making processes is to apply a heuristic. Studies have shown that individuals employ an affect heuristic, in combination with rational cognitive strategies to assess risks in decision-making processes (Finucane, Alhakami, Slovic, & Johnson, 2000; Slovic et al., 2004).

2.1.3 Affect heuristic

While utility theory and bounded rationality presented a rational method of risk assessment, affect heuristic is experiential (see Table 2.1). The affect heuristic is comprised of conceptualized and conditioned emotional responses based on previous experiences and perceptions, and applied by an individual to judge risk and benefit in new situations. A person employs mental

images of experiences relating to the prospective *gains* and *losses*, cost-benefit assessment, of possible risks (Finucane et al., 2000; Slovic et al., 2004).

In nature, the correlation between perceived risk and benefit is positively related: high risk, high benefit. Research has shown that the risk and benefit are negatively related in peoples' minds. This phenomenon has been attributed to affect (Finucane et al., 2000; Slovic et al., 2004). If a person has a positive affect for an activity, they will perceive it to be of high benefit and low risk. If they have a negative affect for an activity, they will see it as low benefit and high risk. For example, a person who likes sky diving, does not perceive it to be as high of a risk as a person who does not like sky diving. In the context of ICT-related teacher change, one teacher may not like to use technology and perceive ICT-integration to be a high-risk activity; therefore, they would feel ICT-integration was of low benefit. The relationship between the risk and benefit lies within a person's perception and context.

Finucane's (2000) research experimentally investigated perceptions concerning risk and benefit, as they are related to affect. She looked at how people perceive technology (nuclear power) regarding high and low risks and benefits. She hypothesized that under time pressure people would refer to past experiences and models constructed by preference, rather than utilizing a purely cognitive process; and, that these affective choices could be influenced through supplying information to change perceptions.

Finucane's first study revealed a higher negative correlation between perceived risk and benefit when "time pressure" was applied (13 negative correlations were statistically significant, eight at $p < .001$ and five at $p < .05$) compared to no "time pressure" (two at $p < .05$ on 23 items). The judgement manipulations in the second study, altering favourability perceptions, worked in 50% of trials ($N = 219$, 3 trials each). Her results showed that perceived risk and benefit judgements were linked to affect and were contextually based (Finucane et al., 2000).

As risk perceptions are specific to perception and context, it is logical that culture would influence individuals' risk perceptions. Considering this, it is important to note that Finucane's (2000) research was conducted in the United States, and findings were consistent with Rohrmann's (1994) affect research in Australia, New Zealand, and Germany. Consistency in findings supports the notion that cultural values and affective risk perceptions in the four populations are similar. This assumption was supported by Hofstede's (2001) research on cultural comparisons. Data from Hofstede's studies indicated that the United States and Australia were both Individualist cultures, therefore had similar cultural concerns and values. Individualist cultural types will be explored in

more detail in Section 2.4. Study findings do not account for individual *teachers'* habits in school culture, but they do show common macro-social trends in both countries.

Considering this, it can be argued that affect does not *predict* an individual's risk-taking behaviour, but it does provide insight into an individual's perceived risks. Evaluating experiences, as they relate to affect, can inform future risk perceptions and risk-taking habits.

2.2 Perceived risk

Different cultures and groups will have varying levels of risk acceptance influencing how they perceive risk (Rohrmann, 2000). What large groups (e.g., nations) perceive as a *risk* is difficult to determine in research because it is relatively complicated and expensive to survey large populations. Researchers often resort to small convenience samples: students or political groups (Lupton, 1999; Sjoberg et al., 2000). This method makes it difficult to generalize results.

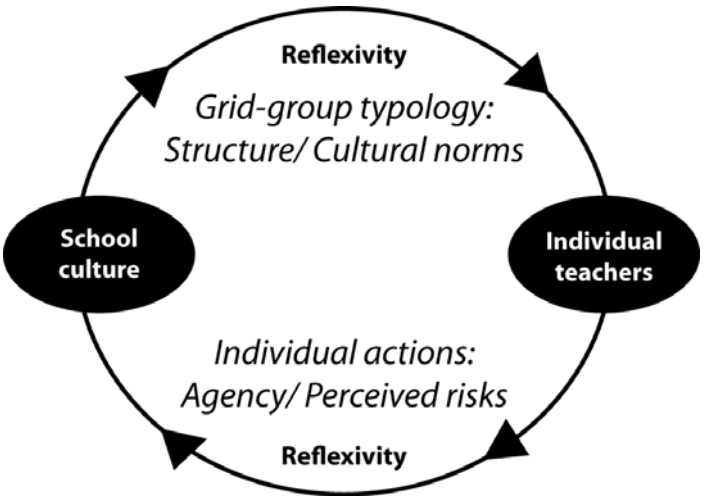
Considering these problems, psychometric risk researchers have tried to develop constructs attempting to *predict* how people will perceive risk (Slovic et al., 2004). Fox (1999) discusses these risk constructs in relation to risk assessment, which is the method commonly used in an attempt to manage potential risks. His discussion considers technical methods developed to logically analyze and calculate risk. He points out that these methods are not sufficient, in that they do not take the social and historical elements of risk into consideration.

Assuming that risk is "...subjectively defined by individuals influenced by a wide array of psychological, social, institutional, and cultural factors" (Slovic, 2000a, p. xxiii); the following discussion will examine risk perception from a sociocultural perspective.

Figure 2.1 presents the two key constructs identified earlier in the discussion, which can be applied to understand perceived risk: Anthony Giddens' (1984) sociological concept of reflexivity, in the theory of structuration; and, Mary Douglas' (1992) anthropological grid-group typology from cultural theory.

Figure 2.1

The reflexivity of culture and individual actions



The major components of ICT-related educational change to be examined are teachers and the school culture. Teachers are considered to be *agents* and the school culture is the *structure* in which they operate. Individual *agents* are able to exercise *agency* within the *structure* of a school. Agency is only possible because individuals posses large amounts of social knowledge upon which they base actions and decisions (Giddens, 1984). Social knowledge is constructed through daily activity, social norms, social conventions, etc; therefore, agents operating in the same structure would have similar perceptions of social knowledge.

Agents, and groups of agents, are defined by their relative positions within space (structure). Bourdieu's (1985, p. 724) conception of *habitus* provides an understanding of why agents may have similar perceptions, and why they would potentially take similar actions. "Habitus designates the system of durable and transposable *dispositions* through which we perceive, judge, and act in the world" (Wacquant, 2006, p. 6):

> *"These unconscious schemata are acquired through lasting exposure to particular social conditions and conditionings, via the internalization of external constraints and possibilities. This means that they are shared by people subjected to similar experiences even as each person has a unique individual variant of the common matrix..." (Wacquant, 2006, pp. 6-7)*

Bourdieu (1994) outlines that an individuals' dispositions, their practices, beliefs, and perceptions, will be shaped by the structures in which they exist. Further, the general practice and tendencies of individuals' dispositions will reflexively reinforce the structures in which they exist (Maton,

2008). The concept of dispositions presents a way to understand how teachers would have common risk perceptions, which would be shaped by their common experiences in school cultures. In addition to the structure of school culture, teachers would have internal structures relating to their teacher role, the grade level they might teach, other duties in the school, etc.

Habitus explains the constancy, or continuity, of individual *agents* in the structure (Shilling, 2004). *Agency* is action taken by individuals potentially effecting change; *agents* within a structure would have common dispositions. This is an important distinction in the study. The next section presents the theory of structuration. Structuration theory presumes that individuals have personal *agency* and perform actions, and that their actions would be influenced by risk perceptions (Giddens, 1984). Considering that risks are contextual, and based on individual perceptions, it is necessary to understand that teachers' common dispositions would imply common risk perceptions. This assumption allows teachers' perceptions and experiences to be grouped together, collectively constructing school culture.

The following sections present the theory of structuration and grid-group typology from cultural theory. The theory of structuration is presented first, as it is the overarching theoretical framework. Grid-group typology, which will be used to classify school cultures, is presented second. The two theories are not presented in total; portions of the theories, relevant to the research aim and questions, are applied in this study to support the theoretical framework.

2.3 Theory of structuration

The theory of structuration "was not intended to be a theory "of" anything...it offers a conceptual scheme that allows one to understand both how actors are at the same time the creators of social systems yet created by them" (Giddens, 1991b, p. 204). Giddens (1973) first introduced the term structuration to discuss class relations in different societies in *The Class Structure of the Advanced Society*. He argued that the notion of "class consciousness" did not sufficiently describe the subjective elements of social relationships (Giddens, 1991b). His most complete description of structuration was in *The Constitution of Society* (Giddens, 1984). Structuration, presented in *The Constitution of Society*, was a "structure of social relations across time and space in virtue of the duality of structure" (Giddens, 1984, p. 376). How the duality of structure can provide insight into teachers' risk-taking habits and risk perceptions, in relation to the school culture, will be explored in the following discussion.

Poole and DeSanctis (2004, p. 207) state that the theory of structuration has been popular in organizational studies, specifically because of its ability to provide insight into group decision-

making. Specifically, structuration has been widely applied in the analysis of technology-related change and information systems (e.g., Orlikowski, 2000; Poole & DeSanctis, 2004). In education, elements of structuration have been used to examine teacher stress and burnout rates (Troman, 2000), but more generally to discuss school-wide cultural change (e.g., Morrison, 2005; Shilling, 1992). Morrison argued that structuration and habitus provide a "fitting explanation for the reproduction of practice," and "an account of change" (Morrison, 2005, p. 320). Postmodern, post-structuralist, theories and concepts have been applied to technology-related change in schools, examining how technology may change traditional boundaries in education (e.g., Lawson & Comber, 2000; Selwyn, 2008); but, the theory of structuration has not been applied to this area of research.

One of the primary arguments against structuration is its lack of empirical contextual application (Slovic et al., 2000), but Giddens did not intend structuration to be applied in this way. His intention was that it would be applied to concrete social scientific work, in an effort to reconstruct social analysis. Giddens (1991b) recommends that structuration should not be applied to works in total, but that concepts from structuration be used in a "sparing and critical fashion" (p. 213). In the discussion presented in this thesis, the theory of structuration is used to explain the relationship between individual teachers and school culture, the agent and structure. The following application of structuration focuses on the concepts of *reflexivity* and the *duality of structure*, examining the nature of interactions between individuals and school culture in the context of ICT integration and change.

2.3.1 Dynamism of modernity

When discussing structuration, it is important to understand Giddens' use of *modernity.* He theorizes that society is in *high-modernity*, not post-modernity; which has significant implications in the interaction between agents and structure. Giddens defines *modernity* as equivalent to the industrialized world, which has a distinct social organization, specifically the *nation-state* (Giddens, 1991a, p. 15). The existence of the nation-state structure implies that agents continue to operate within a structure. The existence of true post-modernity would mean movement towards a distinctly different type of social organization (Giddens, 1990, p. 46).

The *dynamism of modernity* has been an important topic in Giddens' work. He saw it as the movement of society "away from traditional orders" (Giddens, 1991b, p. 208), thus how society changes. Giddens (1991a, p. 20) identified the dynamism of modernity in three main areas explained below:

1) The separation of time and space – the condition for the articulation of social relations across wide spans of time-space, up to and including global systems;
2) The development of disembedded mechanisms – symbolic tokens and expert systems (these together = abstract systems). Disembedding mechanisms separate interaction from the particularities of locales; and,
3) The reflexive appropriation of knowledge – the regularized use of knowledge about the circumstances of social life as a constitutive element in its organization and transformation.

Giddens theorizes that the disembedding of mechanisms removes social relations from specific locales, thus separating them from time and space. Mechanisms can be identified as *symbolic tokens* and *expert systems*. Symbolic tokens are defined as "media of exchange that have a standard value and are thus interchangeable across a plurality of contexts," while expert systems are modes of technical knowledge independent of the practitioners and clients using them (Giddens, 1991a, p. 18). The two together are classified as *abstract systems* that have the ability to *bracket* time and space (Giddens, 1991a). Bracketing time and space implies that an abstract system exists independent of time and space. Abstract systems will be explored in more detail in relation to trust and risk.

2.3.2 Trust and risk

In the context of structuration and modernity, ideas about *trust* are defined as "faith in expert systems and knowledge…vested in disembedding mechanisms" (Giddens, 1991b, p. 210). Theoretically, if a person trusts an expert system or knowledge, they will continue to use or apply it in their actions. Trust in abstract systems is necessary in modern society, as systems become increasingly disembedded, more globalized, and they are moved further away from the individual. For example, national-level curriculum is disembedded from the local school context. Teachers must trust that the curriculum, expert knowledge, is appropriate for their students, even though it was not created for their specific school context.

Trust is separated into two forms of relation, *facework* and *faceless* commitments (Giddens, 1990, p. 80). Faceless commitments are the development of faith in abstract systems. Facework commitments are interactions which occur in *copresence*. Facework trust-relations are situated in a locale, and can provide the context to reembed expert systems. For example, teachers must trust that expert knowledge as national-level curriculum is appropriate. Trust in the expert knowledge could be classified as a faceless commitment. When teachers apply the expert knowledge in the classroom, they are reembedding expert knowledge in a facework commitment.

Teachers are reaffirming their trust in the national curriculum by using it in the classroom. This is referred to as an *access point*, the meeting ground of facework and faceless commitments (p. 83).

In modern society, trust in expert knowledge (faceless commitment) is particularly important. Giddens (1990) states, individuals in the pre-modern world could disregard expert knowledge from priests, sorcerers, etc; and, they were able to continue on with daily life (p. 84). In the modern world, it is not possible for individuals to dismiss and avoid expert knowledge, and continue to participate in society. If teachers did not use the national-level curriculum, there would be professional consequences. Additionally, while many teachers would be able to write their own curriculum, it is not an efficient use of time or resources, nor would it provide the level of standardization expected in education today. In addition to explaining why teachers have to have trust in faceless expert systems, such as national-level curriculum, it also illustrates the *deskilling* of individuals. Deskilling is the result of knowledge being moved further away from individuals and their context, thus necessitating an increased dependence on abstract systems.

Individuals in modern society rely heavily on abstract systems to operate in day-to-day life, to do this they would need to have faith that abstract systems are trustworthy (Giddens, 1991a). In the context of ICT-related educational change, when teachers are asked to change their practice, they will have to consider if a new teaching method or strategy is trustworthy. If they do not find it trustworthy, risk will be perceived. When individuals perceive numerous high-consequence risks they will often have what Giddens refers to as, a *fateful moment* (Giddens, 1991a, p. 142). Fateful moments are crossroads in individuals' lives (Kenway & Kelly, 2000). In a fateful moment, individuals can decide that risks are too high and trust is too low, and choose to disengage from an abstract system and return to traditional values. Or, they can choose to become empowered, exert agency, and reskill. In a moment of reskilling, individuals will devote time and energy to gain mastery over new circumstances. In terms of ICT-related teacher change, returning to traditional values would imply teachers revert to proven teaching practices when they are presented with technology integration challenges. If they choose to reskill, they might choose to engage in ICT-related training.

An individual's assessment of trust or risk is often based on the expert knowledge available to them. Giddens (1991a, p. 123) states that "shifts in knowledge claims" are one part of the growing climate of risk perceived in modern society. These shifts make it difficult for individuals to know which expert systems to trust. In the context of schools and technology integration, the constant flow of new teaching tools and strategies (Lawless & Pellegrino, 2007), each supposedly better

than the last, could be classified as shifts in knowledge claims. If an individual makes the decision to trust an abstract system, it becomes intrinsically reflexive (Giddens, 1991a, p. 18).

2.3.3 Reflexivity

Giddens (1990, p. 54) associates knowledge with social relations; individuals are able to apply social knowledge in different situations or future actions. Thus, knowledge becomes disembedded from time and space and can be reflexively applied to new situations, through four factors:

1) Differential power – some individuals or groups are more able, or better prepared, to appropriate specialized knowledge than others are;
2) The role of values – values and empirical knowledge connect in a network of mutual influence;
3) The impact of unintended consequences – knowledge about social life transcends the intentions of those who apply it to transformative ends; and,
4) The circulation of social knowledge in the double hermeneutic – knowledge reflexively applied to the conditions or system reproduction intrinsically alters the circumstances to which it originally referred.

The four factors can be best understood through a contextual illustration, such as introducing electronic white boards into classrooms, where use of the electronic whiteboard is *knowledge*. The first factor, differential power, explains that some individuals will have the social or technical understanding to be able to apply the new tool in the classroom, while others will not. Social understanding could be awareness of school expectations, or a cultural value of technology integration. In terms of values, the second factor, teachers may not value electronic whiteboards in the classroom, and will therefore not apply them in the classroom. In factor three, the impact of intended consequences, teachers could perceive electronic whiteboards as a risk in teaching, perceiving a loss of instruction time, and will not use the new knowledge.

The nature of *duality of structure* is an essential element in reflexivity - factor four, the *double hermeneutic*. In structuration theory, social change is effected through individual agency (Morrison, 2005). A United Kingdom study illustrated teachers exerting agency to improve levels of trust in school culture. In this study, Troman (2000) qualitatively examined staff relationships in a primary school, arguing that the intensity of their work aided in the erosion of positive staff relationships. Additionally, he felt that the influences of high-modernity perpetuated low-trust relationships. The study showed that Giddens' theoretical framework was appropriate for examining trust and teachers' stress levels school culture. Findings showed that most teachers did

not work well in schools with low-levels of trust. Teachers valued more positive relationships in the workplace, and identified the importance of close staff relationships - *togetherness*. Togetherness was particularly important as a source of support when dealing with an antagonistic student, a head teacher, or a parent relationship (Troman, 2000). Teachers exercised agency , improved oppressive low-trust work schemes, and reflexively brought about improvements in workplace conditions through changing their behaviors (p. 349).

The findings aligned with Giddens' (1990) second factor of reflexivity, the role of values in reflexivity. Findings also illustrate the double hermeneutic; as social conditions in schools improved through teachers' agency and actions, the structure would change. Returning to the electronic whiteboard example, when a teacher begins to use the electronic whiteboard in their classroom, they are reflexively changing their teaching and the classroom with every use. Each time an individual does not apply new knowledge they are reinforcing a teaching role which does not incorporate the new knowledge. Choices to use, or not use, new knowledge reflexively structures cultural norms each time choices are made by individuals.

In the case of Torman's teacher stress study, the theory of structuration was successfully applied to conceptualize trust relationships in schools, but it did not provide a complete story. Trust relationships were explained, but Troman (2000, p. 349) did not feel structuration was able to fully account for the context of trust negotiations between the individual and the group. He felt that there was a considerable amount of anxiety that was not accounted for in the theoretical framework. In an effort to have a more complete understanding of interactions between individual teachers and school culture, the following discussion employs cultural theory and grid-group typology.

2.4 Cultural theory

Cultural theory (from anthropology, not cultural studies) considers how certain social settings encourage certain ways of seeing the world (Harris, 1995; Spickard, 1989, p. 151; Wildavsky & Drake, 1990). Within cultural theory, grid-group typology was created to classify cultures according to individuals' level of autonomy (grid), and the general boundary around a community (group; Douglas, 2006, p. 2). This classification can also be explained through the degree of grid (the extent to which someone accepts and respects the formal system of hierarchy and procedural rules), and the degree of group cohesiveness (the extent to which someone finds identity in a group; Rohrmann & Renn, 2000, p. 32). Definitions of grid and group frequently shift, depending on the contextual interpretation, e.g., organizational, sociological, or risk assessment studies.

Grid-group typology was originally derived from Douglas' (1992) work as an anthropologist studying African tribes, and was influenced by Basil Bernstein's two-dimensional scheme of family organizations (Douglas, 2006). Douglas had noticed that tribes had fears specific to them, different from other tribes. Through observing what tribes feared, she created *grid-group typology*. She first presented grid-group typology in *Natural Symbols* (1970). The typology was republished and refined several times over the following 20 years. Through this process the typology changed, evolving from symbolism to social control (Spickard, 1989, p. 152). Earlier version of Douglas' work outlined the cosmology of groups and the individual's experience in the group, while later versions focused on how cosmologies were used to control individuals.

Grid-group typology has been used extensively in risk perception and organizational culture research (Lupton, 1999; Sjoberg et al., 2000; Spitzer & Stansberry, 2004). Dake (1991, p. 63) argued that perception of risk may be best understood in terms of orienting dispositions, "entailing elements of personality and public policy preferences on one hand, and aspects of social structure and cultural biases on the other." The typology is generally used to classify cultures by types, and gives insight into groups' perceived risks.

This discussion draws on Douglas' version of cultural theory and grid-group typology presented in *Risk and Blame* (1992). In her work, *grid* refers to the extent to which the members of a group adhere to hierarchy and procedural rules, individual autonomy. *Group* refers to the extent to which members are committed to the social group and its isolation from non-members (Douglas, 1992; Harris, 1995).

Douglas (1992, p. 46) outlines four questions which must be addressed in risk perception research:

1) What is the bearing of the risk on the individual risk-perceiver's purposes?
2) How much of the community is part of the ego's purposes?
3) Does the risk affect the individual or the collective good?
4) What type of community, according to the support members give to authority, commitment, boundaries, and structure?

All four of the questions can be addressed using the grid and group dimensions. The first two questions ask whether perceptions of risk are integral or peripheral to the individual, and if the individual is integral or peripheral to the group. In terms of the whiteboard example, on question one, a teacher may identify fears that students will not learn when using the electronic whiteboard. Student learning is often considered the primary purpose of teaching, so the

perceived risk would be integral to the individual's role as a teacher. On question two, student learning is important in schools, therefore the teacher's perceived risk would be related to fulfilling community expectations, therefore integral to the community. The perceived risk would be based on the teacher's desire to support the collective group goal, answering question three. Question four would then examine the group, in this case the school, to determine what kind of school it is. Table 2.2 outlines the characteristics used to evaluate groups, which parallel question four.

Table 2.2

Grid-group typology classification

	Classification	Emphasis	Autonomy	Group dynamic
Positional Hierarchy	High-grid High-group	**Achieved role**: low/ moderate competition for role status	**Low**: moderate insulation	**Strict** insider/ outsider rules High allegiance, life-support system
Isolate Hierarchy	High-grid Low-group	**Ascribed role**: low competition for role status	**Low**: high insulation	**No** insider/ outsider rules Low allegiance, no life support system
Individualist	Low-grid Low-group	**Individual**: high competition for role status	**High**: low insulation	**No** insider/ outsider rules Low to moderate allegiance, evolving
Egalitarian	Low-grid High-group	**Individual**: growth, moderate/high competition for status	**Low**: low insulation	**Strict** insider/ outsider rules High allegiance

Note. From Douglas, M. (1992). Risk and blame: Essays in cultural theory: Routledge; and, Harris, E. L. (1995). Toward a grid and group interpretation of school culture. Journal of School Leadership, 56(6), 617-646.

The four questions presented by Douglas focus on the individual and their commitment to the group. In the typology, combinations of emphasis on individual autonomy and group dynamics define groups, as outlined in Table 2.2. The Individualist type is the only group that shows a high level of individual autonomy. In this group, there is competition for role status, and the social hierarchy is not defined by a structure. The Isolate Hierarchy employs a structure to classify individuals, often based upon socioeconomic and/or cultural elements, with minimal individual autonomy. Group roles are assigned, members do not compete for role status, and members typically have a low commitment to the group. Positional Hierarchy group types have a similar hierarchical structure, but members will have a high allegiance to group goals and values. The fourth type is the Egalitarian group. This group does not have a hierarchical structure, and there is a high level of competition for role status. Members of this group have a strong allegiance to group goals, and are committed to group survival (Harris, 1995, pp. 623-624). There is a fifth

cultural type, not listed in Tables 2.2 and 2.3, the Hermit. The Hermit is an autonomous individual who does not identify with a group (Rohrmann & Renn, 2000).

Table 2.3

Grid-group typology perceived risks

	Object of concern	Social Deviance	Nature	Technology
Hierarchy ***Positional/ Isolate***	**Obedience and authority-** behaviour as a product of agreement	**High Risk**- behaviours may disrupt preferred (superior/subordinate) form of social relations	**Low Risk**- good will come if expert opinions are followed in regard of how to use nature	**Low Risk**- approve of processes and products as long as experts have given safety certifications
Individualist	**Risk is opportunity-** supporting market relationships, and self-regulation	**Relative Risk-** threat only when limiting freedom, market relations, and autonomy- prefer to negotiate for themselves	**Low Risk**- nature should be used for development, any damage will be compensated for by gains in the market	**Low Risk**- trust that institutions can control or compensate for unwanted events, vehicle for unlimited enterprise
Egalitarian	**Equality-** greater equality of conditions for people and nature	**Low Risk**- reject prescriptions associated with hierarchy (i.e., who is allowed to do what with whom)	**High Risk**- "fragile", limited resources, feel it will be exploited	**High Risk**- value equality, technology will be used to exploit nature and poor people

Note. From Douglas, M. (1992). Risk and blame: Essays in cultural theory: Routledge; and, Wildavsky, A., & Drake, K. (1990). Theories of risk perception: Who fears what and why? Daedalus, 119(4), 41-60.

When looking at variables in risk theory: knowledge, personality, political orientation, or demographic information, "…cultural theory gives the best predictions of a broad range of perceived risks and an interpretive framework in which these findings cohere" (Wildavsky & Drake, 1990, p. 53). Widlavsky and Drake (1990) use three grid-group categories: Hierarchy, Egalitarians, and Individualists[3], to assess perceived risks and values within groups. Perceptions and values are examined over three basic cultural areas (see Table 2.3). Group risk perceptions are based in ideology and beliefs, which relate to individual group members' ideology and beliefs, rather than personalities or knowledge. Common ideology and beliefs would be one of the reasons a person subscribes to a cultural group; therefore, their values will often parallel the groups'. This notion is supported by the concept of dispositions, presented earlier in the

[3] Note that different researchers use different labels for the groups; generally, depending on the field of research in which they are applying the typology. Douglas' (1992) work is derived from anthropology and uses the language of that field, while Rohrmann and Renn (2000) and Wildavsky and Drake (1990) use the language of risk theory.

discussion of habitus. Individuals' dispositions will be similar as "schemata are acquired through lasting exposure to particular social conditions and conditionings" (Wacquant, 2006, p. 6).

Understanding group structure can give insight into cultural values. Kluchholn (1965, p. 395) stated: "A value is a conception, explicit or implicit, distinctive of an individual or characteristic of a group, of the desirable which influences the selection from available modes, means and ends of actions." In grid-group typology, values are reflected in the *object of concern*, shaping group risk perceptions and actions.

In grid-group typology, variations between groups' perceptions of risk are explained through the object of concern (Wildavsky & Drake, 1990). For example, it could be argued that Individualist cultures value new technologies, as technologies have the capacity to support market relationships and unlimited enterprise (as seen in Table 2.3). Individualist cultures perceive a high benefit from utilizing technology and therefore perceive risks as low. Hierarchies (Positional and Isolate cultures) have a similar perception of technology risk, but the object of concern is very different. Hierarchies are concerned with regulation. They only perceive technology as a low risk if it has been approved by experts. Therefore, self-regulation and free enterprise in technology use would be considered a risk in hierarchical groups.

Even though Positional and Isolate groups are both hierarchical, they function very differently. Positional group members will have a strong allegiance to group goals and values, while Isolate group members do not. Individuals' perceptions of group insulation from outsiders and risk are closely related to their commitment to the group. Isolate group members, while they believe in the group hierarchy, do not identify with the group (Rohrmann & Renn, 2000, p. 34). Therefore, they would not identify with the power associated with superior and subordinate group roles within the hierarchy. Without structured superior and subordinate roles, group members would not have group experts to approve behaviours and technology. Rohrmann and Renn state that Isolate group members only trust themselves (p. 35). Bernstein stated that classification of culture affects the authority/power structure which controls the dissemination of educational knowledge, and the form of knowledge transmitted (Bernstein, 1975, p. 94). Therefore, it could be assumed that perceived risks in school cultures would affect teaching.

Prior research has demonstrated that grid-group typology is sufficiently comprehensive to help researchers better understand interactions within school cultures, as well as being an appropriate way to describe and analyze school settings (Harris, 1995, p. 639). The following section considers

the application of grid-group typology, and other approaches to risk analysis, in educational research.

2.5 Applying risk theory to education

The theoretical framework outlined in the previous section has not previously been applied to ICT-related educational change research.

This discussion presents a sociocultural understanding of individual teachers' (agents) and schools' (structure) perceived risks in the context of ICT-related change. Harris' (1995) research applied grid-group typology to classify school culture, but the study did not examine ICT-integration or perceived risks. The following discussion builds up on Harris' study employing grid-group typology by examining teachers' perceptions of risk in school cultures. Before discussing Harris' application of grid-group typology and the classification of school culture, prior studies considering teachers' risk-taking habits and perceived risks are presented.

2.5.1 Prior research on teachers' risk-taking

In an effort to locate studies examining teachers' risk-taking habits or risk perceptions in the context of ICT-integration, several databases were queried, in multiple disciplines:

1) Education: Educational Resources Information Center (ERIC), Proquest Education journals & CBCA Education, and A+ Education
2) Sociology and Social Policy: ProQuest Social Science Journals and Sociological Abstracts
3) Work and Organization Studies: Expanded Academic ASAP and Business Source Premier

In addition to subject-specific databases, queries were run in general databases such as Proquest 5000, PsychInfo, and JSTOR. Queries were run using combinations of the following keywords with appropriate wild card characters (e.g., $, *): risk, risk-taking (risk taking), perception, teacher, school, curriculum, change, ICT, technology, value, decision-making (decision making), work, attitude, and other relative terms found in related article keywords. When studies discussed teachers' risk-taking behaviours were found, articles cited in research, studies citing the article (identified through Google Scholar and publisher websites), and related articles were identified. While the search process was exhaustive, there is always the possibility that other articles exist.

Four studies were identified, that specifically considered teachers' risk-taking or perceived risk in educational change. The studies identified examine teachers' risk-taking and risk perceptions, but

they do not consider the influence of ICT, nor do they apply risk theory or methods of risk assessment. The four studies all contribute to different elements of this research: perceived risks, decision-making, and peer discussion, but do not form a sufficient picture of teachers' risk-taking and perceptions of risk.

Ponticell's (2003) longitudinal case study presents an analysis of teachers' risk-taking experiences when implementing a new curriculum and their change processes. Her study considers the psychology of risk-taking, rather than sociocultural implications. The study examined four teachers and three administrators at a single school. Data was collected through interview and observation methods over three years. Teachers' and administrators' risk-taking behaviours were observed as they implemented a school-within-a-school (SWS) program targeting sophomores at-risk of dropping out of school. The SWS program was interdisciplinary and applied a problem-based approach involving cooperative learning, and had alternative assessments (Ponticell, 2003, p. 9).

The main risks identified by participating teachers were loss, significance of loss, and uncertainty[4] (Ponticell, 2003, p. 12). The primary risk identified was loss; participating teachers felt relationships with teachers outside of the program had deteriorated. SWS teachers had been given extra resources and planning time to develop new curriculum for the SWS program. Non-SWS teachers perceived these accommodations as "favouritism" and "perks." Even though SWS teachers were disappointed by non-SWS teachers' reactions, they came to value improved relationships with administrators and students (Ponticell, 2003, p. 13). Therefore, the significance of the loss was outweighed by gains in other relationships. SWS teachers also perceived a high level of uncertainty from the school department's central office, and inconsistency between school and central office expectations. The teachers felt the office wanted them to move slower, and that the office was pressuring them for improved test scores. SWS teachers perceived uncertainty and risks related to changing their practice, creating a new curriculum program, and being unsure if their work would produce results. The most significant negative emotion expressed in relation to uncertainty was a fear of failure (p. 20), but they felt they had developed their professional competence through the project (p. 15). Teachers identified that program evaluation was a strategy that helped reduce levels of uncertainty in the change process (p. 18).

[4] In the study, *loss* is identified as something a person feels they already have, and will be threatened by the risk. *Significance of loss* is the value one places on the perceived loss. *Uncertainty* is the probability of loss occurring as a result of outcomes (Ponticell, 2003; Yates & Stone, 1992).

In conclusion, Ponticell (2003, p. 21) presents a "psychology of risk-taking behaviour," based on reasoning and perceptions, which aligned with Yates and Stone's (1992) risk construct grounded in cognitive psychology. Throughout the discussion, she applies terms such as emotions, gains and losses, and degrees of freedom in her study, but does not align contextual factors with sociocultural risk theory. Ponticell asks "Is there a sociology of risk-taking behaviour?" and recommends further research to examine a sociology of risk-taking behaviour (p. 24).

Reio and Lasky (2007, p. 29) present their study as an extension of Ponticell's work. They argue that their approach to risk-taking provides a sociocultural lens for Ponticell's cognitive psychosocial perspective. Their study, examining teachers' risk-taking habits and school change was a secondary analysis of data, focusing on teachers' motivation in the context of school reform. Data for the study was originally collected through teacher interviews and case study summaries from a Comprehensive School Reform (CSR) initiative in the United States. CSR initiatives were intended to assist "public schools across the country to implement effective, comprehensive school reforms based upon scientifically based research and effective practices" (United States Department of Education [USDOE], 2004). Data collected in the CSR study were from 12 schools, across three states. This study selected one urban middle school from the original study. The chosen school was in the southwestern region of the United States, in a large metropolitan city with a strong economy. The student population was close to 1,100.

Results showed that teachers' motivation to take risks increased in the beginning of the CSR study, but teachers felt more constrained in the last year due to national and state accountability pressures. In terms of teachers' risk perceptions, findings were inconsistent with Ponticell's (2003, p. 12) conceptual model of loss, significance of loss, and uncertainty. Teachers in Reio and Lasky's study did not discuss loss, and had expressed positive feelings regarding the changes in their school (Reio & Lasky, 2007, p. 25). In relation to significance of loss, teachers discussed possible gains or losses associated with participating in the CSR study (p. 26). In regards to uncertainty, teachers at the school understood that reform efforts required structural, pedagogical, and cultural changes; but, uncertainty was still evident in many areas, particularly as it related to student achievement (p. 27).

The researchers feel that "teachers' risk taking, motivation, and experimentation were examined productively through the novel combination of sociocultural and cognitive motivational lenses" (Reio & Lasky, 2007, p. 28). The researchers hypothesize that the CSR initiative provided strong internal and external support for change, and therefore teachers felt safe taking risks. Additionally, they argued that risk-taking motivation increased because risks associated with the

reforms created a sense of trust and collegiality in the school culture. As collegial trust increased, teachers felt positive affective changes and were more willing to take risks. Through the support of a culture of risk-taking and experimentation at the school, teachers and administrators began to value risk-taking behaviour. The researchers feel it was possible that openness to learning through risk-taking created a norm of experimentation in the culture, thus creating the perception that experimentation was a route to success (p. 29).

Reio and Lasky (2007) present a preliminary analysis of teachers' risk-taking habits through a sociocultural lens, but findings are not grounded in sociocultural risk theory. The authors apply Rueda and Moll's (1994) findings on sociocultural motivational theory to explain risk-taking behaviours, but Rueda and Moll's work does not specifically address risk. Further, they identify Yates and Stone's (1992) work in cognitive psychology, but only in relation to Ponticell's work. Yates and Stone's risk construct was not directly applied in the study.

The next study does not focus on psychosocial or sociocultural aspects of risk-taking, but more on school leadership and decision-making. Short et al.'s (1991) work investigated teachers' perceptions of involvement in decision-making, age, gender, and perceptions of support for experimenting and risk-taking. Eighteen schools in the southern United States were randomly selected for the study. Questionnaires were used to collect data on teachers' demographic characteristics, perceptions of school decision-making, and encouragement to experiment (Short et al., 1991). A total of 505 teachers were invited to participate, with a return rate of 60% (p. 85).

Findings from the study showed that teachers' involvement in decision-making had an impact on their perceptions of risk-taking in the school. Three types of school decision-making were identified: Advisory Delegation, Autocratic, and Extreme Autocratic. Teachers indicated that Advisory Delegation, involving teachers in decision-making and supporting collaboration, was most likely to support experimentation. There was also a relationship between age and perceptions of schools' openness to experimentation with new and different teaching activities. The researchers conjectured that the relationship between age and openness to experimentation, would actually be related to teachers' years of teaching experience and professional competence (Short et al., 1991).

In conclusion and similar to Ponticell (2003), Reio and Lasky (2007), findings suggest that schools should create change-oriented environments supporting experimentation and innovation, as well as considering strategies that include teachers in decision-making. The Advisory Delegation model of decision-making, supporting collaboration and involving teachers in the decision-making

process, was the most successful strategy. While Short et al.'s (1991) work was not grounded in risk theory, it does make important claims for school leadership and change.

Finally, Spitzer's (1975) work investigated how peer discussion affected teachers' attitudes toward risk-taking. The study considered the social psychological phenomenon of *risky shift*; that individuals will think about risk differently in a group than alone (p. 371). The study employed a post-test only control group design. Participants were 92 teachers from California, United States, randomly assigned to one of four experimental groups. Groups were asked to rate educational risk-taking situations using 7-point Likert-type items, based on three measures: Educational Choice Dilemmas, an Intentionality Scale, and a traditional Attitude Scale. A one-way, four group analysis of variance was used to determine if significant differences existed between groups (Spitzer, 1975).

Results of the one-way analysis of variance showed significant main effects shifts ($p < .01$) on all instruments, and some transfer effects shift ($p < .05$). These results suggest that group discussion did have a positive effect on teachers' attitudes towards educational risk taking. Spitzer felt that these findings had significant implications for American institutions where group meetings were the predominant mode of interaction. While the application of risky shift in educational organizations was still unclear, and more study was necessary, it was an important area to pursue (Spitzer, 1975). Spitzer (1976) conducted a second study looking at the risky shift; but, the study focused on individual behaviours and group pressures, rather than perceived risks. Research examining the risky shift has continued in the form of *group polarization*, and primarily as part of group dynamics research (e.g., Fox & Irwin, 1998).

Of the four studies, only Ponticell (2003) and Spitzer's (1975) applied risk theory. Both of the studies considered the cognitive psychology of risk perception, but the discussions did not explore sociocultural influences on risk perception. Reio and Lasky (2007) discussed the sociocultural implications of risk perception, but they did not apply risk theory in their discussion. Short et al. (1991), Ponticell (2003), and Reio and Lasky (2007) all presented findings stating that a culture of experimentation in schools supported teacher change. Spitzer's (1975) findings showing the effects of group discussions and the risky shift could have implications on school risk-taking, but at the time, findings were not conclusive. Implications from the four studies will be addressed in the following discussion, but many of the assertions have been previously addressed in risk theory and educational change literature.

2.5.2 Prior research classifying school cultures

As previously outlined, grid-group typology has been used to classify cultures in many different areas of research. The following section presents two studies which have used grid-group typology to classify school culture. The first study was Harris' (1995) work testing the applicability of the grid-group framework in an educational context. In the second study, Spitzer and Stansburry (2004) use the typology to examine teachers' use of technology from an organizational culture perspective. While both of the studies used grid-group to classify cultures, neither analyzed groups' risk perceptions.

Harris (1995) chose four schools in the United States to illustrate each of the cultural classifications in grid-group typology: Bureaucratic, Corporate, Individualist, and Collectivist[5]. Participating schools were not all in the same research project. Of the four schools, two were previously involved in research considering leadership and cultural linkage. Additionally, one of the other schools was part of a different three-year study in the southwestern region of the United States. The final school was part of yet another year-long project, with another researcher.

Data for each school was based on interviews, observations, and documents. Participants were teachers, students, principals, school counsellors, and other school community members. The researcher gathered data examining the level of individual autonomy in the cultures, common group beliefs, and values perceived by participants in the schools. Harris (1995) based *grid* assessment on levels of individual autonomy and role assignment. *Group* was based on members' commitment to group values, and the existence of cultural norms (pp. 625-626). Triangulation methods were used to validate events and relationships occurring in the school. For the final analysis, school profiles were not compared against each other, but were based upon each cultural prototype using the constant comparison method (see Table 2.2 for classification guidelines).

Study findings showed that the grid-group model was comprehensive enough to be applied in an educational context. Harris (1995, p. 639) felt that grid and group were cultural dimensions that would occur in any educational setting. He stated that the typology offered a "…mutually exclusive and jointly exhaustive continuum of categories for dealing simultaneously with social behaviours in varied contexts"(p. 641), and felt that the model could be used to study school reform, based upon the specific cultural context of each grid-group structure.

[5] Harris used Douglas' classification labels from *Risk & Blame*, 1982.

Spitzer and Stansberry's (2004) research examined teachers' use of instructional technology from an organizational culture perspective. The study intended to find out "what and who influenced individual teacher preferences toward instructional technology use; and to describe the relationship *[sic]* of Mary Douglas' grid-group typology in the decision process to implement instructional technology" (p. 770). The study drew heavily on Harris' (1995) work.

Two case studies were presented in Spitzer and Stanberry's (2004) study, both were K-12 schools in Oklahoma, United States. Teachers at the selected schools completed an online survey designed to elicit information regarding schools' grid and group orientations, based on Harris' (1995) work. Unfortunately, classification of the schools was incomplete. Findings were not consistently presented in terms of grid and group classifications, and therefore difficult to assess for reliability. The study did categorize one school as Individualist, and one as Corporate (Positional). The Individualist school showed a high levels of individual autonomy, and the Corporate school showed high levels of commitment to group goals (2004, p. 774).

Spitzer and Stansberry (2004) described difficulties associated with categorizing schools in grid and group axes. They felt that schools often fit into both strong and weak categories in both dimensions. Even though findings were incomplete, several interesting points were made in the discussion. While they perceived difficulty classifying schools, they felt that the typology supplied a vocabulary supporting discussion of individual choice and relationships created by individuals. The authors identified links between schools' leadership styles and teachers' freedom in the classroom, particularly in their use of instructional technology. Overall, they felt the typology helped to develop a better understanding of differences in teachers' instructional technology use (Spitzer & Stansberry, 2004, p. 778).

Previously in the chapter, Table 2.3 was presented. The table combined Harris' (1995) interpretation of grid and group classifications with Wildavsky's (1990) discussions of perceived risk. Teachers' risk perceptions can be identified through the culture's object of concern and related group values. By understanding different school values, along with beliefs regarding individual and group interaction, research can begin to develop a better understanding of school culture. Once the school culture is established, research can begin evaluating how individuals may behave within the culture when integrating technology and changing teaching practices.

2.5.3 Considering individual teacher roles

Individual autonomy and role assignment are two defining elements in grid-group classification (as seen in Table 2.2). Teachers' understanding of their role is closely related to their perceptions

of *effectiveness*. Teachers' perceptions of their own effectiveness, their teaching-efficacy, are addressed later in the discussion. At this time, the discussion will look specifically at the concept of *role*. "All teachers hold beliefs, however defined and labelled, about their work, their students, their subject matter, and their roles and responsibilities..." (Pajares, 1992, p. 314). Research has shown that, in the context of change, teachers are likely to think about their beliefs differently when they experience social pressure from peers (Zhao & Frank, 2003).

Zhao and Frank (2003) presented an ecological perspective as a framework for understanding technology use in schools. The researchers felt that an ecological perspective would unify the multiple dimensions of technology use in schools by supporting cognitive, social, organizational, technological, and psychological issues to be addressed (p. 810). Teachers' decisions to adopt technology, in this study, are conceptualized through rational choice theory. This theory makes the assumption that teachers are rational beings, and they will act in a way that supports their perceived self-interest (p. 817). Arguments presented earlier in this chapter (Section 2.1) explained that decisions were made through a combination of rational and experiential considerations. Zhao and Franks' study concedes that teachers' evaluation of costs and benefits of technology integration is based upon perceptions, and further research should be conducted in this area to investigate how those perceptions can be changed most effectively (p. 831).

Regardless of teachers' cost-benefit calculations, Zhao and Frank (2003) argue that teachers would pressure each other into changing their practice, in this case adopting technology, depending on the social norms. For example, Maths teachers may begin using a new graphing program in their classes; a few teachers may resist using the new program. In this scenario, teachers using the program may begin asking the non-users if they need help learning to use the graphing program, or ask if they are having trouble using it in class. Social pressures can be more intense, such as possible professional consequences for not using the program, if it is a curriculum area requirement. In this example, non-users may become aware that other teachers are using the program through offers of help, and join the group; or, they may fear professional consequences and begin using the program. In either case, Zhao and Frank argue that a teacher will adjust their practice and beliefs to maintain their membership in the group.

The concept of social norms (agreed behaviour) was presented as the object of concern in hierarchical cultures (see Table 2.3). Zhao and Frank's (2003) findings imply that if teachers do not conform to pressure, they would be deviating from social norms. Deviation would be undesirable, and potentially high-risk in a Hierarchical culture, but would not be a concern in an Individualist culture. Spickard (1989, p. 189) stated, Douglas felt that peoples' perceptions were mediated by

their social lives, and that certain societies lean people towards a common belief system. Therefore, findings in Zhao and Frank's study present concepts similar to cultural theory.

The question remains though, what groups define teachers' roles, and which are able to exert social pressure? In Shoen and Teddlie's (2008) comprehensive model of school culture, they identified that macro-level school culture often sets the dominant behaviour pattern and set of beliefs, but they conceded subcultures could exist within a school. One of the most frequently identified subcultures in secondary schools is based on curriculum area. Spillane (2003, p. 344) stated that "teachers don't just teach – they teach Mathematics, Reading, and Science and how they enact their roles depends in part on the school subject." In Muijs et al.'s (2005, p. 65) review of the teacher effectiveness literature, evidence was found supporting the notion of differing effectiveness relative to curriculum area. Differentiations in group commitment, particularly associated with curriculum area, would have significant implications in establishing social norms and effecting group change[6]. Research has shown that the perceived value and integration of ICT in different curriculum areas, "subject cultures," has not been consistent (Hennessy, Ruthven, & Brindley, 2005; Selwyn, 1999). Generally, Science teachers tended to have positive feelings about ICT integration, while Mathematics teachers were the most externally resistant and felt the most pressure to use technology. English faculties tended to have the weakest technology policies, showed less integration into teaching, and reported the highest levels of technology related anxiety (p. 178). Therefore, findings from Hennessy et al. suggest that ICT was not culturally significant in the English subject culture.

In addition to different perceived teacher roles, the roles and responsibilities of leaders in schools can have different meanings. Leadership roles will not only have different meanings, but different superior/subordinate power structures depending on the group culture, thus manifesting different role responsibilities in the context of change (Douglas, 2006; Wildavsky & Drake, 1990). As an example of role differences, two of the administrators in Harris' (1995) study were both considered effective principals within their respective schools. Their roles were very different due to varying cultural group types. One principal, in the Individualist group, brought cultural revitalization to the school. She worked to make school culture more positive and rewarding for students and teachers. In the second school (Positional hierarchical), the principal's role was to reinforce existing traditions, rituals, and beliefs, already established by the school and community

[6] It is important to note that identification with curriculum areas would be stronger in secondary school teachers, as primary school teachers are multi-disciplinary.

(Harris, 1995). Again, both principals were effective in their roles, but the culture defined their roles in very different ways. One was able to effect change in the culture, while the other's responsibility was to maintain the existing culture.

Teachers' educational beliefs guide perceptions of instruction and learning, and will closely align with their perceived role (Ertmer, 2005; Pajares, 1992). These beliefs are considered separate from their general belief system and technology beliefs. Teachers tend to show minimal technology integration in their teaching if educational and technology beliefs do not relate. This assumption is consistent with the low levels of technology integration observed in English faculties, presented earlier in the discussion. ICT was not significant in that subject culture, and therefore was not considered a necessary part of English instruction. In terms of educational beliefs, research has outlined three ways that teachers think about their practice: preactive, interactive, and postactive. Two of these phases, preactive and postactive, are well thought-out and deliberated processes. The remaining phase, interactive, occurs when a teacher is teaching, it is more spontaneous and immediate (Calderhead, 1996). Preactive and postactive teaching are continuous processes of re-examining and evaluating previous planning decisions. Teachers build upon previous decisions with new information.

Teachers' preactive thinking would be planning and preparing for teaching. Planning is generally informal, and could occur on a variety of levels: yearly, termly, unit, weekly, daily, and lesson (Calderhead, 1996, p. 714). Planning is generally considered to be a logical deductive process, drawing on teacher knowledge, subject area knowledge, and past experiences (Grossman & McDonald, 2008). Planning for experienced teachers typically involves fine tuning lessons, as they draw on a large existing knowledge base. The process can be more time consuming for beginning teachers. Additionally, it will be influenced by contextual expectations, such as school and curriculum requirements, and conventions of the subject area (Roehrig et al., 2007).

Teachers tend to make few decisions in the interactive phase of teaching. Research has shown that teachers rarely diagnose problems in the classroom, and tend to refer to sets of adapted responses when reacting to complex situations in the classroom (Calderhead, 1996). Calderhead's research has shown that experienced teachers draw upon existing knowledge and experiences to develop solutions and problem solve novel experiences while teaching. Considering individuals' experiential ways of knowing, presented in Table 2.1, teachers would frequently draw on past affective experiences to judge new situations in interactive teaching. It is also possible that teachers use similar affective judgments in preactive teaching when considering past teaching experiences. Research has shown that favourable "later good experiences" using technology were

considered to be significantly more memorable than the worst “bad later experiences” (Todman & Drysdale, 2004, p. 588). Technology-related beliefs and anxiety will be explored later in the discussion.

In a change context, group members will need to accept new social norms and role definitions, such as integrating technology into their teaching. The influence of past teaching and technology experiences, as well as anticipated future experiences, would be an important consideration in teachers’ ICT-related change processes and school change initiatives. In addition to this type of individual consideration, commitment to the group culture and role acceptance would strongly affect teaching choices made in the context of ICT-related change.

2.6 Educational change

Educational change happens on a variety of levels: individual teachers, school, local community, state, and nation (Fullan, 2001). Change can be affected by many aspects of school culture, such as, leadership choices, teacher participation, accountability (Sandholtz & Scribner, 2006). To manage change effectively, organizations must consider group and individual change processes (Grossman & McDonald, 2008; Leithwood & Reihl, 2003; Morrison, 2005).

A clear meaning for educational change is essential to understand teachers’ involvement in, and experience of, change processes. Change research often refers to *innovation* when discussing ICT-integration and educational change. For the purposes of this research, new instructional theory, tools and curriculum are *innovations*. Innovations could be community partnerships, Smart Boards, numeracy programs, to name a few. *Change* concerns teachers’ beliefs, shifts in cultural priorities and values. Change could take the form of improved peer interaction, ICT-integration, use of student-centred teaching practices. Change can occur within the implementation of, or as a result of, an innovation; but, the two are not dependent. Schools will often attempt to facilitate teacher change through innovations (Boyle, Lamprianou, & Boyle, 2005; Fullan, 2001).

Typically, the principal would introduce an innovation to a school. Teachers would be expected to utilize the new method or tool in the classroom, or integrate it into curriculum. Innovations have been frequently adopted on the surface, without true understanding, which is often due to a lack of resources or knowledge (Fullan, 2001; Roehrig et al., 2007). Without understanding, teachers will temporarily *use* part of a new teaching method, but it will not significantly *change* their practice (Ertmer, 2005). Using and integrating innovations in teaching practice over an extended period of time is necessary to truly facilitate change (Boyle et al., 2005; Dall'Alba & Sandberg, 2006).

For example, a school decides to integrate ICT and problem solving skills into the curriculum, in an effort to develop students' ICT literacy. A Mathematics teacher decides to use ICT in the form of a PowerPoint presentation, to present a new mathematical concept. The teacher decides that students already understand problem solving, because they can solve mathematical problems. The teacher has integrated ICT into their teaching practice, but it is only superficial and essentially equal to writing on the whiteboard. The students are not using ICT to problem solve (e.g., research mathematical concepts or independently find new ways to solve mathematical problems using graphical or statistical software packages). The Mathematics teacher has an individual understanding of ICT integration and problem solving, but does not understand ICT literacy. Using ICT in familiar ways, the teacher did not take risks to explore possible new methods and affect long-term change. Consequently, the teacher does not change his or her practice by using the curricular innovation, and students do not develop ICT literacy.

2.6.1 Defining the context of ICT-related educational change

Educational change focusing on ICT integration is not simply using technology skills; it is developing ICT literacy, including: integrating technology into the curriculum area, problem-solving, and learning skills (Bundy, 2003; Ertmer, 2005; Roehrig et al., 2007). As education becomes more globalized and information is easier to access, students and teachers are able to regularly interact with peers around the world. They are able to research library holdings that were previously unavailable, and students are able to communicate with field experts, just to name a few possibilities available to the classroom. Technology is able to support knowledge building, collaboration, and creative work across schools and cultures (Loveless, 2007). These types of skills are gaining importance in educational policy creation, in many nations, particularly as creative skills and talents are needed in economic innovation (p. 5). Using new tools and associated methods supporting these initiatives will require teachers to change their practice, which involves risk. Considering this, it is important to understand the cultural implications associated with new and different settings (Baron, Bruillard, Howell, & McNergney, 2003; Kenway & Kelly, 2000).

ICT literacy has been identified as a priority in Australian schools. The 2008 draft of the Ministerial Council on Education, Employment, Training and Youth Affairs (MCEETYA) declaration made the following statement regarding ICT-related skills and integration into teaching:

> *"Rapid and continuing advances in information and communication technologies (ICT) are changing the way we share, use, develop and process information and technology, and there has been a massive shift in power – to consumers in*

> *general, and to learners specifically. In this digital age, young people generally need to be highly literate in ICT and increasingly expect to be able to use such technologies in their learning. While there is some knowledge about how to effectively embed these technologies in learning in schools, we need to make a quantum leap in this effectiveness over the next decade." (Ministerial Council on Education Employment Training and Youth Affairs, 2008b, p. 3)*

In the United States, information literacy has been identified as a priority in students and teachers' learning:

> *"Teachers must become comfortable as co-learners with their students and with colleagues around the world. Today it is less about staying ahead and more about moving ahead as members of dynamic learning communities. The digital-age teaching professional must demonstrate a vision of technology infusion and develop the technology skills of others. These are the hallmarks of the new education leader." - Don Knezek, ISTE CEO (ISTE, 2008)*

Developing students' ICT literacy is a goal many teachers are not prepared to undertake. ICT literacy often combines two separate changes in practice: learning to use ICT-related tools and methods, as well as applying student-centred teaching methods. There has been extensive prior research supporting ICT integration with a student-centred teaching method (Ertmer, 1999; Means & Olson, 1995; Riel & Becker, 2000; Sandholtz, Ringstaff, & Dwyer, 1997). Research has often identified student-centred teaching methods in conjunction with effective ICT integration, and that change initiatives should employ real world, project based curriculum, etc. Recent studies still suggest links between technology use and student-centred teaching methods, but tend to discuss how the two strategies can support student learning together (Hew & Brush, 2007; Mueller et al., 2008; Subramaniam, 2007).

Integrating new teaching methods into the curriculum may require teachers to change the way they teach, the way they think about their practice, and review beliefs about teaching and instruction (Ertmer, 2005; Nespor, 1987). In any change process, teachers will weigh the possible risks and benefits of using new curriculum (Calderhead, 1996; Darby, 2008; Ponticell, 2003), and will apply experiential and rational ways of knowing and perceptions based on prior experiences. Pelgrum's (2001, p. 173) Second Information Technology in Education Study (SITES) identified several obstacles perceived by teachers when planning to integrate technology into their teaching. The top three obstacles identified were:

1) Insufficient number of computers
2) Teacher lack of knowledge/skills

3) Difficult to integrate into instruction

It was noted that even under favourable conditions 40% of teachers identified lack of hardware as an obstacle (p. 177). Pelgrum suggests that dialogues addressing effective use of existing equipment could benefit teachers holding these perceptions, rather than the school purchasing additional equipment. This type of reflective process would require time, support, and evaluation to effect risk-taking and long-term change (Fullan, 2001; Lawless & Pellegrino, 2007).

2.6.2 School culture: Roles and experimentation

There are three groups of individuals in educational change: students, teachers, and community (Little, 2002). All three groups have considerable influence upon the success or failure of educational change. For a person to be successful in a role, members of the culture must share a common meaning about the role's purpose and expectations. Research states that developing shared meaning in a culture helps teachers develop practice, implement change and take risks (Fullan, 2001; Reio & Lasky, 2007). Often, in ICT-related change, roles and expectations would be defined through a technology use plan (Baylor & Ritchie, 2002).

Prior research has suggested that schools facilitating an effective culture of experimentation, also tend to set clear expectations and goals for teachers (Roehrig et al., 2007). Baylor et al.'s (2002) comprehensive school study examined factors facilitating teacher skill, morale, and perceived student learning in technology-using classrooms. Through purposive sampling, 94 classrooms were chosen to participate in the study, from four different states in the United States. The schools were chosen based on their reputation as effective technology users (p. 402). The study quantitatively examined the impact of seven factors (independent variables) related to school technology: planning, leadership, curriculum alignment, professional development, technology use, teacher openness to change, and teacher non-school computer use. Factor impact was evaluated through five dependent variables: teacher skill (technology competency and technology integration), teacher morale, and perceived student learning (impact on student content acquisition and higher order thinking skills (acquisition; p.396). Data was collected through interviews with teacher and school leadership, technology plan evaluation, as well as teacher surveys.

Regression analysis showed that each of the dependent variables were predicted through a different combination of independent variables, R^2 ranged from .164 to .608 (Baylor & Ritchie, 2002, p. 407). In terms of school influences on teachers' skill, morale, and perception of technology-use in the classroom, findings showed that the level of technology leadership and

support for professional development was highly predictive. Specifically, teachers were sensitive to positive and negative responses from school leadership regarding technology use. It was particularly important that the school environment provided positive feedback, training, and technical support (p. 411). In addition to supporting technology use, school administrators needed to act as role models and use the technology they were promoting (p. 412). Through providing training, support, and acting as role models, school leaders can provide a strong foundation from which teachers will be able to make positive changes in the classroom. Baylor (2002, p. 410) stated that without this type of support, teachers will be unsure of best practices and expectations for technology-use, which will lead to an inability to cope with change and lower morale.

For school leaders to be able to provide appropriate support and role modelling, their role in the school needs to be better understood. "Just as there are different versions of the leader's relationship with others, there is also disagreement—based on normative thinking as much as on empirical evidence – on who determines the ends/goals to which the group aspires," (Leithwood & Reihl, 2003, p. 7). Determining group goals can be difficult considering the possible sub-cultures within a school culture, particularly within curriculum areas (Schoen & Teddlie, 2008).

Teachers' perception of the administrator's role in a change process is vitally important and has a strong effect on trust and perceptions (Hayes, 2007; Sandholtz & Scribner, 2006). Ponticell's (2003) research illustrated a typical conflict between teachers and administrators in educational change. In her study, teachers were unsure of administrators' motives in the change process. They perceive pressure from administrators to ensure student achievement, which made it difficult for them to take risks and experiment with new teaching practices (Reio & Lasky, 2007). In the context of ICT integration, new teaching methodologies and technology are necessary (Mueller et al., 2008). Using new practices cannot always guarantee student outcomes, particularly on standardized testing (Leithwood & Reihl, 2003). Teachers should be able to change at their own pace, without fear of negative consequences of temporary failure. Supporting a culture of experimentation will create a social norm of change and risk-taking (Ertmer, 2005; Sandholtz & Scribner, 2006).

Facilitating effective change requires administrators to develop an awareness of the individual and contextual factors effecting teachers in the change process. In this study, four risk-taking indicators are introduced: teaching-efficacy, computer-efficacy, playfulness & anxiety, and school culture (see Figure 2.2).

Figure 2.2

Theoretical indicator construct

The indicators present a preliminary foundation of teachers' potential to take risks in the context of ICT-related change. The research considers internal factors, those intrinsic to individual teachers (teaching-efficacy, computer-efficacy, playfulness & anxiety), and external factors (school culture), specifically a culture of experimentation (Ertmer et al., 1999).

The school culture indicator specifically considers elements of a school supporting experimentation in teaching (e.g., Baylor & Ritchie, 2002; Roehrig et al., 2007). Considering the complex nature of school culture, several aspects of experimentation are addressed: defined roles, peer-interaction, evaluation, support, and decision-making. All of these cultural elements are combined to gain an understanding of a school's support of experimentation in the culture, and teachers' risk-taking in educational change. Teachers have an increased likelihood to take risks and implement new teaching practices in a culture of experimentation (Hew & Brush, 2007).

The elements of school culture supporting experimentation would relate to the schools' grid-group type in terms of perceptions of leadership, trust, and openness to change. Considering teachers' risk-taking behaviours in a sociocultural context, cultural implications will be considered with individual perceptions of teaching-efficacy, computer-efficacy, and playfulness & anxiety.

2.7 Teaching: Individual considerations

It is important to understand how individual teachers view educational innovations in an effort to help change their teaching practices. There is a large body of research looking at teacher change and training, but it does not consider risk-taking or perceptions of risk in the change process. Considering that all change involves risk, it should be an essential element in any change discussion.

In Australia and the United States, teaching is continually projecting a negative image (Dinham, 2000; Fullan, 2001; Liu, 2007). Teachers have had high levels of stress and anxiety and have perceived a low level of respect from the community, resulting in a high rate of attrition (Kelly & Colquhoun, 2005; Zembylas, 2008). Teachers are often overwhelmed with multiple innovations and have difficulty assessing the relative worth of new technology. It is possible that this type of confusion, coupled with anxiety and stress, could limit risk-taking and long-term change. Additionally, unclear organizational goals, poor teacher training, and low support levels of administrative support make change difficult for many teachers (Clarke & Robinson, 2005; Fullan, 2001; Hew & Brush, 2007; Smylie, 1988).

In terms of the individual, mediating factors in teachers' potential to take risks and integrate ICT into the classroom are teaching and computer-efficacy, as well as relative playfulness and anxiety (Ertmer, 2005; Mueller et al., 2008). Teachers' will base risk perceptions upon prior experiences and personal beliefs (Slovic et al., 2004), therefore their perceptions of efficacy should have a similar relationship to their affective responses to a task. Individuals will have a positive affect for tasks they feel they are able to successfully complete (Darby, 2008; Yeh, 2006). Further, the research considers the influence of playfulness and anxiety in relation to efficacy, change, and risk perception as they affect individual teachers' potential to take risks in the context of ICT-related change.

2.7.1 Teaching-efficacy

The idea of efficacy is grounded in Bandura's (1989) social cognitive theory of self-regulation. Self-efficacy is a person's perception of how efficiently they will be able to perform a task (Bandura, 1991). If a person feels they are not able to perform at a task, they are less likely to attempt new tasks (Zimmerman, Bandura, & Martinez-Pons, 1992). Thus, they are less likely to take risks and change.

A critical element of efficacy is the individual's belief regarding learning, whether a person believes learning is an acquirable or an inherent skill. Beliefs about learning dictate how individuals' will deal with failure and influence their perceived efficacy on tasks (Bandura, 1991). Learning as an *acquirable* skill implies that a person builds and develops knowledge. In this approach, failure is part of the learning process and occurs from a lack of effort, rather than insufficient knowledge. Learning as an *inherent* skill means that knowledge is fixed. An individual who feels knowledge is inherent and fixed sees failure as a lack of knowledge, and that additional knowledge cannot be gained. In the acquirable approach a person will accept or reject failure, and would see failure relative to the amount of effort they are willing to commit to an activity. People

who perceive knowledge as inherent will cease an activity when they experience failure (Zimmerman et al., 1992). Individuals believing that knowledge is acquirable will have higher perceptions of their efficacy.

Teachers with a high level of efficacy believed that they could control, or at least strongly influence, student achievement and motivation (Tschannen-Moran, Hoy, & Hoy, 1998, p. 202). Teachers who feel they are efficacious will base this judgement upon past feelings of teaching success (Ertmer, 2005; Gutskey, 1986). Teachers showing higher levels of teacher-efficacy have been linked to openness to change and experimentation in teaching. Further, these teachers will perform better in training, are more playful, are more likely to take risks, and adopt change (Baylor & Ritchie, 2002; Yeh, 2006).When teachers are uncertain of their teaching and influence on student achievement, they will have lower teaching-efficacy (Fullan, 2001). They would perceive failure, such as low student achievement, as a direct reflection of their ability to teach. In the context of teaching, low teaching-efficacy would imply that they are less likely to change their teaching practice. Therefore, teaching-efficacy would be a powerful indicator of teachers' potential to take risks and engage in change.

Research has often separated different types of efficacy to allow consideration for variance in peoples' experiences related to specific tasks, as a person refers to experiences when judging their efficacy on a current task (Bandura, 1989, 1991; Compeau & Higgins, 1995). This separation is important when examining teacher-efficacy. Teacher-efficacy can be strong for one content area, but the sense of efficacy does not necessarily transfer to other content areas (Tschannen-Moran et al., 1998). Therefore, while a teacher may have a high level of teaching-efficacy in their content area, they could have low computer-efficacy and perceive barriers in ICT-integration (Ertmer, 2005). Therefore, this research considers teaching and computer-efficacy separately.

2.7.2 Computer-efficacy

Computer-efficacy is specific to ICT-related change, and therefore included as an indicator in this study. In the context of ICT integration, teachers' perceived ability to use ICT, computer-efficacy, must be considered in parallel with teaching practices. Teachers' prior experiences and feelings about ICT capabilities combine to create perceived computer-efficacy.

Research evaluates computer-efficacy within specific tasks, not component skills (Compeau and Higgins, 1995). *Component* skills are simple actions, such as inserting a disk or turning on the computer. *Tasks* include complex processes using a software package, creating a layout, or creating a database. Compeau and Higgins (1995) created a new computer-efficacy measure

based on previous work by: Gist et al. (self-efficacy and computer use; 1989), Webster and Martocchio (micorcomputer playfulness and anxiety; 1993, 1992), and Burckhardt and Brass (patterns of change; 1990). The new measure was divided into eight constructs: computer-efficacy, encouragement by others, others' use, support, outcome expectations, affect, anxiety, and use. The questionnaire was mailed to a targeted population of knowledge workers[7]. Two-thousand questionnaires were mailed to the identified population, and 1,020 were returned (53.4%). Responses were split in two sets (*n1* = 539, *n2* = 481) to create a holdback sample (Compeau and Higgins, 1995).

Data was analyzed using partial least squares. In the initial measurement analysis, four measures (support, computer-self efficacy, affect, and use) satisfied the requirements for reliability ($\alpha > .7$) and discriminant validity (Compeau & Higgins, 1995, p. 199). The remaining four measures were revised and retested on the holdback sample. In the final path analysis of the model, all but four of the paths (between the eight constructs) supported the study's hypotheses. The model explained 37% of the variance in affect, 25% in anxiety, and 32% in use. Findings showed that computer-efficacy was found to play an important role in shaping an individual's feelings and behaviours when using computers. Those with higher efficacy, were more likely to use computers more, derive more enjoyment from computer use, and perceived less anxiety (p. 203). It was determined that the computer-efficacy model was reliable and satisfied the requirements of discriminant validity. The researchers felt that the measure should be used in future studies to determine the impact of efficacy on developing computer skills and the generalizability of computer-efficacy.

In a recent study, Mueller et al (2008) evaluated teachers' perceptions of technology integration in the classroom. The study included 185 elementary and 204 secondary Canadian in-service teachers. A survey was used to collect data on computer-related and general constructs. Computer-related constructs included computer integration, comfort with computers, type of computer use, computer training, attitudes towards computers, and experiences with computer technology. General constructs included demographics, teacher-efficacy, teaching philosophy, and attitudes toward work (p. 1527). Results were analyzed to develop a comprehensive summary of characteristics and variables to discriminate between teachers who do, and those that do not, integrate ICT into the classroom. The results were then split into two groups, "high

[7] Knowledge workers were identified as individuals who worked with large amounts of information.

versus low integrators." Finally, multivariate discriminant function analysis was conducted to determine which measures best differentiated the high and low groups (p. 1529).

Results showed that experience with technology and attitudes towards technology were predictive of teachers' technology integration in the classroom. The "positive outcome" measure collected data on how frequently teachers had positive experiences using technology in the classroom. Positive outcomes may add to teachers' confidence using technology, their computer-efficacy (Mueller et al., 2008, p. 1532). This factor contributed the most to teachers' discriminating function. The researchers hypothesize that positive experiences would improve teachers' technological abilities. More importantly, through positive experiences, teachers would be more likely to develop positive beliefs about technology integration, thus developing their confidence using technology in the classroom (p. 1533).

Through positive experiences using technology, teachers increased perceived ability and confidence using technology. This development would imply a higher perceived computer-efficacy. Like teaching-efficacy, high levels of computer-efficacy and playfulness facilitate risk-taking. Thus, teachers who perceive a high level of computer-efficacy are likely to take risks, and integrate ICT-related tools and concepts in the classroom.

2.7.3 Playfulness & anxiety

The argument advanced in this thesis considers playfulness and anxiety as one indicator. This study considers playfulness as a positive affective response to technology use, while anxiety is part of a negative affective response to technology. Asking teachers to integrate ICT into curriculum could produce anxiety, particularly if they have low levels of teaching and computer efficacy. Computer anxiety is defined as apprehension or fear when an individual faces the possibility of using ICT (Hackbarth, Grover, & Yi, 2001). As previously discussed, people are sensitive to failure, thus perceived trouble using ICT in the classroom would produce anxiety, and could be perceived as a threat (Martocchio, 1994). A threat implies there is potential loss, and thus it would be a perceived risk (Yates & Stone, 1992).

Hackbarth (2001) states that anxiety has a strong negative effect on how easy a person perceives themselves to be able to use technology, thus lowering their computer-efficacy (Todman & Drysdale, 2004). Individuals' ease of use is determined by the level of effort a person perceives is necessary to complete a task. If a person perceives the task as a *challenge* is beyond their skill level, they will perceive anxiety. Conversely, a person reaches the playful state when they are *challenged* by an activity, and they feel encouraged to explore (Csikszentmihalyi & LeFevre,

1989). If a person perceives a technology related task difficult and anxiety producing, it is likely they will not adopt it (Hackbarth, Grover, & Yi, 2001). Generally, increased system experience correlates with a perceived ease of use (Mueller et al., 2008). Hackbarth, Grover, and Yi's (2001) research shows that anxiety is a full mediator of system experience, while playfulness is only partial.

Webster (1993) argues that people who interact more playfully with computers view computers more positively. Computer playfulness is a context-specific individual characteristic, which represents intellectual and cognitive playfulness in given tasks (Webster & Martocchio, 1992). If people show a high level of playfulness when using ICT, they will be more motivated to use the same tools or processes again, thus increasing the number of positive technology experiences and computer-efficacy. Perceived efficacy on tasks motivates goal attainment directly and indirectly, and contributes to subsequent achievement (Zimmerman et al., 1992). Webster and Martocchio's (1992) study, cited in Compeau and Higgin's (1995) work, examined microcomputer playfulness. They collected data on computer playfulness and anxiety in five studies: three survey studies and two training studies, involving over 400 participants. Survey studies collected data from volunteer students in undergraduate business courses. The first training consisted of volunteer students in a Master's of Business Administration program. The second collected data from university employees (Martocchio & Webster, 1992). The five studies collected a mixture of data, including measures on computer anxiety, attitudes, competence, and efficacy. The microcomputer playfulness measure was included in all five data collections (Webster & Martocchio, 1992).

Generally, findings showed that computer playfulness related positively with computer attitudes, computer competence, and computer-efficacy. A positive relationship also existed between computer playfulness and outcomes such as involvement, positive mood, satisfaction, and learning. They also found that computer playfulness related inversely with computer anxiety. The researchers suggest that computer playfulness could be a better predictor of involvement, positive mood, satisfaction, and learning than computer attitudes or computer anxiety (Webster & Martocchio, 1992, p. 217).

Research has shown that people are willing to take larger risks if they have a positive affect for an activity (Finucane et al., 2000). If a person demonstrates playfulness in a situation, they will have a high affect for the task or event; therefore, they are more likely to engage in the same situation again (Martocchio & Webster, 1992). Thus, playful change oriented people are more likely to take risks, and are more likely to adopt change (Baylor & Ritchie, 2002).

Establishing a teacher's level of anxiety or playfulness is important in this research for two reasons. Primarily, understanding levels of playfulness and anxiety will help to predict a person's potential to take risks. People who perceive risks as dangerous or threatening, causing anxiety and having a negative affective response, are less likely to determine risks are worth potential loss (Wilkinson, 2001). Playful change oriented people are more likely to take risks, and are more likely to adopt change (Baylor & Ritchie, 2002). The second consideration is how playfulness and anxiety affect learning. Research shows that anxiety is a stronger mediator than playfulness when learning new ICT skills (Hackbarth, Grover, & Yi, 2003; Martocchio & Webster, 1992). As previously stated, individuals will perceive anxiety if tasks are too challenging or if they have had negative experiences using ICT in the past. Although, once a person has increased positive experience using ICT, anxiety levels will decrease and computer-efficacy will increase (Martocchio, 1994).

The four indicators presented will be used to assess teachers' potential risk-taking habits and risk perceptions in the context of ICT-related educational change. Teaching-efficacy, computer-efficacy, and playfulness & anxiety address aspects of teachers' individual experiences, while school culture considers their perceptions of experimentation in the school. In theory, within a school context, teachers showing higher teaching and computer-efficacy, as well as higher playfulness would be more likely to take risks within the curriculum and integrate technology into teaching. This said, research shows that teachers are more likely to engage in change in a school that supports experimentation. Therefore, it will be possible to observe sociocultural influences on teachers who are likely to, or unlikely to, take risks integrating technology when teaching.

2.8 Summary of key ideas in the literature

Educational research has seen an increasing number of studies calling for a sociocultural examination of teacher and school change in the context of ICT-related change (e.g., Grossman & McDonald, 2008; Hew & Brush, 2007; Roehrig et al., 2007). More specifically, studies have called for an examination of teachers in their school context (e.g., Zhao & Frank, 2003). Periodically in literature identifying these research needs, the following types of comments are made regarding risk:

> *"...these types of changes are riskier for teachers" (Ertmer, 2005, p. 26)*
>
> *"...change requires tremendous sophistication as well as some risk taking by teachers..." (Fullan, 2007, p. 35)*
>
> *"[it]allows us to be risk takers, to make mistakes..." (Granger, Morbey, Lotherington, Owston, & Wideman, 2002, p. 485)*

Research has not clarified what these *risks* are, what it means to be *riskier*, and what constitutes a *risk-taker*. Fortunately, the discipline of risk analysis has been considering these questions since the 1950s (Slovic, 2000a, p. xxii). Psychometric and theoretical risk analysis, from economics, sociology, health, and anthropology provide many perspectives and approaches examining and classifying risk.

Psychometric and theoretical approaches to risk analysis have not been widely applied in educational research, and not at all in the context of ICT-related change. In response to research calls for ICT-related change to be examined on the individual teacher and school culture levels, the theory of structuration has been chosen as the overarching sociocultural theoretical framework for this study. The reflexivity of structuration allows individuals and their cultural groups to be studied in relation to each other, specifically in a change-related context (Giddens, 1984). Structuration theory does not address individuals' dispositions or cultural contexts, so the concepts of *habitus* and *grid-group typology* were added to the theoretical framework to provide a deeper understanding of individuals' common perceptions of risk and risk-taking habits (dispositions), as well as cultures' perceptions of risk associated with technology and social deviance (cultural type).

While these theories are well established in risk analysis, a precedent does not exist to determine teachers' risk-taking habits and risk perceptions in the context of ICT-related educational change. Prior research has indicated that teachers are likely to take risks and integrate ICT into their teaching (Mueller et al., 2008), if they have a high level of efficacy, or they are in a school supporting change and exploration in teaching (Baylor & Ritchie, 2002). Considering these arguments, four risk-taking indicators have been identified to establish a preliminary understanding of teachers' potential to take risks related to ICT-integration in their teaching. The indicators are: teaching-efficacy, computer-efficacy, playfulness & anxiety, and school culture.

The next chapter presents the ways in which the four indicators were used to collect data on teachers' perceived risks and risk-taking habits in the context of ICT-related educational change. As there is very little precedent for conducting risk analysis in the educational context, the research design focuses on data validation. Risk analysis strategies from both psychometric and theoretical risk analysis were applied to gain a full perspective of teachers' risk perceptions within the context of their schools. Through this design it will be possible to begin to understand what risks are perceived by teachers, what their risk-taking habits may be, and what relationships may exist between individual and cultural risk perceptions in the context of ICT-related educational change.

3 Methodology

The following chapter presents the research methodology employed in this study. The first section restates the research aims and questions (Section 3.1). This is followed by a presentation of the main terms used in this study and their definitions (Section 3.2). The study draws on the traditions of theoretical and psychometric risk analysis and assessment, through a quasi-ethnographic approach. These approaches and the risk-taking indicators as variables will be discussed in Section 3.3.

In Section 3.4 the structure and sequence of the study is presented, as well as the targeted population. The study occurs in two phases: Phase 1, quantitative questionnaire; and Phase 2, qualitative case studies. The Phase 1 questionnaire is used to select participants for the Phase 2 case study. As a result of this sequence, Phase 1 will be presented in its entirety in Section 3.5. This will be followed by a discussion of Phase 2, in Section 3.6. Strategies from both phases are discussed in terms of validity and reliability in Section 3.7. An approach to the final analysis is presented in Section 3.8, followed by a short summary of the chapter (Section 3.9).

3.1 Aim and research questions

Literature in the previous chapter outlined how risk analysis could be used to gain an understanding of teachers' perceived risks and risk-taking behaviours in the context of ICT-related change. Previously, risk analysis had not been widely applied in educational research, and had not been applied at all in the context of ICT-related educational change. The research was guided by the following statement:

Teachers' personal and cultural values and beliefs influence their risk perceptions and risk-taking behaviours in the context of ICT-related educational change.

The theory of structuration was applied as the overarching sociocultural theoretical framework, specifically the reflexive relationship of individual agents in their cultural structure. In addition to structuration, grid-group typology (cultural theory) is utilized to examine the specific cultural risk perceptions and group structures. Initially, teacher's potential risk-taking behaviours are examined through four risk-taking indicators: teacher-efficacy, computer-efficacy, playfulness & anxiety, and school culture. The indicators are intended to help explore teachers' *potential* to take risks, and they represent preliminary themes in the examination of *perceived* risks. The research was guided by the following three questions:

1) Do the indicators predict secondary-level teachers' risk-taking behaviour and their potential to integrate ICT into the curriculum?
2) What risks do secondary-level teachers associate with integrating ICT into the curriculum?
3) How does school culture interact with secondary-level teachers' risk-taking when they are integrating ICT into the curriculum and changing their teaching practice?

The research theorizes that risk analysis is an effective way to gain a better understanding of why some teachers, and school cultures, are able to make changes in teaching practices and effectively integrate ICT into teaching.

3.2 Definition of terms

Agent/Agency: Agent defines the individual or individual teacher in the discussion (Morrison, 2005). Agency is action taken by individuals potentially effecting change (Shilling, 2004).

Change: In this discussion, change concerns teachers' beliefs, shifts in cultural priorities and values, such as improved peer interaction, ICT-integration, use of student-centred teaching practices (Fullan, 2001).

Teacher beliefs and values: In this discussion, beliefs and values specifically refer to teachers' *educational beliefs* relating to teaching, learning, and technology. The definition of teacher beliefs is derived from Calderhead (1996, p. 715) and referenced by Ertmer (2005, p. 28), stating that teacher beliefs refer to "suppositions, commitments, and ideologies" regarding education.

Information and communication technologies (ICT): ICT encompasses technology-related tools, such as computers, scientific calculators, SmartBoards, digital projectors, the internet, databases, etc.

ICT literacy: ICT literacy is defined as "the ability of students to use ICT appropriately to access, manage, integrate and evaluate information, develop new understandings and communicate with others in order to participate effectively in society" (Ministerial Council on Education Employment Training and Youth Affairs, 2008a, p. 2).

Information literacy: A subset of ICT literacy is Information literacy. It is defined as "the set of skills needed to find, retrieve, analyze, and use information" (Association of College and Research Libraries, 2008).

Innovation: For the purposes of this research, new instructional theory, tools, and curriculum are *innovations*, such as community partnerships, Smart Boards, numeracy programs, etc. (Fullan, 2001).

Risk/ perceived risk: In this discussion, risk is the possibility of unwanted events (Rohrmann & Renn, 2000, p. 14). Risk could be positive or negative (desirable or undesirable), depending on the context. Perceived risk refers to peoples' "judgments and evaluations of hazards they (or their facilities, or the environment) are or might be exposed to". Actual risk can only occur from actual risk-taking behaviour, perceived risk is a prediction or estimation of risk (p. 15).

School culture: The school culture includes the habits, traditions, norms, and expectations dictating the behaviour of school leadership, teachers, students, and other key members involved in the school. This definition is derived from Schoen and Teddlie's (2008) discussions on school culture and school climate.

Structure: Structure is the culture and context in which individuals exist (Giddens, 1984; Morrison, 2005). In this study, structure refers to the school culture.

3.3 Approaches to research

The overarching theoretical framework put forward in this thesis is the theory of structuration (Section 2.3). This framework is supported by an underlying ethnographic approach to qualitative research. Ethnography is the methodology for studying culture (Eisenhart, 2001), and is rooted in anthropological and sociological traditions (Holloway, 1997).

The theory of structuration is derived from sociology, while grid-group typology, from cultural theory, is from anthropology. In anthropology, Eisenhart (2001) has identified that the view of culture has been relatively enduring, but recently is has been identified that individuals' *way of life* has changed. Eisenhart states that family interactions are changing, and that technology use has blurred the boundaries between home and school. Wildavsky and Drake (1990)have identified that individuals make choices that will reinforce their desired *way of life*, and that a *way of life* is aligned with individuals' value systems. In schools, cultural shifts have been observed through changing expectations in content delivery. Previously teachers "directed and ordered students, where now they are facilitating them" (p. 17). Ethnography has greatly enriched the understanding of how school organizations influence the meaning of schoolwork and achievement, in the context of this study, the beliefs and values supporting schools' and teachers' way of life.

3.3.1 Ethnography

Considering a school context, Cuban (1989) states that two conditions are necessary to support a risk discourse: a) change in the social school organization of schooling, and b) change that assumes broader political and cultural resonance. Cuban's statement is in reference to *at-risk* students, but the same concept can be applied to any individual in a changing environment. The mechanism that instigates changes in schools does not need to be dramatic, it can be incremental, but changes will assume larger symbolic meanings in culture (Richardson, 2000).

Schein (1992) states that culture can manifest itself in three different ways: Artefacts, Espoused Beliefs, and Basic Assumptions (see Table 3.1).

Table 3.1

Levels of organizational culture and associated research methods

Schein's Levels of Organizational Culture	Conceptually Similar Constructs	Social Science Discipline Associated With This Type of Inquiry	Appropriate Research Methods
Artefacts	Symbolic Representations	Anthropology	Observation, Interviews
Espoused Beliefs	Organizational Climate School Climate	Psychology, Social Psychology, Sociology	Surveys, Structured Interviews
Basic Assumptions	Organizational Culture School Culture	Anthropology	Observations, Semi- or Non-structured Interviews

Note. From Schein, E. H. (1992). Organizational culture and leadership (2nd ed.). San Francisco: Jossey Bass; and, Schoen, L. T., & Teddlie, C. (2008). A new model of school culture: A response to a call for conceptual clarity. School Effectiveness and School Improvement, 19(2).

The second level in Schein's construct has been examined in great depth in educational research, specifically in regards to teachers' beliefs. Schoen and Teddlie (2008) state that beliefs are typically examined through psychometric survey methods, and aggregated to the school level. These methods have been used, even though Schein (1992) has stated that many individuals are unaware of basic assumptions or beliefs in organizations, and would therefore be unable to identify them through a questionnaire. Therefore, a more effective way to examine organizational culture is to apply anthropological and ethnographic approaches, such as interviews and observations. Ethnography is described as a combination of observation and participation interwoven with other procedures – collecting whatever data are available to "shed light on issues that are the focus of the research" (Hammersley & Atkinson, 1995, p. 1).

Atkinson and Hammersley (1998, pp. 110-111) outline four main features of ethnographic research:

1) A strong emphasis on exploring the nature of a particular social phenomenon, rather than setting out a test hypothesis about them;
2) A tendency to work primarily with *unstructured* data, that is, data that have not been coded at the point of data collection in terms of a closed set of analytic categories;
3) Investigation of a small number of cases, perhaps just one case, in detail;
4) Analysis of data that involves explicit interpretation of the meanings and functions of human actions, the product of which mainly takes the form of verbal descriptions and explanations, with quantification and statistical analysis playing a subordinate role at most.

Flick describes ethnography as a "general attitude" approach to research (Flick, 2006, p. 229). One of the strengths of ethnography is the flexibility it allows in research. Hargreaves (2005, p. 969) comments, "...only detailed ethnographic or anthropological study that investigates people's experiences and expressions of emotions in action offers the opportunity for highly verifiable and richly valid accounts of people's emotional lives and experiences." As risk perceptions are contextual, and influenced by social, psychological, and environmental factors qualitative approaches offered more sensitivity to individuals' experiences, and offered a richer understanding of the teachers' experiences in the school culture.

Using ethnography, researchers are able to gather data from sources they feel are appropriate. Often, in ethnography, data collection methods are secondary to interpretation and writing style. This tendency can lead to a lack of rigour and arbitrariness in data collection (p. 230). In this study, triangulation is employed to ensure that findings are valid and reliable. Triangulation was first conceptualized as a strategy for validating results obtained with individual methods (Flick, 2006, p. 390). Four types of triangulation were originally identified for use in ethnographic studies: data (the use of different data sources), investigator (different observers/interviewers to minimize bias), theory (approaching data through multiple perspectives), and methodological (within-method and between-method strategies). Flick presents an additional method, which is the systematic triangulation of several theoretical perspectives linked to qualitative methods. This study primarily employs the data method of triangulation, which will be explored further in the following sections.

3.3.2 Methodology

Flick (2006, p. 228) states that currently ethnography seeks to show what is "familiar to us all." In the modern cultural context, individuals are familiar with, and perceive, risk. The research presented in this thesis draws from two areas of risk research, psychometric and theoretical.

Psychometric approaches are credited for their strength in empirical research, but have been faulted for their lack of consideration for the broader social context of risk perception (Lupton, 1999). Theoretical risk discussions consider culture and risk on a macro level, have been said to lack empirical rigour. Both approaches to risk perception and analysis assume that "risk is subjectively defined by individuals who may be influenced by a wide array of psychological, social, institutional, and cultural factors" (Slovic, 2000a, p. xxiii). Similar to quantitative and qualitative methods, the two approaches to risk analysis are complimentary and can be used together to create a more robust understanding of risk perception and the social phenomenon of risk.

Risk has been widely examined in disciplines such as Science, Engineering, Psychology, Economics, Medicine, and Epistemology. While it has been examined in these disciplines, it has traditionally been treated as a taken-for-granted objective phenomenon (Lupton, 1999, p. 2). Figure 2.1, in the previous chapter, explains how risk perception is conceptualized and examined in this discussion. Psychometric approaches are used to examine individual risk perceptions and agency. Traditionally, in the field of psychometric risk analysis, risks would be examined through quantitative approaches. In recent years, qualitative methods have been employed, in an effort to gain a deeper understanding of *why* individuals perceive risks. The theory of structuration presents a way of thinking about individual and group perceptions, as well as explains part of how and why risks are perceived. Finally, grid-group typology, from cultural theory, can be used to explain *why* groups perceive some risks. Therefore, grid-group typology is able to explain group risk perceptions in the school culture.

As previously stated, the theory of structuration and grid-group typology are not intended for empirical research. Therefore, the two theories are not approaches to research; rather, they provide a way to analyse and understand risk perceptions. The study presented in this thesis looked to Hofstede's (2001) work, *Cultural Consequences,* as an empirical example of the application of grid-group typology, as his work is conceptually similar to grid-group typology (p. 39n87). Hofstede's study explores differences in thinking and social action in members of over 50 nations. He states that cultural differences or similarities are most clearly illustrated though values (p. xix). The study was a paper-based survey, distributed twice around the years 1968 and 1972, to 116,000 employees of a large multi-national business organization (IBM) in 72 countries. In a later collection, surveys were distributed to participants unrelated to IBM, but in the same countries. The study is presented with validating data from other survey, and non-survey-based, studies, as well as two organizational culture case studies. Instruments used,

country scores per survey item, original and additional country scores per dimension, and a summary of the external studies validating the dimensions are also included with the study.

The surveys were constructed on five dimensions: power distance, uncertainty avoidance, individualism verses collectivism, masculinity versus femininity, and long-term versus short-term orientation. The categories reflect the basic problems any country would encounter, but solutions would differ (Hofstede, 2001, p. xix). For the purposes of the discussion put forward in this thesis, the *power distance, uncertainty avoidance*, and *individualism* verses *collectivism* dimensions were the most relevant. Power distance is the basic problem of human inequality (i.e., hierarchy). Uncertainty avoidance is the level of stress in a society in the face of an unknown future. Individualism verses collectivism is related to the integration of individuals into primary groups (Hofstede, 2001, p. 29). Power distance is closely related to *grid*, while individualism verses collectivism is closely related to *group* in the typology. Uncertainty avoidance is closely related to the concept of risk perception. Even though Hofstede does not address risk analysis directly, because of its similarity with grid-group typology, his work offered a well validated structure through which the sociocultural perceptions of risk could be examined. Hofstede intended for his exploratory work to be applied in further studies, to further the understanding of cultural differences and to improve communication and cooperation between groups (p. 466).

3.3.3 Research design

Ethnography supports an examination of the social phenomenon of risk perception, fulfilling the first aspect of ethnographic research (see Section 3.3.1). In this thesis, teachers' risk perceptions and risk-taking behaviours are considered in the context of ICT-related change. As previously stated, an existing body of research considering teachers' risk perceptions does not exist, and therefore a standard approach to methods or research design was not available. Research in the area of teachers' perceptions, change, and experiences has used both quantitative and qualitative approaches. The most recent studies, identified in Section 2.5.1, examining teachers' risk perceptions have been qualitative in nature (e.g., Ponticell, 2003; Reio & Lasky, 2007). The two older studies employed quantitative approaches (e.g., Short et al., 1991; Spitzer, 1975). Harris' (1995) work using grid-group typology used qualitative methods. Studies focusing on teaching-efficacy and/or computer-efficacy have tended to use quantitative methods (e.g., Baylor & Ritchie, 2002; Mueller et al., 2008), while studies considering teachers' emotions and experiences have often been qualitative (e.g., Darby, 2008; Hargreaves, 2005).

The research presented in this thesis employed sociological and anthropological ethnographic methods in a mixed-method design, in two phases. Phase 1 collected quantitative data through a descriptive cross-sectional survey questionnaire, from teachers in Australia and the United States. Phase 2 qualitative data was collected through three rounds of interviews, observations, and research field notes, as well as document analysis and key informant interviews. Data was collected over the course of a year from two case study schools, eight secondary-level teachers in total. One of the case study school was in Australia (four teachers), and the second was in the United States (four teachers).

While the study used a mixed methods design, the majority of the data analysed was qualitative, derived from Phase 2. Quantitative Phase 1 results were primarily used for Phase 2 participant selection. This aspect of the research fulfils Atkinson and Hammersley's (1998) fourth factor of qualitative research, quantitative methods are secondary to qualitative approaches. The qualitative approach fulfils the second factor of ethnographic research, working primarily in unstructured data and from a variety of sources. The small number of cases fulfils the third factor of qualitative research, examining a small number of cases in detail.

In Chapter 2 (Sections 2.6 and 2.7), the four risk-taking indicators were presented: teaching-efficacy, computer-efficacy, playfulness & anxiety, and school culture. The four indicators have been related to teachers' risk-taking behaviours in prior studies. The quantitative and qualitative portions of this study were based on these concepts.

3.3.4 Risk-taking indicators as research variables

The indicators: teaching-efficacy, computer-efficacy, playfulness & anxiety, and school culture are employed to develop an initial understanding of teachers' potential to take risks when integrating ICT into existing curriculum. Table 3.2 shows the risk-taking indicators outlined as research variables.

Table 3.2

Research variables

Independent	Intervening	Dependent
Teaching-efficacy	School culture	Potential for risk-taking
Computer-efficacy		Teacher change
Playfulness & Anxiety		ICT integration

Prior research has linked high or low levels of efficacy with the likelihood that teachers would take risks (Baylor & Ritchie, 2002; Yeh, 2006). Additionally, high or low levels of playfulness or

anxiety have also been linked with individuals' potential to take risks. These variables are considered specific to individuals and their beliefs regarding teaching and technology. In addition to efficacy and levels of anxiety or playfulness, teachers working in a school supporting experimentation are more likely to take risks (Fullan, 2001; Reio & Lasky, 2007). Therefore, school culture is considered an intervening variable. The culture of the school is considered external to individual teachers, but will impact how they perceive learning and teaching in their specific context. The result of the interaction of these variables will be teachers' level of risk-taking, change, and ICT-integration.

It is important to note, the variable format helps explain the interaction between individuals and their school culture, not necessarily to show a causal relationship. In the Phase 2 case studies, variables are converted into categorization themes for content analysis.

3.3.5 The researcher in context

Hofstede (2001, p. 523) states that "research into values cannot be value-free," and as previously stated, risk perceptions are part of individuals' and groups' value systems. In ethnographic research, the researcher becomes a data collection instrument and an element in the setting being studied. The relationship between the research and the setting is reflexive; one can impact the other involuntarily. Part of ensuring procedural validity is understanding the relationship between the observer (researcher), the observed, and the setting (Flick, 2006, p. 374).

Prior to commencing the degree of Doctor of Philosophy in Education at the University of Sydney, I worked as a secondary-level teacher in the United States; I have been a teacher for the majority of my working life. Because of my prior teaching experience, I primarily identify myself as a secondary-level teacher and I am generally considered a member of the teaching community. Having been a teacher, I am intimately familiar with the school context. I was able to understand the barriers and limitations associated with technology use in the school environment. This knowledge made it easier for me to gain access to schools and build rapport with participating teachers.

Even though I was considered a teacher, I was not a member of either school community, as I was not employed at either case study school. Additionally, at the United States school, I was not considered a member of the community because I was not living in the community, I had not grown up in the area, and I lived outside of the United States as the time of the study. In

NSW, I was not a member of the community for similar reasons; I did not grow up in the area, I was not living in the area at the time of the study, and I am from the United States.

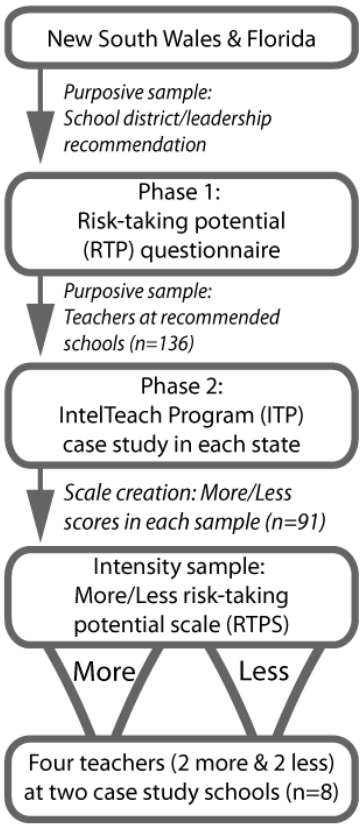
When conducting data collection, data analysis, and writing the dissertation I endeavoured to remain personally removed from the study. Wolcott's (1990, p. 127) statement, that "the researcher should refrain from talking in the field but rather should listen as much as possible" was followed while visiting the schools. Flick (2006) labels this detachment as *ethnomethodological indifference*. She states that researchers will abstain from making a priori interpretations of observed interactions, and that they will not adopt the perspective of the observed actors.

3.4 Structure of the study

The study was divided into two phases: a quantitative questionnaire in Phase 1, and qualitative case studies in Phase 2, collecting data from teachers in New South Wales, Australia, and the southeast region of the United States.

Figure 3.1

Two phase research and participant selection strategy



As outlined in Chapter 2 (Section 2.6.1), governments in both locations have identified ICT as an educational priority. In Australia, it has identified that students needed to be "highly literate in ICT" (Ministerial Council on Education Employment Training and Youth Affairs, 2008a). In the United States, it has been identified that teachers and students need to have strong ICT skills (ISTE, 2008).

Phase 1 data were collected from teachers and schools participating in school-level ICT-integration initiatives. Phase 2 of the study specifically focused on schools participating in the IntelTeach program. One of the benefits of this design is the opportunity to validate Phase 1 questionnaire responses in the Phase 2 case study. Figure 3.1 illustrates the method of research, participant selection strategy, and design of the study.

Between 2000 and 2006, 3 million teachers worldwide had participated in IntelTeach (Intel, nd). Between 2003 and 2007, 3000 NSW teachers (300 mentor teachers) had been trained in the program, in 168 NSW schools (Blackwell, 2006). At the beginning of this research project, 160 mentor teachers, a total of 4800 participating teachers, had been trained in FL (Miami Museum of Science & Planetarium, 2006). In NSW and Florida, school districts often did not know how many schools would participate until the training week. It was difficult to assess how many teachers would be participating in the program between 2006 and 2008, as schools and teachers elect to participate in the program at different times. Although, data did show participation growing exponentially since program inception, and the trend was expected to continue (Blackwell, 2006; Centre for Learning Innovation, 2004).

Each semester, schools elected to be involved in the IntelTeach program. The program aims to help teachers learn how to improve ICT integration in the classroom and stimulate critical thinking skills (Intel, 2006). The program trains mentor teachers from participating schools to teach peer teachers to integrate ICT into curriculum. After participating in the training, the mentors return to their schools to train peers over the course of a semester (Intel, 2006). Mentor training is conducted twice a year, and is structured around a 40-hour mentor course conducted over a 5-day face-to-face training (Center for Learning Innovation [CLI], 2006a; Miami Museum of Science & Planetarium [MMOS], 2006). In 2007, Intel introduced an online component to the program. To participate in IntelTeach, schools must provide teachers with access to at least one computer lab or classroom set of laptops, in short, ICT-integration would need to be a priority in the school if they wanted to participate in the program. Therefore, participation in the IntelTeach program required a certain level of technology equipment and school commitment (CLI, 2006b; Educational Development Center [EDC], 2006).

At the time of this study, the IntelTeach program was available in the New South Wales (NSW) and Florida school districts.

3.4.1.1 New South Wales

The NSW Department of Education and Training (DET) ICT Strategic Plan (2002) stated, "no area of education is changing as quickly as ICT", and "curriculum and educational focus need to match these changes." Considering the varying ICT plans within government, DET specifically identified the need to align goals and standards with industry, in an effort to streamline ICT development (New South Wales Department of Education and Training, 2006a). In the 2006 DET strategic plan, they identified a need to "promote, develop, and provide the ICT environment and initiatives that facilitate, foster, and improve teaching and learning to meet individual student's needs"(New South Wales Department of Education and Training, 2006a). DET initiatives support the NSW Board of Studies (BOS) required ICT-integration in the years 7-10 syllabi. "All new syllabuses make some explicit statements about the ICT that is to be incorporated into teaching and learning. The mapping shows the opportunities that exist for students to develop skills in the use of ICT through the study of the mandatory curriculum in Years 7-10," (BOS, 2008).

Schools were given the opportunity to nominate themselves for participation twice a year, February and September. In 2006-2008 the program was offered in the Sydney metro area and regional NSW. In NSW, the Centre for Learning Innovation (CLI), part of DET, managed the IntelTeach program.

3.4.1.2 Florida

In the United States, teachers from three southeastern states participated in Phase 1 of the study: Florida, Georgia, and Alabama. The Phase 2 case study school was in Florida. Florida state standards are examined in the following section.

The Florida state wide curriculum standards, Sunshine State standards, were updated in 2007 and under revision in 2008 (FLDOE, 2008b). The revised and refined standards are categorized as "World Class Education Standards that prepare Florida's students to effectively engage, communicate, and compete globally with students around the world. Florida's standards will incorporate important skills such as critical thinking, problem-solving, creativity, innovation, collaboration and communication" (FLDOE, 2008b). The new standards explicitly include ICT integration, under Media Literacy and Technology standards.

The Reading & Language Art, Media Literacy Standard states, “The student develops and demonstrates an understanding of media literacy as a life skill that is integral to informed decision making ” (FLDOE, 2007). In the 2007 standards, teachers were given explicit benchmarks guiding how to apply the standards in curriculum. For example, in Reading & Language Art, a benchmark under the Media Literacy standard, for grade six, is “The student will analyze ways that production elements (e.g., graphics, colour, motion, sound, digital technology) affect communication across the media," (FLDOE, 2007, p. 114).

In Florida, the IntelTeach Program was implemented through individual school districts, at the county level. Depending on resources available in the county, the training sessions were conducted at a professional development centre or in a school. Participants from the two countries were selected using the following methods.

3.5 Phase 1: Risk-taking potential questionnaire

Phase 1 employed a descriptive cross-sectional survey questionnaire, the Risk-taking Potential (RTP) questionnaire, designed to identify teachers’ high or low scores on the four indicators. Questionnaires comprise of items developed to collect information on one or more underlying constructs (Fabrigar & Ebel-Lam, 2007). They are often used to gain a better understanding of individuals’ beliefs and values. In psychometric risk analysis, quantitative scaling measures are used to measure risk, perceived risk, perceived benefit, and other aspects of perception. Psychometric methods have proven useful in identifying similarities and differences between risk perceptions and attitudes of groups (Slovic, 2000a).

The four indicators in the RTP questionnaire were based on five previously tested standardized measures (see Table 3.3). The teaching-efficacy (TE, 6 items, V1.1.1 – V1.1.6) and school culture (SCu, 13 items, V1.2.1 – V1.2.13) measures were adapted from Lee, Dedrick, and Smith’s (1991) School Organization, Teacher-efficacy, and Satisfaction Measure (STS). This measure was designed to examine relationships between schools’ organizations, teaching-efficacy, and job satisfaction.

The computer-efficacy (CE, 10 items, V2.1.1 – V2.1.10) measure was taken from Compeau and Higgins’ (1995) Computer Self-Efficacy Measure. The complete Computer Self-Efficacy Measure investigated relationships between individuals’ computer-efficacy and their self-efficacy. Only the computer-efficacy items were used in the RTP questionnaire.

The Play&Anx variable is a combination of two measures, Playfulness (Play, 8 items, V2.2.1 – V2.2.8) and Anxiety (Anx, 8 items, V2.2.9 – V2.2.17). The original Computer Playfulness Scale was created by Martocchio and Webster (1992), and administered in conjunction with Heinssen, Glass, and Knight's (1987) Computer Anxiety Rating Scale. The Computer Anxiety Rating scale was also used in conjunction with the Computer Self-Efficacy Scale in Compeau and Higgins' (1995) study.

The RTP questionnaire collected ordinal data on the four indicators. Questionnaire items were based on a 5-point Likert-type scale. The TE, Play&Anx, and SCu measures used the scale: 1 = "strongly disagree" to 5 = "strongly agree." Participants were also given the option to indicate 0 = "not answered" if they did not wish to answer a question. The CE measure was also a Likert-type scale from 0 = "couldn't do that" to 5 = "totally confident."

Table 3.3

Previously tested measures within the risk-taking potential questionnaire

Measure	Description	Source
Teaching-efficacy (TE)	Based on the STS scale which combines teaching-efficacy and teaching satisfaction (V1.1.1 – V1.1.6)	Lee, Dedrick, & Smith (1991)
Computer-efficacy (CE)	Including personal and professional outcome expectations in relation to using a new software package (V2.1.1 – V2.1.10)	Compeau & Higgins (1995)
Playfulness and anxiety (Play&Anx)	Items addressing perceptions of anxiety or playfulness when using technology (V2.2.1 – V2.2.17)	Martocchio & Webster (1992) (Play) Heissen, Glass, & Knight (1987) (Anx)
School culture (SCu)	Including items from the following sections of the STS questionnaire: Sense of community, Principal leadership, Staff influence on decision making, Encouragement to innovate, Administrator responsiveness, and Collaboration time (V1.2.1 – V1.2.13)	Lee, Dedrick, & Smith (1991)

The preliminary RTP questionnaire included the complete original measures (84 items). The preliminary questionnaire was given to Australian experts in the field of educational technology, and secondary-level teachers in Australia and the United States for review before pilot testing. Reviewers were asked to ensure that the questionnaire was appropriate for both educational contexts. No significant problems were identified.

At this point, it is necessary to discuss ethical considerations, as they impacted on the RTP questionnaire development. Revisions resulting from the pilot test will be discussed with ethical considerations in the following section.

3.5.1 Ethical considerations

In this section, ethics will be discussed in two ways. First, general presentations of ethical considerations taken into account are outlined. This is followed by a discussion of the University of Sydney Ethical Guidelines and the NSW State Education Research Approval Process (SERAP) processes.

Under the first point, the research methodology dealt with five main areas of ethical considerations (De Vaus, 2002), outlined in Table 3.4.

Table 3.4

Ethical Considerations

Ethical Responsibility	Action
Voluntary participation	Participants[a] were informed that involvement in Phase 1 and 2 of the study was voluntary. They were informed that they could withdraw from the study at any time. Additionally, participants were informed that they could review and withdraw their questionnaire, interview, or observation data at any time.
Informed consent	All participants received full disclosure of research goals and intent through the Participant Information Sheet (see Appendix A).
No harm	All considerations were taken to avoid inflicting any harm upon participants. Participants did not report harm at any stage of the research project.
Confidentiality anonymity	All necessary steps were taken to preserve participants' confidentiality and anonymity. Participants had full disclosure regarding anonymity and confidentiality relating to these processes. Participant and school names were changed in all data reporting. At certain times, participant information was used in data collection. In the online survey, participants were given the option to identify their school. This field was not mandatory.
Privacy	The researcher only contacted potential participants through school recommendation and personal indication. At the NSW school, the IntelTeach master teacher initially contacted potential participants regarding the study, after this initial contact and their agreement, the researcher contacted participants directly.

Note. Ethical considerations were addressed in both phases of the research.
[a] *Participants* is defined as teachers, key informants, and all members of school culture.

The University of Sydney Ethical Guidelines and the NSW State Education Research Approval Process (SERAP) approved the research. An application for University of Sydney ethical approval was submitted to the Human Research Ethics Committee in October 2006. The application was approved in December 2006. After receiving approval from the university, the initial questionnaire was piloted and revised, which will be discussed in the following section.

The revised questionnaire was submitted to the NSW Department of Education and Training (DET) for ethics approval, through the SERAP online application, in February 2007. Approval was received in July 2007. The NSW DET ethics review process recommended that three questionnaire items be reworded and/or removed from the questionnaire. After NSW DET accepted the revised questionnaire, the questionnaire was resubmitted to the University of Sydney Human Research Ethics Committee for amendment. Amendments were approved in July 2007.

In the following section, revisions from the pilot study and SERAP process are discussed in more detail.

3.5.2 Pilot study and revisions

The preliminary RTP questionnaire (84 items) was pilot tested in December 2006, in the United States. The participating population consisted of ten middle school teachers in Oakland, California. The school was in its first year, serving 150 students in grades 6 and 7. One of the school's main goals is to integrate technology in the curriculum to prepare students for the workplace; therefore, ICT-integration was a priority. The school's teachers had access to at least one full computer lab for classroom use. All of the teachers completed the pilot study questionnaire online[8], during a faculty meeting.

Reliability and correlation analysis were applied to help determine which combination of items created the best combination of items for the final questionnaire. Results from the pilot test were found to possess adequate reliability; each of the measures showed a Cronbach's α of.70 or higher, which is recommend by Kline (1999) for reliability (see Table 3.5).

Table 3.5

Reliability scores from pilot study

Indicator	Standardized measure	Reliability
Teaching-efficacy (TE)	School Organization, Teacher-efficacy, and Satisfaction Measure (STS)	$\alpha > .70$
School culture (SCu)	School Organization, Teacher-efficacy, and Satisfaction Measure (STS)	$\alpha > .70$
Computer-efficacy (CE)	Computer Self-Efficacy Measure (CSE)	$\alpha > .90$
Playfulness & anxiety (Play&Anx)	Microcomputer playfulness scale (MPS)	$\alpha > .80$

[8] Online questionnaires were available through http://coco.edfac.usyd.edu.au/Members/showard.

Correlation analysis was conducted to determine which items could be removed from the RTP questionnaire. Several items were removed from the TE, SCu, and Anx portions of the questionnaire due to weak correlation ($r < .4$), being non-significant ($p > .05$), or being redundant (see Table 3.6). The CE scale was unchanged.

The most significant change in the questionnaire was the revision of the Play measure. Participants felt the measure was seen as "strange." The scale asked participants to "characterize yourself when using computers" by identifying agreement, on a Likert-type scale, with descriptive adjectives (e.g., spontaneous, conscientious, unimaginative, etc.) Questions were reformatted from single adjectives to a comparison between two adjectives, (e.g., when I use ICT I feel… more **Unimaginative** than **Creative**.) The revised questions were emailed to pilot study participants, who had indicated that they would be interested in further participation in the study, for review. Participants did not indicate any problem with the new questions.

After the pilot test and questionnaire revisions, additional revisions were made during the New South Wales Department of Education (NSW DET) State Education Research Approvals Process (SERAP); see Table 3.6 for a full list of revisions.

Table 3.6

Risk-taking potential (RTP) questionnaire revisions

Measure	Revision	Piloted items	Rational	Final items
Teaching-efficacy (TE)	Pilot study	#5-8	Redundant[a]	#5
	Pilot study	#10	Unnecessary[b]	
School culture (SCu)	Pilot test	#5	Unnecessary	Removed
	SERAP	#6	Reworded from positive to negative	#5
	SERAP	#7 & 10	Removed on NSW DET recommendation	Removed
	Pilot test	#11-14	Merged into one item	#9
Computer-efficacy (CE)	No revisions			
Playfulness & anxiety (Play&Anx)	Pilot study	#3, 5-7, 9, 10, 13, 19	Non-significant in correctional analysis	Removed

[a] Correlation analysis showed that the items were highly correlated, and correlating with the same items

[b] Information gathered with items were not necessary for the study (i.e., questions about homework)

After analysis and reviewing participant responses, demographic items were added to the questionnaire. Additionally, two ICT-use questions were added, a) "Last semester how many times did you use technology (i.e., software, computers, and internet) in a lesson?" and, b) "Have you met with you school's technology coordinator to discuss technology integration and lesson planning?" The last question asks participants to provide "any additional comments regarding teaching, your school, or technology" (see Appendix B).

The number of items on the finalized RTP questionnaire was 53: 6 TE items, 10 CE items, 17 Play&Anx items, and 13 SCu items, as well as 5 demographic items, and 3 free response questions.

3.5.3 Purposive sample

Schools were identified to participate in the Phase 1 questionnaire through purposive sampling. Sampling targeted schools engaged in school-wide ICT innovation. Schools participating in the IntelTeach program were identified first. Other schools, participating in similar school-wide ICT innovation programs, were targeted to increase the sample size. Broadening the Phase 1 sample helped ensure that the population was large enough to prove that the questionnaire provided adequate reliability, and that it would be able to fulfil the purpose of creating scales for Phase 2 participant selection. Additionally, while the results from this study were not intended to be generalizable, expanding the sample outside of the IntelTeach program helped to minimize bias, as well as increasing the variety of teachers' experiences and perceptions when using technology in teaching. Further, applying a purposive sampling method allowed the researcher to be guided by experts in both communities in sample selection. The researcher chose participating Phase 1 schools based upon recommendations from the NSW Department of Education (DET), Intel Education Australia, the State of Florida Department of Education (FLDOE), Florida State University (FSU), and independent researchers.

In NSW, the Phase 1 online questionnaire was distributed by the Centre for Learning Innovation (CLI) in two ways. The first solicitation was through a monthly IntelTeach email newsletter, which was sent to all IntelTeach mentor teachers in NSW. A short description of the study and the questionnaire URL was included in a department newsletter. The online questionnaire URL was then posted on the NSW school computer coordinator listserve. In addition to guidance from CLI, Intel Education Australia and researchers involved in an independent IntelTeach program evaluation were able to suggest several schools which would be appropriate to contact. After IntelTeach confirmed participating schools, CLI validated that the identified schools were appropriate participants. The researcher then contacted the schools individually.

In Florida, IntelTeach schools were identified through searching online resources, such as school improvement plans and Intel press releases[9]. The researcher contacted school districts participating in the IntelTeach program to gain clearance to contact schools participating in the

[9] Intel Education Florida was contacted to identify schools participating in the program. They were unable to provide this information. Many of the resources used to initially search for schools are no longer active links.

program. After receiving clearance from the school district, the schools were contacted individually and invited to participate in the project. In Phase 1, in addition to IntelTeach schools, teachers were identified through a Comprehensive School Reform (CSR) project. The CSR project is through Florida State University's (FSU) Learning Systems Innovation group. CSR initiatives are funded by the United States Department of Education (USDOE), and are intended to assist "public schools across the country to implement effective, comprehensive school reforms based upon scientifically based research and effective practices" (USDOE, 2004). Schools participating in the CSR project were from Florida, Georgia, and Alabama. The Phase 1 questionnaire was distributed to teachers participating in the 2007 summer workshop. Participating teachers were from the southeast region of the United states: Florida, Georgia, and Alabama (the largest distance between schools was 640 km/400 miles).

3.5.4 Administration

The questionnaire was administered in paper and in an online format over a six-month period, from April 2007 to September 2007. The two locations had different timelines. Research in Florida was able to commence with approval from the University of Sydney, the school district, and the principal. The approval process was completed in March 2007. In NSW, it was necessary to gain ethical approval from the University of Sydney and from the NSW DET, through the SERAP process (see Section 3.5.1); this process was completed in July 2007. Therefore, questionnaire administration in Florida was from April 2007 to June 2007, and in NSW from July 2007 to September 2007.

The questionnaire was offered in both paper and online formats in an effort to avoid bias towards more technologically inclined participants. Schools decided which version they felt was appropriate for their population. At the two case study schools, the questionnaire was administered in paper format at the bi-weekly faculty meetings.

In April 2007, the RTP questionnaire was administered in a Florida school, which was participating in the IntelTeach program. The principal administered the paper questionnaire in a faculty meeting. Teachers were not required to complete the questionnaire.

In June 2007, the questionnaire was administered through the Florida State University CSR project. The RTP questionnaire was included in its entirety, with other measures, at the beginning and the end of the 2007 summer workshop. The additional measures asked teachers about technology in their teacher preparation courses, how their students use technology, and about collaboration and library media within their school.

In July 2007, the Centre for Learning Innovation (CLI) made the questionnaire available to NSW teachers participating in the IntelTeach program. The questionnaire URL was distributed to teachers through an email newsletter and a listserve posting.

In September 2007, the RTP questionnaire was administered at a school participating in the IntelTeach program. The mentor teacher administered the paper questionnaire at a faculty meeting. Teachers were not required to participate. The mentor teacher provided the questionnaire URL to teachers who did not attend the faculty meeting.

3.5.5 Analysis

Teachers' questionnaire responses on each indicator were aggregated to create a risk-taking potential scale (RTPS). The scale created a range of high and low values, based on individual scores relative to the group (Gall, Gall, & Borg, 1999). More and less risk-taking potential scale (RTPS) scores will show teachers' potential risk-taking behaviour in the context of learning to integrate ICT into curriculum.

3.5.5.1 Creating indicator scales

First, all negatively phrased items were reversed to align with the positive. Cronbach's alpha was calculated to determine the reliability of the questionnaire, and the internal construct validity of each indicator measure. After this process, each measure was examined for irregularities. T-values were calculated to ensure teachers' responses were homogeneous across the samples.

After reliability and homogeneity were established, scales were calculated. Items within each of the four indicators were combined and averaged. This process resulted in each participant having four indicator scores. The four indicator scores were then averaged to create the RTPS score. The RTPS score ranged between 1 = less potential for risk-taking behaviour, to 5 = more potential for risk-taking behaviour.

Descriptive statistics for indicators and item V1.2.13 (not included in SCu scale, see Section 4.1.5 for discussion) were calculated. Independent sample t-tests were conducted on each indicator to ensure the teachers' scores were not statistically significantly different between the samples.

3.5.5.2 Phase 2 participant identification

Teachers' RTPS scores were used as the Phase 2 selection scale. Teachers in each of the sample populations were divided on the mean. This created two groups in each sample: more risk-taking behaviour (MRB) and less risk-taking behaviour (LRB) participants. In Phase 2, participants were asked to validate their original questionnaire responses, in an effort to validate their LRB or MRB scores.

3.5.6 Intensity sample

Two schools, participating in the IntelTeach program, were selected for the Phase 2 case study from the Phase 1 sample. One case study school from each country was chosen, four teachers from each school, two *less risk-taking behaviour* teachers (LRB), and two *more risk-taking behaviour* teachers (MRB) were chosen for Phase 2 (see Figure 3.1).

In the United States sample, the case study school was in northwestern Florida. The school was identified through its participation in the IntelTeach program. Four possible case study teachers were identified as LRB (2) or MRB (2) teachers by their RTPS scores. After the teachers were identified, their participation was discussed with the principal, to see if the teachers did or did not use technology in their classroom. After the principal confirmed teachers' LRB or MRB identifications, the teachers were then invited to participate in Phase 2 of the project.

In the Australian sample, the case study school was in NSW. The school was identified through its participation in the IntelTeach program. The IntelTeach mentor teacher identified four possible Phase 2 participants before the Phase 1 questionnaire was administered in the school. The four identified teachers' LRB or MRB ranking was confirmed using their RTPS scores, which validated if they were appropriately categorized. Upon validation, the IntelTeach mentor teacher contacted the teachers to invite them to participate in Phase 2.

3.6 Phase 2: Risk-taking case studies

Qualitative data collection was in-depth and in multiple forms: interviews, classroom observations, field notes, key informant interviews, and document analysis. The collection strategy is outlined in Table 3.7. The five data types were collected to develop a holistic sense of individual and cultural risk perceptions in the schools.

Interviews and classroom observations occurred over the 2007 and 2008 school years. Interview, observation, and field note data were collected in three rounds at each school. Document analysis and key informant interviews were conducted as necessary.

Table 3.7

Phase 2 Case study data sources

Type	Method	Collection
Interview	Episodic/Critical Incident	Narrative/ Semi-structured
Classroom observation	Direct observation	Structured/ Low inference
Researcher field notes	Direct observation	Unstructured/ Low inference
Document analysis	Found in field settings	Policy/ Curriculum documents
Key informant interviews	Informational	Unstructured

The following section will outline the methods used in the case study and the data collection process.

3.6.1 Teacher interviews and classroom observations

Teacher interviews were narrative and semi-structured, and were based on episodic and critical incident interview methods. The episodic interview method is particularly appropriate for this task, as it considers social groups and technological change (Flick, 2000). The critical incident method identifies significant events in a process (Holloway, 1997).

The episodic interview is based on the assumption that subjects' experiences of a certain domain are stored and remembered in forms of narrative-episodic and semantic knowledge (Flick, 2000, 2006). Flick designed the episodic interview method as a way to access episodic knowledge embedded in experiences, and semantic knowledge based on assumptions and relations. Therefore, the interview format is narrative and semi-structured. This method is particularly useful when examining technology change, where it is necessary to examine an interviewee's routines as well as their prior experiences. The episodic approach allows the interviewer to guide the interview process through key questions, helping to clarify situations and recount experiences (Flick, 2006). The critical incident method was developed as a set of procedures for collecting direct observations of human behaviour (Flanagan, 1954). The method was originally designed as a way to gain knowledge of people's behaviours in critical situations in order to solve problems on task performance. Critical incidents can be used to evaluate effective and ineffective problem-solving strategies (Holloway, 1997, p. 40). Traditionally, behaviours are observed and then analysed through semi-structured interviews.

In the context of this study, the episodic method was used to present topic areas and to identify an experience that the interviewee associated with that topic. The critical incident method was then used to identify if there was a specific incident that the interviewee associated with the topic area or prior experience. Questions on the interview schedule were structured as follows:

(REF) How do you feel about teaching as a profession? Personally?
(TYP) What is a typical example illustrating this belief or perception?
(CRT) Is there a specific event in your professional or personal history that illustrates this belief or perception? Please describe it in detail.

The main approach in the episodic interview was asking the interviewee to present a narrative of a situation (Flick, 2000), thus the first part of the question (REF) asked the interviewee to

reference a topic and to present a narrative. The second section (TYP) in the question asked them to illustrate a *typical*, in the case of the above example, belief. In the TYP question, teachers would also be asked to illustrate a typical teaching method used in the classroom. The TYP question established the first part of the critical incident question, which would "tie down the selection of incidents to be reported on" (Flanagan, 1954, p. 16). In the final question (CRT), teachers were asked to give specific examples of their perceptions. The CRT question asked the interviewee to identify a specific, critical, incident (see Appendix C for the full interview schedule).

The interview schedules were based on the four risk-taking indicators: General perceptions of teaching and school – your teaching and your school; Using computers and technology; Playfulness and anxiety when using computers and technology; and, Risk perceptions. All three of the interviews were based on the same interview format. In the second and third interviews, questions were adjusted to include information from the prior interviews. This process will be discussed in more detail later in this section.

Classroom observations were direct observation (full observation schedule in Appendix D). The observations were intended to collect data relative to technology in the classroom, the act of teaching, and technology use when teaching. Direct observation notes were taken during classroom observations. Observations were validated in the interview process. Student data was not collected in the observations.

3.6.2 Interview and observation data collection

Interviews were conducted face-to-face, as well as through SkypeOut[10]. Face to face interviews were conducted in the teacher's classroom or in a private room in the school. The researcher booked the private room, if they were unable to use the teacher's classroom. Interviews were recorded using a digital recorder. Files were converted to a MP3 audio file using Smart PC recorder[11]. The researcher used Express Scribe transcription software[12] to transcribe all interview files. When interviews were conducted using SkypeOut, the researcher would contact the teacher during their free period or at home, depending on the participant's preference. Hot

[10] Information on SkypeOut can be found at, http://www.skype.com/allfeatures/callphones/. Skype out allows a user to make phone calls from their computer to a phone number.

[11] Information on Smart PC recorder can be found at http://www.download.com/Smart-PC-Recorder/3000-2646_4-10611566.html?tag=mncol;lst&cdlPid=10802783.

[12] Information on Express Scribe can be found at http://www.nch.com.au/scribe/.

Recorder for VoIP 4[13] was used to record SkypeOut calls and convert the audio file to MP3 format.

Interviews and observations were conducted in three rounds, over the course of the 2007 and 2008 school years. Table 3.8 outlines the data collection timeline. Teachers were given a general timeline at the beginning of the study, so they would have a general idea when data collections would occur. For each round of data collection, the researcher spent between three and four days at the school. Two weeks before a data collection, the researcher would schedule interviews and observations with each teacher through email or over the phone.

Table 3.8

Interview and observation timeline

	Florida		NSW	
	Date	**Collection**	**Date**	**Collection**
Interview 1	May 2007	SkypeOut	October 2007	Face-to-face
Observation 1	October 2007	Classroom	October 2007	Classroom
Interview 2	October 2007	Face-to-face	December 2007	Face-to-face
Observation 2	October 2007	Classroom	December 2007	Classroom
Interview 3	January 2008	SkypeOut	February 2008	Face-to-face**
Observation 3	April 2008*	Classroom	February 2008	Classroom

*A short informal interview was conducted after the 3rd Florida observation
**One of the NSW participants was conducted through SkypeOut.

The researcher visited the Florida school in April 2007, after Phase 1 was completed. During this visit, teachers were asked if they would like to participate in Phase 2 of the research, short preliminary interviews and classroom observations were conducted at that time. The first round of interviews were conducted one month later over Skype, before the close of the 2006-2007 school year. Teachers did not return to school until September 2007, beginning the 2007-2008 school year. On the second visit to the Florida school, the researcher conducted two classroom observations. The first observation was done before each teacher's second interview, followed by the second observation. The third Florida interview was completed in January 2008, as the researcher was unsure if they were able to travel to the Florida school to conduct the final round of data collection. The researcher was able to travel to Florida to conduct the final classroom observation. At the time of the final classroom observation, in April 2008, the researcher conducted short informal interviews with each teacher, to ensure significant changes had not occurred in their teaching or the school between January and April 2008.

[13] Information on Hot Recorder for VoIP 4 can be found at, http://www.hotrecorder.com/.

In the NSW school, interviews and classroom observations were conducted within two days of each other. Only one NSW interview, in the third data collection, was conducted using SkypeOut. At the time this teacher was scheduled to interview, they were called away for a school emergency. The interview could not be rescheduled for a face-to-face time during school, so it was conducted using SkypeOut.

When conducting classroom observations, the researcher was a passive observer. If clarification on actions observed during teaching was needed, it was asked for after the observation or in the following interview. The researcher told the teacher to use their own discretion regarding introductions to the class. Some teachers wanted to introduce the researcher, others did not. The researcher did not interact with the students. During class, the researcher sat outside of the student desk area when possible. If other seating was not available, the researcher sat in the back corner of the desk grouping.

3.6.3 Researcher field notes, document analysis, and key informant interviews

Data on school culture was collected through teacher interviews, as well as the researcher's field notes, document analysis, and informal interviews with key informants. Direct observation and separated inference[14] was used to record jotted notes throughout each visit to the schools, in an effort to keep specifics separate from more abstract concepts or inferences (Neuman, 2005). Researcher field notes were typed and annotated at the end of each day at a school. School documents were collected using three strategies:

1) The researcher would collect any documents available to the public, such as school newsletters or subject area standards available on the internet;
2) The researcher would ask for documents that could possibly be available but were not being distributed to the public, such as a school's technology policy; and,
3) The researcher would ask for documents referenced in informal conversations or mentioned in teacher interviews, such as a flyer for an internet safety meeting.

Through teacher interviews and informal conversations with members of the school communities, key informants would be mentioned, such as the technology coordinator. Often it would be mentioned that the researcher should talk to this person about technology integration. As key informants were recommended in the community, the researcher would contact them to discuss their role and perspective on the school, teaching, and technology.

[14] Observations and inferences were separated in the researcher notes using asterisks.

3.6.4 Case study analysis

The primary basis for qualitative analysis was constant comparison and content analysis (Gall et al., 1999; Harris, 1995). The NVivo 7.0 software package was used for project management and coding. Through constant comparison, successive data collections were built upon findings from the previous collections. The first interviews were structured upon, and validated, the Phase 1 data. The second interviews were based upon Phase 1 data and themes emerging out of the first interview data. The third interviews followed the same pattern. By analysing data throughout the collection process, the researcher was able to refine and deepen interview questions, as well as improve the coding categories for the following data set.

Coding categories were not based on a previous scheme. As examining teachers' and school culture risk perceptions is a new area of educational research, a new coding scheme needed to be developed. The researcher applied a combination of theoretical and thematic coding strategies. Flick (2006) identified this method for "elaboration of thematic structure for case analysis" (p. 359). One of the first steps necessary in thematic coding was a characterization of each case. The first interviews were initially coded on four broad thematic categories, *profile codes*: teaching, technology, school, and risk. Case excerpts from each theme were assembled to develop a profile of each teacher. The researcher expanded and refined the themes and profiles through the second and final interviews. Through analysis, it became necessary to identify when teachers were voicing perceptions or using an illustrative example; these were identified as *clarifying codes*. Teachers were explicitly asked, through the Episodic/Critical Incident interview methods to state their perceptions and to give illustrating examples. These codes were necessary to accurately construct case profiles. The final profiles are presented in Chapter 5.

After coding the first set of interviews with the profile codes, the researcher did a second pass through the first interviews using *indicators codes*: teaching-efficacy, computer-efficacy, playfulness, anxiety, and school culture (Section 3.3.4). These coding categories began to construct teachers' risk perceptions and risk-taking habits, based on Phase 1 risk-taking indicators. Open coding was conducted in parallel to thematic coding. Through open coding, thematic categories refined, and evolved the *individual, school, and community codes*. Through axial coding, these broad categories identified values, goals, affect, etc. The *clarifying codes*: training, teaching, and ICT were added to the scheme to identify what context teachers were referring to when individual, school, or community codes were applied.

3.7 Reliability, validity, and alternative criteria

In ethnographic studies, data is collected from a variety of sources, which allows for validation of findings. Indicators are difficult to isolate in a single cross-sectional design (Gall et al., 1999), therefore research recommends that school culture and organizational research be conducted in two dimensions. Examining school culture on two dimensions supports investigations considering how school structure impacts on individuals' experiences in the school (Lee, 2000).

Wolcott identified nine points which need to be considered to ensure validity in ethnographic research:

1) The researcher should refrain from talking in the field, but rather should listen as much as possible;
2) Produce notes as exact as possible;
3) Begin to write early;
4) Outside readers should be able to read field notes and reports to see for themselves;
5) Reports should be candid;
6) Reports should be as complete as possible;
7) Presentations of the findings should be characterized by balance between aspects of the findings, as well as;
8) Findings should be presented with accuracy in writing (Wolcott, 1990, pp. 127-128).

The eight points outlined were taken into account in this study. Point number one was fulfilled through adoption of ethnomethodological indifference. Direct observation notes fulfilled the second point. Notes were transcribed the same day they were taken, to ensure accuracy. Using the constant comparison method ensures that analysis and writing occur early in the research. All reports and presentations derived from the data have been unbiased, candid, and balanced.

It was important to make clear that the code developed as data was collected, and categories were constantly adjusted, merged, and refined (see Appendix E for a list of final coding categories). Coding using complimentary methods, theoretical and thematic coding, further supported data validation and internal consistency. Using these methods, individual perceptions regarding risk perception and affect were validated against observational data. The coding categories were developed and validated in the interview and classroom observations process, and were further validated through triangulation with document analysis, research field notes, and key informant interviews.

Credibility and dependability are two alternative criteria to validity and reliability (Flick, 2006). Applying a mixed-method design, and triangulating data from both phases, allows the researcher to validate the four indicators on two levels: individual interviews and observations, as well as, school-level document analysis and researcher field notes, while allowing new themes to arise.

3.8 Final analysis

After the data collection closed and data were analyzed, the researcher employed an illustrative method to apply grid-group typology, to determine generalized cultural risk perceptions across cases (Neuman, 2005).

The research first looked at illustrative risk perceptions in relation to the individual, the classroom, and the school in relation to technology integration. This analysis was based upon themes identified through teachers' individual responses, as well as their collective responses in the areas of the four indicators. This analysis strategy looked for patterns between teachers' perceived risks when integrating technology into their curriculum and changing their teaching practice. Chapter 7 outlines how findings are understood through the theoretical framework outlined in Chapter 2 (Sections 2.2-2.4).

The result of the final analysis is a grid-group classification which can explain some of the cultural risk-taking values and perceptions of risk in schools, and a validated measure to determine individuals' risk-taking potential.

3.9 Summary

The previous discussion presented an outline of the quasi-ethnographic approach to this study, as well as the mixed-methods design and accompanying data collection strategies. The chosen methodology and strategies allow for an in-depth exploration of teachers' risk-taking behaviours and risk perceptions in the context of ICT-related educational change. As risk perceptions are contextual, gathering data on individual experiences (interview, observation) and data on school culture (researcher field notes, document analysis, and key informant interviews) allows for a holistic investigation of the risk phenomena in schools.

In Chapter 4, results from the Phase 1 questionnaire are presented. The results presented in this chapter give a first look at the study participants, and their general potential to take risks in the

context of ICT-related change. The chapter will also present the participants selected for the Phase 2 case studies.

4 Phase 1 results: Identifying individuals

The following chapter presents the analysis of Phase 1 quantitative data, and the resulting risk-taking potential scale (RTPS). Prior to this study, educational research had not considered teachers' risk-taking habits and perceptions in the context of ICT integration; therefore, validated measures examining risk-taking behaviours and risk perceptions in an educational context were not available. The Risk-taking Potential (RTP) questionnaire was designed to identify teachers' potential risk-taking behaviours in the context of ICT-integration: whether they were more or less likely to take risks and use technology in the classroom. Through identifying whether teachers were more or less likely to take risks and use technology in the classroom, research can begin to understand risk-taking behaviours and risk perceptions associated with ICT integration.

Chapter 4 is the first, of three, presenting teachers' data in the two collection phases. Chapter 5 will present profiles of each Phase 2 participant, and Chapter 6 will present teachers' risk-perceptions in the context of ICT integration. Together, the three chapters answer the first and second research questions.

1) Do the indicators predict secondary-level teachers' risk-taking behaviour and their potential to integrate ICT into the curriculum?
2) What risks do secondary-level teachers associate with integrating ICT into the curriculum?

Chapter 4 begins to address the first research question. The RTP questionnaire is based on four theoretical risk-taking indicators: teaching-efficacy (TE), computer-efficacy (CE), playfulness & anxiety (Play&Anx), and school culture (SCu). In addition to the Phase 1 questionnaire, the four indicators are also used to construct the Phase 2 data collection. In the following discussion, descriptive data from each of the four measures is presented and analyzed to confirm reliability. After the general sample is analyzed, homogeneity between Australian teachers and teachers from the United States is evaluated. It is necessary to establish homogeneity within the sample to ensure significant differences between Australian teachers and teachers from the United States did not exist within the sample.

After reliability and homogeneity are established, teachers' risk-taking potential scale (RTPS) scores are calculated and scaled. The final section in this chapter will present preliminary data on the eight Phase 2 teachers. This chapter will only cover data related to the risk-taking

indicator scales used to select the teachers, and descriptive statistics of the eight teachers' RTPS scores.

4.1 The Phase 1 results

The RTP questionnaire was directly administered to 175 teachers for voluntary completion in faculty meetings and workshops. In addition to the 175 teachers, 600 New South Wales technology coordinators[15] were invited to complete the questionnaire by the Centre for Learning Innovation (CLI), at the New South Wales (NSW) Department of Education and Training (DET). In total, 136 participants completed the questionnaire: 51 Australian teachers, 40 teachers from the United States, and 45 NSW DET identified technology coordinators. Data collected from technology coordinators was included in the reliability analysis, but not included in the general presentation of questionnaire results, or the Phase 2 participant selection. Removal of DET technology coordinators will be discussed later in this section.

Kline (1999) has stated that good reliability has an alpha, in most cases, of over .7. Therefore, the questionnaire was found to possess adequate reliability (α = .882). Table 4.1 outlines internal measure reliability.

Table 4.1

Internal measure reliability for Phase 1 questionnaire

Indicator	Standardized Measure	Reliability
Teaching-efficacy (TE)	School Organization, Teacher-efficacy, and Satisfaction Measure (V1.1.1 – V1.1.6)	α = .763
Computer-efficacy (CE)	Computer Self-Efficacy Measure (V2.1.1 – V2.1.10)	α = .959
Playfulness & anxiety (Play&Anx)	Microcomputer playfulness scale (V2.2.1 – V2.2.17)	α = .902
School culture (SCu)	School Organization, Teacher-efficacy, and Satisfaction Measure (V1.2.1 – V1.2.13)	α = .814

Acceptable internal measure reliability allowed further analysis based on the indicators. The theoretical foundation of the questionnaire was evaluated through construct validity using Pearson correlation coefficients (see Table 4.2).

[15] NSW DET identified technology coordinators were invited to participate in the data collection as part of the case study school search. Many technology coordinators volunteered to participate in Phase 2 of the study. Questionnaire data was analyzed with teachers' data.

Table 4.2

Correlations of risk-taking indicators

	TE	SCu	CE	Play&Anx
TE	1.00	.381**	.206*	.249**
		0.00	0.02	0.01
SCu	.381**	1.00	-0.04	0.01
	0.00		0.65	0.91
CE	.206*	-0.04	1.00	.629**
	0.02	0.65		0.00
Play&Anx	.249**	0.01	.629**	1.00
	0.01	0.91	0.00	

**. Correlation is significant at the 0.01 level (2-tailed).
*. Correlation is significant at the 0.05 level (2-tailed).

Correlations showed significantly strong positive relationships between the TE and SCu indicators (r = .381, p < .001) and the CE and Play&Anx indicators (r = .629, p < .001). Weaker positive relationships existed between TE and CE, as well as TE and Play&Anx, but they were still statistically significant (p < .05). A relationship between the SCu and CE indicators was not found, nor between the SCu and Play&Anx indicators. These findings were consistent with prior research considering teaching and computer efficacies (e.g., Mueller et al., 2008). Prior studies did not find relationships between teaching and computer efficacies. TE and SCu relationships are also consistent with research findings identified in Stoll, Bolam, McMahon, Wallace, and Thomas' (2006) review of professional learning communities literature identifying that teaching-efficacy was strongly related to school culture.

The relationship between CE and Play&Anx can be compared with Compeau's (1999) work examining social cognitive theory and efficacy. Their study employed the same CE and Anx scales. In Compeau's study, correlation between the CE and Anx scales was negative, strong, and statistically significant (r = -.540, p < .001). The relationship between CE and Play&Anx is positive, but shows a similar strength, and is also significant. A significant, but weak, relationship exists between TE and Play&Anx. Playfulness and reduced anxiety can imply a type of intellectual playfulness (Webster & Martocchio, 1992), which would align with high levels of efficacy.

After establishing that the results were reliable and valid through consistency with existing research, the NSW technology coordinators were removed from the sample for RTPS calculation. Technology coordinators were removed because, as a group, they had a significantly higher average CE score (M = 4.45, SE = .09) than the teachers (M = 3.45, SE = .09), t(102) = 7.35,

$p < .001$. The technology coordinators also showed a higher Play&Anx mean ($M = 4.40$, $SE = .08$) than teachers ($M = 3.67$, $SE = .06$), $t(74) = 7.05$, $p < .001$. The technology coordinators' scores were not statistically significantly different from teachers on the TE and SCu indicators ($p > .05$). Indicator scores showed that technology coordinators were confident using technology; and therefore, their risk perceptions and risk-taking habits would be different from the general teaching population. Considering this, they were not appropriate for Phase 2 of the study, and thus were removed from RTPS scale creation.

Subsequent analysis was based upon indicator scores from 91 participants (52% of teachers invited): 51 Australian (AUS) teachers and 40 United States (USA; see Table 4.3). Of the 91 teachers, 84 answered all of the questionnaire items.

Table 4.3

Indicator means for Phase 1 questionnaire

	TE	SCu	CE	Play&Anx	RTPS
N	85.00	85.00	85.00	86.00	86.00
Missing	6	6	6	5	5
Minimum	2.67	1.88	1.70	2.44	2.64
Maximum	5.00	5.00	5.00	5.00	4.91
Mean	4.06	3.98	3.49	3.67	3.80
SE	0.06	0.05	0.09	0.06	0.04
SD	0.52	0.45	0.85	0.55	0.40

Note. Data does not include DET Technology Coordinators

The following sections present descriptive statistics for each of the four measures, as well as descriptive statistics for individual items within the measures. It is important to note that analysis is not conducted at the item level, but it is necessary to identify trends that may be occurring within the measures, to gain a better understanding of teachers' possible risk perceptions.

4.1.1 Descriptive statistics of teaching-efficacy (TE)

Teachers, as a whole, identified positive agreement regarding their level of teaching-efficacy ($M = 4.07$, $SD = .52$). Descriptive statistics for the individual items are presented in Table 4.4.

Variable means and standard deviations were fairly consistent between the six teacher-efficacy variables (V1.1.1-V1.1.6). All items showed general agreement with feeling effective (see Table 4.4). Variable V1.1.4 had a slightly lower mean and a higher standard deviation than the other scores, but it strongly correlated with the overall TE mean ($r = .7$, $p < .001$).

Table 4.4

Descriptive statistics for teacher-efficacy (TE)

	Valid	Missing	Mean	SE	SD	Minimum	Maximum
V1.1.1 - I feel that I successfully educate my students.	84	7	4.12	.082	.751	1	5
V1.1.2 - I generally look forward to teaching my classes.	85	6	4.26	.082	.758	1	5
V1.1.3 - I feel satisfied with my job in this school.	84	7	4.05	.077	.710	2	5
V1.1.4R - I sometimes feel it is a waste of time to try to do my best as a teacher.	85	6	3.71	.128	1.183	1	5
V1.1.5 - I am encouraged to experiment with content, techniques, and materials in my teaching.	85	6	4.09	.072	.666	2	5
V1.1.6 - I am able to maintain control of the class and discipline students appropriately when necessary.	85	6	4.15	.072	.664	2	5

4.1.2 Descriptive statistics of school culture (SCu)

Teachers showed general agreement that their schools supported a culture of experimentation (*M* = 3.81, *SD* = .48). The resulting data indicated that teachers felt accepted and respected by colleagues and staff members. Additionally, they perceived they and their colleagues shared similar values and beliefs (V1.2.1-4), as shown in Table 4.5. Looking closer at variable V1.2.3, the minimum response was a neutral response (3), implying that all teachers felt accepted by their colleagues, or at least not unaccepted.

As well as feeling accepted in the school culture, teachers generally felt expectations and school priorities were clear and well communicated by the principal (V1.2.6-8). Teachers' responses showed less agreement with item V2.1.9 (*M* = 3.58, *SD* = .75), indicating that they felt slightly less positive about their involvement in school policy decisions. This trend will be explored further later in the discussion. In regard to their own teaching, teachers generally felt they were encouraged to experiment (V1.2.11), and agreed that school principals were interested in innovative and new ideas (V1.2.12).

Table 4.5

Descriptive statistics for school culture (SCu)

	Valid	Missing	Mean	SE	SD	Minimum	Maximum
V1.2.1 - You can count on most staff members to help anywhere, anytime - even though it may not be part of the official assignment.	83	8	3.98	.091	.826	0	5
V1.2.2 - Most of my colleagues share my belief and values about what the central mission of the school should be.	83	8	4.04	.074	.671	2	5
V1.2.3 - I feel accepted and respected as a colleague by most staff members.	83	8	4.31	.057	.516	3	5
V1.2.4 - There is a great deal of cooperative effort among the staff members.	83	8	4.02	.087	.796	1	5
V1.2.5 - I am provided with appropriate teaching and classroom resources.	82	9	3.90	.098	.883	1	5
V1.2.6 - The principal sets priorities, makes plans, and sees that they are carried out.	83	8	3.86	.073	.665	2	5
V1.2.7 - The principal knows what kind of a school he/she wants and communicates it to the staff.	84	7	3.99	.073	.668	2	5
V1.2.8 - The principal lets staff members know what is expected of them.	84	7	4.01	.071	.649	2	5
V1.2.9 - Teachers are involved in making decisions that affect them and school policy.	83	8	3.58	.082	.751	2	5
V1.2.11 - In this school, I am encouraged to experiment with my teaching.	85	6	3.94	.086	.792	2	5
V1.2.12 - The principal is interested in innovative and new ideas.	84	7	4.12	.078	.718	2	5

Note. V1.2.10 was removed from analysis, Section 3.5.2.

4.1.3 Descriptive statistics for computer-efficacy (CE)

The teachers, as a group, indicated moderately confident perceptions of their computer-efficacy (*M* = 3.49, *SD* = .85). Higher standard deviation on the CE indicator implies a wider variation in computer-efficacy throughout the sample, than on other indicators (see Table 4.4). Table 4.6 presents the descriptive statistics for items in the CE measure.

Teachers perceived they would feel less confident using a new technology or software if they could not call on a person for help, or if they only had the manuals (V2.1.1-3), as seen in Table 4.6. These three variables showed the largest deviations. Teachers expressed feeling more confident if they were able to see another person use the tool, or if they had a person to ask for help (V2.1.4-6). Predictably, as support structures increased, teachers perceived they would feel more confident completing a task using a new technology tool or software, except for the built

in help facility (V2.1.8). Teachers felt the most confident (*M* = 4.06, *SD* = .84) if they had used a similar software in the past (V2.1.10).

Table 4.6

Descriptive statistics for computer-efficacy (CE)

	Valid	Missing	Mean	SE	SD	Minimum	Maximum
V2.1.1 - even if there were no one around to tell me what to do.	85	6	2.74	0.13	1.21	0	5
V2.1.2 - even if I had never used a package like it before.	85	6	2.60	0.14	1.26	0	5
V2.1.3 - if I had only the software manuals for reference.	85	6	2.99	0.13	1.20	1	5
V2.1.4 - if I had seen someone else using it first.	85	6	3.41	0.11	0.99	1	5
V2.1.5 - if I could call someone for help if I got stuck.	85	6	3.84	0.10	0.88	1	5
V2.1.6 - if someone else helped me get started.	85	6	3.91	0.09	0.84	2	6
V2.1.7 - if I had a lot of time to complete the task.	85	6	4.00	0.09	0.82	2	6
V2.1.8 - if I had just the built-in help facility for assistance.	84	7	3.39	0.12	1.10	1	5
V2.1.9 - if someone showed me how to do it first.	85	6	4.01	0.10	0.91	2	6
V2.1.10 - if I had used similar software for the same task.	85	6	4.06	0.09	0.84	2	5

4.1.4 Descriptive statistics for playfulness (Play) & anxiety (Anx)

The Play&Anx measure includes eight playfulness items, and nine anxiety items. Items are grouped into two sub-measures, Playfulness (Play) and Anxiety (Anx).

4.1.4.1 Descriptive statistics for playfulness (Play)

Play showed a lower mean and higher standard deviation than TE or SCu (*M*= 3.38, *SD* = .81; see Table 4.7). It is possible that responses were affected by participants' interpretation of the two opposing concepts (e.g., spontaneous/ stagnant). Survey responses are often affected by the complexity of language (Converse & Presser, 1986), therefore the results would not be atypical.

Teachers showed the strongest disagreement and lowest standard deviation with "feeling more curious than bored" when using technology (V2.2.2R, *M* = 3.84, *SD* = .88). They showed the strongest disagreement with feeling more playful than serious (V2.2.5, *M* = 2.89, *SD* = 1.08). It is possible, that responses to V2.2.5 were affected by teaching being a profession, and perceptions that being "playful" would be off-task or inappropriate in the workplace.

Table 4.7

Descriptive statistics for playfulness (Play)

	N	Missing	Mean	SE	SD	Minimum	Maximum
V2.2.1 - When I use technology, I generally feel more spontaneous than stagnant.	84	7	3.38	0.12	1.10	0	5
V2.2.2R - When I use technology, I generally feel more bored than curious.	82	9	3.84	0.10	0.88	1	5
V2.2.3 - When I use technology, I generally feel more experimenting than mechanical.	84	7	3.38	0.11	1.03	0	5
V2.2.4 - When I use technology, I generally feel more conscientious than erratic.	83	8	3.43	0.10	0.95	0	5
V2.2.5 - When I use technology, I generally feel more playful than serious.	84	7	2.89	0.12	1.08	0	5
V2.2.6 - When I use technology I feel more questioning than routine.	84	7	3.21	0.12	1.07	0	5
V2.2.7 - When I use technology, I generally feel more flexible than constrained.	84	7	3.49	0.11	1.04	0	5
V2.2.8R - When I use technology, I generally feel more unimaginative than creative.	82	9	3.66	0.09	0.85	1	5

4.1.4.2 Descriptive statistics for anxiety (Anx)

The sample showed a general disagreement towards feelings of anxiety when using technology (M = 2.13, SD = .63).

The items V2.2.12 and V2.2.13 may have positively affected the Anx mean (see Table 4.8). It is possible that the two items present a more extreme concept of technology (e.g., “losing reasoning skills” and that “machines are smarter”). Participants indicated disagreement with both of these statements.

Table 4.8

Descriptive statistics for anxiety (Anx)

	N	Missing	Mean	SE	SD	Minimum	Maximum
V2.2.9 - I feel insecure about my ability to understand messages on the computer.	84	7	2.38	0.11	1.05	1	5
V2.2.10R - I look forward to using a computer for work.	84	7	2.23	0.10	0.96	1	5
V2.2.11R - The challenge of learning about computers is exciting.	84	7	2.40	0.12	1.05	1	5
V2.2.12 - I am afraid that if I begin to use computers I will become dependent upon them and lose my reasoning skills.	83	8	1.86	0.08	0.77	1	4
V2.2.13 - I dislike working with machines that are smarter than I am.	84	7	1.85	0.09	0.81	1	4
V2.2.14 - I feel apprehensive about using computers.	85	6	2.18	0.11	1.05	1	5
V2.2.15 - It scares me to think that I could make mistakes I cannot correct by hitting the wrong key.	85	6	2.26	0.13	1.18	1	5
V2.2.16 - You have to work in information technology or computer science to really understand how to use the computer.	85	6	2.19	0.11	1.03	1	5
V2.2.17 - I avoid computers because they are unfamiliar and intimidating.	84	7	2.00	0.11	1.03	1	5

4.1.5 Frequencies of collaboration, technology use, and support

There were three items in the questionnaire that were not included in RTPS calculation (V1.2.13, V3.1.1, and V4.1). The items were not part of the original measure, as they ask teachers to report on frequency of activities rather than perceptions. Findings from these items were used to validate the final RTPS scores. Additionally, item responses were referred to in the Phase 2 interviews in regard to peer collaboration, technology use, and support.

The first item (V1.2.13) was included with the SCu measure. It asked teachers, “How often do you meet with other teachers on lesson planning, curriculum development, guidance and counselling, evaluation of programs, or other collaborative work related to instruction?” Frequencies for the item show 75% (*n* = 61) of the responding teachers were spending 10 hours or less per month working with colleagues (see Table 4.9).

Table 4.9

Frequencies for V1.2.13, "How often do you meet with other teachers to discuss topics specifically related to your instructional practices?"

		Frequency	Percent	Valid Percent
Valid	0 hours	2	2.2	2.5
	1-5 hours	34	37.4	42.0
	6-10 hours	25	27.5	30.9
	11-15 hours	12	13.2	14.8
	16-20 hours	5	5.5	6.2
	21+ hours	3	3.3	3.7
	Total	81	89.0	100.0
Missing	Missing data	10	11.0	
Total		91	100.0	

Correlation analysis revealed a positive linear relationship between V1.2.13 and teaching-efficacy (r = .335, p < .05), as well as between V1.12.13 and the school culture indicator (r = .315, p < .05). These results imply that teachers with higher efficacy and the perception that their school supports experimentation are more likely to engage with other teachers. The relationship between teachers' engagement with peers, teaching-efficacy, and positive perceptions of school culture is consistent with prior research on educational reform and teaching-efficacy (e.g., Wheatley, 2002).

The second item (V3.1.1) asked teachers, "Last semester, how many times did you use technology (i.e., software, computers, internet) in a lesson?"

Table 4.10

Frequencies for V3.1.1, "Last semester, how many times did you use technology (i.e., software, computers, internet) in a lesson?"

	Number of times	Frequency	Percent	Valid Percent
Valid	0	1	1.1	1.9
	1-2	15	16.5	27.8
	3-5	9	9.9	16.7
	6-9	4	4.4	7.4
	10-15	10	11.0	18.5
	16+	15	16.5	27.8
	Total	54	59.3	100.0
Missing	Missing data	37	40.7	
Total		91	100.0	

Of the 91 teachers, only 59% (*n* = 54) responded to the item. Results on this item are bimodal, responses cluster at the bottom of the scale (near 1-2), and at the top (over 10) instances of technology use in teaching (see Table 4.10).

Item V3.1.1 positively correlated with computer-efficacy (ρ = .617, *p*< .001), as well as with playfulness and anxiety (ρ = .548, *p*< .001). V3.1.1 did not correlate significantly with either teaching-efficacy or school culture. As would be expected, relationships between V3.1.1 and the indicators show that teachers who feel more confident using technology, were more likely to use it in the classroom. These findings are consistent with prior research examining teacher traits and technology integration in the classroom (e.g., Mueller et al., 2008).

Teachers who were using technology in the classroom indicated that they were likely to have used PowerPoint and digital projectors to present content in class. They identified having students do internet research in class, and some said they had been using online tests and wikis. Teachers that did not use technology in their teaching stated that they did not feel confident taking the students to the computer lab because of password problems, and because they were concerned about classroom management. Others expressed the idea that the computers did not work, and that there was not enough time to "prepare a computer based lesson."

The final item (V4.1) asks teachers, "Have you met with your school's technology coordinator to discuss technology integration and lesson planning?" Of the 91 participating teachers, 53.8% (*n* = 49) had not met with the technology coordinator, and 33% (*n* = 30) had met with the technology coordinator. Twelve participants did not answer the question.

4.1.6 The risk-taking potential scale (RTPS)

The risk-taking potential scale (RTPS) is based on participants' indicator scores. Items within each measure are averaged to gain the mean value of each teacher's four indicator scores. The four indicator scores are then combined and averaged to produce the RTPS score. The potential for more (MRB) and less risk-taking behaviour (LRB) was based on teachers' individual RTPS scores relative to the group mean of teachers in their sample. The RTPS mean for the Australian sample was 3.75 and 3.87 for teachers in the United States. See Chapter 3, Section 3.5.5.1, for a full description of the scale creation and Phase 2 participant selection process.

The RTPS strongly correlated with item V3.1.1 (Last semester, how many times did you use technology [i.e., software, computers, internet] in a lesson?) showing that the scale has concurrent validity (ρ = .606, *p*< .001). Therefore, the teachers who claimed to be using technology were more likely to take risks and change their teaching practice in the classroom.

4.1.7 Summary of results

Analysis of responses within the four measures shows that RTP questionnaire results are consistent with prior research, and that significant irregularities do not exist within the measures. Considering questionnaire reliability, and validity of responses on the four indicators, it was appropriate to select Phase 2 participants using RTPS scores.

4.2 Comparing samples from Australia and the United States

In the previous section, results from all participants were presented. The following section presents the two groups within the larger sample, teachers from Australia (AUS) and the United States (USA). It is necessary to establish the homogeneity of the pooled groups, on the four indicators, for several reasons. Primarily, establishing homogeneity allowed the AUS and USA samples to be treated as one sample in Phase 2. Using the two data collection sets as one sample supported a primary research premise: nationality and ethnicity, as well as gender, were not important background variables. The thesis considers individual experiences within culture to be situational and relative to context, rather than dependent upon assigned characteristics or classifications. Therefore, establishing homogeneity between the samples supported the theory that teachers' dispositions, independent of nationality or school, are similar in terms of the risk-taking indicators.

On a second point, the research was not a cross-cultural comparison; therefore, similarity between the samples was necessary to support future discussions. As previously discussed, teachers were to be organized according to *more* and *less* risk-taking behaviours (MRB and LRB respectively). It is necessary to discuss the MRB set in relation to the LRB. MRB and LRB sets are a combination of AUS and USA teachers. To group participants in this manner, it was necessary to establish they were not statistically significantly different within the sets.

4.2.1 Demographics of the Australian sample

Phase 1 data collected from 51 Australian teachers was included in Phase 1 analysis. Information on teacher age was not collected in NSW. The 51 teacher participants were from a rural secondary school, Stages 4-6. Many of the teachers (99%) indicated teaching in more than one grade and subject, some indicated fulfilling other school roles, such as year advisor.

Thirty-seven percent of the NSW teachers (n = 19) surveyed had been teaching for eight years or less, while 45% of the population (n = 23) had been teaching for 16 years or more. In the NSW group, only 8% of the teachers (n = 4) indicated being at the same school for 16 years or more. A

much larger percentage of teachers (37%) indicated teaching at the same school for 6-15 years, and 50% indicated being at their school for five years or less.

4.2.2 Demographics of the United States sample

Phase 1 data was collected from 40 teachers in the southeastern United States. Participants were predominantly located in northern Florida, as well as southern Alabama and Georgia. At the time of the study, all participating teachers were employed in rural elementary and middle schools, Stages 2-4. Teachers in this group tended to teach only one grade level, but several identified having multiple school roles, such as administrators, guidance counsellors, or curriculum coaches, in addition to teaching.

A large portion of the participants, 40% (n = 16), had been teaching for less than five years, 35% (n = 14) of the participants had been teaching for 16 years and over. This distribution left a population gap (5%) between 6-15 years of teaching experience; similar to the gap in the NSW group between 9-15 years of teaching experience. Eight teachers (20%) identified teaching at the same school for 16 years or more, less teachers (15%) identified being at the same school for 6-15 years. Over half (55%) of the teachers had been at the same school for five years or less.

4.2.3 Homogeneity of sample

It was determined, through independent sample t-tests, that the two teacher samples were not statistically significantly different on the RTPS, $t(84) = -1.36$, $p = .154$, and therefore homogenous. While the two samples were homogenous on the RTPS, there was a difference between the two groups on the TE indicator, $t(83) = -1,79$, $p = .06$. It was necessary to determine exactly where the samples differed at the TE item level, to gain a better understanding of differences in the sample. Independent sample t-tests revealed, of the six TE items, four did not show statistically significant differences between the two samples. The items V1.1.3, $t(82) = -2.01$, $p < .05$, and V1.1.4R, $t(83) = 2.82$, $p < .01$, were statistically significantly different.

The Australian teachers were less likely to be satisfied with their jobs at their school (V1.1.3), and showed a stronger agreement with item V1.1.4, “I sometimes feel it is a waste of time to try to do my best as a teacher.” Both of these items identify a negative affective response to the school and to teaching in general. This is a significant difference between the two groups, and has particular implications regarding teachers’ commitment to their role and their school. This trend will be explored in detail later in the discussion.

As previously stated, even though the samples were different on the TE indicator, they are homogenous in terms of potential risk-taking behaviours. This study considers potential risk-taking behaviour in the context of ICT-integration, therefore teaching and technology must both be considered in relation to potential to take risks integrating technology in the classroom and changing their teaching. Teachers' perceived teaching and computer-efficacy would both influence technology integration in the classroom, and therefore must be considered together. For example, teachers will consider their ability to control the classroom when integrating new technology tools. This type of consideration relates to their perceived teaching-efficacy, as well as their perceived computer-efficacy of actually using the technology in the classroom. The interaction between the two efficacies will be explored in later chapters.

4.3 The teachers of Phase 2

From the 91 participating teachers, eight case study participants were selected for Phase 2. Two rural schools were chosen for Phase 2: East Middle School (EMS) in Florida and North High School (NHS) in New South Wales. Considering that United States participants were teaching in Stages 2-4, and Australian teachers were predominantly from Stages 4-6, teachers with classes in grades 7 and 8 (Stage 4) were invited to participate in the study. The teachers at EMS worked in grade level teams, and therefore were less likely to teach outside of their primary grade. At NHS, staffs were grouped into curriculum-area faculties. They were more likely to teach in different grade levels. Of the eight teachers, seven of the teachers taught at least one class in Stage 4 (grades 7-8), one of the teachers from the United States only taught grade 6.

Table 4.11

Demographic data on Phase 2 participants

		V0.2 - How long have you been teaching at your current school?	**V0.3 - How many years have you been teaching?**	**Curriculum area**
61	NHS	3-5 years	20+ years	Maths
86	NHS	1-2 years	20+ years	English
603*	NHS	3-5 years	6-8 years	Science
540*	NHS	3-5 years	11-15 years	ESE**
401	EMS	1-2 years	11-15 years	Reading
501	EMS	11-15 years	16-20 years	Career Planning
101	EMS	1-2 years	1-2 years	World Civics
721*	EMS	1-2 years	3-5 years	ESE**

*completed questionnaire online
**Exceptional Student Education

The eight participating teachers covered a variety of curriculum areas (see Table 4.11). Two of the teachers were in Special Education units (Exceptional Student Education, ESE). The six other teachers taught: Career Planning, World Civics, Maths, Science, Reading, and English. As in many schools, most of the participating teachers had responsibilities in addition to teaching in the classroom, or being in the classroom was in addition to their primary school role. The Science teacher served as the Gifted & Talented coordinator for their school. The Career Planning teacher was primarily the Guidance Counsellor for the school, and did daily tutoring with students throughout the school. One of the ESE teachers was a Year Advisor, and the second ESE teacher was the Reading teacher for the afterschool enrichment program. The Reading teacher was the Grade Level Team Leader. The Maths, English, and World Civics teachers did not have school duties beyond classroom teaching.

4.3.1 Phase 2 participants' risk-taking indicators

The eight Phase 2 teachers' RTPS and indicator scores did not prove to be statistically significantly different from the larger sample ($p > .05$). Therefore, the Phase 2 participants were representative of the sample. It is important to note, that this does not mean they are representative of the larger teacher population, nor that results will be generalizable.

The teachers 501, 61, 401, and 86 were identified as less risk-taking behaviours (LRB), and 101, 540, 721, and 603 were identified as more risk-taking behaviours (MRB). In the NSW sample, 3.75 was the RTPS mean, in Florida it was 3.87. Participants' indicator and RTPS scores are presented in Table 4.12.

Table 4.12

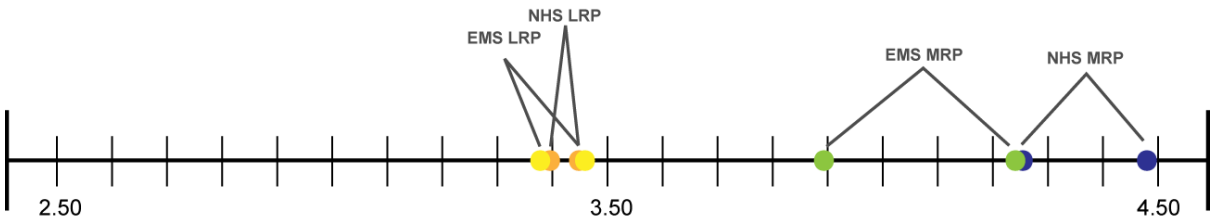
Phase 2 participants' indicator scores

			Subject area	Sample group	TE	SCu	CE	Play&Anx	RTPS*
LRB	501	Kerry	Career	EMS	4.00	4.45	2.60	2.51	3.39
	61	Judith	Maths	NHS	4.17	3.91	2.80	2.67	3.39
	401	Kelly	Reading	EMS	4.33	3.91	2.00	3.52	3.44
	86	Simon	English	NHS	3.67	4.45	2.50	3.20	3.45
MRB	101	Beau	Civics	EMS	4.00	3.55	4.00	4.00	3.89
	540	Elizabeth	ESE	NHS	4.83	3.55	4.60	3.94	4.23
	721	Danielle	ESE	EMS	4.83	4.00	4.50	3.63	4.24
	603	Molly	Science	NHS	4.50	4.55	4.60	4.27	4.48

*RTPS a five-point scale, 1 being less risk-taking behaviours, and 5 being more risk-taking behaviours.

Figure 4.1

Phase 2 participant risk-taking potential scale



4.3.2 Summary of participant selection

The RTPS scores did not generally show a relation to Phase 2 participants' curriculum areas. One of the LRB teachers was in Maths, while one of the MRP teachers taught science. The English, Reading, and Civics teachers were in the middle of the RTPS scale. Interestingly, both of the ESE teachers had high RTPS scores. Additionally, in this sample, teachers' RTPS scores did not relate to the number of years they had been teaching.

It can be seen in Table 4.12 that while teachers are grouped into LRB and MRB designations, their indicator scores vary. For example, Kelly, a LRB teacher from EMS, showed a large variation between indicator scores. Her TE score was above the sample mean (TE *M* = 4.06), while her SCu and Play&Anx scores were very close to the sample means (SCu *M* = 3.98, Play&Anx *M* = 3.67), but her CE score was well below the mean (Phase 1 CE *M* = 3.49). Her TE score is higher than Beau's score (one of the MRB teachers). Her scores imply that her risk-taking potential would be strongly affected by her computer-efficacy, while a teacher such as Beau would be affected by his teaching-efficacy.

Variations between teaching and computer efficacies imply a complex relationship between teaching and technology in the context of ICT-related educational change. This phenomenon has significant implications for ICT integration in the classroom. As previously mentioned, integrating technology into teaching practices involves risk related to teaching, as well as using technology. Teachers' risk-taking habits, and their perceived risks, will be based upon beliefs and values in both realms, and both should be considered in relation to perceived risks.

4.4 Conclusion

This chapter has presented a way to identify teachers' potential to take risks and change in the classroom, in the context of ICT-related educational change: the Risk-taking Potential (RTP) questionnaire and the risk-taking potential scale (RTPS). Analyses of Phase 1 results have proven that the RTP questionnaire is reliable ($\alpha > .7$). Construct validity of the four indicators was

illustrated through the existence of significant relationships between the CE and Play&Anx, as well as the TE and SCu indicators, which was consistent with prior research. Also interesting, was the lack of relationship between the TE and CE indicators. This pattern was also consistent with prior research (e.g., Mueller et al., 2008), and reinforced the notion that teaching and technology belief systems are unrelated. The resulting RTPS scores showed a strong correlation with item V3.1.1, "Last semester, how many times did you use technology (i.e., software, computers, internet) in a lesson?" This relationship showed that the RTPS has concurrent validity. Therefore, it was possible to use the RTPS to select Phase 2 participants.

Two case study schools were chosen, and Phase 2 participants were identified through RTPS scores. Of the eight teachers chosen, four were identified as less risk-taking behaviour (LRB) and four were identified as more risk-taking behaviour (MRB). Variations in teachers' indicator scores imply a complex relationship between teaching and computer efficacies, which would be mitigated by perceptions of anxiety and influences in school culture. Interactions between the indicators, in relation to risk-taking behaviours and risk perceptions will be explored in the following chapters.

Chapter 4 has begun to answer the first research question, "Do the indicators predict secondary-level teachers' risk-taking behaviour and their potential to integrate ICT into the curriculum?" through identification of LRB and MRB teachers. Teachers' actual risk-taking behaviours and risk perceptions will be used to validate their RTPS classification of more or less risk-taking behaviour. Through identification of LRB and MRB teachers, the second research question can be answered in Phase 2 of the study. From this point, variances between the risk perceptions and risk-taking behaviours of MRB and LRB can be identified and analyzed.

In Chapter 5, detailed narratives of each Phase 2 participant will be presented. The narratives examine teachers' individual experiences in, and perceptions of, teaching and technology integration, in relation to the four indicators and risk perception. These narratives will provide the first step in understanding interactions between the indicators and begin to identify teachers' perceived risks and risk-taking behaviours. It is important to note, that in Chapter 5 the teachers will not be discussed in terms of more or less risk-taking behaviours. Teachers' stories unfold naturally and without classification. In Chapter 6, their experiences will be aligned with their RTPS score.

5 Phase 2 results: Individual experiences

An important aspect of ethnographic research is its focus on everyday activities and the events in individuals' lives. Research within this perspective does not focus on the subjective meaning of these events, but rather their organization; specifically, the context in which events and interactions take place (Flick, 2006).

In the previous chapter, Phase 2 participants' questionnaire responses revealed perceptions of their teaching-efficacy, computer-efficacy, playfulness & anxiety, as well as school culture in the context of ICT-integration in teaching. As would be expected, the questionnaire responses only created a preliminary understanding of teachers' perceptions. Using ethnographic methods, specifically episodic and critical interviews, as well as observations, detailed accounts of Phase 2 participants' teaching and technology were constructed. Ethnomethodological indifference was maintained, in an effort to minimize bias and subjective interpretation of teachers' experiences and events.

The following extensive descriptions give detailed accounts of the two case study schools and the eight teachers. Before discussing each teacher, a school profile is presented. The school profile is based upon document analysis and researcher field notes gathered on school visits. School descriptions were not based on information from individual teacher interviews. Profiles of the four teachers at each school immediately follow their respective school description. Each teacher profile was structured into five sections: his/her teaching, computers and technology, perceptions of school, playfulness and anxiety, and a final section summarizing the individual. These sections were based upon the interview structure, which was patterned after indicator measures in the RTP questionnaire.

5.1 Welcome to the Panhandle

East Middle School (EMS) was located in the northwest Panhandle region of Florida, in Wilkins County[16]. The town was approximately 30 minutes south of Alabama and 45 minutes north of the Gulf of Mexico. The "Panhandle" region was named for its geographic likeness to a kitchen pan handle. Generally, the Panhandle regional culture is closer aligned with the southeastern United States, than with southern Florida (i.e., Orlando, Miami, etc.) Over the course of the

[16] Name of the county has been changed for confidentiality.

year, a visitor could attend the All-Night Gospel Sing in July, the Two-Toed Tom Festival in August, or the Northwest Florida Championship Rodeo in October (eFlorida, 2008).

Driving to Wilkins County on Interstate 10, which ran the breadth of northern Florida, only a solid green wall of trees is visible. This is distinctly rural Florida. Many rural school districts in the United States are based on county areas, rather than cities or towns due to low population densities. There were three cities included in Wilkins County; students from one of the towns attend EMS. In 2007, the county population was just under 20,000 residents: 88% White, 7% Black, 2% Hispanic, and 1% Native American (MapStats, 2008). The population was projected to increase approximately 2% over the next 8 years. The two main area employers were Public Administration (8%) and Trade, Transport, and Utilities (6%). The annual wage in the area was $22,529, which was approximately $14,000 below the Florida state average (United States Census Bureau [USCB], 2005).

Taking a few turns off the highway, and travelling through the town's two traffic lights, there was little to see. On a side street, past a small lumber mill, EMS became visible. Single level buildings connected by covered walkways sprawl along a gradual rise. There was a large white wooden sign in the front of the building with an American flag, the school name, and the school's test ratings for the last 5 years. The school grounds are neat; litter or graffiti were not obvious.

At EMS, teachers were grouped in grade level teams and had dedicated classrooms. Students rotated between the classrooms for different subjects. The four case study participants (Beau, Kelly, Danielle, and Kerry) taught in grades six through eight (Stages 3 and 4), which was considered middle school in this district[17]. Their subject areas were Reading, World Cultures, Exceptional Student Education (ESE), and Career Planning.

The school mission statement stated: "Our mission is to promote positive self-concepts, academic excellence, enrichment opportunities, acceptable social behavior, and self-discipline in order for all students to become productive, contributing citizens in this technologically-oriented society." Fluency and numeracy were high priority curriculum areas at the school, as well as increasing teachers' and students' technology use (EMS principal, October 9, 2007). At the time of this study, all teachers were required to use vocabulary words in their lessons and homework, and all teachers attended fluency training at the beginning of the 2006-2007 school

[17] In the US, middle school is often classified as grades 7 and 8, but can include grades 6 and 9; it varies between school districts.

year. In the 2007-2008 school year, "Word Walls[18]" were implemented across the school to further support vocabulary integration. In regards to ICT use, the school only required teachers to use two software packages: GradeBook[19] and First Class[20]. The school strongly encouraged teachers to use technology in their teaching and to build personal class websites in First Class, but neither were required.

There were two significant changes at EMS during the study. First, a new principal started in the 2007-2008 school year. The previous principal transferred into a different school district. When the principal transferred, the deputy principal was promoted to principal. The new principal established a goal to supply all teachers with digital projectors and laptops for their classrooms in 2008. The second change was that the school district made the school's IT administrator full-time, from part-time, by eliminating his teaching responsibilities.

EMS teachers were interviewed and observed over two school years, April 2007 to April 2008. The following teacher descriptions begin to explore how teachers viewed technology, teaching, and risk taking, from an individual perspective.

5.1.1 Kelly

Kelly had been teaching in the southeastern region of the United States for over 20 years. She retired several years prior to this study, from a state other than Florida, but decided she was not ready to stop teaching. In 2006, by way of an administrative loop-hold, she was able to begin teaching in Florida, while being retired in another state. The 2006-2007 school year was Kelly's first year at EMS.

Kelly was a confident teacher, and was very at ease with her students. With visitors, she was open with her classroom and willing to be observed at any time. Other teachers in the school identified Kelly as a good teacher who managed her classroom well. She described her own teaching as "hardcore" (Kelly, Interview 3), but expressed a desire to make learning more fun for the kids. At the time of this study, Kelly was teaching 6th grade Reading and 7th grade elective English (Drama and Vocabulary).

[18] A word wall is a list of words that are related to each other in some way. Word walls are used as a tool to teach a language concept. Often, they are displayed in large letters on a wall and used in collective classroom exercises, but smaller printed word wall word lists can be used for a variety of teaching exercises (abcteach, 2008).

[19] http://www.mygradebook.com/

[20] http://www.firstclass.com/

Entering Kelly's classroom and stopping about one meter in, I stood facing the side of her desk. From this position, the white board was directly to my left, and extended along the long side of the room (see Appendix F for a floor plan). Kelly's desk faced six rows of five student desks. The student desks were all facing a podium, which was in front of the whiteboard. On the other side of Kelly's desk was a large bookshelf full of class book sets. The walls were decorated with reading motivation posters. Next to the bookshelf was a rotating magazine rack and table with magazines and newspapers. Behind the rack and table were two open windows, which looked out on to a small mowed field. In the back left corner of the room, diagonally opposite the door[21], there were two computers and a printer, which were, according to Kelly, not "hooked up," (Interview 2). To the far left, on the other side of the student desks, was the Word Wall. Each classroom had a Word Wall, which was part of EMS' vocabulary initiative. Kelly was part of the committee organizing and supporting teachers to use their Word Walls.

When it was time for class, students ambled through the door and sat down at their desks. Some of them started to read silently to themselves or organized materials for the lesson. Kelly handed back homework. After about five minutes, she had them put down their reading materials, and listen to her read a-loud. Her reading was engaging and animated. Students seemed to listen attentively; they did not follow along in books. She explained later, reading aloud was the "latest" technique she used to help students gain fluency (Kelly, Observation 1).

5.1.1.1 Her teaching

Kelly tended to speak about teaching in relation to curriculum structure. She mostly used teacher-centred methods, but she was beginning to experiment with group activities. Towards the end of 2007, her first year at EMS, Kelly felt she was still "figuring out" the Reading curriculum. In addition to being her first year at EMS, it was her first year working with the Florida state standards. While she was a highly experienced teacher, she was unsure how to use many of the reading textbooks, ESL language materials, and the testing resources at EMS:

> *"…the curriculum in reading - there are several different books and readers and things, and as far as how to start and what do you fit where and how do you organize the different readers in the classroom, and that kind of stuff…." – Kelly, Interview 1*

When asked if it was difficult to structure unfamiliar curriculum and resources she said she relied on the state standards for guidance:

[21] The computers and printers were moved to the front right hand corner in the second year. They were still not fully functioning.

> *"… I have a set of goals that I need to teach, and I go by those whether it is taught from that curriculum or not, it's grade level, it's expectations and state standards and I make sure those are covered and I pull from other reading materials." – Kelly, Interview 1*

She felt, as long as student learning goals and objectives were covered, she "would be okay." Her perception was that she was sufficiently familiar with literacy resources, and that she could cover necessary curriculum requirements, even if she did not use the school's materials. In the summer of 2007, to further develop her curriculum knowledge, Kelly attended a Reading Advisory Council workshop and started a reading endorsement course. She felt the Reading Advisory Council workshop would specifically help her with Florida standards and testing requirements:

> *"… which has to do with our school, and what we will be working on as far as school language initiatives what you are going to be working on, what can be expected, which all goes back to testing, the FCAT and those types of things." – Kelly, Interview 2*

Kelly reported focusing on state standards and state level testing. She felt her teaching goals and expectations were based on the test, and this was her priority (Kelly, Interview 1). The test and state expectations gave her teaching structure and focus.

In the second school year, Kelly stated, "I am more familiar with the curriculum [reading], and I know more about what I am doing. Everything is not brand new. I can incorporate new things…" (Kelly, Interview 2). Feeling confident in her teaching and curriculum knowledge, she decided to try a new teaching strategy, Literature Circles[22]. The new strategy involved students working in small reading groups to develop comprehension. In their groups, students took a role to discuss an element of the reading. The groups rotated roles over time. The Literature Circles were recommended to her in the reading endorsement course. Kelly did not implement the Literature Circles in all of her classes, feeling some classes would become unstructured and would not work productively.

In parallel with her desire for structure in learning, Kelly expressed a need to make the curriculum interesting for students. Personally, she did not feel confident using technology, but she did perceive that kids were "all about technology and that keeps their attention a lot better." She would have liked to use technology in her classroom, to make her teaching more

[22] http://www.litcircles.org/LCRGblurb.html

interesting, but felt she didn't know how to use it and that she needed training (Kelly, Interview 1).

5.1.1.2 Computers and technology

Kelly's relationship with technology was mixed. In regards to teaching, she felt it was interesting for students and supported engagement, but she did not think it directly supported learning. On a personal level, she found technology very frustrating, and expressed a low perception of her own computer-efficacy:

> *"… there are a lot of times, integrating programs we use and stuff I have trouble navigating through some things. I don't navigate well through different programs, things like that." – Kelly, Interview 1*

She illustrated her difficulty navigating programs through her experience using GradeBook and the reading curriculum test generator[23]. Both programs were new to her in the first year, and initially she did not feel confident using them:

> *"When I first arrived here I was not given any instructions how to use this program, I just had to do it on my own…As a last resort I go to manuals (laughing). I click and read and I click and read, to see if I can figure it out. We have a test generator in with our reading books that is difficult to navigate through. I have resorted to the manual with that. It is still not real clear. I have not been able to use it. It's something I will work on this summer. Being able to use it more efficiently." – Kelly, Interview 1*

In the second school year, she felt more confident using technology, "a small amount, not a great deal, but a small amount," but she still found technology very challenging. She felt she had started to use email more over the year, because it was required by the school; although, she only used it at school, not at home (Kelly, Interview 3). Additionally, Kelly's confidence navigating through software increased. She expressed feeling more confident when navigating through different software packages, and felt she would be able figure things out on her own – if she had the time. She maintained, throughout the interviews, if she had the appropriate training or someone showed her how to use software or equipment, it would be "much easier than having to figure things out on my own" (Kelly, Interview 1). When working through technology problems on her own, she identified motivation and time as limitations:

[23] She did not know the name of the test generating software, it was included in one of her textbooks.

> *"…I printed out what they wanted us to download, I'm struggling with it. When I get to here, I'm like which one do I choose. They are not specific. The directions are not specific enough for me. I have not been able to figure it out…" – Kelly, Interview 2*

> *"...I mean, I try it, but unless it hinders something I have to have that's on here [First Class] …Then I probably won't bother with it..." – Kelly, Interview 2*

> *"You can get on the list and they will come see you during class time, but it's frustrating. I can't do it then. I have to worry about all of them [students] and I need to have my undivided attention for this [downloading] if they are going to come and show me something like that." – Kelly, Interview 2*

Even though Kelly spoke of having personal difficulty using technology, she wanted to use technology in the classroom. She felt "education was evolving to that [technology]" and it's "what everyone wants," and she wanted to keep up with this trend (Kelly, Interview 2). She spoke about this perception in relation to the reading endorsement course she was taking at the time:

> *"Well, education is evolving to that [technology], and then there is… I'm taking a reading endorsement class right now that is being taught here in my room twice a week. There is one class you have to take on line. They require you take a class online. They are pushing for that. They are pushing for things to be done online, everybody brings you something because you might want to pull it up, I found it online. Everything is on that… If you could get everything on the computer…It would be great." – Kelly, Interview 2*

Kelly perceived that "everyone" used resources online, and that everyone was always talking about "pulling things up" online (Kelly, Interview 2). She felt the ability to use technology was closely linked to access and reliability:

> *"Everyone should have their own computer, their personal needs. Then two more student computers, at least two… But we don't. We all don't have that. You could implement more things into your lesson plan, and how to do things if you know for sure the computers are up and running." – Kelly, Interview 2*

She further expressed the desire to have a digital projector, laptop, Smartboard, and for all teachers to have their websites "up and running." When asked how she felt about incorporating new technology in the classroom, such as previously listed, and competing for time spent on reading curriculum priorities, she had a different perspective:

> *"Students that need help with vocabulary, who need one-on-one or partners, or they need help, so it's not technology, you have got to have partners working on fluency. It's practice, they have to have that, technology is not going to help. It's*

silent reading or independent working that you can do there. A lot of the reading is reading the stuff aloud and you need to talk about the story, those kinds of things with them. Then, all readings you need to read out loud, the story, and then have them read to each other. It works better, I've found. The technology, I just don't think I'd use it that much. From time to time, yes, it's a change. But…" – Kelly, Interview 2

The previous statements illustrate Kelly's mixed sense of technology's value; she theoretically valued technology, but she did not feel it directly supported student learning. Many of her perceptions regarding technology, and what she felt was "ideal" centred on access to technology tools. In practice, she did not typically use technology in her teaching, and only used it in her administrative tasks when it was required by the school.

5.1.1.3 Perceptions of school

Kelly felt the school was generally supportive and had a positive atmosphere. In her first year, she felt like a bit of an outsider, but felt more involved in the second year. If Kelly had problems or questions, especially in the first year learning the new curriculum, she felt comfortable going to administrators and peers for help. She was most likely to go to the other grade-level reading teachers for help on an informal basis, approximately once a week. She perceived teachers in the school were always ready to volunteer for committees and projects, and felt the administration involved teachers in the decision-making process through these committees (Kelly, Interview 1). Kelly did not feel the school expected her to use technology in the classroom. The school did expect her to use First Class and GradeBook, to which she complied.

She felt, even if there were expectations, she had not been trained to use the tools and therefore would be unable to integrate technology into her curriculum. She identified several ways in which school resources were not supporting her use or integration:

"…It is just, we only have a computer lab here, and it is not available to all of my classes. It is only available one day a week…I have one computer in my room… and I have over 100 students..." – Kelly, Interview 1

"It would be great to use PowerPoint, or something along those lines if you had the projector and the software…There is one in the school, I don't have a laptop, and I'm not sure, I've got old computers in my room, I'm not sure they are compatible with that..." – Kelly, Interview 1

"I would like those computers over there [in classroom] to be working, so I can put in – we have a reading program that has the interactive reader book on it … I really struggle. I could put them on that, it's the same thing we are doing in hard copy and that – they would get more out of that. Neither one of those are hooked up to anything right now, so they plan to be, but there isn't anything

> *wrong with them. Period. I could use them in the reading program, that would help." – Kelly, Interview 2*

Kelly did not have functioning computers in her classroom, and she did not think the school would be replacing them in the near future. She perceived teachers would be given new computers and equipment based on seniority, not on need (Kelly, Interview 1). She did not express dissatisfaction with this allocation method, feeling seniority was an appropriate basis for this decision.

Overall, she expressed very positive views of school culture, decision-making processes, and leadership:

> *"Great. Great, wonderful…He is always available. He is always here to answer questions. He shoots straight forward, and tells you what he thinks and what he expects. Not comparing or saying it wasn't that way, it's the things I like. I like the atmosphere. You feel you can always go in and discuss any problems you are having. He works well with the community, involving the community in the school." – Kelly, Interview 2*

In January 2008, the school decided to supply all teachers with projectors and laptops. Kelly felt this would change the school's technology use expectations (Kelly, Interview 3). She was strongly motivated by this decision, and was excited to begin using the equipment:

> *"Well, like, they are putting the projectors in everybody's' rooms… I've seen some of that done, and they [the school] feel confident they are going to have the funds to get these, and get them installed. There is already one on my hall. That is encouraging…They are trying to go more to that, and we are seeing a lot of changes with teachers wanting to use that. Our principal is very positive about trying to get us more of those kinds of resources to use." – Kelly, Interview 3*

> *"I feel we have a lot of resources that we are able to use, and they were just a bit slow, but are pushing towards technology. And, in the coming years, it's going to be better and better. It's what everything is focused on, so it's improving, slowly." – Kelly, Interview 3*

Kelly was part of the school's Advisory Committee, as a teacher representative, and was involved in the decision to supply teachers with digital projectors and laptops. The committee consisted of administrators, teachers, and parents. She felt being on the Advisory Committee was a good experience, and allowed her to become more active in the community. She said the decision to provide teachers with this equipment came from teacher requests. When teachers

went to trainings content was presented using technology, and they wanted to use the same methods in their classrooms.

When she received the new equipment, Kelly felt the school would place minimal requirements on how the equipment was used in the classroom, but that the expectation to use technology would increase. She felt the school allowed teachers full control of how and what they teach, as long as they met school and state expectations and curriculum standards (Kelly, Interview 1). Having a high perception of her own teaching-efficacy, Kelly was confident she would meet those expectations.

5.1.1.4 Playfulness and anxiety

Kelly felt that teaching required a balance, "it can't be fun all the time" and "you have to pick and choose, you have to have structure." She admitted being too focused on "what needs to be covered" in teaching, and not spending enough time making learning fun for students (Kelly, Interview 3). In regard to using technology in her teaching, she felt that students enjoyed using technology, but she did not necessarily feel technology improved student learning. While she was unsure of experimenting with technology, she was willing to experiment with methods she perceived would improve student learning, such as the Literary Circles.

While Kelly felt confident in her content knowledge and her teaching, she expressed anxiety about using new teaching techniques. She was concerned that she could "miss elements" when using new resources and new curriculum. In her first year at EMS, she repeatedly stated a desire to "explore the curriculum more, and see what is in there that I have not used this year, that might make it more interesting, and better for the kids" (Kelly, Interview 1):

> *"…overlooking part of the curriculum that is for struggling readers, comprehension or vocabulary, whatever the weakness might be…it all being so new and hitting the high points of it and get it organized of what to teach to which group of students, I may miss something." – Kelly, Interview 1*

In her second year, when Kelly experimented with Literature Circles, she felt "uneasy" implementing a new type of group activity. But, she was motivated to try a new strategy, add variety to the class, and keep the kids' attention. In the "lower classes," she was concerned students would argue and have difficulty working together, or that the activity simply wouldn't work. But, she felt "it went okay" with most of her classes. In one class, she did not incorporate Literature Circles. She explained, "It is an intensive group and I do a lot of discipline in that class. And they have to be very very structured." If the class was not structured, Kelly felt the lesson would be a waste of time.

In the classroom, she did not typically experiment with technology in her teaching. She cited lack of resources and training as the primary reasons. Further, she felt anxiety towards integrating technology into her teaching. The anxiety was related to her confidence using technology and the value it added to learning. She struggled with performing tasks, such as downloading items from the internet or email. She would anticipate feeling frustrated by potential problems, which she found discouraging. She would "make the effort" to explore and resolve problems; but, unless an unresolved technology problem stopped her from something she had to do, she "wouldn't bother with it" (Kelly, Interview 2).

While she was unsure about using technology in the classroom, she felt positive about getting the digital projector for her classroom. Peers she trusted had recommended the digital projector to her, and she felt it would be a positive addition to her teaching. She was excited to explore and play with the new technology, but did express anxiety about how she would learn to use it in her teaching:

> *"I'm just excited to see what all I can find and use with it… I'm not real good at things like that (laughs)... I just hope we have the support of someone to come and show me how to get that up… Someone is going to have to come help me and show me how, because I don't have any idea (laughs). They are going to come to my room, and I'll say put this on there, and they will have to show me how to do it (laughs). But hopefully he is going to be able to do that." – Kelly, Interview 3*

When asked to consider students using technology in the classroom, Kelly perceived a variety of issues. Her primary concerns related to students being off-task and exposure to inappropriate materials on the internet, specifically pornographic content and political opinions (Kelly, Interview 2):

> *"…if you are using stuff, talking about, the capital and the government, you go online to research you have got to be careful what you pull up. Like whitehouse.com [24]you have to be real careful of that, a lot of things come up and they have nothing to do with the White House." – Kelly, Interview 2*

> *"I'm not going to trust them totally. I'll keep my eyes on what they are pulling up and what they are - simply because, I think they are okay, but you never know. They might be looking at something else when they are supposed to be doing this." – Kelly Interview 3*

[24] http://www.whitehouse.com is an adult and alternative political opinion website. It was originally political commentary, but pornography was added to make it more profitable. The real United States White House website is http://www.whitehouse.gov.

She did not feel anxiety towards students using technology, as she felt that "they know more about how to do that, more than I do...they are just so much more used to using technology" (Kelly, Interview 3). She felt students' technology skills were sufficient. She felt more at ease having her year seven students participate in a technology based activity, there were fewer of them and they were a bit older than her other classes. She did express concern for their ability to identify quality information and access appropriate resources when conducting research, using vocabulary games, or comprehension games.

5.1.1.5 Summary: "I just don't have…"

In summary, Kelly had very positive perceptions of teaching, technology, and the school; but, she was not actively integrating technology into her teaching. She did not feel she was able to integrate technology due to limited access to resources and appropriate training, but she felt the school was supportive of teachers using technology. She was motivated by the school's decision to provide every classroom with a digital projector. When she talked about potentially using the digital projector and laptop, she insisted a person would need to sit with her and show her how to use it. If issues arose when using technology, she was not motivated to problem solve on her own and would only resolve an issue if her teaching duties or school expectations would not be fulfilled. In terms of priorities, student learning and her teaching took precedent over using technology. Although, she felt technology was becoming more prevalent in teaching, and that education was "moving in that direction."

5.1.2 Beau

Beau exuded a classic southern charm, a tall heavy-set man who was quick to laugh − a visitor could not help but feel welcome in his classroom. Teachers and administrators expressed feeling comfortable going to him with technology questions, a chat, or to have lunch. Beau had only been teaching for three years, all three years were at EMS. At the time of this study, he was teaching sixth grade World Cultures, six periods a day.

Beau felt he had a lot to learn in teaching, compared to his more experienced colleagues. While he may have perceived needing more experience teaching, Beau had a diverse educational history. As well as being trained as a teacher, he had an associate's degree in Computer Science, and a bachelor's degree in Psychology and Christian Counselling. He said he came to teaching a few years after finishing his other degrees. He felt that teaching was something he always "had," and it was something he had always wanted to do in life. Prior to teaching he worked, and at the time of this study was still working, as a Baptist preacher. Beau's religious thinking tended to seep into his teaching and conversations, and he was ready to admit that being a preacher

coloured his view of certain issues. For example, on his personal school website, he had included links to scripture and Baptist news sites. These resources were combined with information about his family (including his children's names and ages) and his personal motto, "You have been given a role in history. Fulfil your God-given destiny." On the website, the word "God" was bold-faced and red-brown in colour; the rest of the text is black.

Looking around Beau's classroom, several elements caught my eye (see Appendix G for a floor plan). Standing in the left-hand corner, as I entered the classroom, the first visible element was the front of Beau's desk with a new Dell desktop situated on the left side. On the wall, behind his desk, was a poster-size Louisiana State University (LSU) football banner. LSU was Beau's favourite college football team – in the southeastern United States, college football was akin to religion. Between the door and Beau's desk, along the left hand wall, there was an assortment of classroom furniture and teaching materials: piled chairs, stacks of books, a few stray desks. Within the clutter was an older "blueberry" iMac. The iMac was on the floor, under a chair. On top of the chair was an aquarium full of fish, plastic plant life, and probably a bit more algae than recommended by the pet shop. Turning to the right, there were six rows of student desks, five in each row. A cart with a laptop and digital projector facing the front wall sat in the middle of the desks and facing the whiteboard. A projection screen was pulled down, covering most of the whiteboard. On the far right side of the classroom, on the other side of the students' desks, were bulletin boards. The boards advertised daily homework, what was being covered in class, and the Word Wall. Suspended from the ceiling, at the joint of the whiteboard and bulletin board walls, was a television. The television was controlled by the library; Beau would have to call the librarian to turn it on if he planned to use it. Along the back wall of the room were two large windows looking out over green practice fields rimmed with scrub pine.

At class time, kids rumbled into Beau's room, shouting hellos as they jostled each other to their desks. They were extremely chatty. Beau settled them down, but they continued to giggle and rustle their bags. "Your hands are going to fall off today," Beau told them. He then told me that they typically take a lot of notes in class. This statement evoked loud groans from the students. Beau, stood at the cart in the centre of the room, laughed and woke up the laptop. When everyone was ready, he started going through a PowerPoint presentation.

5.1.2.1 His teaching

When first asked to describe his teaching, Beau stated, "I'm a big lecturer, that's just a big part of my teaching style" (Beau, Interview 1):

> *"On a typical day the kids come in, I have my assignments listed on the board, and their homework assignments they copy into their planners. I give any special directions, they open the books and I begin to lecture." – Beau, Interview 1*

The act of "taking notes" during the lectures was a predominate theme in Beau's teaching. He explained, "…the students have to be able to take notes, in 7th grade they will take even more" (Beau, Observation 1). He used resources from the textbook to support the lectures, including pre-packaged PowerPoint presentations from the publisher. He expressed a desire to create his own presentations with contributions from the kids:

> *"I would love to, love to. I just right now, I don't have time to create slide show presentations. You know, I kind of use the standard, what the book publisher sends." – Beau, Interview 3*

While he felt he did a lot of lecturing, he also used a variety of student-centred techniques in the classroom, which he felt would involve the kids in their learning. Reinforcing his desire to involve the kids, he expressed a preference to have kids act out curriculum and visualize History. He expressed the perception, "History gets a bad rap" and that it was not interesting for students. He bases this assumption on the fact that he did not find History interesting until he took Western Civilizations in high school. He remembered a teacher that "made it come alive." One strategy Beau has used in the past to engage students in the curriculum was to bring in replica gladiator suits, for a lesson about gladiators. He had the kids model the outfits in class.

Beau felt his class structure worked well for the kids, "the way things are going now, I'm comfortable, and the kids are comfortable" (Beau, Interview 1). Even though he felt satisfied and confident in his teaching, Beau referred to himself as a "new teacher" and felt he was still learning (Beau, Interview 2). Specifically, he did not feel he used group work or teaching strategies other than lecturing as often as he would have liked. In the first year, he estimated using other materials, such as video, once every couple of weeks. The second year, Beau felt he was using more group work. He felt it was difficult to do a lot of group work in class, because of the amount of History curriculum they needed to cover in a year.

In regards to time limitations in the classroom, he expressed feeling that FCAT[25] testing increased the pressure to cover as much curriculum as possible. History was not included on the FCAT test in 2008, but Beau felt it was going to be added for 2009[26]. He said, while History was

[25] Florida Comprehensive Assessment Tests (http://fcat.fldoe.org/)

[26] At the end of 2008, the Florida State Department of Education had not announced that they were including History in the FCAT.

not in the 2008 test, Florida wanted each student to have a base knowledge of History when they took the test. Therefore, he needed to have his students ready for the test by March 1st every year. A month before the test, Beau's classes had already skipped two chapters:

> *"We will try to cover those, if we have time, towards the end of the year, we will try to go back and catch that. It would be really hard to teach, or explain to them, to get here and here and here, because I do try to move a little fast."*
> *– Beau, Interview 3*

Beau had mixed views on the FCAT process. He felt having a way to assess students' learning in History would be beneficial, but he did not feel the test motivated students. He felt motivation to learn was generally difficult for students because they were "technologically active at home, and they come to school, and they have to open a book…it drags them down" (Beau, Interview 3).

5.1.2.2 Computers and technology

Consistent with his identified teaching style, Beau felt technology's primary role in his teaching was to support taking "notes," and allowed kids to learn through multiple delivery methods:

> *"I would say with notes. Projecting notes on the projector. I can lecture and talk, and the kids can copy down. They are not only hearing it, they are seeing it… I'd stand up verbally, and they kids were like, "Okay Mr. Betts, slow down, speed up, stop, pause." Now I am able to go through it, and give them the opportunity to hear and write down. It definitely has made a difference." – Beau, Interview 3*

In addition to "notes," he identified many other ways he integrated technology into the curriculum, such as: showing videos from history.com, exploring lecture topics during class via the internet, looking at tornado watches during a severe weather warnings, etc. He wanted to use technology to facilitate communication between his classes and classrooms in China, for students to submit homework to him via email, for the students to be able to work independently in the classroom on laptops (Beau, Interview 3).

While Beau valued technology highly and expressed positive views of technology, he did not necessarily feel it was without problems. He felt technology was "wonderful," "he liked it," "it could make life easier," and has numerous educational benefits, but he felt it had the potential to "make people lazy" and that it had a "bad side" (Beau, Interview 3). The problems he perceived were not related to difficulty using tools, but focused more on *how* tools were used:

> *"I have internet at home, but of course I am very careful. A lot of people think the internet is bad and demonic. I tell them, 'No, it's all how you use it, and you*

have to be familiar with how it works.' You have to know when to get out of it." – Beau, Interview 2

He illustrated his perception of technology use through a personal example:

"A best friend of mine called me a year ago. He says, 'Beau, my job requires me to use a computer.' He is a computer programmer and web designer. He says, '…my job requires me to use a computer.' His wife caught me at a pornographic website at home one day. He says, 'I got caught.' I said, 'Get rid of your computer. If that is something you are going to do, get rid of it. Take it out of the house if that is something you are going to do, give it up. Go to work; use the computer for work to do what you have to do for work. But, when you are home it won't be there. Pull yourself away from it.' Like I said, if you are going to use it, and it's purposeful... It's there, it's good, but when the bad side shows up, you have to know when to step back and step away from it." – Beau, Interview 2

Beau maintained that he knew how to use technology, and perceived a high level of personal computer-efficacy. Further, he was very confident that he could learn how to use new technology tools or software. He felt he was more knowledgeable than many of the teachers, but on the "lower end of the scale" of technology knowledge when compared to the kids (Beau, Interview 1). In contradiction, he felt the kids were "smart enough to learn your password," but felt they were significantly lacking in basic technology knowledge (Beau, Interview 2).

5.1.2.3 Perceptions of school

Beau was identified in the school as someone who knows how to use technology; students and teachers frequently came to him with technical questions (Field notes; October 7, 2007). While he was willing to help teachers and students, he was concerned that students did not seem to have basic computer knowledge:

"You know, the kids come to me, and ask me more questions about computers than they do their computer teachers. Because they say when they go into computer class, it's not to learn how to use more computers, it's to do more Math skills, more reading skills, more language skills, and so they are not being taught the technology." – Beau, Interview 2

Beau's perception of EMS computer classes was that students were not learning how to use computers or software:

"All I know is kids go in and some days they can type homework, for the most part – this is feedback I am getting from students. I'm not going to go up to Mr. Beale or Mr. Howe and say, 'What are you doing in class?' Aren't you supposed to be learning computer skills, how to do spreadsheets, how to use Word Perfect. 'Are you learning?'" – Beau, Interview 2

> *"… kids need a base foundation of what a computer is and how it works. They should utilize various software that is out there: spreadsheets, PowerPoints, this type of thing. I think most of the classes are just reinforcing Math and science. I think they need a genuine computer class, how it functions and how it works."*
> *– Beau, Interview 3*

He felt students needed to know how technology worked, to properly use the tools. While he thought they needed to learn discrete computer skills, he thought it should be in computer class, rather than in his class. Beau did not feel it was appropriate to integrate technology skills into the regular curriculum. He stated, "Around here, there really is no time for integration as far as how to use it" (Beau, Interview 3). He did not feel the school expected him to teach technology skills in the classroom, but that he was *encouraged* to use technology tools in his teaching.

Beau explained that the school was trying to encourage teachers to use Smartboards in 2006. The teachers were told, if they attended Smartboard training, the school would purchase a Smartboard for their classroom. Motivated by this promise, Beau attended Smartboard training in 2006. Interestingly, when Beau started teaching at EMS, he had a Smartboard in his classroom, but he had not known how to use it. Since he did not know how to use it, he gave it to a teacher down the hall. He said the teacher uses it every day. Beau was a little frustrated that he gave the board away, but did not feel it was appropriate to ask for it back. He was hoping the school would supply him with a Smartboard after he completed the training. Unfortunately, at the beginning of the 2007-2008 school year, Beau had not yet received a Smartboard:

> *"Well, like I said it has been over a year. I was told I would have one by Christmas last year. The last time I even asked about it was before school last year. [How does that make you feel?] Disappointed. It would be wonderful, absolutely wonderful, if every classroom had Smartboards….I will probably bring it up again. I don't know when. Probably one day when I'm down at Mr. Troy's office, I say, 'Hey, by the way' …if you wait for something around here; it's like watching a pot of water boil. Waiting for it to boil and it takes forever. I'm hoping I'll just get here one day, and it will be here (laughs)." – Beau, Interview 2*

In early 2008, Beau was still waiting for a Smartboard:

> *"Smartboard, still don't have one. Been waiting on that for a while. Still don't have one, and it doesn't look like I'll be getting one anytime soon…basically, someone is dragging their feet. They are not pursuing. I have pretty much done what I can do, without annoying the heck out of the person, to say, 'Where is my Smartboard? Where is my Smartboard?'" – Beau, Interview 3*

Ultimately, Beau decided to ask for a set of ten laptops in his classroom, instead of pursuing the Smartboard. He felt it was a "dream" to expect the laptops soon, but would be a realistic possibility in two years. Beau expressed feelings of frustration towards how technology was distributed to teachers. He perceived that the school was giving technology equipment to teachers who do not know how to use the equipment (Beau, Interview 2).

In 2007, Beau had also wanted a digital projector. He had originally requested one with the Smartboard. He felt that a digital projector would greatly improve his ability to integrate technology into his lectures, but did not feel it was a priority in the school:

> *"I would like to integrate a little more technology. With History, there is only so much you can do, if this was Science and Math - those are your two biggest pushes. With History there are things that are good, but if there was more available [technology], it would be wonderful to have something set up to pull up a lesson in a few minutes." – Beau, Interview 1*

The school did supply Beau with a dedicated digital projector in the beginning of the 2007-2008 school year. In 2008, they mounted the projector into the ceiling and wired his laptop to the projector from his desk:

> *"I like it because now I can keep it stationed. When I'm done I can unplug it and roll it in back. It shows, it does movies, the whole nine yards… [Are you happy with that set up?]Oh yes, but now I would love to have a Smartboard." – Beau, Interview 2*

Even though Beau was frequently waiting for technology tools, he maintained a very positive perception of the school. He stated, when your boss asks you to have lunch, and it's just to talk "it's all good." He also felt involved in school improvement plans, which he found motivating. In the beginning of the 2007-2008 school year, Beau was selected to attend year long training, Tuesday Teacher Training[27]. The training was a five part series presenting the best teaching practices in the state:

> *"You watch video clips of different schools attempting different strategies of education. It's broken into five parts: one of them is creating inviting schools, establishing and effective climate and environment, increasing student achievement, rules routines consequences, and how to engage learners. And, you use technology in presenting…They were like, he won't say no. I'm probably one of the few who is not fearful of standing before a large crowd of people and presenting it." – Beau, Interview 3*

[27] Learning in safe schools: Tuesday teacher training, http://www.paec.org/fec/ttt/

At the end of the training, he would present what he has learned to the school. He was surprised and flattered to be chosen for the training, because he did not have as much experience as other teachers. He was looking forward to giving the presentation in August 2008, when teachers were at school for pre-school workshops.

5.1.2.4 Playfulness and anxiety

Describing how he learns and uses technology, Beau stated using exploratory and playful techniques. He was not always successful solving technology problems, but this did not discourage him:

> *"I am a hands-on person, if I was learning something new, I would put the software in, let it load up, install the software, and play with it. I would read to find out what I am dealing with, put it in and play with it…very seldom do I pick up the manual to do something. I am pretty good about looking and figuring it out..I don't mean to sound like I know it all. I figure it out. I feel challenged a lot of time. It bugs me because I've been the kind of person to just figure it out, and if I've got to read?! I'll pick it [the manual] up and see what I've done. I don't like to call tech support. I'm pretty confident, but there have been time where my wife is like, 'Call!', and I'm like okay, okay." – Beau, Interview 1*

He felt he encouraged the kids to be more "hands-on," playful, and exploratory when they were learning:

> *"I encourage the kids in here, you know, to be a little more hands on, to, you know to pick up something and see how it works instead of staring at it and saying, 'I wonder what it does.' You know, if it does not look like something that is going to bite you or hurt you, you know ask Dad ask Mom 'is that okay, can I try that out?' Sure, have at it, figure it out." – Beau, Interview 2*

He illustrated this perception through an experience; when a student brought a new toy into class:

> *"The kid had this thing, you turn it and slap – I don't know – it had me going nuts, you slap it, hit it, bang it, and you have to twist it, and twist, whack bang, and real fast and you have to do it in the right sequence. This kid came in and said, 'Mr. Betts you want to try this?' and I did. And, the kids were like I want to try it, but you don't know how it use it, well, go ahead try it. I encourage them to try things." – Beau, Interview 1*

Using technology and being exploratory did not cause Beau anxiety, but he did perceive significant anxiety in relation to students' technology use, specifically what they could be exposed to when using the internet:

> *"As far as trying new things, I am willing to try various things, but you know but if I think it's going to hurt the kids, if it's not going to matter a hill of beans, if it's something going to help them. I want to be very cautious about what kids see… there are certain things that I don't want them to experience." – Beau, Interview 1*

Beau based this concern upon times when students have been exposed to potentially inappropriate website content:

> *"I remember pulling up discover.com at the beginning of the year. There was an advertisement for Victoria's Secret, right there on the website – I was like wait a minute. The guys are in there going 'Oh-oh' different things like that." – Beau, Interview 1*

> *"I tell the kids, just to be careful what you research and how you search. [What are you worried they are going to find?] Well, I'm worried about – well, a couple of years ago a student was doing a research paper on the White House and they typed in 'whitehouse.com' and it pulled up all kinds of trash. This was in a computer class. They quickly found out it was 'whitehouse.gov'. But, you know this was at school. That's what I am afraid of, that they will go…and it will hit them." – Beau, Interview 2*

He felt he could manage the content students saw on the internet by giving them a list of specific websites and guidelines for research. Beau felt, and hoped, other teachers in the school shared the same strategy, rather than telling kids not to use the internet at all.

While Beau spoke positively about using technology in the classroom, he did not generally take the students to the computer lab to do group work or research. He did not feel that students would be interested in going to the computer lab to work. He stated that he might take his Period 4 class, but definitely not Period 1. He said he did not generally do group work with the Period 1 class, as they were "too wild, did not cooperate well, and would lose focus" (Beau, Observation 3). He felt his teaching behaviour was different with the Period 1 class, that he could not be himself, and that he had to "crack down on them too much." He did not like having to teach this way. He hoped that his classroom management would improve with more teaching experience.

5.1.2.5 Summary: "…when you use it, just be careful."

Overall, Beau expressed positive feelings about technology and teaching. At the same time, he was concerned with classroom management, and students losing focus when using technology. His primary goal in teaching was to make content interesting for students, while making sure they are prepared for the following school year. Having a high level of computer-efficacy, Beau

did not perceive anxiety when learning to use new technology tools. He adopted exploratory methods in his own learning, and encouraged the students to explore learning in a similar manner – as long as they were safe. Even though Beau has had some difficulty acquiring technology tools for his classroom, and he expressed some disappointment, he was not permanently discouraged at any point. He simply found a new way to get the tools he needed for the classroom. He expresses a similar tenacity toward his curriculum, and making History interesting and important in the school, regardless of what others thought. He felt if more people felt History was unimportant, he would "turn it up a notch, and show them how it was" (Beau, Interview 1).

5.1.3 Danielle

Talking to Danielle, one got the sense that she was strong and competent, and that she was not from the area. She grew up much further north, south of the Great Lakes, and between the east coast and mid-western United States. She migrated to the southeast region four years ago, but said she had lived "all over the place" since leaving her hometown (Danielle, Interview 1). She had an energetic air about her, and was possibly a touch exotic. On either side of her eyes, were two small blue tattooed lines[28]. The little horizontal lines gave her a faintly Native American look.

At the beginning of this study, Danielle had been at EMS for two years as an Exceptional Student Education (ESE) Special Education teacher. She had been teaching for a total of three years. Prior to EMS she was teaching in the Department of Juvenile Justice (DJ) in Florida. Her students had been adjudicated 14-18 year old boys[29]. Tired of the DJ bureaucracy, she left the department when a science ESE position became available at EMS.

In the 2006-2007 school year, her first year at EMS, she taught 5th through 8th grade Science, and worked in mainstreamed classrooms supporting ESE students. Additionally, she had one class of full-time ESE students. In her second year, the school restructured Special Education, eliminating mainstreaming. In the new structure, ESE students were taught together for all academic subjects. The students were split into two rotating groups of 8-10 students. In a 3-hour class

[28] Traditional arctic cultures saw this type of tattoo as medicinal, http://www.vanishingtattoo.com/arctic_tattoos.htm.

[29] In the state of Florida, adjudicated is the juvenile equivalent of the adult criminal finding of guilty. An adjudicated delinquent is a youth who has been found by a judge to have committed a delinquent act. The court can commit an adjudicated juvenile or place the juvenile on community control. Definition from, http://www.districtsupport.com/FANSweb/jjn/glossary.shtml

block, Danielle taught all four grades of ESE students, covering Science, Math, and History. A second teacher taught the remaining subjects, they switched groups at mid-day. A few extra students would come into her class for Science or Math as necessary. In addition to teaching six full hours a day, she was the reading teacher for the after school program (RING).

Danielle's classroom gave the impression of a self-sufficient educational unit. Entering the classroom, I first noticed the incredible amount of equipment and learning supplies strategically balanced throughout the room (see Appendix H for a floor plan). The room was lined with cupboards and shelves full of books, aquariums, terrariums, colourful curtains, boxes, groups of desks, air planes hanging from the ceilings, computers, laptops, Playstations… the list could go on.

The room was loosely broken up into three main areas. Typically, the middle area of the room was a set of approximately twelve classroom desks. The number of desks and space was approximate, considering the area was constantly repositioned for group work and other activities. Standing just inside the room's entryway, the main desk area was usually directly to the left, facing the whiteboard which ran the length of the wall from the entryway. A teacher podium was close to the door, set at an angle to the desks, but not directly in front. In a second main area, there was a set of four desktop computers positioned on a long table, against the far left-hand wall and on the other side of the student desks. The right side of the classroom was filled with a variety of workstations and activity areas. There was a Smartboard positioned against the back wall, with a digital projector on a cart. In the right-hand back corner was a small book corner; above it on the wall was a chart of students' assigned class time activities. Closer to the door, before the book corner, were two long activity tables. The tables often covered with Playstations, microscopes, or students' work, depending on the day and time.

5.1.3.1 Her teaching

The classroom layout was illustrative of Danielle's teaching. She tried to keep the students as engaged as possible, using a variety of delivery technique. She used student-centred techniques as often as possible. A primary theme in Danielle's conception of teaching, was her desire to push herself to find new strategies to implement in the classroom:

> *"…my students require a lot of stuff and I always have to be on my toes and trying to figure out new things that I can implement to get kids to understand any core concept. That is motivating for me, it makes it exciting." – Danielle, Interview 1*

> *"…implementing new and different ideas, new techniques, hands on stuff with the students. Even with my own learning, just trying to do things a little bit different to see how it works. Sometimes it works and sometimes they don't."* – Danielle, Interview 3

Danielle felt she had a high level of motivation to learn new skills, and a willingness to change her teaching practice. She expressed the perception, "it would be valuable in the long run" to learn new skills (Danielle, Interview 2). In addition to wanting to improve her instruction, she was never satisfied with her teaching.

> *"I feel like I could always do better. I am not a person who is easily satisfied. I always think there has to be something else, there has to be more."* – Danielle, Interview 1

An illustration of her desire to improve was learning to teach Math[30]. In 2007, a result of the Special Education restructuring was that Danielle would need to teach ESE Math. She had not previously taught Math, and strongly self-identified as a "science person":

> *"I feel I am pretty confident in definitely science. I am a science person. I have a science background. Math and History this year, History is okay. I like History, travel, geography, culture part of things. Math - taken plenty of Math, teaching Math is a whole other story. I am getting there. I am pushing myself to find new ways and strategies to implement in my classroom to make it work. I am pretty motivated and excited about teaching."* – Danielle, Interview 1

Later in 2007, Danielle continued to struggle with teaching Math. In an effort to develop a better understanding of student learning and their needs, she adopted a strategy involving the kids in instruction:

> *"Doing math and teaching Math are two totally different things… I ask them [students], well you seem to understand it, how could you help this person? And that of course, helps the kid… and helps me too because it gives me the perspective of how they are understanding it and getting it a little bit more...It's come a long way. I see a lot of things I need to do for next time."* – Danielle, Interview 2

In the beginning of the second term, early 2008, Danielle was feeling much more confident about teaching Math:

[30] Please note that this is not a typographic error. In the discussion of this thesis, Mathematics is referred to as "Maths," which is typical in the Australian context. Teachers in the United States refer to Mathematics as "Math." When quoting from an American teacher "Math" will be used.

> *"It is getting better, we are trying new things… Things that I don't think a lot of these students have had exposure to…They have to process the information a bit more. It has been challenging, but pretty fun and exciting on my end because it's not just sort of math. I think I am getting a lot more responses from the students. It is getting better, I am doing a lot more and feeling a lot more comfortable with teaching Math and trying to figure out what the kids need."*
> *– Danielle, Interview 3*

In the previous statement, Danielle expressed exposing her students to new math ideas and challenging them. To gather information and improve instruction she accessed a variety of resources: she had worked with peers, had a person from the county out to assess her progress, and was doing internet research to find new teaching methods – all in an effort to improve her Math instruction. In addition to these methods, she would try new ideas in the classroom, as they came into her mind.

Danielle was very motivated to provide her students with an enriching learning environment. She felt, even though her students have learning disabilities, she worked to push them to their fullest potential. She desired to make learning as engaging and enriching as possible for her students. While she felt generally successful teaching, she felt extremely limited by time and state-level testing.

> *"What can I possibly do to change or help them, or to perform better, or to be able to take these tests? I know they know this stuff. And, I do put it on me, on what can I do. I have to find some way, or something in there. We have been looking at these questions [FCAT] more. They have been looking at them in small group, to dissect them more, take them apart, and implement thinking strategies. We'll see come March. It definitely affects me in my teaching. It's not so much, I mean I do the best job I can possibly do in a given time, but I know there are always things that can be improved, things that can be changed."*
> *– Danielle, Interview 3*

When discussing standardized state-level testing, she expressed frustration towards question items on the test. She felt her students had the ability to answer the test questions, if they were just phrased in the right way. While she found it discouraging, Danielle wanted to give her students the confidence to take the test, to believe, "Yes, I can do this" (Danielle, Interview 3).

5.1.3.2 Computers and technology

Danielle felt technology made content interesting for the kids, and that it was a great tool to challenge the students. Additionally, she liked using technology in the classroom, because it was flexible. She defined "technology" as anything that was not a textbook, worksheet, or a piece of paper. She felt teachers needed to use technology in the classroom because, "the kids are

exposed to it all the time… and want to use it" (Danielle, Interview 2). She used a wide variety of technology tools in her teaching, such as the Smartboard, Playstations using LightSpan software[31], AutoSkills[32], and even ThinkLink[33] test scores.

For Math instruction, Danielle rotated her students in groups between three stations: AutoSkills, Lightspan, and small groups. She would first cover a topic as a whole class, and then the students would break into their groups. Groups' daily stations were posted on the bulletin board. Structuring Math lessons in this way allowed her the flexibility in her teaching:

> *"The first couple of weeks I was on the fly, trying to do something with Math in here, but it was very rough. They [students] are all on different levels, and I only have 10 students and they are all over the place... This is at their level, they work on their level and at their pace. They are not timed. I can incorporate that, it makes a whole lot of difference." – Danielle, Interview 2*

The technology kept students engaged, and allowed her to work with smaller groups to address varying skill levels. She felt the students' favourite station was AutoSkills, which was on the desktop computers.

While she highly valued technology in her classroom and felt it helped instruction, she did admit it was not always easy. Danielle identified issues relating to students' transition time from the large group instruction to smaller technology stations:

> *"…it requires more work from the teacher, you have to keep the kids all organized through that transition period, when really the students tend to be a little less controllable, or out of control, because you are doing something different than they are used to in the day. But, we have a routine. It's on the board every day, they know what we do. … Anytime you want to transition from – even today, to transition from a whole Math class to little groups they were a little more chaotic, but they just get in their seats and calm down, and get re-focused. It works. I'm okay with that. I do go like this sometimes (hides eyes)." – Danielle, Interview 2*

[31] Achieve Now includes 29 reading/language arts and 28 mathematics Adventures, the program adapts to many environments and situations. http://www.plato.com/Elementary-Solutions/Early-Reading/PLATO-Achieve-Now-on-PSP.aspx

[32] AutoSkills is a reader-friendly math intervention software solution that helps at-risk elementary, middle and high school students develop computational fluency. http://www.autoskill.com/products/math/index.php

[33] Think Link is comprised of research-based formative assessment services that are state specific and provide the most productive online and paper tools for educators in each state. http://www.thinklinkassessment.com/corporate/index.html

She also identified limitations in her own time when trying to use technology in the classroom. She illustrated this perception through a description of her experience learning to use the Smartboard. She had acquired a Smartboard early in her second year at EMS. She absorbed the Smartboard into her classroom, through the afterschool program RING. The board needed to be stored when the program was not using it, and Danielle volunteered her room. While it was in her room, she regularly used it in her teaching throughout the school year:

> *"I have a Smartboard… it has been pretty cool. But again, it is something that – it is time consuming to be able to use it on a regular basis. To be able to find new and different things to be implementing all the time, and researching what sort of things are available to use for the lesson I am teaching, and subject, and grade level. But, it is definitely getting better the more I use it…I used it for at least one day a week, for each subject, at least one time in the week…it would be neat to be able to use it a couple more days of the week. But, I'm not sure how that would work with the things we need to do. I'm thinking about Math, and incorporating it more into Math lessons." – Danielle, Interview 3*

Even within time and curriculum limitations, Danielle continued to use technology in her classroom as much as possible. She felt having many different sources, including textbooks, helped her students "see the content in different ways" (Danielle, Interview 3). She felt good about using the resources, and did not feel the kids were getting tired of the stations. She said the real challenge was, "to take all the information, and put it all together, and get ready for the FCAT test."

5.1.3.3 Perceptions of school

In 2007-2008, Danielle was working with the ThinkLink software to prepare students for the FCAT exam. The entire county was using the software. She expressed mixed feelings regarding FCAT testing, but agreed with having standards and benchmarking students. Late in 2007, she did not feel pressured by the FCAT (Danielle, Interview 1). As the test drew closer, in early 2008, she began to feel it was "daunting" and "stressful" as an ESE teacher (Danielle, Interview 3).

State-level testing aside, Danielle felt "it is left up to us how we do things in the classroom." She perceived, the school and district allowed teachers to manage their own classrooms:

> *"I have many friends who teach all over the country and the world. I know at some schools they have to be on a certain page, and say a certain thing at a certain time and hour. We definitely don't have that. We have standards we have to do, and administration and school board, it is left up to us how we do things in our classroom. There is not constantly someone looming over my head saying are you doing this, are you doing this." – Danielle, Interview 1*

She expressed generally positive feelings about the school and felt supported. She could go to peers for help when necessary, and she felt that the new principal was accessible and easy to approach. She felt teachers were involved in the school's decision-making process. She illustrated this perception through an experience at a staff meeting in the beginning of the school year:

> *"We have regular faculty meetings [issues] are brought up and taken care of there. I feel as if the teachers there have a lot of input about what goes on. If I had a concern I feel that concern would be valued and listened to and done with whatever needed to be done….Every year we have these little focus things. Last year was different questions we focused on to get our students ready for the state tests. Now this year we, Troy talked about what worked and didn't work, and that we are going to work on implementing vocabulary in our classrooms. Simple things like that… At the beginning we talked about behaviour policies, and everyone expressed their concerns about what worked and what didn't work, and the final behaviour policy I think pretty well reflected what everyone had to say." – Danielle, Interview 1*

While she felt teachers were involved in decision-making at the school, she did not know why Special Education had been restructured. She felt it could have been related to two reasons: a) scheduling, the 50-minute class rotation was too quick for ESE students; and, b) quality teaching, classroom teachers not doing "worthwhile" work with the ESE students (Danielle, Interview 1).

As an ESE teacher, Danielle frequently consulted with peers regarding teaching and curriculum. She revealed having to "butt heads" with a few teachers regarding changing teaching practices to accommodate ESE students:

> *"…to get them to understand, you are working with a different type of student here. We need to change things a little bit, meet some resistance here...It was definitely a lot of support to that teacher, validation, back up plans, why this needs to happen, I'm not just a jerk. I don't think I know everything…Over time it did change some. Not the ones I had to deal with, but other teachers I know had to deal with were just not willing to branch out of the way they were doing things, for however many years." – Danielle, Interview 1*

She conceded it might not be as easy for mainstream classroom teachers to vary the curriculum, as she had been able to do. She noted class size as a significant barrier in regular classes, and that mainstreamed classes could have up to 30 students, while she has eight to ten. She also felt the shorter classes, 50-minute periods, would make it difficult for teachers to integrate different tools and teaching strategies for different learning styles (Danielle, Interview 2).

She thought, in the case of technology use, many teachers might not want to put in the effort to learn and incorporate new tools. Other teachers would frequently ask Danielle computer related questions:

> *"…I have teachers come to me and ask me, 'What do I do with this?' I'm not the IT person, but more than some of my colleagues… We have an electronic grade book; some people ask how to set these things up, working in Excel setting up spreadsheets, tables, anything like that. Emailing, I have teachers who ask me about emailing, attaching to emails, and retrieving attachments. It seems kind of simple (laughs)." – Danielle, Interview 1*

Danielle did not feel well supported by the technology team at EMS. She expressed a perception that the technology person was rarely available and she often had to figure most things out on her own. Fortunately, she was able to figure out technology on her own, so the availability of support was not a limiting problem.

5.1.3.4 Playfulness and anxiety

When Special Education was restructured, the school combined "three classrooms of stuff into one classroom" (Danielle, Interview 1). Therefore, Danielle had more technology available to her than in the prior year. She had to figure out how to use most of it on her own, through "trial and error" (Danielle, Interview 3). Danielle expressed very little anxiety towards changing her teaching practice and using technology. She repeatedly stated a desire to try any new teaching strategy or resource, if it would help her students.

She felt the most challenging aspect of her teaching was not having a teacher's aide in the classroom, "not having any help in my classroom" (Danielle, Interview 1). She would have liked to have help dealing with behavioural and emotional problems in her classes:

> *"It is a wide range of learning abilities. Some of my 7th graders are 15 years old. They are still pretty low level. I am just trying to get them up to speed, grade level, but even age level. And then there is all the social emotional stuff that they bring into the classroom…So, don't be taken aback when you come into my classroom and you see what goes on…I have anywhere from 8 to 11. Not as many as a regular teacher has…At one point I had 14 and I was like I don't know if this is going to work." – Danielle, Interview 1*

Even though Danielle perceived her class as "atypical" in skill level and emotional state, she did not hesitate to change her teaching and introduce new tools. When integrating the Smartboard to her teaching, she talked about initially "figuring it out" and "playing" with the board as a group (Danielle, Interview 2). A few days after making this statement, she used the board in a science lesson on the periodic table. First, she did a short lesson on the Periodic Table, using the

Smartboard in front of the class. She then explored the additional resources with the students. As a group, they decided to try a Periodic Table game. She let the students help each other touch and drag elements around the board. At times, students were frustrated, excited, or agitated; with quick verbal cues from Danielle, they settled down and continued to participate in the activity (Danielle, Observation 2).

As previously illustrated, Danielle encouraged her students to play and explore while they learn. She felt a willingness to be playfulness, was the opposite of feeling anxiety . While she employed playfulness in her teaching and personal learning, she expressed a negative perception of playfulness in learning:

> *"I feel playfulness has almost a negative connotation to it…. being playful, we can't do that… I guess it's not really on task, not focusing on what you are supposed to be doing, getting stuff done… Oh, for my own learning I need to have some sort of fun involved. I like to do things a little bit differently than… I guess I'm just hung up on the word playful (laughs), but I could see how it fits in…It's fun and playful. Exploring something and playing. I can see as being difference. I can see it overlapping a bit, where you are playing and exploring. Kids playing on the playground or playing outside, sometimes just playing is exploring. But exploring can be…. I don't know. I haven't really thought about it. To explore - childish maybe?" – Danielle, Interview 2*

Several months later, she revisited the topic of playfulness:

> *"… it has been on my brain forefront. The idea of playing, and being more conscious of that and what I am doing in my teaching. I guess I would call 'play' a little more presenting information with my students. It's necessary with middle school students, to be able to play around with things, instead of being rigid and inflexible in what we are doing…Um, I think I have always done it, but I think talking with you, putting a term to it, and looking at it as playful. I think I said this before, when I think of playful, I think of not doing their job. Not getting done what you are supposed to get done…there is a different realm of playing, that I have become more conscious and aware of – that playful is not such a bad thing." – Danielle, Interview 3*

As previously stated, Danielle frequently implemented new and different ideas in her teaching. While she often used new technologies in her teaching, she felt integration could be problematic. She identified that technology "is more involved than just having a textbook" and could potentially be unreliable. She saw how this could be a limitation for other teachers. Personally, she did not find this problem limiting, and was willing to accept that, "sometimes it works, and sometimes it doesn't" (Danielle, Interview 3). One of the only areas she expressed

anxiety was in relation to time, specifically having planning time to find, and then learn, new tools and resources.

5.1.3.5 Summary: "It's worth the effort…"

Generally, Danielle expressed a strong desire to constantly improve her teaching, and a willingness to utilize any tool which would fulfil this goal. These challenges motivated her, rather than cause anxiety and discourage. She saw technology as a necessity in teaching, and felt that technology motivated students to learn. Further, she felt technology allowed her flexibility in her classroom, and gave her time to address students' varying skill levels and learning needs. While she identified that changing teaching strategies and introducing new tools could be problematic, particularly in classes larger than her own, she felt the benefits of improving learning were worth the time and effort. She felt the school encouraged her to experiment with her teaching, as long as she kept within the state standards. Each new aspect added to her teaching, such as Math and FCAT, Danielle took as a challenge to improve her teaching and to push her students to learn. In her mind, new strategies or tools might work one day, and possibly not the next – she would keep trying regardless.

5.1.4 Kerry

Like many of the people at EMS, Kerry had a welcoming and open "southern" demeanour. Speaking with her, she would shift from serious task and oriented focus, to happily laughing at herself – in a few seconds. Kerry had worked at EMS as the guidance counsellor for over sixteen years, her entire career, and with at least four different principals. A symptom of her personality, or simply her longevity at the school, she had absorbed many responsibilities beyond guidance counsellor. Other teachers commented on the large workload she carried and the variety of her responsibilities.

In a given day, Kerry would tutor students, see parents and students with various problems or questions, liaise with the reading and curriculum coaches, work with administrators as needed, etc. In addition to these tasks, in the second half of the school year, she would teach a unit of Career Planning and high school planning to the 8th grade students. While she had numerous duties, often unstructured and daily increasing, she tended to take on new tasks. For example, in the course of this study, Kerry became the contact point for other Phase 2 participants[34]. She felt it would be easier, as they were quite busy.

[34] The other teachers did not know Kerry was also participating in the study. She communicated regularly with all teachers and felt it would be easy to liaise for the study.

Most of her work was done in her office. The 8th grade Career Planning unit was taught in a regular classroom. Her office had two doors (see Appendix I for a floor plan). While she did not share it with another person, it did double as a hallway. The first door was attached to the copy room, and very close to the school's front desk. On the other side of the copy room were administrative offices, including an administrative assistant, and the assistant principal (deputy). This was a very busy and high traffic area. The second door in her office, just opposite the first, connected to a larger cluster of administrative offices, including the principal's office, his administrative assistant, and a meeting room. Therefore, Kerry's office was the most direct route between the principal's and assistant principal's offices. When she was in meetings, she would shut both doors to reduce noise and foot traffic, but this did not stop people from repeatedly knocking on the door to ask questions.

The office itself was well lit and full of dark oak executive furniture. As I entered her office through the first door, from the copy room, I stood looking across to the second door. Looking 90 degrees to my right there was a chair, then a small end table, and then a second chair. Turning my gaze back towards the second door, I was looking at the same furniture combination along the left wall connecting the two doors. All four chairs seemed to have rotating piles of paper, and folders – manila absorbing the furniture. Kerry's desk sat in the middle of the office, perpendicular to the hallway-like throughway area. Directly behind the desk, against the wall, was a large office hutch, essentially a second desk. Inside the hutch sat a computer. Kerry simply had to spin her chair to move from the main desk, to the hutch workspace. Above the computer, on a shelf, sat a University of Florida stuffed alligator, a "Gator." Kerry was, as many people in the area were, a Gators fan. The wall on the opposite side of her desk had two large windows, looking out over the patch of grass in the school's central courtyard. The view extended to the opposite brick wall, through the opposite windows, fleeting glances of students walking between classes could be seen.

5.1.4.1 Her teaching

Kerry had many roles at EMS, but strongly identified with being a teacher. Her teaching took on two different forms, and not always in a traditional classroom. In the afternoons, she worked with regularly scheduled tutoring students. She worked with these students on daily assignments, reviewing topics covered in class, or any other supplemental instruction students needed (Kerry, Interview 2). Additionally, each year in second term, Kerry taught the 8th grade Career Planning unit. The Career Planning unit helped 8th graders begin planning their transition to high school, and their working life beyond high school.

In 2006-2007, the Florida Department of Education (FLDOE) restructured the Career Planning unit, switching to an online tool, Florida Choices[35], rather than workbooks. Kerry had to do more preparation than previous years to teach using the new tool:

> *"At the end of every school year I do a week long unit in regards to Career Planning and high school planning… this year, quite a lot because they have just planned what we do – typically this was done with students through a workbook. This year we have done it on-line. This year I did a lot of preparation. Number one we went to two different in-services to kind of be familiar with the website and how to utilize the information how to get students through it and how to just try to prepare the parts I was going to use, to streamline for our 8th graders." – Kerry, Interview 1*

The course was reformatted again in the 2007-2008 school year; it became an entire semester, rather than a weeklong intensive unit. The online unit, which Kerry had previously used, was expanded to cover the semester course. She felt the revised Career Planning curriculum would be more useful to the students than the previous course format:

> *"… we just did the Readers Digest condensed version, here's what it is, let's get your IEP [Individual Educational Programs] done, because it's the end of school. They [students] are going to be able to really use that, to really have time to explore careers and develop career plans and look at schools." – Kerry, Interview 2*

Unfortunately, Kerry was not able to continue teaching the course in 2008. Late in 2007, she mentioned being concerned about her workload. She was concerned that she would not continue to be effective at her job if she kept taking on new tasks. Therefore, considering her other responsibilities, she was not able to teach a semester long course. Fortunately, a Computer teacher came to the middle school, from the high school, which gave EMS two full-time teachers in the computer lab. The principal assigned one of the computer teachers to the Career Planning course. Kerry worked closely with the new teacher. Midway through term 2, Kerry felt the Career Planning course was "going fine." The teacher, Mr. Gunn, had used a textbook until week nine of the term, instead of the online component. There had been confusion regarding which internet browser to use for the FLDOE Career Planning on-line component. The issue was ultimately resolved.

[35] https://access.bridges.com/auth/login.do?sponsor=7

Kerry expressed the belief that one of the 8th grade classes "just didn't care" about the course, and they were difficult to teach. She felt preparing for this class required more effort and preparation, and that they needed constant monitoring to keep them engaged (Kerry, Observation 3). Mr. Gunn expressed the same sentiment. At the same time, she felt it was important that all students completed the unit.

5.1.4.2 Computers and technology

Initially, Kerry had a very low perception of her computer-efficacy, but she felt she was becoming more confident using technology, professionally and personally. Professionally, she felt more adept using email, specifically attaching documents. Early in 2007, she had been unsure about emailing attachments:

> *"…if I were going to attach something to an email, and send that to someone. I'd still have to either go back and look at the notes I wrote to make sure I did it right, or call a buddy into the office and say, 'Come here, any idea how I did this?'… I know there are a lot of things going on out there that I have refused to learn, but I know I'm going to have to." – Kerry, Interview 1*

A year later, in 2008, she expressed very different attitude about using email:

> *"I was willing to email all along. It was attaching things to an email, where you have to leave where you are and go somewhere else, move a document to someplace else, if you can find it, attach it to an email. Those are the things I wasn't confident in at all. But, I am doing more of that more. I do more of it now. I know if all else fails, I can take this, move it to my desktop and then I can go and retrieve it there and attach it to an email. I can make that work every time." – Kerry, Interview 3*

She did not feel her way of doing things was "necessarily the best, but it works for me" (Kerry, Interview 3). Kerry did not identify a specific point or experience where she decided to begin learning how to use technology; she had simply decided it was time to learn:

> *"…a willingness to pursue those things, and how do I figure this out, how is it I attach this to an email to send to a person – I know there is a way, they do it all the time. For me, there comes a point when you don't want to ask another person, no I need to figure this out for myself (laughs)." – Kerry, Interview 3*

While in her personal use, Kerry may not have been motivated to use technology, she consistently valued using technology in teaching and the school, particularly access to databases and information. This perception was illustrated through the value she places on the Florida Choices module, for the Career Planning unit. She was quite clear of the student benefits available through this program:

> *"…the online program we are using in our career class has volumes of information that you can easily access at your finger tips, as opposed to going to the library to pull out the dictionary of occupational titles and send kids to 50 different places to try to collect all the different information. I so see the benefits of it" – Kerry, Interview 1*

> *"…it's going to be tremendous. It's going to be helpful to students – obviously they, like I said; they are very interested because they are already computer savvy. You just get them started and they go." – Kerry, Interview 2*

She also valued other teachers' individual school websites. She felt these were useful in her afternoon tutoring sessions, but would have liked to see teachers keep them more up to date. She also used the internet to help students gather information for assignments:

> *"I have kids I work with in the afternoons. And if I think, 'Oh, Ms. So-and-So is gone, but maybe we can look at her website or her page and get that information.' I notice that greatest majority of our teachers do not have that where they put their lesson plans and homework assignments for the day…I know I'm making use of the things now that I'm aware I need… Obviously having access to the internet here at school, we can do searches which are sometimes very useful. For example, I have a kid after school, he has a project on the solar system, 'Come here, quickly let's look.' And, those are ways I already use it, and I'm trying [to think] if there is something else I could add to it to make it truly more helpful." – Kerry, Interview 2*

Throughout her discussions of technology, Kerry tended to value tools which provided easy access to information. Early in 2007, this point was illustrated through her perceptions of the Florida Choices program, and students' ability to access career information. Later that year, she discussed a reading scores spreadsheet created by the reading coach:

> *"Now with our after school tutoring program I have these providers coming in and they need to see these scores. I don't have to go to ten other places… I can just look in one place in the spreadsheet on First Class, there it is. I print one sheet out and give it to that provider... It's tremendously convenient." – Kerry, Interview 2*

Her perceived value of technology was mirrored in her professional goals. She stated, learning to use the school's data analysis program, Dashboard, was a goal for the 2008-2009 school year (Kerry, Interview 3). She felt the program would help her track students' performance on the FCAT from year to year. As in many schools in the United States, managing state-level test scores was a school priority, and she felt this program would be an effective way to support this school need.

5.1.4.3 Perceptions of school

Kerry's personal values, relating to teaching and technology, were closely aligned with those she perceived in the school. For example, she perceived "access to information" as a top school priority, similar to her own goals and values, outlined in the previous section (Kerry, Interview 3). She felt this type of access opened up learning opportunities for students and teachers:

> *"…probably the most important thing to us, to me, is that access to information that we turn around and use for lots of things. Whether it be research projects or looking at things – we have several resources that pertain specifically to educators where they can go and look for different ways to teach a concept, see what other teachers had done, not only within our district, but the world. To be able to teach something differently, new and innovative, something that other teachers have tried and has been successful, is good. We have a lot of teachers that use the web for those reasons, accessing whether its school data – we do a lot of what we call "FCAT Chat" from school to school, from teacher to parent. It allows us the ability to glean information, but easy access to people in other parts of our nation and the world that before now you would not see available. Easily available that is." – Kerry, Interview 3*

She felt it was important for teachers and students to access information online. She did not feel the other teachers were developing their personal websites, but felt access to class information would be helpful for parents and students. She identified "limited time" as the reason teachers, and she, had not developed websites:

> *"I don't think individuals are moving more towards personal websites. I think probably the reason is the work overload. At the end of the day it's all they can do to get those 120 papers graded and things that are required of them in the school. I have not seen a lot of progress in the area of personal websites. I know I have not touched mine. I almost pretend it's not there. I have never even put anything on it, to be absolutely honest. In looking at information people put up, I think a lot are the same way. Our technology person does a good job of putting things on and trying to keep up to date our school website, but no... . teachers don't... last year I know a couple of teachers were trying to put their daily assignments up there, and I know even that last one of those I checked was way out of date." – Kerry, Interview 3*

She identified teacher websites as a school "push" in 2007; the school wanted teachers to put up their lesson plans and assignments online (Kerry, Interview 1). While she felt websites were important and valued in the school, she did not feel "pushed, as in hold the feet to the fire" to work on them, and they were not a requirement. She felt encouraged to use technology, such as developing personal websites, and encouraged to improve her technology skills, but on an individual basis rather than school wide:

> *"He [the principal] makes sure that our teachers have the things they need… [They] offered incentives to teachers, in the way of, we are not going to get it for you if you are not going to use it. Therefore, if you go to the training, you show a strong interest, we will provide… he would absolutely, make anything available to teachers in the way of their technological skills, or access to equipment that he could. I see it as a top priority with him. He wants his people, we kind of like to be on the forefront of things in the county, and a lot of the time we are. Our teachers are the first ones who have used some of the technology that is out there." – Kerry, Interview 2*

As well as strongly identifying with school values and priorities, Kerry had a very positive perception of the teachers and school culture. Similarly to the previous statement, the school being "on the forefront" of the county, she perceived EMS staff to be consistently motivated and of a high quality:

> *"Our school is always, in the years I have worked here, even as we change, there has been a large turn over because our people are trained and move on to different positions – we continue to be very motivated, and very competitive. That has not changed, and I find that very fortunate, given our people have changed from year to year. As far as our school community... we are highly motivated, and have been, to do well, to have top test scores. Our people are very serious about what goes on in their classrooms. I don't see that having changed, which as I've said, I see that as pretty remarkable, in that personnel has changed from year to year, that remains constant." – Kerry, Interview 3*

Kerry explained, over the past few years, EMS has had quite a bit of staff turnover. In 2006-2007, of the five 6th grade team members, none of the teachers had been at the school for more than two years. Teachers in the school had been promoted within the county, particularly reading specialists, leaving multiple vacancies. As well as being promoted through the county and state systems, teachers were leaving the school to work in higher paying districts:

> *"I could just sit here or move across the county line, and increase my annual pay by $10K annually. For a schoolteacher, that is a lot of money. When those positions open people are gone. That is just another reason that people are moving out of our district because we are losing some really quality people. For that reason alone, that is tough, tough to compete with." – Kerry, Interview 1*

Considering turnover at the school, Kerry felt the school had been very fortunate to acquire high quality, experienced teachers with "good common sense," and excellent teaching skills. She felt the new teachers had all assimilated into the school well, and have maintained the school's high standards:

> *"I don't think it takes long, once you have been at the school to see that everyone here works, and that no one here tolerates any one that doesn't. They are pretty – granted they don't have a lot of time to be in each other's business. They know if people are working every day, and what goes on in classroom every day. Our community is on us, we all know the kids and their teachers' classrooms. We are very small, it's not like you can hide those things. We all go to church together, we play ball with each other. There is a constant, what is going on in Ms. So-and-so's classroom, they know by the types of assignments kids have to work on. It's just, once people step on our campus, especially professionals who have been transferred here, are chosen to transfer here to work, it's immediately apparent. This is not a place to come to goof around. And, sometimes, that makes us not as close knit as other places. We are pretty much down to business, not that we don't care for each other, and enjoy the occasional Christmas breakfast and things like that, but we are – it's evident, when you come here, you come here to work, achieving is a top priority."*
> *– Kerry, Interview 3*

In the previous statement, Kerry placed achievement over being a "close knit" community. She compared EMS' achievement to other schools in the county, "...there are some schools that have pockets where people are not being as productive as they could be" (Kerry, Interview 3). She felt EMS was doing better than other schools.

5.1.4.4 Playfulness and anxiety

Early in the study, Kerry expressed anxiety in several technology-related areas. She felt particularly unsure about navigating through new systems and losing files. Even though she valued the Florida Choices module, she was apprehensive and anxious when first learning how to use it in her teaching:

> *"…I did not just walk in there the first day and look at it myself. I had toyed with it prior to going into the class. So, hopefully it can eliminate some of that, to have at least walked through the steps that they were going to have to through to make sure I could navigate the system? But it's – it's – I do okay with the things I know how to do. But, I am very resistant to learning things." – Kerry, Interview 1*

She had been "apprehensive" to use the new module, but ultimately she found it user friendly. She identified "toy"-ing with the module to learn how it works, as well as going to several in-service trainings (Kerry, Interview 1). Generally, when learning how to use a new tool, Kerry would usually "call a buddy into the office" to help, if she felt there was going to be trouble. She tended to anticipate problems and frustration when using technology:

> *"… when I sit down in front of my computer, and I'm like okay, let me take a shot at this, the thing that I try that I swear this is what somebody said, goes wrong, I'm immediately – I'm immediately - frustrated. Because – then I can't – I don't know – just when I watch kids, even, they are very – they are very comfortable, with trying this and trying that, and I'm like, I'm going to mess something up if I try too many things at once and not get back to where I need to be originally. I'm just – it's just – aw…I would say that when I – when that is the mindset I come to the computer with, this is going to be difficult and this does not work pretty quickly, I'm going to want to toss it out the window."*
> *– Kerry, Interview 1*

Even though she found technology frustrating, she felt that she was able to complete the necessary daily tasks. She expressed the sentiment, "I would never be hired for me computer expertise, but I could certainly get through what I needed to do" (Kerry, Interview 1). Over the year of this study, Kerry began to feel more comfortable using technology. Late in 2007, she was not as "resistant" to learn new skills. She began to express a desire to improve her technology skills:

> *"There well, there's a lot, there's a lot obviously that I am not familiar with in aspects of technology… I realize I am comfortable with certain tasks are good for confidence when it comes to programs or things with the computer I can work a couple of them. I'd like to move on a little bit more…I'm much more comfortable with those types of tasks and use them regularly. If I have to do a lot of transferring of files from something to something else, I'm not too comfortable with that. I am always concerned I am going to lose something and not be able to retrieve it." – Kerry, Interview 2*

Kerry felt more comfortable using technology, and was able to identify that she was able to complete tasks, as long as she had written directions. She felt the directions gave her "security," in case she "messed it up" (Kerry, Interview 2).

In 2008, Kerry expressed a desire to begin using more technology. She had identified specific goals she wanted to accomplish to fulfil her professional needs:

> *"I know there is a way; I know there is access to that. It's just a matter of just deciding, I'm going to learn to do this, so I can use those tools, so I can make them benefit me and I can get the results I want… We have a new data analysis system, called Dashboard. That is probably my next professional goal. No one has been fully trained on it yet, but it allows us access to test scores, and being able to compare performance from year to year, breaking... breaking our students population down into quartiles and the needs at those different levels. That would be my next professional goal, how to use that system." – Kerry, Interview 3*

While Kerry seemed to gain confidence using technology and identify the ability to successfully complete tasks, she still found technology very frustrating. A particular point of frustration, in early 2008, was that the Florida Choices online module would not run on the school computers:

> *"The online part is very frustrating. We are not, still, able to run that program in our lab. The promise they will fix that. I talked to that instructor a week ago and he was very frustrated, and rightfully so. According to him, and I can only assume this is true – all of the other schools in the county have that capability, and still, at that point, did not, and we have the largest population of 8th graders. And, yet, here we sit. Without the wiring, the technical capability, whatever is needed to run that program… Yes, and our computers did not have – are not new, and they also just did not have the memory to make that program work. So, they were working on something to make that happen. That is our own hold up… It's frustrating when you know it's out there, but you can't access it. Hopefully, they will quickly have that resolved so our kids can get online with that program." – Kerry, Interview 3*

Limitations related to the module illustrated Kerry's frustration with technology, as it affects school goals and expectations. She expressed similar frustration in relation to her own technology use and goals, particularly when she could not access the correct tools or information.

5.1.4.5 Summary: "It allows us the ability…"

Overall, Kerry's attitude toward technology was one of utility. She gained confidence using technology, and gained awareness of available information, as she was introduced to new tools. Even as she gained confidence using technology, she was still frustrated. She began to value technology resources, such as teacher websites and databases, and was able to see how they would benefit her work and the community. While she saw the benefit of teachers having websites, she did not have her own website up. She felt she could manage to construct a website, but would not have the time to maintain it. She stated that technology was a priority at the school, but the school leadership was not going to force teachers to create their website or use any other technology tools. It was up to teachers to choose to learn the skill, based on personal motivation.

5.2 Entering the Central Coast

North High School (NHS) was located on the NSW Central Coast, approximately 1.5 hours drive north of Sydney and an hour south of Newcastle. Driving out of Sydney along the Pacific Highway the landscape rapidly changes from dense population to bush. Grey-green foliage shines along the roadside, periodically dipping away to reveal wide gorges and waterways. Sixty-

six percent of the surrounding area was Forestry or Bushland (Land and Water Australia [LWA], 2007).

Leaving the highway and driving into town, towards the ocean, new sprawling housing developments were visible. The population of Jenkins[36], in the year 2008, was projected to be approximately 19,500 residents. The area was projected to have an annual growth of .3% in the next year. The average salary in the area was $35,294 which was approximately $6000 less than the New South Wales state average (Australian Bureau of Statistics [ABS], 2008). Activities available to visitors include a Mardi Gras Festival in December or the Brass Monkey Regatta in June.

The route from the highway to the school was flanked with loosely spaced housing developments. The road followed through several round-abouts, past an RSL, and a few small strip-malls. At seven-thirty in the morning, students in multi-coloured uniforms could be seen alternately ambling and bunching along the footpaths, slowly drifting towards schools or bus shelters. NHS was situated a few minutes off the main road in a residential area, just before a medium-sized shopping centre. Driving up to the school, students could be seen wandering towards the CalTex station, which was between the school and the shopping centre gateway.

Entering the NHS school grounds, I navigated through the trees and extensive landscaping protecting the front of the school complex. The school itself was barely visible from the main road. In fact, without a sign indicating the staff parking lot and bus drop-off area, it would be easy to drive past. The school itself was a multi-levelled mass of buildings, rimmed with criss-crossing covered walkways; teachers described the complex as a "rabbit warren." It seemed akin to an M.C. Escher drawing. The school offered student guides at the front desk, to help visitors navigate the multi-layered wings and external walkways. Walking through the school, there was obvious litter and graffiti, as well as a significant amount of gum on the ground. Upon closer inspection, several graffiti tags were dated from the late 90s.

The NHS school mission stated: "Respect, co-operation and personal best." Teachers at the school were grouped into curriculum-area faculties, each with a dedicated staff room. The staff rooms were distributed throughout the branching school structure, clustered with the classrooms. The staff rooms were self-contained and isolated from the streaming hallways and student noise. Between each class, students rotated classrooms. Teachers tended to stay in the

[36] Names changed for confidentiality.

same rooms, but it was not uncommon for them to teach in different classrooms. The four case study participants (Simon, Molly, Elizabeth, and Judith) taught in grades seven through ten (Stages 3 and 4). Their subject areas were English, Science, Special Education (ESE), and Maths.

At NHS, computers are not kept in the classrooms. Each faculty had its own computer lab, which they were responsible for keeping clean and alerting the IT professional when the computers needed maintenance. In addition to the labs, teachers had access to several computer clusters (four or five desktops) and audiovisual equipment. These resources were scattered in small rooms throughout the school. Teachers were also able to use the 20 library computers. In 2007, a new Learning Skills Centre was added to the school. The centre was housed in a portable classroom, situated between the school and road, shaded by several large trees. The Skills Centre was intended for senior (Grades 11 and 12) student use only, but teachers from other grades were occasionally able to book time, in certain cases.

At the time of this study, the school was ranked as one of the most technologically equipped schools in NSW (Field notes; October 31, 2007). But, teachers were only required to use technology to fulfil NSW curriculum requirements: Maths taught spreadsheets, English taught word processing, Science taught databases, and Physical Education taught mail merges. Beyond these obligations, the school did not require teachers to integrate ICT into their teaching. The school was focusing on literacy as a group, in response to low School Certificates scores and the English Language and Literacy Assessment[37] ELLA. Individual faculties worked on their own curriculum initiatives, which will be addressed in each teacher description.

The following teacher stories illustrate the individual teacher's experience teaching, perceptions about students, and how they see the NHS school culture.

5.2.1 Simon

When Simon spoke, it was with hesitation and careful word selection. His intonation and accent alluded to 19th century England, but he grew up on the Central Coast of New South Wales – about 30 minutes south of NHS. He said the area was different when he was a kid. At the time of this study, Simon had been teaching English and History at NHS for two years. In total, he had been teaching for over 20 years. He had worked at several schools, and at one time, was a year advisor. He was generally quiet, but liked to joke with students when they were working individually in class.

[37] http://www.schools.nsw.edu.au/learning/7-12assessments/ellatest.php

The English faculty room consisted of seven or eight teacher desks crammed into a small room. All desks were stacked with books, papers, makeshift shelving, etc. In theory, this was the smallest faculty room in the school. Even with the limited space, the group managed a sitting area in the far corner from the door, sectioned off with a two and a half-seater couch (of a non-descript orange-ish colour) and a variety of random chairs. In the sitting area, there was a small water boiler, a jar of instant coffee, and a small arsenal of mugs. When I came into the room, teachers were quick to offer up a mug, and mix a cup of coffee. As the English teachers chatted and laughed, Simon smiled and showed positive affirmations, but did not necessarily actively engage in the conversation. He said, he likes to like the people he works with, and he doesn't like to look for reasons not to, "it is hard if you don't" (Simon, Interview 2). He said this to me with a small smile.

Leaving the English faculty room, I walked into the courtyard. Diagonally to the left and across the courtyard, was Simon's classroom. His room was located at the end of a long wing of classrooms; the actual entrance was recessed into the wing, with three other classroom doors. The entry area for the classrooms was similar to the inside of a tunnel, with as much light as a person might expect in a box without windows. There were no decorations or notices on the walls, simply four green doors with small red numbers designating the classroom.

Students waited outside of Simon's classroom (see Appendix J for a floor plan); they tumbled in as he walked up and opened the classroom door. The classroom itself was on the corner of the building and flooded with light, two of the four walls were all windows. The room was filled with student desks. Sometimes the desks were gathered into three double rows of four desks with a desk at the front, other times in five groups of five. There was minimal decoration in the room, only a few stock motivational posters. The teacher desk looked littered, as though it was only used to store useless papers and random classroom books. There were no computers in the room. The English faculty computer lab was three doors down from the classroom and the audiovisual storage room was two doors down.

5.2.1.1 His teaching

Simon felt generally satisfied with his teaching, but spoke of an internal conflict between perceptions of the "ideal and reality":

> *"I don't know that I have ever reconciled that, or many teachers do, you constantly look at the deficiencies or the kids that didn't get their work done or didn't respond or didn't improve. It's easy to lose sight of some of the success stories. I don't know if it's a job where you ever are completely satisfied. There are times when you wrestle with the intangibles. You think something has gone*

> *well, and the results don't necessarily bear that out. Other times you are looking at a good set of results, and haven't thought the class has gone well, or the unit has gone well, or whatever. So, I am comfortable with what I am doing, but I have always been frustrated by the lack of success in certain areas."*
> *– Simon, Interview 3*

Overall, he felt he was operating in a "comfortable space" in his teaching. His level of comfort gave him a certain amount of confidence in his teaching. He admitted he could be too comfortable, which might make him hesitant to try new things. He illustrates this perception using the terms slow and reluctant:

> *"…some are quick to embrace them, to adapt and others are quite slow, and some are quite reluctant… being slow in teaching often means I don't devote the time to get up to pace with it, reluctant means I'd really rather not. Slow means you will get there, but more in time, but reluctant suggests something else. [Where do you fall in there?]Oh, probably bordering on slow and reluctant. Um… being fairly honest I think. I find that constitutionally I…I operate really comfortably within certain parameters, perhaps many people do. Perhaps some are more comfortable launching out into new areas, and I think I quite, to a large extent, see capability with that feeling of comfort. Whether it is self-serving or not is debatable matter, but I quite align my performance with feeling comfortable." – Simon, Interview 2*

In the 2008 school year, Simon was required to change his teaching. The English faculty implemented a new narrative unit in the junior curriculum (Years 7 and 8). Simon felt the unit was very "prescriptive." There were certain things students had to do at certain times, such as, two drafts and a final submission date. At each step students were given a sheet telling them what tasks to complete and which goals they needed to meet, before moving on to the next step. Teaching the unit, Simon felt the goals and direction were quite clear, but it did not leave much room for spontaneity nor was particularly innovative (Simon, Interview 3). Even though Simon had a few doubts, he tried to maintain a positive outlook and unbiased opinion of the unit:

> *"We will see how it goes. There is nothing particularly innovative about it, I don't think, or altruistic, but simply to improve skills. Whether it does or not, the results will tell the story…I have an open mind at the moment. I think if we got nowhere in terms of results, no discernable trend in results or upturn in results, I would question the wisdom of doing so. I think it does eliminate a certain capacity, flair, innovation, divergence from a specified path. My view would be shaped by results." – Simon, Interview 3*

Simon felt these kinds of curricular changes were common in teaching. He felt that it was possible to operate in the classroom similarly to teaching 10-20 years ago, with one exception – technology (Simon, Interview 1). Observations supported Simon's previous statement. His teaching was generally traditional, teacher-centred, and students working independently on worksheets or their writing.

5.2.1.2 Computers and technology

Simon saw himself as a computer "luddite" and on the "shallow side of compliance," in regard to integrating technology into his teaching (Simon, Interview 1). He sometimes took his classes to the computer lab for research, but it was not a regular part of his teaching. He identified feeling uncomfortable with computers, and said they made him question his performance (Simon, Interview 2). He perceived being able to perform repetitive tasks, but did not have an intuitive sense of technology:

> *"I can perform tasks repetitive tasks I am familiar with, but like Pavlov's dogs if I am made to feel uncomfortable. I am not intuitive with new procedures. The challenge is my expertise…" – Simon, Interview 1*

He felt, if he needed to get a certain job done, he would complete it in a familiar way, even if it meant taking more time and several additional stages. If some of the younger teachers were around, he would ask them for help. He felt they were "quite helpful" (Simon, Interview 1). He had a strong perception that younger teachers were more intuitive with technology:

> *"I think the younger ones, a couple of people in their 20s, are certainly more comfortable with technology. I don't know that they are using it necessarily in significantly different ways than what I might anyways, or necessarily achieving – this is to the extent that I know, I'm not particularly privy to what other people are doing, but to the extent that I am – they are certainly more comfortable in their own personal use. They have come through school and university using it themselves, they are far more intuitive than I and some of my generation are. I suspect this makes them more comfortable with them, and probably more adept at helping kids or assisting kids with precise instructions and directions."*
> *– Simon, Interview 3*

Simon repeatedly questioned how well technology actually assisted student learning, which he referenced in the previous statement. While he generally questioned teaching with technology, he did value the ability to help students navigate through computer-related tasks. In 2007, he felt unable to navigate through software and computers. He felt limited by his perceived inability to support students' technology use in the classroom:

> *"I suppose the last frontier for me might be, would be, to be able to assist them to navigate around programs on the computer. And simply, the intricacies navigating around files. Their expertise far exceeds my own. I would I suppose do this, their capacity to do it... [When I was in your class last time, and they were on the computers doing the career counselling process, you would like to help them navigate through things.] Yeah. I was silent; on pretty thin ice there if there were any questions about moving around. I was not able to help them. Fortunately, they can do those things themselves. A less motivated and less capable group would be quite difficult. To steer them around the inevitable questions, I would not be able to do." – Simon, Interview 2*

In 2007, he felt his computer skills were incrementally improving, and that he was developing a better understanding of how technology worked. He identified several "mundane things" he was able to do at that point, such as moving a document from one file to the next, saving, and using thumb drives. He felt he had more confidence, and was learning from exposure:

> *"…there is a whole lot of mundane things that I have a certain level of confidence now, that I did not have before. So, those mechanical things, I have a greater appreciation of the potential, or perhaps of my own, which is extended, to things that can be done… I don't see it as revolutionary. It's the little things that can be incorporated…I have a greater understanding of what they are doing, trying to do as well. Where I might be able to make suggestions to them, or knowledge." – Simon, Interview 2*

He reinforced this perception in 2008:

> *"… in relatively minor and incremental ways. There are things that I am doing that I wasn't doing last year, that personal use of computers. There are things that I understand to a greater extend… I supposed I have a staple diet of regular things I can do and tend to live relatively comfortably within those. At an incremental rate new ideas and things come forward." – Simon, Interview 3*

Simon identified a desire to help students navigate through the computer and software, but he was not motivated to integrate technology into his curriculum. He did acknowledge how useful technology was in regards to administrative tasks, such as grades and "collating information around the school" (Simon, Interview 1). He saw word processing as the primary use of technology in the English curriculum. He felt other subject areas, such as Science, were more suited for ICT-integration. Throughout the school, he felt other faculties were "doing different things, far beyond mine."

5.2.1.3 Perceptions of school

Simon stated that the English faculty was responsible for teaching students word processing, but he did not explicitly teach it. In addition to teaching word processing, the school expected him

to maintain his marks, reports, and other administrative duties on the computer (Simon, Interview 1). He perceived it was his decision if he wanted to take kids to the computer lab or integrate technology in his curriculum; it was not mandated by the school. He felt 90% of the kids used technology independently of him to complete their assignments, research, and bibliographies (Simon, Interview 3). Therefore, he did not feel it was necessary to explicitly teach word processing.

He felt he had the freedom to implement technology in his teaching however he wished, but he did not perceive the same level of control over his classroom teaching. He used the English faculty's new narrative unit as an example of this limitation. Simon felt the new unit was implemented to "boost School Certificate results," which he felt was essentially a literacy test (Simon, Interview 3). He interpreted the new unit as a "crash course" in writing structure, as previously stated, he did not find the unit particularly innovative:

> *"It certainly in some ways it avoids having to make too many decisions, in a sense. The goals are set and the direction is quite clear. It may, I don't know that they is a lot of spontaneity possible, so it does not worry me greatly because it is one unit. It is just about over; it was a five or six week exercise. It may be something we need to have a look at later and reflect on. At the moment, I am not unhappy about it." – Simon, Interview 3*

Simon kept an open mind about the new unit, even though he wanted to have more "spontaneity" in his teaching. He believed it was easier to wait, and see the students' results, before he passed judgement on the unit. He felt that, "...there are times to cry wolf, and there are times to get your head down and just make it happen" (Simon, Interview 2). He felt "more of the latter" was a good way to operate in the English faculty. His statement, "not unhappy about it [new unit]," illustrated Simon's continuing conflict between the ideal and reality of teaching. He expressed the perception that being idealistic about teaching made the job more difficult, and that it was similar to a person choosing to not be satisfied.

When discussing his level of satisfaction in teaching, Simon mentioned a sense of increasing "administrative scrutiny":

> *"I think there is a degree of scrutiny, certainly administrative scrutiny now, that hasn't existed before. There are certain administrative guidelines that have to be met, I suppose, to improve things individually or across the board. Whether they are or not is a moot point. By and large, I am satisfied. I think if you get to the point where you are not; it can become very difficult task." – Simon, Interview 3*

Simon identified an increasing level of scrutiny over his teaching, specifically in reference to his personal feelings of being unsuccessful. He did not feel his success, or lack of, in certain areas was more pronounced now, or that he felt more frustration than he had in the past. He based his performance assessment on other teachers in the school and conversations with these teachers. Generally, he felt he was doing as well as his peers, but that the school was holding all of them more accountable for student outcomes.

Overall, Simon perceived that the school generally operated well, that and there was good will towards the students and outcomes. He had the sense that teachers and administrators were hard working, highly motivated, and qualified in their fields. Simon perceived the administration placed a high value on technology in the school. He felt they had a strong awareness of technology, it was a priority in the school, and the school was well equipped (Simon, Interview 2); but, that he had the choice to integrate technology into his teaching, it was not mandated.

5.2.1.4 Playfulness and anxiety

Simon felt, in relation to other faculty members, that he was less playful with technology. When in training, he would look around and see people who were quicker and more intuitive when learning new skills:

> *"…there are one or two people like me who are not particularly intuitive. There are some others, particularly younger people who grow up with computers are part of the furniture, some who come along later are far more quicker, they are intuitive, they are not daunted by pressing the wrong button. Intuitively they manoeuvre through programs faster, far more easily." – Simon, Interview 1*

Simon maintained that he did not enjoy learning how to use technology, or "playing" with computers:

> *"[Do you like being able to figure things out for yourself?] Yes, but as much from the viewpoint [computers], that I am not, unlike somebody else I am not getting any sense of satisfaction. I have completed the task. I don't like computers of themselves. I don't find them interesting pieces of equipment to play with; I find them a tool…. They are a modern tool…. I am not overly confident and I'm not intuitive, so I approach things with a degree of reserve…." – Simon, Interview 1*

> *"I notice that some people get quite a thrill mucking about with computers, and joy out of self-discovery, and have absolutely no qualms about "mucking it up." I do have qualms about mucking it up, and if I do press the wrong button, and contrary to advice, can rarely retrieve the situation. I'm not motivated by computers, as a source of joy in themselves. They have some utility value, but I would never get on my computer and play around for amusement. I could never, have never been interested in computer games. I dare say computer games*

> *enhance ones skills. The idea of playing a game on a computer is horrendous. I'd rather be clapped in irons. I don't get an intrinsic trill from playing around with them." – Simon, Interview 2*

In the context of his subject area, Simon placed a very high value on playfulness. He felt playfulness was relevant in teaching and in learning:

> *"Playful does not mean off-task or time-wasting, so I'm very happy to engage kids in conversation and to discuss their stories with them, and to think of ideas, and contribute ideas in response to things they might say. Over the course of a couple minutes − map out a general plot line of a story, where you are essentially feeding off of them, and suggesting which way things might go. I interpret that word in that sort of context, so that feeling that the story is your creation and it can go whichever way you want. You have the playful capacity to take it whichever way you want; you can do this, or stop here and take it in that direction. Most of them respond to that, and I think it's a very constructive thing. I have no problem with that and I have no problem with, some of them had an idea and ran up a brick wall, the idea is run dry and they have started again. That to some extent, you have played with an idea, taken it a certain way, it's not working, fine, you throw it away and start again. That playing around still has, even in a unit that is relatively prescriptive like this one, there is scope for that. I wouldn't want it to be any other way really." – Simon, Interview 3*

When asked if he considered taking the students to the computer lab, to work on story drafts, Simon said he had not considered the option:

> *"No, I haven't. That initial draft is just a jotting down of ideas…I don't know that the computer would have been an asset in that process. Perhaps I am exhibiting my prejudice there. I don't know that they computer would be an assist or an advantage rather than just playing around on a piece of paper." – Simon, Interview 3*

His statement illustrated how he felt students could "play around" on a piece of paper, but not on the computer. Simon did not perceive that computers could facilitate brainstorming; additionally, he did not feel comfortable taking a whole group to the computer lab. He perceived numerous problems related to taking a class to the lab to write:

> *"They are a bit hard to keep on task. I suspect a session on the computer would be a distraction or an opportunity for many of them to wander off and play around. There are dozen or so who would do that. I am not convinced necessarily it is a great leap forward in terms of the final product they might come up with... especially last period. I certainly wouldn't take them down to the computer room in last period. I am not convinced the outcome would be better if I had them in there anyway." – Simon, Interview 3*

He did take a year 11 class to the computer lab to do research, feeling they were better equipped to handle the task than other groups. He had created a structured activity based on websites for the group, and felt it went "reasonably well." At the same time, he felt many of them were off task, going to different websites, and "fiddling around," if he left them for a moment. In the end, he was not sure they benefited from doing the task in class, rather than completing it as homework.

5.2.1.5 Summary: "I'd rather be clapped in irons…"

Generally, Simon was satisfied with his teaching, but that he was not likely to experiment in his teaching. He repeatedly reflected on the concepts the ideal and reality of teaching. He felt it was difficult to resolve the two concepts, particularly in areas where he felt the need to improve student learning. He was not comfortable using technology, and did not derive "joy" from using technology tools. Therefore, he did not feel a great need to use it in the classroom. He thought that he might be a little too comfortable with his teaching, and potentially not making enough of an effort to change and integrate technology. Although, he did make changes in his teaching when necessary, such as using the new English writing unit. While he was unsure of the new unit, he did not complain and was willing to try it. He expressed the perception that it is easier to go along with what happens in a school, rather than create a battle.

5.2.2 Molly

Molly was open and energetic. She got excited about ideas, students, trying new things – almost anything actually. Her speech was layered with hand gestures, punctuated by "you know what I mean" when a concept was presented.

Molly was born in South America; but, she had lived in Australia for most of her adult life. She described herself as a new teacher, but has been at NHS for five years. In addition to a teaching degree, she had a doctorate in Biology. Molly expressed a wish to do a second doctorate in Education, specifically Gifted & Talented studies. At the time of this study, she was teaching in the Science faculty, mostly in the junior school (Years 7-9); she taught science extension courses in the 7^{th} and 9^{th} grades. In 2008, she had a class of year 11 students. She was also the Gifted & Talented coordinator at the school.

The Science faculty room was on the second level of a building wing. Walking from the front office to the faculty room was a twisting journey. It took me several attempts to actually reach it, without a guide - through several halls, the common room, and one and half sets of stairs. The faculty room was rectangular, approximately two and a half meters across and ten meters deep. The walls of the room were rimmed with a continuous counter top, creating teachers'

desks. In addition to the counter top, there were shelves running the length and breadth of the room. All surface areas were covered in paper, laptop, textbooks, portions of unconsumed lunch, and bits of science equipment. The office had a busy and congenial atmosphere. The teachers laughed and joked as they prepared for classes and did other work.

Molly's classroom/lab was up a set of stairs, and down a different walkway, not a direct route. The walkways were difficult to travel, as students aggressively swarmed out of doors in large clumps. Students drifted and pooled outside of classrooms, waiting to be let in for the following period. Flowing into Molly's classroom with the students, I first noticed the warehouse ceiling style, with skylight windows along the top. The room had a wide-open light feeling. The rest of the room had the typical layout of a Science lab (see Appendix K for a floor plan). The centre of the room was filled with two rows of four large tables. The surrounding classroom walls were affixed with taller lab benches, and cupboards underneath. Most of the daily lab supplies were kept locked in a storage area adjoining the classroom. As the students settled into their seats, they snuck peeks at what was on Molly's desk, attempting to find out what they would be doing that day.

5.2.2.1 Her teaching

A dominant theme in Molly's discussion of her teaching was student motivation. She tried to use student-centred techniques in the classroom as often as possible. As the Gifted & Talented Coordinator, she was keenly aware of the benefits of engaging students in learning. One of the very first comments she made, in regard to teaching was, "I always look for new things and using new things to motivate the kids" (Molly, Interview 1). She described herself as a "perfectionist" when it came to teaching and her desire to motivate students:

> *"… I'm always hard with myself that I can do much better. You know, usually the principal or the deputy, or even my head teacher they say, 'No Molly you are doing enough. Stop yourself,' because, mainly, because of the way I want them [students] to learn or to motivate them in the classroom. I am confident I am doing a good job. Sometimes I have classes that I hit the wall, and I come back home crying (laughs). But, it's part of the culture of the society. You have people who respond to your motivation and people who don't care. I feel confident that I am doing a good job and the best that I can." – Molly, Interview 1*

She felt one of the reasons students were not motivated was, "…education has changed, and they [students] are really bored. They are not being challenged, and it generates a vicious cycle" (Molly, Interview 2). She felt students were coming to the classroom with more knowledge than before, and that the curriculum did not address this change. In reaction to this trend, if a

teaching strategy, tool, or experiment would motivate students and help them learn, she was willing to try it – even if other teachers did not think it was a good idea:

> *"Trying something new, that you don't know how other people are going to react to it…I am usually using new techniques in the classroom, or teaching different that other teachers... I enjoy doing more in the classroom." – Molly, Interview 1*

> *"That would be thinking out of the square, that no one did before, or something that is not in the school policy …someone doesn't like what I am doing, and they are like, why are you doing that, it's not in our focus and you are not supposed to be doing that… It could be an experimental thing, or a program, that some people don't want me to do, but I do it anyway. For example, a retention program, that it's not going to be worth it, but I feel it's worth it for the kids." – Molly, Interview 2*

> *"…it's related to the way other people see the way I use it. For example, the lesson you just observed, the type of kids that are in there – usually teachers won't give them the magnets to work. They [other teachers] do demonstrations…I encourage them [students] to be responsible... they can experiment things by themselves…Sometimes it works, like today, and sometimes it doesn't work. It all depends on the level of trust… I can be in trouble with my head teacher, 'Oh, why would you give them the materials?' and things like that." – Molly, Interview 3*

Molly admitted, it was her personal drive and motivation pushing her to use different teaching methods in the classroom; the kids should "…do stuff, not just copy" (Molly, Interview 1). She illustrated this perception through her technology use in the classroom:

> *"…you can challenge kids with questions to make them use the internet in a more challenging way, to work their brain. For me, that could be a key point. If you have straightforward questions, it's easier - cut and paste, cut and paste, that's it. But if you challenge the kids to say, okay, try to answer the question from five web pages, which one is of more value. Which one is more reliable? When we do the research for example, they research how to do the experiment, they get thousands of pages with the experiment, but which one is the best for you?" – Molly, Interview 2*

She felt this method gave students ownership over their learning, while she acted as more of a facilitator (Molly, Interview 3).

5.2.2.2 Computers and technology

Molly was ready to teach with any available technology tool, "Something that is practical to use...computer, data projector, and any device I use with the kids." She felt that if it was practical, it was appropriate to use in her teaching. She had a high level of computer-efficacy, but felt there were tools she did not know how to use yet:

> *"I am good with computers, but if you put in front of me a data logger, I don't know what to do. You know what I mean (laughs). So once I know the technology and I have someone to explain it to me, I will be alright and I can improve it. But, if you put it now at the moment in front of a data logger without a manual, I don't know what to do. But, once I get that worked out I can improve it. That is my sense of the computer." – Molly, Interview 1*

Molly's difficulty using the data logger[38] was a topic she frequently touched up on when discussing technology in teaching. In the 2007 school year, she talked about trying to use the data logger in an experiment:

> *"Well, I think the data logger we are not using much, because we are not well trained…we tried to use it there is something in there that we don't know, we really don't know. At some point something happens, you know, so it's not well set up right. Last year, I worked with it in my lesson (laughs) it was a mess. The graph did not appear in the way we wanted. I said to Mari, we need to sit down all of us and do a workshop, to say, this is the way it is working." – Molly, Interview 2*

Molly's experience with the data logger illustrated her computer-efficacy. But, not being able to use it did not make her question her own computer skills. Rather, she identified it as a place for improvement:

> *"I was thinking to improve it in a way with the data logger. I feel confident that if someone explains it to me properly, I can do it." – Molly, Interview 2*

In the summer break, between the 2007 and 2008 school years, the lab assistant identified the problem with the data logger:

> *"They were not working because the data logger was too old, and the computers were too new. They weren't able to communicate. Some of the logs they didn't work properly. The problem was the talking between the data loggers and the computer was not working. Now we are waiting for the new ones." – Molly, Interview 3*

[38] For more information on data logging, NSW DET suggests http://www.le.ac.uk/education/lto/logging/test.html

Molly was not discouraged by the data logger problem being an equipment issue. Rather, she expressed excitement that the issue would be resolved soon, and she would be able to use the tool in her classroom. She needed to use the data logger to fulfil science curriculum requirements. She viewed it as a teaching priority, because it was in the curriculum.

5.2.2.3 Perceptions of school

In regards to curriculum requirements, science classes were required to teach databases in 7th and 9th grade. Molly did not find teaching databases difficult, but did identify passwords, necessary to access the New South Wales (NSW) Department of Education and Training (DET) portal, as a significant problem:

> *"Well, the difficulty I got is that the kids don't have the right passwords (laughs). Not that the school doesn't have the facilities, it's is a waste of time with the new system we have from the department. It's not a problem for me to set up the task and execute it. Next week is computer week, we do all the database. Do this as homework and then we create the multimedia presentation from it. But the passwords (laughs)… with classes that have a lot of problems with the passwords I have to cancel the computer room because it's a waste of time. I spend more than half of the lesson trying to get all the kids passwords in the computer, and I cannot teach. I cannot give my password to them." – Molly, Interview 1*

She felt the school was dealing with the problem well, but that the problem was with department's system. She felt NSH was "lucky," because they had an information technology (IT) person from the department three days a week in 2007, and that they were going to have a full-time person in 2008. She stated, "...once the classroom is working properly…I don't have any problems at all" (Molly, Interview 1). Although, she did feel the amount of time it took to teach the students Microsoft Access, to create a database, combined with logistical problems, put the class behind schedule.

Molly felt some teachers were "whinging" about teaching computer skills, such as databases or spreadsheets, in the classroom; they wanted computer skills to be separate from other curriculum (Molly, Interview 3). She felt the science department handled the integration well, building the database unit into the curriculum, but she did not have a sense of how other teachers in the school were using technology (Molly, Interview 1). She did not interact with teachers in other faculties unless it was for a direct reason, stating that she is, "…not going to other staff rooms and bothering people if I don't have to…I'm not socializing during the day, because I don't have time" (Molly, Interview 2).

In regards to school leadership, Molly felt supported, particularly in her role as the Gifted & Talented Coordinator. She also felt she was able to go to school leadership for help with classroom management:

> *"Now with me the gifted & talented conference, or a science conference, the school pays for it… classroom management, like last year, I come down and was having trouble… with the computer… or an accident…. They come down because I could not do it. And they go there straight away, even the principal comes to my classroom… for me the school is very supportive." – Molly, Interview 1*

Overall, Molly saw the school community as a very close group, and that the community was different from schools in Sydney. She felt faculty members were very close, that they all lived in the community, and saw each other on the weekends:

> *"…we see each other as professionals and as a person. Of course, there are silly things, we are human. I've never had any problems with any person that… other people, who have had more years of school are having personal problems with another one. When that goes to the professional level, the principal stops it straight away. He does not allow us to bring any personal issues into the school, and I think that is very important. We have the politics, it's like a little town. But we support each other a lot, in our family distresses and things like that. I don't know, we always supporting each other." – Molly, Interview 1*

At the same time, she identified problems in the community. In the previous passage, she alluded to conflicts between staff members and politics. She also identified issues relating to teachers' promotions within the school:

> *"It is a 'boys' club.' We always say, I always tease them, it is a boys' club. The three of them are boys. It is not my situation, but a lot of head teachers who are females, whinge that they are not promoted to higher things because it is a boys' club…It is not what I feel when I have to approach them. So far. Maybe if I get a head teacher position or other position, I might get it." – Molly, Interview 1*

Molly had independently approached the principal about becoming the Gifted & Talented Coordinator. She took the initiative herself, and was supported by the school. As the Gifted & Talented Coordinator, Molly felt that teachers were not challenging higher achieving students:

> *"… I feel frustrated in a way because I am not teaching the top classes which are the ones a lot of people are putting the expectations…It seems to me the teacher who has got those classes and does not challenge them enough. That is really frustrating for me. Tomorrow when I have the meeting with the deputy principal I will explain that. A lot of things need to change for the teaching practices." – Molly, Interview 2*

In early 2008, Molly instructed teachers on how to reshape their teaching, to put learning in the students' hands, especially higher achieving kids:

> *"I am telling them how to reformulate something in a different way. In the beginning it is a lot of work for them, because you have to change your own mind as a teacher, to change your approach to the students…He [principal] wants to increase the level of achievement of the school. He is more focused in the learning of the kids. That is why I did the workshop for the teachers. Some people need to at least for the top classes, to increase the level of achievement. The school is not good enough in the level of the School Certificate and the HSC [The Higher School Certificate]. We need to be at a higher level." – Molly, Interview 3*

She felt it would be difficult for teachers to make these changes in their teaching, particularly Maths and English teachers. She felt these subject areas were more structured, and therefore it would be harder for teachers to "move out of their comfort zones" and make changes.

5.2.2.4 Playfulness and anxiety

Molly expressed a high level of playfulness in her teaching, she enjoyed challenging herself, working out of her comfort zone, and pushing the kids out of their comfort zones:

> *"I am usually using new techniques in the classroom, or teaching different than other teachers. I am always looking for new things and using new things all the time to motivate the kids. I enjoy doing more in the classroom. I am always doing risky experiments when there are more explosions (laughs). It is important to me to take risks in the classroom so you can push the kids' minds up or down to take them out of their comfort zone." – Molly, Interview 1*

> *"… playfulness is related to learning. The more you play with something the more you learn from it. If you enjoy playing with something, the more you learn. So, it comes back to taking risks. I gave them, the kids, magnets, they were touching with the magnets across the room, and they were playing with it. It was that sort of game that teaches them the concept of magnetism. But, in the Gifted & Talented class, that I had this morning, I can give them the magnets, yes, because they were discussing other things for them. So, the play for them was totally different, comparing with the kids who were playing with the use of magnets is much more simple because of their intellect, and learning difficulties." – Molly, Interview 3*

As previously mentioned, she identified two "tricky" areas relating to technology use: data loggers and portal passwords. While she felt both were "challenging," she was confident with the appropriate instructions she would be able "to master" how to use them (Molly, Interview

1). While Molly had a high level of teaching and computer-efficacy, she did perceive some anxiety towards classroom management when using the computer labs:

> *"The problem is when the computers don't work, or the passwords of the kids don't work, and they get frustrated. That is a problem with classroom management… [This year] I think they are much better, because the system was working on it from last year... They showed us how to set things up for the kids in the classroom, if something happens." – Molly, Interview 3*

Molly perceived anxiety in relation to students not learning properly, rather than her own teaching. She felt it was necessary to make changes and experiment with teaching strategies, in an effort to optimize student achievement. She felt the danger of students not learning, out weighted any possible anxiety she might feel as a teacher. She stated, "A lot of teachers don't like that, but you take the risk of doing that, and the kids don't know how to learn" (Molly, Interview 3).

5.2.2.5 Summary: "I am a facilitator…"

Molly expressed a willingness to try any new teaching strategy or tool in the classroom that would facilitate student learning. She had a high level of teaching and computer-efficacy, but did not have the same expectations of other teachers in her school. She saw her role in the classroom as a facilitator, and tried to teach all class levels in this manner. While she was willing to experiment with her teaching, she perceived some anxiety related to classroom management. Her perceived anxiety did not strongly affect her teaching, as she felt the school leadership was able to support her if there were problems.

5.2.3 Elizabeth

When Elizabeth spoke, she vacillated between joking, theorizing, and expounding on varying topics. She had extremely high energy, and strong personal opinions. She was a Special Education (ESE) teacher, so her energy served her well in the classroom. In addition to teaching, she served as the Year 9 class advisor and worked on several school policy revision committees.

At the time of this study, Elizabeth had been teaching at NHS for five years. She felt a good day in class was when no one was "punched." As an ESE teacher, she taught students from 7th to 12th grades who were identified with intellectual disabilities or behavioural issues. She considered herself to be cross-curricular, as she taught multiple subjects which were included in the "Life Skills[39]" curriculum; but, she did not teach science lab. Typically, she had 12-14 students in her

[39] For information on Life Skills, please see http://www.boardofstudies.nsw.edu.au/special_ed/faq_secondary.html#what-is-life-skills

class. Some students were mainstreamed for Music and Physical Education, and additional students came in for Maths or Reading as necessary.

Being cross-curricular, Elizabeth did not have an assigned staff room. She tended to spend time in the English faculty staff room, which was only a few doors down from her classroom. She felt the room was a bit small, but that it was a good group. As she moved about the tight faculty room offering coffee and tea, she felt she was a member of the group.

Unlike most teachers at NHS, she had a dedicated classroom. The classroom was on the lower level of a gangly building wing, intermixed with the English classrooms. The classroom was, for the school layout, centrally located near the library and main school offices. Similar to other classroom, the door was solid green, without a window. Dissimilar to other classrooms, upon entry I was faced with a densely packed room full of desks, books, storage boxes, posters, folders, computers, and a variety of other teaching supplies (see Appendix L for a floor plan). After several classroom visits, it became apparent that the room's contents shifted according to class activities: groups of desks, rows, storage boxes on this wall, or piled behind the teacher desk. Upon entering the room, I was usually faced with four groups of student desks. From the door, the right hand wall extended perpendicularly, and in front of the desks. On this wall, there was a blackboard, not a whiteboard. Above, surrounding, and actually on the board were posters and flyers. Directly on the other side of the desks, the other side of the room, there was a small reading area. The reading area was constructed out of several low benches and a table. To the left of this area, were five desktop computers, huddled in the back corner of the room. Elizabeth theorized the computers had been here longer than she had, and they were old when she got here. Continuing to look around the room, along the far left hand wall, I saw a jumble of boxes and stackable drawers. The in-room storage contained a wide variety of teaching supplies, odds and ends, workbooks, etc. On the other side of the storage was the teacher desk, set perpendicular to the wall, creating a bit of an alcove. Between the teacher desk and the doorway, shelves run along the wall, stuffed with additional teaching materials. Overall, the room was dense and compact, but inviting.

5.2.3.1 Her teaching

Elizabeth had a very high perception of her teaching-efficacy. She felt confident adjusting her teaching practice to accommodate any tool necessary to reach quality-teaching goals (Elizabeth, Interview 2). One of the most commonly repeated themes in Elizabeth's discussions was the desire to present materials in different ways, to accommodate different learning styles. She tried to use student-centred teaching methods, and group work as often as possible:

> *"These days there are a lot of different learning styles in the classroom. Many are mainstreamed, so mainstream classrooms are very Special Ed oriented. With all the different learning styles you have to present your material in all those different ways, so all those different learning styles have a sense of equity to learn what you are presenting… I think the special issues are more exposed in the Special Ed classroom. So you are prepared for that. In the mainstream classroom, they are not exposed and teacher can't train Special Ed, or dividing material for the learning style." – Elizabeth, Interview 1*

One of the strategies Elizabeth adopted, to improve teaching and learning, was to be more organized. She felt organization would allow her to anticipate the different learning style needs in the classroom, as well as manage behavioural issues:

> *"…I did work over the holidays so I could be more organized now. And, leading up to Christmas, I spent a lot of time on organization… we thought ahead to what would be the possibilities and what would be the little naughties in the room. The kids should not have to suffer because other kids are taking up so much of our time. So, I just got booklets together and they can go on with their booklets and still feel challenged, and I can deal with the other ones. That way they are not sitting there idling. That was a main thing, dealing with so many different learning styles in one room, that I needed to foresee all the problems, as many as I could see. Other than, I have given them booklets, to make them feel they had something to do in the common room while they were cooking. I didn't collect them back, and they took them home and have lost them. I didn't foresee that one; the crystal ball didn't tell me that one would happen."*
> *– Elizabeth, Interview 3*

In addition to being more organized, Elizabeth had transferred the responsibility of teaching Science labs to another teacher. She did not feel confident teaching science, and felt a Science teacher would serve the students better:

> *"And, they will have a Science teacher next year, because I can't teach in a lab, so they will have theory work and food chain, which I got wrong anyway. I had some critter eating something else, when it was the other way around. I'm just no good at science. They have a proper science teacher next year, which allows them to have four periods a week in a science lab, which is wonderful."*
> *– Elizabeth, Interview 2*

As illustrated in the previous statement, Elizabeth was aware of limitations in her teaching, and was able to identify when she needed to seek assistance. In addition to science labs, she identified several content areas she needed to emphasize in the 2008 school year, in preparation for the School Certificate exam. One of the areas she wanted to focus on more was

technology integration. She felt being more organized would help her use technology better and more efficiently in the classroom (Elizabeth, Interview 2).

One of the challenges in Elizabeth's classroom was behavioural issues. Many of her students were dealing with social or emotional issues, which often manifested violently in the classroom. In the beginning of the 2008 school year she received several 7th grade boys with known histories of violence:

> *"We are just being told they are naughty – but, define naughty. We are trying to put them in situations that will push their buttons, to see how they will react, in a supporting environment so we can know. Because, often I have to let the whole staff know. The staff needs to know when they let the kid into their classroom, what is possible, and the things you should do in a situation, if anything occurs. So, I need to give them tips. And, I need to know myself, so I've got to really push these kids, trigger them early, to have them respond to certain situations." – Elizabeth, Interview 3*

While Elizabeth felt confident handling these students, she expressed the sentiment that they would "challenge the lovely little thing happening this year. They are going to unstable my boat" (Elizabeth, Interview 2). She perceived her classroom as a supportive and "lovely" environment, where she could experiment with kids and teaching. As previously stated, Elizabeth had been improving her classroom organization in preparation for the new students.

5.2.3.2 Computers and technology

One of the organizational strategies Elizabeth adopted was to make all of her computer lab bookings in advance, hoping she would not "fly by the seat of my pants" when it came time to use technology in class (Elizabeth, Interview 3). She made all of her computer lab reservations for the 2008 school year, at the end of 2007. She made a specific goal of increasing the amount of time her students used technology in a week. Early in 2008, her class was in the computer lab three times a week.

She said, as a group, they call it "Computer," and it has been very successful. She created a long-term task in which students used internet research to create a worksheet for other students. She tried to make the task as open-ended as possible:

> *"The older kids, went full into it, they thought it was amazing. The task was, they had to find one website, and they had to decide 10 questions, giving instructions of how to find the answers, but not giving the answers. They were designing an assignment for their classmates. Which they have to mark [it] themselves, so they must know the answers, and it must be comprehensive. The instruction*

sheet they give they have to use Publisher, Word, that sort of thing." – Elizabeth, Interview 3

Technology was one of the primary avenues Elizabeth identified to support different learning styles:

"… we are visual learners in here, kids are visual learners in Special Ed... Anything that is visual or technology based format, adds to the curriculum, it's wonderful. The outcomes double are double and the curriculum comes a lot faster, and stays there a lot longer... Where they lack in other areas, in technology they are very good." – Elizabeth, Interview 1

"… presenting something in a PowerPoint to the kids, that could be more easily understood. A topic would be more easily understood and visual. Teachers don't use PowerPoint and projectors and screen, it's just not going to get done, teachers will just stand at the front of the room and just talk... and use textbooks and just talk, or a DVD." – Elizabeth, Interview 2

Elizabeth felt technology added variety to content delivery and kept kids interested. She used the technology, such as: literacy games, DVDs, PowerPoint creation, AlphaSmarts[40], and internet research, just to name a few, to keep students' attention and better serve their varying needs.

Even though she used technology frequently, Elizabeth felt there was much more to learn. Being very open to new tools and change, she identified several technology-related personal learning goals. She wanted to learn how to use the "do-dads," "fancy-shmancy buttons," short cuts in Microsoft Word and Excel, and to learn how to use Microsoft Publisher (Elizabeth, Interview 3):

"My knowledge comes from the mistakes I have made. I do not know Publisher, and everyone is telling me, this would be better done in Publisher. I don't know it. I am trying to learn it. I am trying to do a couple little notes and things like that for year 9. We are doing a couple of things through Publisher, because we are going to set up a class newsletter to go home to parents in Publisher. I have to learn it. I do everything in Word. That's it, and I don't even do that well (laughs)." – Elizabeth, Interview 3

Elizabeth expressed a desire to learn new technology skills, but also conceded needing strong motivation to persist if problems arose when using technology. If she felt a skill or tool took too much time to learn, she would become frustrated or quickly lose interest. In 2007, if the technology did not work quickly, she would abandon use:

[40] http://www.alphasmart.com/index.html

> *"I'll try it, figure out if I can use it. If I don't need it, it's a time waster. If I can't figure it out, and someone won't show me very fast. I see it as a time waster and get on to doing something else. Delivering the material in a different format."*
> *– Elizabeth, Interview 1*

It is important to note, that Elizabeth's high-perceived value of technology pushed her to work through technology problems in the classroom. She would often work through problems with the students. She noted that the same problems happen repeatedly, such as the DVD player not working, which she typically has the kids fix. She said that she would lose motivation if she felt the time to problem solve was not worth the benefit. But, through the process of this study, she began to reconsider how she learns to use technology:

> *"…this whole process has made me start to think and analyse how I do things with technology and as far as being prepared, accepting when I can't do something, maybe seeking out a course, or help prior to using technology. It has made me plan ahead. The whole process has put me into a process of analysing what I do." – Elizabeth, Interview 2*

She expressed the perception that she could look for a solution or assistance when she had difficulty with technology tools, rather than immediately abandoning a tool when it took time to figure out. Elizabeth felt this study gave her time to reflect on her technology use, which she would not have done otherwise.

5.2.3.3 Perceptions of school

Elizabeth had a mixed perception of NHS. On one hand, she felt faculty members were supportive and positive, "people are happy to say hello" (Elizabeth, Interview 1). At the same time, she did not feel as though school leadership was properly supporting the teachers. Personally, she felt that responsibilities beyond the classroom were limiting her time to plan, or reflect on, her teaching. She expressed the concern that school responsibilities were beginning to affect her teaching:

> *"Because of my year advisor role, and, um, the front office – I don't think they communicate very effectively with each other. They are constantly pulling me out of my class. I've just accepted I get pulled out of my class. I told them I had a phone call at 8:30am. They called me out at 8:27am to come over to speak to a parent. I say I can't. Well, she is very upset. Well, you need to get a deputy. There are no deputies; I need you to come here now. You know that type of thing. I can't even prioritize." – Elizabeth, Interview 2*

Being pulled out of class was not the only problem Elizabeth perceived in the school administration. Throughout the study, she spoke of a faculty bully whom she felt administrators had allowed to victimize faculty members:

> *"There are a couple of bullies, which I've never seen before. They have really put some staff out. The administration has not dealt with it well. I have never seen bullies in a school before. It does not affect me, except the people it has nearly broken them. The support for those people who were nearly broken, was amazing." – Elizabeth, Interview 1*

Elizabeth claimed part of the bully's problem was a lack of life experience. She felt that teachers with life experience, beyond teaching, were less likely to be caught up in "school yard things" (Elizabeth, Interview 2). In 2007, Elizabeth perceived faculty moral to be very low, in result of weak administrative support when dealing with the bully. At the end of the 2007 school year, Elizabeth said that many teachers did not attending the principal's retirement dinner in "silent protest":

> *"He [principal] has come back and said, there is nothing warranted to go on… She just continues… A lot of teachers in the staff are very, very unhappy, which then transfers across to the amount of work they would do for their students. In preparation of lessons, for School Certificate kids, for HSC kids, it transfers to every part of a person's life I guess. …so they are not doing anything for the retirement dinner, and that he is going away." – Elizabeth, Interview 2*

Additionally, in 2007, Elizabeth perceived school issues relating to promotions and decision-making were also affecting faculty moral:

> *"It's a political game… there are teachers who do speak up and make suggestions to leadership, and they accept when they get passed over[j]…They feel like they can't win anyway… there are lots of opportunities for promotion and learning, oh there is lots of that. But, also it's only the chosen ones." – Elizabeth, Interview 1*

In 2008, the principal was replaced by the deputy principal. Elizabeth felt this was good for school moral. She had been working with the deputy in 2007 to redesign several school policies, specifically the Discipline Policy. She felt many teachers were "unhappy that repeat offenders [students] continue to get off lightly." Through the redesign process, she felt the deputy took faculty input into consideration. She felt that this type of leadership strategy would help unite the faculty as a group:

> *"…the deputy who wants the new job has been working closely with four of us to write a new policy, taking into consideration what our staff members are saying,*

> *and the input they are giving. That would be the biggest, if we could get a new policy together on it, and we were united. That would change the culture of the school incredibly." – Elizabeth, Interview 2*

She was excited to work on the new policies, and felt other faculty members were as well:

> *"Yeah, a new start. Let's do something new. Everything is getting looked at; all the old policies are getting looked at. Even all the old, the old suspension booklet that kids take home with them. They are all getting a revamp with the new discipline policy. Everything and everyone is putting their hand up to do something in the revamp." – Elizabeth, Interview 3*

Elizabeth felt motivated by the potential for school change, and the opportunity to reinvigorate the faculty. At the same time, she felt limited by the amount of time she had to spend on administrative tasks, such as speaking to parents or working on new policies. She felt more time management strategies were needed to control how much of her time was taken out of the classroom.

5.2.3.4 Playfulness and anxiety

Elizabeth spoke about playfulness and anxiety in terms of being motivated; the two states co-existed within her teaching and technology use. When she was feeling motivated to do different activities and experiment, she would try anything. If she found something difficult, she would not take the time to play with it:

> *"… I feel confident that I'll somehow sort it out. Or, I'll manipulate the system so I don't have to use it. It's not working, not doing what I wanted…Motivation is the key, its keeps you going… I'll try it, figure out if I can use it. If I don't need it, it's a time waster. If I can't figure it out, and someone won't show me very fast. I see it as a time waster and get on to doing something else. Delivering the material in a different format…If it is something that is going to help me professionally in the future, then I will make time, but something that is just there for a short period of time, not going to use again, just something that needs to be done that isn't that important to me professionally, I won't give it any time." – Elizabeth, Interview 1*

Much of Elizabeth's motivation to "figure out" technology relates to her perceived later use. The technology has to align with what she felt was necessary, or she would "manipulate the system" to avoid using it. She admitted not having much patience with technology, and she "just wants it to work" (Elizabeth, Interview 1).

When teaching, Elizabeth was concerned about technology not working, and how it disrupted her classroom. She felt this was an especially relevant concern in the Special Education classroom:

> *"Not prepared and not able to teach the content effectively. If you are using a new technology and you are not familiar with it, anything could go wrong. Maybe you've been through some troubleshooting. But, not being able to transfer the information….especially in Special Ed. You need to be very well prepared." – Elizabeth, Interview 1*

She illustrated this concern through a specific classroom situation. In this incident, the class was in the computer lab at attempting to use a game. Elizabeth perceived the computers in this lab were not "up to scratch":

> *"…a couple sounds and it [computer] didn't work. I had to find the sheet, with the complaints and the problems on, no sheet in the room, I had to run and grab one. It's only a 53 minute lesson. It took me 15 minutes out of a 53 minute lesson. Meanwhile, the boys in the class who were able to access, and the machine was running well, they had already finished and got bored. They were waiting, and we got bored." – Elizabeth, Interview 1*

When problems arose in the classroom, Elizabeth was often quick to act. When she did not feel comfortable with her own troubleshooting skills, she readily sought resources which could solve the problem. For example, in the previous excerpt, she first consulted the troubleshooting sheets; then, she sought assistance in a faculty room, and the technology office (Elizabeth, Observation 1).

While Elizabeth felt some anxiety about technology, she had a playful perception of teaching and learning, for students and herself:

> *"…delivering instruction in a very down-to-earth student level, happy place and environment. That is what comes to my sotted mind…I can't learn if it's not – for instance when I did the Intel, oh my god, I thought I was going to pass away. It was, use the menu now. The delivery, the way the instruction was delivered, ugh – please, give me valium. I couldn't learn unless there was a little bit more excitement to it, a little pizzazz. There was no pizzazz, so I switched off. So, I'm doing all my Intel learning now through the manual, because I didn't really take that much in. I had one of my ADD attacks." – Elizabeth, Interview 3*

When teaching with technology, she was comfortable with students exploring and playing. For example, when the DVD player did not work, she let the kids fix it. She also gave students free reign when conducting internet research:

> *"The older kids who have been with me for a while, love to do stuff like that [internet research], so they were fine. The younger kids – UGH – they can't get to this website. They wanted boobs, and bombs, and guns (laughs). The older kids know whites block, so they choose racing cars – other things of interest, other than boobs, bombs, and guns (laughs)… They are meant to do their own research for their homework each week… We talk about if anyone had problems finding anything…and I'm learning as well. And, we are learning go to the 20th suggestion on Google, not the 1st or the 2nd, the 20th and see what is there… They are like, that's crap and we have to go back to the 1st or the 2nd. They are really interacting with each other, a lot more talking. If they are having trouble, you'll see some of the kids that are a bit more savvy with technology, popping up to help. So, it's helping me, because the kids are like, I've done this before. They are popping up to help the others. They are developing the social skills, in the context of the class as well..." – Elizabeth, Interview 3*

Elizabeth felt some anxiety when giving students open ended tasks. One of the biggest problems she identified was students finishing at different times, thus creating "down time." One particular class period she felt was poorly planned. Several students with behavioural issues were left unattended without work at the end of class, which caused Elizabeth anxiety. The students had the potential to become violent if they were not working, which would disrupt the entire class. Elizabeth had set this task to experiment, and "see what they [students] would do." She determined that tasks couldn't be left to open.

5.2.3.5 Summary: "Change is good…"

Numerous times throughout the study Elizabeth stated, "change is good." She felt experimentation and playfulness were essential for learning, particularly when addressing different learning styles. The potential to improve teaching and learning motivated her teaching. When using technology, she was willing to experiment and try different tools or software; but, if she became frustrated, she had little patience and was not motivated to troubleshoot. While she may not have been willing to troubleshoot technology herself, she was more than willing to let the students experiment and come up with a solution, such as fixing the DVD player. Overall, she promoted an exploratory learning environment, supported by technology, which she felt was a "right" of her students. She placed a high value on using technology in the classroom, and integrated the tools into her experimental student-centred teaching style. As a cross-curricular teacher, she familiarized herself with the inner workings of the school, "in a lot of peoples' faces." She perceived the school moral had been low, and was working to help improve policies and school culture. This motivation extended into her desire to improve the school community.

5.2.4 Judith

Talking to Judith, she had a slightly reserved demeanour. She had a tendency to wink "knowingly" as she spoke, implying subtext she was unwilling to verbalize. She had been teaching Maths since 1976, but not continuously. She taught full-time for six years; then, like many women, she left her career to raise a family. While her children were growing up, she intermittently worked as a casual teacher. In 2002, she went back to teaching full-time. At the time of this study, she was looking toward retirement in a few years. At NHS, she taught a range of Maths classes, from one of the lowest level Grade 8 classes to Grade 12 Extension Maths.

Judith taught all of her classes in the same room, which was on the second level of a spidery building wing. The room was located at a T-intersection between two exterior hallways. When students crossed between classes, it was difficult to reach the door and enter the room. Similar to a freeway, if a person was not in the correct lane, it would be impossible to exit to the off ramp – in this case the classroom doorway. Entering the room, I was presented with very little (see Appendix M for a floor plan). The room had a standard layout. At the front of the room was a whiteboard, running the length of the wall. Six rows of five student desks faced the whiteboard. The desks were varyingly in pairs or single rows, depending upon how many students had forgotten their textbooks that day. To the left of the entry way, against the wall and before the whiteboard, was a bookcase. The shelves had a disorganized combination of extra textbooks of varying levels, and papers. Across from the doorway, on the other side of the whiteboard, was the teacher's desk. The teacher's desk had a few extra textbooks and a woven basket of papers.

The most noticeable element of the classroom was the incredible quantity of graffiti on the walls, all at desk height. The room was coated in doodles, notes, names, and scaring floating 1.5 meters from the floor. Upon examination, a person would notice many of the markings are from the mid-90s (e.g., Lisa was here in '94). During the classes, students continued to add to the community of markings as Judith taught.

5.2.4.1 Her teaching

Judith had not changed her teaching style since 1976. She believed that the way she taught was the "most effective way to teach Maths," especially for higher achieving students (Judith, Interview 1). She generally had a high level of satisfaction with her teaching:

> *"I get a lot of satisfaction out of teaching the type of students that want to learn…they [observed class] are really poorly behaved and unmotivated class. Some are coming up. I taught them something. The rest are wasting their time being here." – Judith, Interview 1*

Her classes generally followed a teacher-centred format, followed by individual seatwork. She would start the class with examples on the board. Students completed the examples; she then led the class through each solution. She would then teach the group a new concept, followed by additional individual practice examples from the book or on the board (Judith, Observation 1).

Judith felt the Maths curriculum was fairly rigid, and there was little flexibility. She felt this was a characteristic of the content and a result of curriculum pacing:

> *"It is fairly regimented. We have common tests, so we have a list of topics. For example, in year 9 we have a list of topics we teach them and everyone is basically doing the same test around the same time. When we do the half-year reports we need a set of common tests all those classes have done so we can then compare them. So no, there is not much flexibility in what we teach and the order we teach. But that is normal, to be workable." – Judith, Interview 1*

At the same time, Judith did not feel constrained by a paced curriculum, and perceived it to be appropriate for Maths:

> *"Other subjects have quite a bit more leeway in what they can teach. In English, they can choose their books, and divert to some other area that comes up through that book. In Maths, I don't think you can do that. With a top class, if I have time, I can extend them through other work, but we still have to get through the basic work first." – Judith, Interview 3*

When asked to consider other teaching practices she might like to implement, to improve her teaching, she stated, "Well, to be honest, it's been a long time since I have thought of this. It's just not something I have considered, in the 30 years I have been teaching (laughs)" (Judith, Interview 1). Judith identified her biggest problem in teaching was motivating top students. She felt many of her top students, who want to learn, did not have the work ethic to continue to do well:

> *"The biggest problem here is to motivate the kids who want to learn, like my top year 9 class. I've got some kids that are really good. They have reasonably good marks; they have natural ability, and cannot do a lot of work at home and not study for tests. With their natural ability they do well. That will all change in year 10 when we start doing harder stuff, and they realize they aren't getting the marks they were getting." – Judith, Interview 2*

She felt some students' attitudes would change over time, and they would continue do well, but many would not want to put in the effort. She perceived students felt "it's not cool to be top of the class," and succumbed to the peer pressure (Judith, Interview 2). She felt this phenomenon was most likely to occur in the general level classes, rather than top classes. As previously

illustrated, Judith preferred to teach students who wanted to learn. In her lower classes, she had several students whom she perceived did not want to be in class:

> *"…they weren't doing anything, they were a nuisance. Sometimes if you put a bit of pressure on them, they will leave. That's what you try to do. You try to get rid of the ones that aren't going to do anything. Sometimes it works, and sometimes it doesn't." – Judith, Interview 2*

In one observed class, Judith kicked out three students for being disruptive and throwing objects. An additional five students, whom were not kicked out, disrupted the remainder of the lesson. In frustration, she said to the class, "…some would like to learn, and should not be distracted by the idiots that don't" (Judith, Observation 1). The deputy principal checked in on one class three times, in the course of 50 minutes. Judith said he routinely checks in on this class, because of the known behavioural problems.

5.2.4.2 Computers and technology

Generally, Judith did not use technology in her personal or professional work. She repeatedly expressed difficulty seeing the real value of integrating technology into the classroom, particularly when teaching time was so limited (Judith, Interview 3). Apart from her own personal values, when Judith came back to full-time teaching in 2003, she felt expectations to use technology in the school were much higher than in previous years:

> *"…when I was casual teaching, technology came into schools, we had to start doing reports on the computers, and access information. Before it would be in a book or something like that. So when I go on again here, five years ago, all of a sudden I had to master basic computer skills." – Judith, Interview 1*

To help teachers meet these expectations, NHS offered short sessions to help teachers learn how to use technology tools. Judith found these sessions difficult to follow. She felt it was because she did not feel competent at the start. When she did the Intel course, she was lost at the very start. She felt everyone was starting ahead of her, and she immediately fell behind.

Judith was willing to use the computer for tasks required by the school, such as discipline reporting or grades. If she was going to try to use the computer, she liked to have someone there to help if problems arose:

> *"You get on the computer to try and do something and some message will come up that is totally meaningless to me. I have to find somebody who can interpret what it means and what to do. Quite often it means, if I am the only one in the staff room and I'm wanting to do something on the computer I get so far and*

something happens and I have to abandon it until someone can come and help." – Judith, Interview 1

She did not feel confident using technology, but in 2008, she felt her skills were gradually improving. She identified feeling more confident completing task such as reporting and referrals:

"Oh, definitely. In the past years… You don't do reports as a casual teacher. It was not really until I got here that I had to get a few basics really, so I could carry out tasks, like doing reports on the computer and doing referrals, and doing the spreadsheet in year 10." – Judith, Interview 2

In Year 10 Maths, teaching spreadsheets was required. Judith did not feel comfortable teaching spreadsheets or taking students to the computer lab. In 2007, the head Maths teacher took several of Judith's classes to teach spreadsheets:

"Um, I didn't take them. The head teacher had them for one lesson a week, and he took them (laughs). He had trouble. That class was just not interested in it… The biggest problem that I had with it actually, was the lack of time I had to sit down and come to terms with it. That is why I'm not all that comfortable. It's fine if things go to plan and the computers work. If there is something wrong with the computers, or something you can't get out of it, I don't have the tools to cope with that." – Judith, Interview 2

She felt more comfortable teaching spreadsheets in 2008, but still expressed the sentiment, "It's not something I look forward to" (Judith, Interview 3), and was hoping to not have to teach the spreadsheet unit. As expressed in the previous statement, Judith felt, with an appropriate amount of time she would be able to teach spreadsheets, but she did not feel she had this time. Additionally, she perceived problems related to trouble-shooting technology if the equipment did not work properly. Finally, she mentioned student motivation as a limiting factor. She perceived students in her lower classes simply weren't that interested in going to the computer lab, and they were difficult to manage. Further, in addition to time and student motivation, Judith did not feel using technology benefited Maths curriculum:

"…I don't use any other technology tool in the classroom. I work off of the whiteboard, the textbook, overheads. I don't use PowerPoint's, stuff like that. I can see the relevance, but the risk of impending failure… the amount of time you would spend doing something like that is not in proportion to the volume. I am sure there are other reasons (laughs)." – Judith, Interview 1

"… well in Maths there…a bank of multiple choice questions that kids can work through at their own pace. But, I don't see the value in that, as opposed to them

> *actually sitting down and actually doing the problems themselves. When they do the questions, they have to have pen and paper anyway, and do the calculations on the calculator. Otherwise, it just becomes an exercise in seeing if your answers are correct. I just don't see the value. From what I've seen of that kind of thing is that kids just tend to guess any answer. The better kids will have a go at it, but I think there is no real value in it, apart from the fact that they are actually sitting at a computer. I don't see that as a better way of learning than working at their desk." – Judith, Interview 2*

In the previous excerpts, Judith mentioned not using technology, but that students used calculators. She did not categorize calculators as "technology":

> *"… that is just a normal part of the class. I don't have any concerns [with calculators], while taking the class to the computers is a very different thing. I have been using a calculator myself from my first year at uni. I have been using them since they first came into the HSC. My first year of uni was 1970. It something I am very familiar with and the only hassles you get are when you are trying to teach a class that has different models of calculators. Then you have got to show different people how to do things on their calculators." – Judith, Interview 2*

Judith felt scientific calculators were just part of teaching, and that they were something she had used for her whole career. While she was very comfortable using scientific calculators, she wanted students to have basic numeracy skills. She felt many of her Year 8 classes had trouble "working out fractions, because they don't know their times tables" (Judith, Interview 3). She attributed this problem to the primary schools, possibly allowing students to use calculators too early.

5.2.4.3 Perceptions of school

Judith freely shared her perceptions of school culture and leadership. One of her primary concerns at the school was the School Certificate process:

> *"I'm not happy about how the School Certificate is run, but that is out of my control. I think many teachers are upset about how the certificate operates…They scaled it up so everyone passes. It's totally stupid…The lowest student in 10-6 which is considerably lower than the 10-4 it used to be, got 53% or 54%. In reality, that kid probably got 10%. That is what they do. They have been doing it for years and years. It's a lie… to make it look like everyone is doing well." – Judith, Interview 3*

When a student was in danger of not completing a course, due to unfinished work, the teachers sent out a warning letter. If student had outstanding warning letters, they were not supposed to receive their School Certificate or HSC:

> *"Oh, I don't know. You sometimes feel as though you are bashing your head against a brick wall (laughs). I know we have warning letters handed out with the morning attendance about putting in more effort for the School Certificate. One boy I had in my 10-4, I think he got 15 warning letters sent to him, some of it was for work he had not completed in Term 1. He handed that in about a week and half after the School Certificate had been set, and he got a School Certificate. So, I mean a lot of us – I've talked to a few other members of the staff, not just Maths people – a lot of them are very disillusioned, thinking we are wasting our time putting all this effort into sending out these letters, when they don't achieve anything. It's up to the principal if a student gets the School Certificate or not, and he makes decisions a lot of the staff are not happy with." – Judith, Interview 2*

Judith stated that students only needed to "attempt" 50% of the course work to receive a School Certificate; she felt the "whole system was ridiculous," (Judith, Interview 2). From her perspective, many other teachers felt the same way and were upset with the system. Teachers were doing all of the work and sending out the warning letters; but, felt it was all pointless if the student received the School Certificate regardless of their work. According to Judith, teachers felt, "in the end it's for nothing" (Judith, Interview 2).

As a result of this situation, Judith stated teachers were feeling unsupported and unmotivated. She thought some teachers had stopped sending out warning letters:

> *"There are some teachers that don't. In the Maths, I know, there are a couple of teachers who never send warning letters. I don't think it's because their kids do all of the work, they just don't…They probably just can't be bothered, that sort of impacts on the rest of us. I know, in that awful year 10 I had last year. I sent out a few to one of the boys, and he ended up being move down into a lower class. And, when he got moved down that class, I'm sure he was not doing anymore than he was in my class, but no more warning letters were sent out. So, from the parents' point of view, they think, this teacher is doing a much better job with my son than Ms. Price was, because I'm not getting warning letters... It's not consistent." – Judith, Interview 3*

The principal retired at the end of 2007. In the beginning of 2008, Judith could not tell if the new principal, the former deputy, was going to change the process. She felt it was possible that the new principal was supportive and would change the warning letter system. In the previous year, the old principal had overturned the deputy's decision regarding warning letters. She felt the deputy had not been happy about this, and could be motivated to make changes in 2008 (Judith, Interview 2).

While she was hopeful the process would improve, changes had not been communicated to the faculty. Overall, she felt issues were typically not discussed with the staff as a whole. This perception was consistent with her perception of how School Certificates were allocated:

> *"I don't want to say the principal makes most of the decisions without consultation with the staff. There is consultation at a staff meeting, it is a bit of a token gesture, decisions are made regardless of the overall feeling." – Judith, Interview 1*

While she felt the staff as a whole did not discuss issues, she did feel the interaction and support within her own faculty was "very good." Overall, she felt the faculty was "good to work with" and she "enjoyed coming to school" (Judith, Interview 1).

5.2.4.4 Playfulness and anxiety

Judith was clear about her perceived anxiety when using technology in the classroom; she saw technology as a risk of failure and instruction time:

> *"Yeah, anything out of the ordinary, beyond the basic. I've sat down and worked through all of the spreadsheets on the computer in the staff room, but yeah, if they get into some area and they can't do the basic steps. I would feel quite stressed. Anxiety." – Judith, Interview 1*

> *"Um, no I pretty much stick to the same teaching style. There are different computer packages that I am aware [of]… different packages that we can show kids different graphs. They can type it in and the computer will graph it for them…If there was more time in the course, maybe I would do something like that, but there isn't. It's tough to get through the course as is, so I don't see the time taken up by that as being a benefit." – Judith, Interview 3*

She spoke repeatedly about time limits in teaching, feeling there was never enough time to cover the necessary curriculum:

> *"… there is more pressure to use computer skills and integrate technology. There is not that much time in the school day. We have small sessions where someone is showing us, but it's so rushed, if you don't feel competent to start with it's difficult to keep up." – Judith, Interview 1*

> *"…we don't really have the time available to do different interests. We have a program, we have the end of each topic, everyone has to do the test on it, and we get our final marks. There really is not much choice..." – Judith, Interview 3*

In the previous statements, Judith spoke of pressures related to using technology in the classroom: a) not having time to learn new skills and fulfil expectations, and b) the limits of trying new techniques in the classroom within a pacing schedule. Judith felt she was spending

enough extra time teaching the extension courses, and was not willing to spend more time learning additional technology tools. Further, she did not feel motivated to learn new technology skills:

> *"Um... yeah I'm not into it. It just doesn't interest me. There are so many things I'd rather do than be on the computer… You really need an extended period of time [to learn new skills]. That one lesson, you know you start on something, then you have to go to class. You need someone there for assistance… I only see myself teaching for a few more years. I'll learn what I have to learn, but apart from that I'm not really all that motivated." – Judith, Interview 1*

In addition to not feeling confident using technology, Judith perceived a low personal motivation, she did not necessarily feel Maths curriculum was, or needed to be, "playful":

> *"I can't think of anything…… the only thing I could think of is, my year 9 class I did probability a while ago. I debated whether to do a lesson on practical probability, getting them to toss a coin or dice, to do a lesson that. I think classes can get really rowdy when doing that. You only need one or two kids that get silly tossing a coin, and really makes for disaster. I didn't do that practical lesson." – Judith, Interview 1*

> *"In Maths, it would be practical activity, like probability. Get kids in to groups and toss a dice, record how many times numbers come up, a 2, a 3, or a 4, and try to work out patterns from them. [Do you feel they could have an element of playfulness in just doing Math?] Um, no... I think I just feel Maths is different to practical subjects like science, where they can do lots of different experiments and engage the kids that way... There is more pressure on the top classes to get results, than the lower ones, to get through the amount of work." – Judith, Interview 3*

Judith did not feel comfortable using technology, and she did not feel playfulness was necessary in Maths, but she seemed to feel differently about scientific calculators. As previously illustrated, Judith felt very comfortable using scientific calculators. She had used them for her whole teaching career. She felt comfortable using unfamiliar calculator models, and just "figuring it out":

> *"When we do statistics, the newer model calculator that have just come out are totally different to the ones most kids have got. So, we had to sort of learn how to use the newer models for statistical calculations. But, that is not a problem because it's something I have used all of my teaching career, where computers are a different matter (laughs)… if necessary you have to ask the kids, it's one you have not seen before, to bring in the instruction book. You can usually figure out what to do from that [manual], or trial and error before you get the combination of operations." – Judith, Interview 2*

Judith did feel some anxiety regarding scientific calculators. She expressed concerns regarding the school having Maths teachers begin using calculators in Year 7. She felt kids were already losing basic numeracy skills, and this change would continue the trend (Judith, Interview 3). Further, she felt this would not support the department's (NSW DET) goal of improving students' numeracy without a calculator.

5.2.4.5 Summary: "…I just can't see the benefit of it."

The strongest theme in Judith's teaching was the perception that she did not need to change her practice, which had been the same for 30 years. In regards to technology, Judith was able to identify the relevance of technology in teaching, but did not feel it had a high value in Maths. She expressed the feeling, if she had more time in the year, to cover the required curriculum, she might be willing to try different teaching activities. At the same time, she felt tools, such as graphing programs, were not worthwhile, as they did not teach students to graph. She felt other teachers in her faculty were supportive when she did use technology for administrative tasks, helping her in the staff room when necessary. She perceived the staff to be supportive and congenial as a whole, but did not feel the same about the school's leadership. She felt the principal made his own decisions, and did not consider staff input. She believed that many staff members felt the same way.

5.3 Conclusions

Eight teachers, from two schools were presented in the previous discussion. Each teacher had a unique perception of his or her personal experience in relation to the four indicators. In Chapter 4, teachers' indicator responses alluded to a complex relationship between teaching and computer-efficacy in the context of risk-taking and ICT-integration. The qualitative data has shown the same patterning. For example, teachers such as Kelly and Kerry were willing to use technology, but did not feel confident in their technological skill level. They perceived value in using technology, but felt the risk of reduced classroom control was too high. Danielle and Molly were very confident using technology in the classroom, and perceived almost no risk when integrating technology tools into their teaching.

Results from this chapter begin to suggest that there is a relationship between teachers' preferred method of teaching and their risk perceptions. It would seem logical that teachers who were more inclined to use student-centred methods would perceive fewer risks associated with integrating ICT into their teaching, as using student-centred teaching methods have the potential to be risky. Several of the teachers expressed similar anxieties when using group work, student-centred methods, or integrating technology. Kerry, Kelly, Judith, and Simon all discussed

feeling that certain groups of students were more difficult to control in group projects, or when they were using computers.

The next chapter presents an analysis of teachers' individual risk perceptions related to teaching and technology integration, in relation to their risk-taking potential, based on their RTPS scores. Teachers are grouped as more risk-taking behaviours (MRB) or less risk-taking taking behaviours (LRB), independent of their school affiliations. Chapter 6 will consider the relationship between teacher's individual perceived teaching and technology risks in greater depth, as well their individual perceptions of school culture.

6 Individual risk perceptions of ICT integration

This chapter presents teachers' risk perceptions in the context of ICT integration and teaching. The discussion brings the Phase 1 and 2 data sets together, aligning teachers' indicator scores in relation to interview responses and observations. The resulting patterns of beliefs and values form a picture of teachers' risk perceptions and risk-taking behaviours in relation to ICT-related change. Through analysis of teachers 'risk perceptions and behaviours, an idea of their potential to take risks and make changes in their teaching can be developed.

Based on responses to the Phase 1 questionnaire, four of the participants: Kelly, Kerry, Simon, and Judith were classified as less risk-taking (LRB) teachers. The other four teachers: Beau, Danielle, Molly, and Elizabeth were identified as more risk-taking behaviour (MRB; see Section 4.3). In the following chapter, teachers from the two schools are grouped according to their risk-taking potential, not their school.

Phase 1 data, presented in Chapter 4, established teachers' initial perceptions of their teaching and computer-efficacies, playfulness & anxiety, as well as school culture. In Chapter 5, teachers' stories constructed from interviews and observations illustrate the depth and complexity of experiences teaching and using technology, and values and beliefs relative to the four indicators. Findings from the two research phases are combined in this chapter. Teachers' risk-taking potential scores (RTPS) scores are discussed along with the case study data in three areas: individual (primary), classroom (secondary), and school culture (tertiary). These three areas have been conceptualized as the *spheres of control*. Within the spheres of control, risks associated with technology integration were primarily related to how technology supported teachers' notions of effective and quality teaching (primary), loss of time and classroom control (secondary), and meeting cultural expectations (tertiary). Teachers' judged and evaluated risks from all three areas in relation to overall student achievement.

6.1 Spheres of control introduced

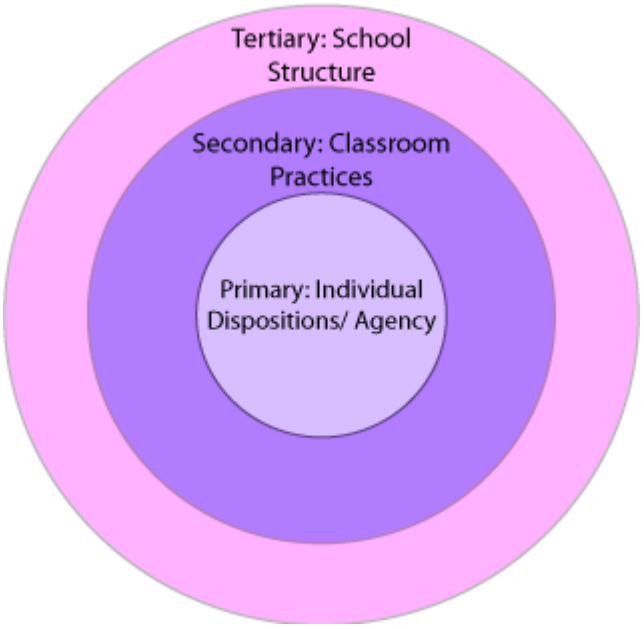
Participants' Phase 1 and 2 data results were conceptualized into three areas of risk perception based on results from constant comparison coding: individual (primary), classroom (secondary), and school culture (tertiary) spheres of control. *Spheres of control* provide a way to understand and conceptualize teachers' risk perceptions, giving structure to teachers' perceived risks and risk-taking behaviours. The spheres, and risk perceptions associated with the spheres, are not

intended to be rigidly categorized. The spheres build upon each other; therefore, conceptual overlap between the areas would be expected.

To conceptualize *spheres*, the discussion employs Giddens' theory of structuration, specifically the concept of *duality of structure*. The duality of structure (see Section 2.3.3) presented *agency* and *structure* as the two main forces in the change and development of groups and societies (Morrison, 2005). In this discussion, teachers' perceptions of efficacy (agency) are mainly addressed in the primary sphere. The tertiary sphere considers teachers' perceptions of school culture (structure). The second sphere is the intersection between agency and structure. In this sphere, teachers' values and beliefs associated with agency and structure can be viewed through their teaching practice and technologies used – the choices made by individuals. In the second sphere, teachers' risk-taking behaviours and risk perceptions can be assessed to create an understanding of the relationship between agency and structure in context of ICT-integration and teacher change. In Chapter 7, intersections between the primary and tertiary spheres will be further analyzed through Giddens' idea of reflexivity, and Douglas' (1992) grid-group typology from cultural theory.

Figure 6.1

Spheres of control in the context of ICT-integration



The relativity of objects to an individual refers to the level of control they are able to exert within the immediate sphere. The concept of *control* is derived from risk society theory. In modernity, it is assumed that individuals have control over their interactions and environment, as well as human responsibility (Giddens, 1990, 1991a; Lupton, 1999, p. 4). The term *object*

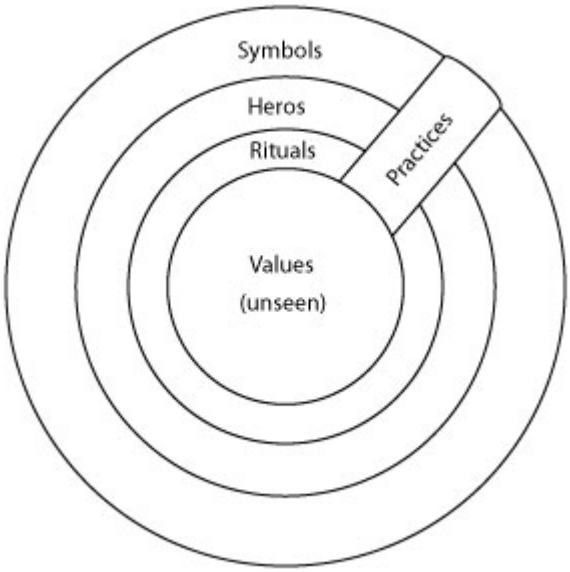
refers to an element upon which a person can exert control, such as their teaching or tools they use within this space. In this discussion, individuals are considered to have the maximum amount of control over their own actions and perceptions, which can be interpreted as their level of agency. For example, when a teacher integrates technology into their teaching practice, the primary sphere of control encompasses the teacher's individual perceptions of teaching and technology. The second sphere is the act of teaching and their risk-taking behaviours. The second sphere could include how technology is integrated in the classroom and the student response. The tertiary sphere represents how the action is situated in the wider culture/structure. An example of an action situated in the school culture could be a teacher using a Maths software program chosen by the school.

Perceptions are rooted in individuals' social knowledge, past experiences, and values. Therefore, to a certain extent each teacher will view teaching, technology, and school culture differently. By the nature of individuals being teachers and having similar general experiences in that role, they will have a common disposition. At the same time, teachers often fulfil different roles within a school, which will affect how they perceive situations and actions. For example, Molly is a Science teacher and the Gifted & Talented Coordinator. Kelly is a Reading teacher, a grade-level team leader, and a member of the school Advisory Board. Teachers perform each of these roles as part of their "day-to-day life," in addition to their roles outside of the school. The risks individuals may associate with each of their roles are defined through the choices and practices associated with that role.

Prior research has defined *risk* as "the possibility of unwanted events" which would affect what individuals value, while *perceived risk* is the judgement and evaluation of hazards individuals might be exposed to (Rohrmann & Renn, 2000, p. 14). Risks are perceived when an individual feels an outcome may be undesirable, threatening a value. According to Hofstede (2001, p. 10), values are invisible until they become visible in behaviour; and, culture is visible through a combination of values and behaviours.

Figure 6.2

The "Onion Diagram"



Note. From Hofstede, G. (2001). *Culture's consequences: Comparing values, behaviors, institutions, and organizations across nations* (2nd ed.). Thousand Oaks: Sage Publications.

The following discussion will present teachers' perceived risks in each of the three spheres.

6.2 Individual perceptions (primary sphere)

In the context of spheres of control, individuals' perceptions are considered within the primary sphere. Therefore, teachers' perceptions of their teaching and computer-efficacy would be considered *closest* to them. The discussion considers the "self" in terms of self-regulation and self-efficacy. The concept of self-efficacy is rooted in the notion of self-monitoring, how an individual perceives their performance in a given situation (Bandura, 1991). Individuals' perceptions of efficacy are contextual and task specific, therefore this study examines both teaching and computer-efficacy (Compeau & Higgins, 1995). It is important to note that perceptions of efficacy do not establish identity, but can give insight into beliefs and values. People do not care for activities that have little or no significance to them, and that are perceived to be devalued (Bandura, 1991, p. 255). They will base self-performance evaluations upon activities which are determined to be relevant. Therefore, by determining what teachers base their sense of efficacy upon, individual values can be extracted.

In Phase 1, the teaching-efficacy (TE) and computer-efficacy (CE) indicators gathered data relative to the primary sphere. As previously outlined, TE and CE were examined separately to

isolate their affects individually, and then together. The Phase 2 teachers all expressed positive perceptions of their teaching-efficacy (*M* = 4.29, *SD* = .41), which was consistent with the wider sample (*M* = 4.06, *SD* = .52; *Min* = 2.67, *Max* = 5.00). Phase 2 participants showed a wider range of responses regarding their computer-efficacy (*M* = 3.45, *SD* = 1.08; *Min* = 2.00, *Max* = 4.60). These findings were consistent with prior studies examining TE and CE together, in that CE showed more predictive strength (e.g., Mueller et al., 2008).

6.2.1 Teaching

People perceive risks when they judge or evaluate that they could be exposed to hazards. The concept of "hazards" could include any number of results from actions that could be judged as satisfactory or unsatisfactory. Judgement of satisfactory or unsatisfactory results would be based upon what individuals value. In the context of teaching, teachers will gauge a risk worth taking, based upon their perception of how it will affect the quality of their teaching, and subsequently student learning. The concept of *quality teaching* is often subjective and contextually specific. What a Maths teacher considers to be of high quality may not be the same as an English teacher. Additionally, quality teaching does not necessarily directly relate to technology integration.

This discussion will operate on the basic value premise, "high student achievement is important." Research has demonstrated that teachers derive self-worth and measure efficacy through students' achievement (Darby, 2008; Hargreaves, 1998). Therefore, in terms of risk perception, high student achievement could be considered a value of teaching. This conception was best illustrated in an excerpt from Simon's (TE *M* = 3.67) discussion of job satisfaction, in the second interview:

> *"I get quality work out of kids; kids are coming up and showing me good stuff. I suppose, there is that constant between and ideal and reality. I don't know that I have ever reconciled that, or many teachers do, you constantly look at the deficiencies or the kids that didn't get their work done or didn't respond or didn't improve. It's easy to lose sight of some of the success stories. I don't know if it's a job where you ever are completely satisfied. There are times when you wrestle with the intangibles. You think something has gone well, and the results don't necessarily bear that out. Other times you are looking at a good set of results, and haven't thought the class has gone well, or the unit has gone well, or whatever." – Simon, Interview 2*

In the previous statement, Simon discussed his satisfaction with teaching and the difficulty of judging successful teaching. His TE scores showed a positive perception of his teaching-efficacy

and was consistent with the Phase 1 sample (*M* = 4.06, *SD* = .52). Overall, Phase 2 participants showed a positive perception of their teaching-efficacy, as seen in Table 6.1.

Table 6.1

LRB & MRB teachers' TE descriptive statistics

		Mean	SE	SD	Minimum	Maximum
TE	LRB	4.04	.14	.28	3.67	4.33
	MRB	4.54	.20	.39	4.00	4.83

In terms of *desired* and *desirable*, if an individual finds a value desirable, they will express agreement. Simon's interview excerpt shows agreement with the notion that good student results are part of job satisfaction; therefore working towards student achievement is a value. The other Phase 2 teachers reiterated this value throughout the interviews. Danielle had a very high TE score (TE *M* = 4.83), yet expressed similar frustrations. She felt discouraged by her students' performance on state-level testing, even though she felt generally satisfied with her teaching and did not generally agree with the testing process. In her third interview, she stated:

> *"...I'm like, aw what am I doing?! What can I possibly do to change or help them, or to perform better… I do put it on me, on what can I do. I have to find some way..." – Danielle, Interview 3*

These types of statements reinforced the notion that student achievement was desirable. In this study, this value was consistent between the MRB and LRB teachers. Although, this does not imply that they all perceived the goal of student achievement in the same way. In terms of value judgements, variance between teachers' beliefs about student achievement and teaching-efficacy could be connected to different perceptions of quality teaching.

The MRB teachers: Elizabeth, Molly, Danielle, and Beau all discuss teaching in terms of accommodating different learning styles and enriching students' experiences. These teachers frequently expressed a willingness to adjust their teaching if it would improve their teaching. Indicator means showed the MRB teachers as having relatively high TE scores (TE *M* = 4.54, *Min* = 4.00, *Max* = 4.83). The LRB teachers' TE responses were lower (TE *M*= 4.04, *Min* = 4.00, *Max* = 4.33). Independent t-tests showed that the difference was not statistically significant, $t(6) = 2.06$, $p = .085$. Simon, Kelly, Judith, and Kerry discussed teaching goals in terms of grade-level expectations and test scores. While the LRB teachers were not resistant to adjusting their teaching to support student learning, they tended to feel they were already achieving good results in their classes; therefore, they did not often feel it was necessary to change.

The previous generalizations do not intend to imply LRB teachers are not willing to change, or that MRB teachers are constantly seeking to change. As excerpts from Danielle and Judith's interviews show, when teachers consider using technology to improve student achievement, they have different conceptions of what encompassed student success (i.e., test scores vs. student experience):

> *"…there is different packages that we can show kids different graphs…I really can't see the benefit of that, when in an exam they have to write a graph and analyze… I don't see the time taken up by that as being a benefit. – Judith, Interview 3*

> *"…I would like to implement anything that is going to work to help these kids learn. If someone came up with a new something and said, this is the best thing ever, I'd say, okay let me try it. All the help I can get." – Danielle, Interview 1*

Judith mentions technology use and student achievement in relation to "an exam," while Danielle focuses on the desire to help her students learn better. Judith's priority is the outcome of student achievement on the exam, and she does not feel technology supports this goal. Danielle is concerned with the students' experience learning, and is willing to try new teaching strategies to improve students' experiences.

Each teacher chooses a method of instruction that will fulfil their conception of quality teaching to reach their desired goal; this choice will be partially based upon their own teaching values and beliefs. In the context of technology integration, two sets of values will influence teachers' decisions: teaching and technology. Teachers would need to value technology, and feel it supported student achievement, to include it in their teaching practice.

6.2.2 Technology

Teachers' perceptions of technology were measured on two indicators, CE and Play&Anx. Correlation tests did not show a linear relationship between teaching and computer-efficacy ($p > .05$). Table 6.2 shows that, LRB teachers, as a group, were neutral regarding their level of playfulness & anxiety, but that they had low computer-efficacy.

The CE mean score between LRB and MRB teachers were statistically significantly different, $t(6) = -8.76$, $p < .001$. Further independent-samples t-tests showed that LRB and MRB teachers were statistically significantly different on all items within the CE measure. The Play&Anx indicator also showed statistically significantly differences between the LRB and MRB sets, $t(6) = -3.67$, $p < .05$. The two groups did not show statistically significant differences on any of the Play items,

but MRB indicator means were consistently more positive. The CE and Play&Anx indicators showed a strong relationship in the full sample (N = 91, r = .541, p < .001).

Table 6.2

LRB & MRB teachers' CE and Play&Anx descriptive statistics

		Mean	SE	SD	Minimum	Maximum
CE	LRB	2.48	.17	.34	2.00	2.80
	MRB	4.43	.14	.29	4.00	4.60
Play&Anx	LRB	2.97	.23	.47	2.51	3.52
	MRB	3.96	.13	.32	3.62	4.27

Independent-samples t-tests revealed significant differences between LRB and MRB teachers in four of the nine Anx items: V2.2.10, "I look forward to using a computer for work," $t(6) = 4.89$, $p < .05$; V2.2.11, "The challenge of learning about computers is exciting," $t(6) = -3.00$, $p < .05$; V2.2.14, "I feel apprehensive about using computers," $t(6) = 5.89$, $p < .001$; and, V2.2.15, "It scares me to think that I could make mistakes I cannot correct by hitting the wrong key," $t(6) = 7.20$, $p < .001$. These responses imply that LRB teachers were less likely to have positive feelings toward using computers in the future. Interview responses showed that LRB teachers anticipated anxiety when considering technology use:

> *"[Are you apprehensive or anxious about using the new technology?] Well, yeah, because I'm not real good at things like that (laughs)." – Kelly, Interview 3*

> *"…I sit down in front of my computer… I'm immediately – I'm immediately - frustrated... I come to the computer with - this is going to be difficult..." – Kerry, Interview 1*

> *"… I'm not all that comfortable… If there is something wrong with the computers, or something you can't get out of it, I don't have the tools to cope with that." – Judith, Interview 3*

> *"I am computer Luddite. I can perform repetitive tasks I am familiar with, but like Pavlov's dogs if I am made to feel uncomfortable." – Simon, Interview 1*

The previous four statements showed LRB teachers' generally low perception of their computer-efficacy. The teachers frequently used words such as "frustrated" and "uncomfortable" when speaking about technology. Prior research has shown that avoiding loss of control is a common human value (Darby, 2008). When loss of control was anticipated, teachers perceived that they would feel anxiety due to their lack of knowledge or problem solving ability with technology.

The previous statements do not necessarily mean that LRB teachers do not value technology, they simply were not confident using it.

Consistent with higher CE and Play&Anx scores, MRB teachers were more likely to discuss technology in terms of being able to "figure it out":

> *"…I am usually pretty good at figuring stuff out and being able to move around on the computer and email… I can do what I need to do. …" − Danielle, Interview 3*
>
> *"I am a hands on person… I am pretty good about looking and figuring it out." – Beau, Interview 1*
>
> *"… I am good with computers… once I know the technology and I have someone to explain it to me I will be alright and I can improve it…" – Molly, Interview 1*
>
> *"[Do you feel confident when learning new things and using technology?] Yeah… I feel confident that I'll somehow sort it out… I'll try it" – Elizabeth, Interview 1*

In contrast to LRB teachers, MRB teachers did not perceive anxiety when anticipating potential problems. They all expressed the ability to work through issues. The teachers perceived that their ability to work though technology issues significantly minimized the potential loss of control and frustration, thus reducing the possibility of technology-related anxiety.

Research has often identified high personal technology use as an indicator of high-perceived value of technology (e.g., Becker, 1994; Riel & Becker, 2000). In this sample, the MRB teachers all used technology in their personal lives. They frequently emailed outside of work and spent free time researching on the internet. Three of the LRB teachers did not use technology outside of school. They perceived similar frustrations in using email and the internet for home and work use. Two interview excerpts illustrate the difference between MRB and LRB teachers' personal technology use: Molly stated she used the internet and emails "all the time" (CE *M* = 4.60), while Kelly "just doesn't take the time at home" to use email (CE *M* = 2.00).

Kerry, a LRB teacher, did use technology in her personal life (CE *M* = 2.60). She took digital pictures as a hobby. But, she was nervous to transfer the files from her camera to the computer, and she had her husband transfer the files for her. In her first interview, she expressed fear of transferring files from her camera to the computer, that she would lose them. This trend is consistent with Kerry's low Play&Anx indicator score (*M* = 2.51). A year later, Kerry stated that she had made the conscious decision to learn how to transfer files on her own. She was tired of always asking for help. She had adopted a new personal value, that she would be able to

complete tasks on her own. As outlined in Chapter 2, Section 2.3.2, Kerry became empowered to learn and has decided to reskill. This shift in values will be addressed further in Chapter 8.

6.2.3 Teaching with technology

As risk perceptions are context specific, it is possible to identify combinations of values that will affect risk-taking behaviours in certain settings. In the context of technology integration in teaching, teachers will consider their teaching related values first and then consider technology. The most commonly identified risks associated with technology in the classroom were "loss of time," "loss of classroom control," and "decreased student achievement." Teachers enter into a complicated cost-benefit calculation estimating the relative value of technology in teaching and the perceived risks. In this sample, LRB teachers felt these risks could be avoided by using methods they trusted. Observation showed that typically LRB teachers were using teacher-centred methods in the classroom, and did not integrate technology into their curriculum. MRB teachers were more likely to use a combination of student and teacher-centred methods, as well as group work in their teaching. They were also more likely to integrate technology into the curriculum.

Interview responses showed that LRB teachers were aware of how they could integrate technology into their teaching, but they did not feel it was necessary. They perceived that traditional teaching methods were effective. Therefore, there was little incentive for LRB teachers to change their practice and integrate technology into their teaching. MRB teachers expressed openness to any teaching practice that would improve student learning. Predictably, teachers' computer-efficacy strongly affected how they felt about using technology in the classroom.

Depending on a teacher's personal belief system, technology could support their conception of quality teaching. MRB teachers' interview responses showed they often felt students needed to receive content through multiple delivery channels, which they often felt could be supported through technology:

> *"I think teachers need to stop teaching with chalk and board all the time. They need to put the learning in the hands of the kids… There are a lot of kids in this school where it could be more beneficial to have a different approach, teach the same thing, but in a different context. Just give the kids ownership of their learning." – Molly, Interview 3*

> *"I can lecture and talk, and the kids can copy down. They are not only hearing it, they are seeing it." – Beau, Interview 3*

> *"With all the different learning styles you have to present your material in all those different ways, so all those different learning styles have a sense of equity to learn what you are presenting… anything that is visual or technology based format, adds to the curriculum, it's wonderful." – Elizabeth, Interview 1*

> *"...we do a lot of different things, implementing different things all the time – we don't even work from the same textbook all the time...They are always bugging me to do stuff with the Smartboard, playing with the Smartboard, doing something with it. I think it's all great stuff that helps them see the content in different ways." – Danielle, Interview 3*

The MRB teachers expressed similar conceptions about teaching with technology, and expressed being satisfied with their teaching, at the time of the study. Conversely, LRB teachers tended to talk about teaching with technology in more limited terms. They did not tend to discuss different learning styles or improving students' learning experience:

> *"It's practice, they have to have that, technology is not going to help. Its silent reading or independent working that you can do there… Then, all readings you need to read out loud, the story, and then have them read to each other. It works better, I've found." – Kelly, Interview 2*

> *"…I don't know that they computer would have been an asset in that process. Perhaps I am exhibiting my prejudice there. I don't know that the computer would be an asset or an advantage rather than just playing around on a piece of paper." – Simon, Interview 3*

> *"There are good programs that might be used, but are they going to get much benefit out spending a lesson on that? They don't get much benefit having a lesson on that, and then it's a lot more work." – Judith, Interview 1*

> *"You need to structure the search project, everybody has to do the same thing. If you let them loose nothing gets accomplished." – Kerry, Interview 3*

The two sets of teachers had different conceptions of integrating technology into the curriculum. Excerpts from the Phase 2 interviews illustrate very different teaching perspectives and approaches between the MRB and LRB teachers. MRB teachers saw technology as supporting different learning styles and as a classroom tool that could give students more control over their own learning. LRB teachers felt that traditional methods and tightly structured tasks were better. How perceptions of teaching and computer-efficacy manifest in their classroom practices will be discussed further in the secondary sphere of control section.

6.2.4 Value-based risk perception

The primary sphere of control considers risks related to individuals' perceptions of teaching and computer-efficacy. As previously stated, individuals will base their perceptions of efficacy on tasks that are relevant and valued in the school culture. Patterns in this sample showed that LRB and MRB teachers all valued general student achievement, but they perceived student achievement differently. MRB teachers were motivated to address different learning styles and give students ownership of their learning, while LRB teachers were more concerned with addressing curriculum and preparing students for standardized testing. This finding is consistent with Bandura's (1991) theories in which it is argued that individuals with a higher sense of efficacy would be more intrinsically motivated, while individuals with a lower sense of efficacy would be more motivated by external expectations.

Teachers' perceptions of student achievement were linked to their notions of quality teaching. All of the Phase 2 teachers perceived a relatively high level of teacher-efficacy, as illustrated in the questionnaire responses (TE *Min* = 3.67, *Max* = 4.83). While teachers identified varying theories of effective teaching, they all worked toward high student achievement in some form. All of the teachers expressed the belief that technology was worth the time and risk, if it improved student achievement. MRB teachers were likely to experiment with technology tools in the classroom, to see if they improved student learning. Interestingly, while LRB teachers expressed the belief that technology had some value in teaching, they often spoke of the time cost related to using technology in the classroom and that it was worth the effort. The LRB teachers were able to identify their lack of computer-efficacy and experience as a strong influence on this perception.

LRB teachers identified more risks related to technology, primarily due to their lack of perceived technology problem-solving ability. The LRB teachers did not feel they had the ability to troubleshoot in the classroom, or when performing computer-related tasks, and therefore anticipated trouble when using technology. This notion was evident in the questionnaire results, as well as interview excerpts; LRB teachers anticipated problems when considering technology use. MRB teachers indicated higher levels of playfulness and computer-efficacy. They felt able to "figure out" any technology-related problems, and therefore did not perceive risks related to technology use.

Ultimately, teachers' risk perceptions related to their personal sense of control and professional competence in the context of ICT-related educational change. LRB teachers experienced anxiety if they were unsure of their ability to control student achievement, hence they were not

motivated to change their teaching methods and integrate technology. If they could not control student achievement, they could not be sure of students' performance in courses or on standardized tests. MRB teachers were not as concerned with controlling their teaching to ensure results; they were more willing to experiment with new techniques if students' learning could be improved. This differentiation is important as teachers will base their professional competence, their level of teaching-efficacy, and satisfaction with teaching on perceptions of student performance.

Within the primary sphere, the combination of teaching and computer-efficacy presents two fluctuating influences upon teachers' potential to take risks, and integrate technology into the classroom. Reviewing the Phase 2 teachers' efficacy scores, TE scores were quite similar showing that they all had positive perceptions of their teaching-efficacy. But, interview excerpts showed that MRB and LRB teachers had quite different ideas regarding quality teaching and student achievement. MRB and LRB teachers also showed considerable differences on their CE scores, as well as their perceptions of using technology in the classroom. LRB teachers did not feel confident using technology and did not feel it necessarily supported their notion of quality teaching. Differences between MRB and LRB teachers are an important consideration when evaluating teachers' perceived risks in technology integration at the secondary (classroom) level.

It has been established that MRB and LRB teachers perceive similar risks associated with technology-integration, but the risks are not perceived to have the same costs. MRB teachers were more likely to believe that risks associated with technology-integration, such as loss of classroom control, would be outweighed by the benefit of improved student experience and learning.

The second sphere considers teachers' individual risk perceptions related to ICT-integration in conjunction with classroom variables.

6.3 The classroom and students (secondary sphere)

In this discussion, the *classroom* is considered a constructed space, in which the teacher and students are agents; each has a role and an understood relationship. Considering the hierarchical nature of the classroom, teachers are in a position of power. Students will typically identify the teacher as a superior in the classroom hierarchy. Hofsteed (2001) discusses power distance, hierarchy, in the classroom relative to teaching methods. Teacher-centred classrooms would have a larger power distance between teacher and student. Typically, this type of

classroom would have relatively strict order and teachers would transmit knowledge to students. In classrooms with less power distance, teachers and students would operate on a more equal level. These classrooms would typically be more student-centred, students would be expected to take initiative in their learning, quality of learning is determined by the "excellence of the student" (p. 101).

In the teacher-centred classroom, teachers are usually more concerned with maintaining power distance in the classroom and maintaining control. When events occur which threaten this structure they would perceive risks. Teachers minimized risks in the classroom through *choosing* the teaching method they felt best supported their notion of quality teaching. In both schools, MRB and LRB teachers identified being able to decide how they teach their respective curricula and that they were able to manage their classrooms as they wished. Generally, the teachers expressed the perception that they had control over their classrooms. Danielle illustrates this point, in reference to other teachers' schools:

> *"I know at some schools they have to be on a certain page, and say a certain thing at a certain time and hour. We definitely don't have that. We have standards we have to do, and administration and school board; it is left up to us how we do things in our classroom. There is not constantly someone looming over my head saying are you doing this, are you doing this?" – Danielle, Interview 1*

She felt EMS left her to address the curriculum as she felt was necessary in the classroom. The NHS teachers felt similarly, but the NSW curriculum was closer to a pacing schedule. The NHS teachers did not need to be, as Danielle stated, "on a certain page," but they conducted unit testing at approximately the same time. Judith expressed the view that it was important for classes to take tests at the same time, so the faculty could use common tests. She felt this limited flexibility, but that it was appropriate for Maths. She also felt, if she "needed to come up with something different," it would not be a problem (Judith, Interview 1).

This discussion posits that the act of teaching is the juncture of individual teaching values and perceived cultural expectations. Conceptualizing teaching in this structure could help explain what research frequently identifies as the link between beliefs and practice (e.g., Calderhead, 1996; Ertmer, 2005). If teaching is considered reflexively, the interaction between individual agency and the structure of school culture could help explain why teachers make different instructional choices in the classroom. While a teacher may feel highly efficacious, there could be numerous perceived risks related to cultural expectations, such as classroom control, limiting how they are able to teach.

As previously outlined, perceived risks related to ICT-integration were contextual to the constructed space of the classroom, and therefore distinguished from larger school culture influences beyond the classroom. The primary sphere encompassed teachers' perceived risks, based upon their values – if technology supported teachers' notions of effective and quality teaching. School culture influences, such as curricular requirements and support from school leadership, are explored later in the discussion. In the context of the second sphere, the classroom, two particularly influential perceived risks in ICT-integration were: loss of time and classroom control.

6.3.1 Time

All of the teachers identified "time" as a risk related to technology integration in the classroom. Time was discussed in two forms: preparation time to teach with technology, and class time to teach content. Depending on teachers' level of computer-efficacy, they saw potential lost time as more or less of a possibility.

The MRB teachers were less likely to identify lost instruction time as a significant potential risk related to technology integration. This was primarily a function of higher computer-efficacy, which includes their perceived ability to solve technology related problems in the classroom. LRB teachers did not feel they had the same capabilities, and frequently anticipated time lost due to technical problems. Judith illustrated this perception in her second interview:

> *"Another thing that turns me off, when something goes wrong and the computer is not working and they can't access [password issues]. Unless there is another teacher to call on for support, I wouldn't be able to sort out the problem. That's why I don't take the class to the computer room..." – Judith, Interview 2*

In the previous statement, Judith clearly anticipated problems with the computers. Her perceived worth of technology integration was reduced by anticipated lower student achievement, which she felt would be due to lost instruction time. Generally, perceived low computer-efficacy had a strong influence on LRB teachers' willingness to use technology. Additionally, LRB teachers did not place a high value on technology in the classroom. These two factors would limit teachers' willingness to voluntarily integrate technology into the curriculum, as they would believe the end-result of technology integration to be loss of instruction time.

MRB teachers perceived similar risks, but the risks did not have as large an impact on their choice in the classroom. Elizabeth had a high perception of her computer-efficacy (CE M = 4.30), and made similar cost-benefit assessments of technology use. In her first interview, she expressed the view:

> *"I'll try it, figure out if I can use it. If I don't need it, it's a time waster. If I can't figure it out, and someone won't show me very fast. I see it as a time waster and get on to doing something else, delivering the material in a different format." − Elizabeth Interview 1*

The main difference in the two statements was the approach to using technology in the classroom, which was consistent with their discussion regarding computer-efficacy. While Judith anticipated problems with technology which would risk instruction time, Elizabeth was willing to "try it out" and then make a judgment.

A second risk perceived, relative to time, was the teachers' available preparation time to appropriately use technology in the classroom. Both sets of teachers spoke to this issue, but their perceptions manifested differently. LRB teachers would perceive a lack of preparation time, and not use technology at all. MRB teachers would perceive limited preparation time, but would prepare as much as they were able, and still try to integrate technology. Beau illustrates this pattern in his third interview:

> *"…He [another teacher] creates his own PowerPoint slide shows...I would love to, love to. I just right now, I don't have time to create slide show presentations. You know, I kind of use the standard, what the book publisher sends." − Beau, Interview 3*

Beau, like many teachers, felt he did not have enough preparation time, particularly to create original PowerPoint presentations for his class. Instead, he used the publisher's presentation slides included with the textbook. He felt the publisher's presentations fulfilled the purpose of enriching the students' learning, and fulfilled his immediate needs. Beau's goal was to create his own slides, or have the students create slides. Danielle presented a similar desire and perceived limitation:

> *"…it is time consuming to be able to use it on a regular basis. To be able to find new and different things to be implementing all the time, and researching what sort of things are available to use for the lesson I am teaching, and subject, and grade level. But, it is definitely getting better the more I use it." − Danielle, Interview 3*

In the previous excerpt, Danielle was talking about using the Smartboard in her teaching. She valued using it in the classroom, and its capacity to support her students' learning needs. She expressed a desire to have the time to find new and different tools for the classroom. At the time of this interview, Danielle was using the Smartboard once a week for each subject. Her goal was to use it three times a week for each subject. Due to Danielle's high levels of teacher and

computer-efficacy, she did not perceive loss of instruction time as a risk when integrating technology into the classroom; her priority was supporting and enriching students' learning.

In contrast, when considering planning to integrate technology into their teaching LRB teachers perceived a larger time demand than MRB teachers. If LRB teachers planned to use technology in the classroom, they had to consider their ability to use the tool, then how it would manifest in a classroom situation. MRB teachers did not typically consider this step in the planning process. Kelly expressed the desire to use technology, if she had help:

> *"…there are a lot of times - integrating programs we use and stuff I have trouble navigating through some things. I don't navigate well through different programs, things like that. There is, you put your name on a waiting list to get someone to help you… I have been unable to use them…basically, and I don't have the time…" – Kelly, Interview 1*

The previous statement was consistent with her CE indicator responses (TE *M* = 2.00). Her CE item responses showed she "could not" use new technology tools without assistance, if she had not used it before. When she was using new tools, she contacted IT support for help. The time involved for her to figure out how to use technology tools, such as reading programs which came with the textbook, was not available in her day. She felt, if she wanted to learn how to use the textbook resources, she would need to do it over the summer, when she had time. Kerry reiterated Kelly's sentiment. She felt the workload, grading and school priorities, limited how much time people had available in the day.

All of the Phase 2 teachers felt integrating technology into their teaching was left to their discretion; neither school had explicit expectations for technology integration. Having this level of autonomy allowed teachers to prioritize their actions, depending on their individual values. Teachers were able to control risks associated with lost instruction time and limited preparation time, through their choice to integrate technology or not. A second, less controllable, risk identified through analysis was students' reactions to technology integration and behaviour.

6.3.2 Affective response to the "class"

Teachers tended to speak about students in terms of "classes," as units. This grouping would be a natural function of the classroom hierarchy, and role of the individual students as a group receiving instruction. Teachers felt that classrooms took on the attitude of strong student personalities, and would sway a class of thirty students from "good" to "bad" behaviour. This assessment was not limited to students using technology, but was how teachers generally saw classes.

For example, Kerry explained, one of the Career Education classes was a "challenging" group. Kerry explained that when planning to teach this class, she would "plan for the worst" (Kerry, Interview 3). Together, the computer teacher and she had planned the class to be very structured to limit distractions and maximize their ability to supervise the students. The school had made efforts to schedule students in different classes during the day, to limit how much they "feed off of each other." Kerry felt that using technology presented more of an opportunity for the students to be off-task.

When technology was being used in the class, the teachers' perceived teaching and computer-efficacy levels compounded anticipated anxiety related to classroom control and students being off-task, as they affected quality of learning. LRB and MRB teachers' all expressed affective class perceptions relative to students' ability to stay on task. Teachers perceived students would become off task for several reasons, such as behavioural problems, intellectual ability, ability to work together, and interest in using technology. The overarching perceived risk related to this belief was the possible loss of classroom control – loss of classroom control threatened student learning.

6.3.2.1 Experimenting

In Elizabeth's second class observation, she had difficulty with the DVD player. She planned to show the class a DVD on sharks, in the library. But, the DVD player and TV were not set up when the class arrived. She said this happens all the time. She could not get the DVD player to work, and decided to have the kids help her figure it out. It took approximately five minutes to get the DVD to play. Her willingness to problem-solve in the class was consistent with her willingness to integrate technology into her teaching. After the class, Elizabeth stated, "…a class with behavioural issues would not be able to sit through the process, it would be a big problem, but this class is fine" (Elizabeth, Observation 2). Elizabeth saying "it would be a big problem" meant she would lose control of the class.

Elizabeth was willing to experiment with her teaching, even if she anticipated a possible loss of classroom control. Having a high level of teaching-efficacy (TE M = 4.83), Elizabeth felt confident she would be able to control the class if problems arose with technology. Specifically, Elizabeth was willing to experiment with their reactions to new technology-based lessons. For example, in the second interview, Elizabeth mentioned she was getting three students in the following year with behavioural problems:

> *"I am getting three big behaviour kids in my class next year, in year 7, so I need to be ultra on top of things. I think they are going to challenge the lovely little thing happening this year. They are going to unstable my boat (laughs)."*
> *– Elizabeth, Interview 2*

In the third interview, she described testing an unstructured internet research task on the group, including the three new students. She felt the task was unsuccessful, due to students finishing at different times and the resulting problems from downtime. She did not have alternative tasks for "fast finishers," and felt it was "…a big risk because some of the kids in the class, the new kids, like to be a little bit violent, so we can't leave that open" (Elizabeth, Interview 3). Elizabeth continued to use technology in her class, but she structured future lessons to better manage student behaviour.

Molly adopted a similar strategy. If she felt a class was difficult to control, she simply created a more structured task, but one that allowed as much student experimentation as possible (Molly, Interview 3). Molly felt it was important to have students experiment with learning, even if it risked her ability to manage the class. She illustrated this perception in her third interview:

> *"…the type of kids that are in there – usually teachers won't give them the magnets to work. They do demonstrations. But, I take the risk of giving them the materials. I encourage them to be responsible and... and they can experiment things by themselves. The risks I take in the classroom, is to trust the kids more, to do more stuff, and take risk. Sometimes it works, like today, and sometimes it doesn't work. It all depends on the level of trust." – Molly, Interview 3*

Molly felt that all students should be able to experiment with materials and explore learning, but that some classes were limited by their intellectual ability. This did not discourage her, but made her think of how she could work with these students more effectively using technology and student-centred teaching methods (Molly, Interview 3).

Danielle was also motivated to improve students' experience in the classroom, and felt technology supported this effort. As outlined in Chapter 5 (Section 5.1.3.1), she rotated her students between several learning stations. She felt the benefits of using technology were worth the extra effort. She stated, "...it takes a little more work from the teacher" to keep the kids organized through station transitions:

> *"Anytime you want to transition from – even today, to transition from a whole math class to little groups they were a little more chaotic, but they just get in their seats and calm down, and get re-focused. It works. I'm okay with that. I do go like this sometimes (hide eyes)." – Danielle, Interview 2*

Elizabeth, Molly and Danielle all had high perceived teaching-efficacy, as well as high RTPS scores (see Table 4.12). They felt capable of experimenting with their teaching, and were willing to accept the possible risk of students being off-task; they would simply adjust the structure of the lesson if necessary.

6.3.2.2 Limiting

Beau, who was a newer MRB teacher, had the lowest perception of his teaching-efficacy (TE *M* = 4.00). His overall RTPS score was on the lower range of the MRB teachers (RTPS = 3.89, *Min* = 3.89, *Max* = 4.48). At the time of his third interview, he had a "difficult" class that he felt was limiting his teaching. He says one of his classes was "wild," did not cooperate well, and was unfocused. He did not enjoy teaching this class as much as other classes. He was not able to joke as much as he normally would, and needed to be more "hard line." In response to their behaviour, he did not typically do group work in this class. Additionally, he did not take this class to the computer lab, because he did not feel they would be interested in using the computers, not because of his own lack of confidence using technology.

Beau's anticipated anxiety regarding students' reactions to group work and using technology in the "difficult" class was similar to the LRB teachers. Unlike LRB teachers, Beau had high computer-efficacy (CE *M* = 4.00; LRB CE, *M* = 2.48, *Min* = 2.00, *Max* = 2.80), he used technology in the classroom every day, and had established goals to integrate technology in the future. His limitations were related to teaching-efficacy and classroom management, rather than computer-efficacy. In Beau's second interview, he expressed an admiration for Kelly's experience with classroom management; he felt he could learn from her (Beau, Interview 3).

Kelly did not use technology in her teaching, but was beginning to experiment with student-centred teaching methods. As outlined in Chapter 5 (Section 5.1.1.1), Kelly used a new Literature Circles teaching strategy in her classes. She used Literature Circles in all of her classes but one. She described this class in the following terms "...they can't work together; they are just arguing... they are an intensive group and I do a lot of discipline in that class. And they have to be very very structured" (Kelly, Interview 3). The omitted class made her "uneasy," and therefore she did not feel comfortable introducing the group project.

Judith made the same assessment of a math class. She considered this group to be a "top class," but there were four boys with behavioural problems. At one point, she considered doing a practical activity to teach probability. This activity would have included putting the students in small group, having them throw dice and recording how often different numbers occurred:

> *"...in the end I thought, well, it's going to be very disruptive, and some of the boys would be tossing the dice and they would end up on the other side of the room. And, I thought the gain out of it wasn't worth the time. I did not particularly want to have a lesson that would basically end up a bit of a disaster." – Judith, Interview 2*

Judith anticipated students being out of control in this class, and therefore did not feel the activity was worth the time or effort. Simon perceived similar problems would occur in his classes if he took them to the computer lab:

> *"Um, I don't think I'd take the whole group in [to the computer lab]…They are a bit hard to keep on task. I suspect a session on the computer would be a distraction or an opportunity for many of them to wander off and play around... especially last period… I am not convinced the outcome would be better if I had them in there anyway." – Simon, Interview 3*

Simon did not feel confident taking his class to the computer lab, and anticipated a loss of control and students being off-task. Additionally, he did not feel confident helping students in the lab. In addition to his low perception of teaching and computer-efficacy, he did not feel technology would benefit the students; he did not feel it would improve their level of achievement.

Summarizing teachers' perceptions of classes, Elizabeth, Danielle, and Molly experimented with teaching methods and technology, with all classes. They were willing to accept risks associated with classroom control and students being off-task. They would refine the lesson if they felt there were problems. Beau used technology in all of his classes, but was not willing to use student-centred techniques and group work lessons in one of his classes that he felt was "wild." LRB teachers were very apprehensive about using, and generally did not use: technology, student-centred methods, or group work with classes they felt would be difficult to control or off-task. The LRB teachers anticipated problems, and did not feel the experimentation and risk was worth the lost class time or effort.

MRB teachers were willing to try new techniques, "figure it out," while the LRB teachers anticipated problems and did not experiment. It was not that MRB teachers did not perceive loss of control in their classes, as illustrated in their interview excerpts, but they did not perceive it to be as high of a risk as LRB teachers. That MRB and LRB teachers perceive similar risks supports the assertion that they would have a common disposition. Dispositions imply that perceptions would not be limited to the individual (agent), but that they would be cultural (structure).

6.4 School culture (tertiary sphere)

The tertiary sphere represents the cultural structure in which individual agents exist. In this context, the structure is school culture. This discussion considers group values and perceptions presented in individual teachers' experiences, including individuals' sense of group membership. In Chapter 7, school culture will be examined from a sociocultural perspective, rather than individual teachers' experiences. This section presents individual views of the larger structure, as a member of a group.

In the tertiary sphere, explicit school culture elements, such as curriculum and teaching expectations, will act directly on an individual. For example, in both samples, teachers had state-level outcome expectations, syllabuses in NSW (Board of Studies, 2007a), and standards in Florida (Florida Department of Education, 2006). While teachers perceived autonomy in delivering content in the classroom, they were expected to teach certain skills and cover certain topics. Further, in NSW, certain curriculum areas were expected to teach computer skills, such as Science teaching databases and Maths teaching spreadsheets (Board of Studies, 2007a). There were also implicit cultural expectations such as appropriate interaction with other staff members, technology integration in the classroom (rather than teaching computer-skills), and the level of support provided by school leadership.

One particularly influential implicit cultural expectation, arising from the data, was how well teachers controlled their classroom. In many teachers' minds, classroom control was closely related to the concept of quality teaching. This concept of classroom control (management) has been addressed extensively in educational research (e.g., Evertson & Weinstein, 2006), particularly in relation to using student or teacher-centred methods in the classroom (e.g., Sandholtz et al., 1997; Zhao & Frank, 2003).

6.4.1 Cultural expectations of classroom control

A well-managed classroom is often linked to professional competence and student achievement. When describing a student-centred classroom, teachers would often say that it has a higher volume, more chatter and noise, than a teacher-centred classroom. As a teacher, it can be demoralizing to have peers perceive they do not have control over their classrooms. Kerry illustrated this perception in her first interview. As indicated in Chapter 5, EMS lost a large portion of their staff to promotions in 2005-2006. In the following statement, Kerry explained her perceptions of the new teachers:

> *"...we have been extremely fortunate, a lot of the new teachers we have acquired are high quality seasoned teachers with good common sense and certainly excellent teaching skills and classroom management skills." – Kerry, Interview 1*

Of the three descriptive elements she chooses to qualify "high quality," one is classroom management skills. This implied it was highly valued in the school, and teachers' performance and value was based, in part, on their ability to control the classroom. The concept of classroom management is problematic, as its meaning is ambiguous, as is the case with quality teaching. Classroom management skills are different when integrating technology into the classroom (Hew & Brush, 2007). Molly spoke of this issue in her second interview:

> *"A risk could be one of the experiments I did with the kids. It could be an experimental thing, or a program, that some people don't want me to do, but I do it anyway...The thing is that it puts ideas in the minds of the kids, that sort of thing. It's a risk that I take..." − Molly, Interview 2*

She perceived risks related to how other teachers felt she should teach. For her, engaging students was highly valued. She felt this was best promoted through hands-on activities, and letting them explore. She believed that her idea of "in control" was different from other teachers'. In the previous excerpt, she discussed a lesson she conducted involving blowing things up in her Science classes. Other teachers felt this was too dangerous and "was suggestive" to students. Indicative of Molly's high risk-taking potential (RTPS = 4.48), she felt it was important to conduct potentially dangerous experiments in class. Even if it did cause disruptions or excitement in the students − she felt it enhanced their learning.

During classroom observations, both MRB and LRB teachers would make comments regarding the level of classroom control which would be observed. Several times teachers suggested classes which were "better behaved" for observation. For example, one of Judith's class observations was rescheduled; later in the day, she mentioned, "…better you did not come to the 9.4 class, they were being 'silly' today. But, at least they were not throwing things, like the class you saw last year" (Field notes, February 2, 2008). In an observation the previous year, several students were removed from a class, some with the support of the deputy principal. Students were regularly removed from Judith's classes, in an effort to restore a level of control. Judith expressed the belief that "encouraging problem students" to transfer out of a class was a good way to remove those who were not interested in learning and were making learning difficult for other students.

Danielle made similar observations of her students' behaviour, but in less extreme circumstances. Before her second observation, she commented that the kids were not "feeling themselves today." She elaborated on this perception in the following interview:

> *"[Today you said they were kind of tired from the long weekend. You said they were low key and fussy.] Yeah, they were fussy they just weren't thinking as they normally do and giving responses to things, they were just like…We had a long hour this morning talking about being focused in school and why we come to school. We do that on a regular basis, why is it important for you to be here, why do we go to school, why do we need to learn. To keep them motivated, interested, and engaged. After that they start being more involved and bringing more, it's the morning." – Danielle, Interview 2*

In contrast to bringing in the deputy principal, Danielle preferred to deal with class problems and issues personally. This preference was also expressed by Elizabeth. As Special Education teachers, Danielle and Elizabeth were trained to deal with behavioural issues. Both Elizabeth and Danielle worked with teachers on inclusion, and were able to witness how mainstream classrooms operated. They both believed it was easier to deal with problems in their classrooms due to small class size. They also expressed the perception that mainstream classrooms had a wide variety of behavioural issues, but that they were not structured to properly deal with arising issues. They felt this was due to time limitations, large student numbers, teachers' unwillingness to adjust their teaching, or their lack of training.

As previously outlined, teachers' perceptions of control are partially based upon their perception of hierarchy in the classroom, and their preferred teaching method. In both schools, if teachers felt they needed assistance controlling their classroom, they would call upon the school leadership. MRB teachers were comfortable with lower levels of classroom control, while LRB teachers were much more likely to maintain strict control. Classroom observations showed LRB teachers were much more likely to threaten to remove students from class, and actually remove students from class.

In the context of technology integration, teachers perceiving students to be unfocused and off-task, would perceive a loss of control. Teachers did not observe other classes, and therefore based perceptions of classroom control only on personal experience or anecdotal stories from other teachers. None of the teachers in this study felt they had a good sense of what others were doing in the classroom, and had difficulty identifying specific practices they felt were "good" or "bad" in others' teaching. That said, several of the teachers did assess peers based on other teachers and students' comments.

6.4.2 Meeting school expectations

What teachers perceive as "good" or "bad" teaching is based upon individual teaching values and perceived school expectations. Ideally, explicit school expectations would be communicated to teachers by the school leadership. In the SCu indicator, both MRB and LRB teachers expressed general agreement on item V1.2.8, "The principal lets staff members know what is expected of them" (LRB *M* = 4.00, *SD* = .00; MRB *M* = 4.00, *SD* = .82). In the interviews, teachers were very clear on what was required by school leadership, such as using email to communicate, using grading software, and teaching computer-skills at NHS.

Technology integration in a school cannot happen in isolation, and teachers' ability to change their teaching practice and adopt technology will be impacted by other events in the culture. For example, NHS teachers were expected to send out warning letters when students did not complete work. Judith identified several serious school problems related to the warning letters. She felt teachers were putting a significant amount of effort into generating warning letters, but the school leadership did not follow through with appropriate consequences for the student. She said the lack of follow through from school leadership on the warning letters, making students responsible for completed work, was demoralizing. In response to the lack of support, many teachers had stopped reporting when students were not completing work. When teachers become disengaged from their school, they will not be as committed to school initiatives or goals (Fullan, 2001).

Judith identified inconsistencies in distributing warning letters as a serious problem. She felt ultimately, it would reflect badly on her competence as a teacher:

> *"That sort of impacts on the rest of us. I know, in that awful year 10 I had last year. I sent out a few to one of the boys, and he ended up being moved down into a lower class. And, when he got moved down to that class, I'm sure he was not doing anymore than he was in my class, but no more warning letters were sent out. So, from the parents' point of view, they think, this teacher is doing a much better job with my son than Ms. Judith was, because I'm not getting warning letters." – Judith, Interview 3*

Ultimately, Judith felt students being allowed to receive their School Certificate at the end of the year, without having completed the work, was "totally stupid" (Judith, Interview 2). Teachers at NHS were also expected to use the Student Welfare and Behaviour Intervention Database (SWAT) system, to enter referrals reporting behavioural issues. Elizabeth had chosen not to use SWAT. In her third interview, she explained why she did not use the system:

> *"I never use it, because I don't enter referrals with my kids, I deal with things then and there, and they don't need to go any further, unless it's going to be heading to suspension. But that is very unusual with my room. I like to deal with everything in-house." – Elizabeth, Interview 3*

She went on to explain that her head teacher decided she did need to use the SWAT system. When this expectation became clear to her, Elizabeth "freaked" because it was an expectation she was not fulfilling. Elizabeth had stated in her interviews, if a technology tool did not fulfil her professional needs, she would not spend the time learning how to use it. She explained, if it did not work, she would, "…manipulate the system so I don't have to use it" (Elizabeth, Interview 1). While Elizabeth had originally felt she did not need to use SWAT, when she discovered it was a requirement she was concerned about not fulfilling the expectation. Ultimately, the deputy principal took time to explain to her how the system worked.

Kelly had a similar approach to the email system at EMS. The school required teachers to use email to download resources. Kelly had problems following the downloading directions. She felt they were not specific enough for her to follow easily:

> *"I mean, I try it but unless it hinders something I have to have that's on here. They said you may not be able to receive some of your emails and things [without the download], but I have not had anything I cannot receive yet. So, if it gets to that point then I'll ask for help, but as long as day to day things we are supposed to do, I can do all of that. I'll make the effort. I do try (laughs)." – Kelly, Interview 2*

She felt she was able to fulfil all of her other daily requirements, and did not want to spend the time getting technology support. Kerry expressed the same problems learning to use email, but was attempting to improve her skill level. Simon and Judith simply did not use email. They did not feel it was necessary, and did not perceive they had time to learn. For the LRB teachers, not using the email system was a function of their low computer-efficacy, while Elizabeth felt the SWAT program was simply not necessary for her teaching goals. All of the teachers were able to fulfil student achievement goals without the technology tools, legitimizing their non-compliance through a lack of time. Spending time learning to use the processes would cost time, when the teachers did not feel the process was worth the effort.

Teachers expressed the perception that technology innovations were secondary to curricular goals. This inconsistency further illustrates the dominance of teaching values, over technology values. Therefore, they could avoid fulfilling technology expectation for a certain amount of time, as it was a value secondary to student achievement. Again, this was possible as long as the

teachers continued to show a high level of student achievement, which was a priority in both schools.

At both schools, state-level testing tended to be the benchmark for student achievement. Evaluating student achievement and relative teacher performance through standardized testing has become increasingly important in recent years (Smith & Southerland, 2007). Simon articulated this sentiment in terms of "administrative scrutiny." He felt, "…there is a degree of scrutiny, certainly administrative scrutiny now, that hasn't existed before," in relation to student achievement (Simon, Interview 3). While Simon perceived a higher level of "scrutiny," he was not fulfilling the explicit school expectation to teach word processing in his classes. Illustrated in Chapter 5 (Section 5.2.1.2), Simon felt he was on the lower end of technology compliance; and, he felt teaching computer skills was not truly necessary in English. He justified his actions through his membership as an English teacher. He stated, the English faculty at NHS, as a group, did not explicitly teach word processing skills.

6.4.3 Being part of a group

Within school cultures, there will be many naturally forming sub-groups based on grade level, curriculum area, seniority, etc. (Schoen & Teddlie, 2008).Teachers frequently made comments relating to their content area concerning "how it was" for their group, or how they were different from other subject areas. For example, Danielle and Elizabeth both felt they had more flexibility in their special education classes due to lower teacher-student ratios. Beau felt Math was more important than History in his school, because it was an FCAT tested subject area. Kerry felt it took a certain kind of teacher to work with the middle school child. Finally, Judith felt Maths was different from "practical subjects" like Science.

Being part of a group based on content area was particularly evident in teachers' interview comments. Excerpts from Judith's third interview illustrated this idea:

> *"I think I just feel Maths is different to practical subjects like Science, where they can do lots of different experiments and engage the kids that way. Or, subjects like Geography, or History, where they can do research assignments, and there is a lot of different things. Where Maths, you just sort of do the math..." – Judith, Interview 3*

Additionally, Judith did not feel teachers in the Maths faculty were using technology in the classroom, which supported her perceptions of subject area appropriateness. Both MRB and LRB teachers had preconceived ideas of what constituted student achievement in each of their areas, which affects their idea of "quality teaching." Kerry felt teaching the middle school child

required a specific set of skills. Having taught at the middle school level for 15 years, she identified strongly with this group. She expressed this perception in her first interview:

> *"You might be the greatest Math teacher that ever lived, and if you don't have, especially at middle school, if you don't have some people skills and you don't understand the nature of a middle schooler it can be disastrous." – Kerry, Interview 1*

She specifically related this perception to teachers who had remained at EMS, when new teachers were entering the school. She felt the group of teachers who had been at the school for longer periods of time were particularly aware of this idea. At EMS, there was an implicit grouping of "insiders" and "outsiders." This cultural grouping is typical of small rural communities, and will be explored further in Chapter 7.

One of the differences between the two schools that impacted MRB and LRB teachers' group membership, was the faculty structure. Teachers in NHS were grouped in curriculum-area faculties, while teachers at EMS were grouped in grade-level teams. Additionally, NHS teachers did not have dedicated classrooms, while teachers at EMS did. School observations showed teachers at NHS would stay in their faculty rooms. Judith confirmed this observation, stating no one comes into the common room area; they all stay in the faculty rooms for lunch. Additionally, she made the following statement regarding faculty interaction:

> *"...not much interaction between other faculties...There is no need to interact with other faculties… there is no need to speak on an educational basis to another faculty." – Judith, Interview 1*

Molly made a similar statement; she did not typically interact with teachers in other faculties. She did not feel there was "no need" to interact, but she did feel the geographic layout of the building made it difficult to visit other faculty rooms. Further, she also felt she did not have the time to walk down to another faculty room. Reinforcing teachers' identification with the faculty group, many decision-making processes happened at the faculty level in NHS, and were not discussed at the larger school-level staff meeting.

At EMS, teachers were more likely to interact with other faculty. Grouping teachers in grade-level teams is a typical middle school practice in the United States. In the case of the EMS teachers, they reported working with teachers in their own curriculum area, but in different grades. For example, Kelly reported meeting with the 7th grade Reading teacher about once week to talk over curriculum questions, as well as periodically meeting with the 8th grade Reading teacher. In the grade-level teams, teachers would work together on grade-level

objectives and new initiatives, such as the Word Walls. School observations showed teachers frequently visited each other in their classrooms to discuss curriculum or to pay a social visit.

It is quite possible that faculty structures influences teachers' interaction with peers and implicit expectations of collaboration. This notion and other elements of school culture will be discussed in greater detail in Chapter 7.

6.5 Conclusions

The previous discussion presented three spheres of control, relative to teachers' perceived risks when integrating ICT into the classroom. Findings showed that teachers perceived risks at the individual (primary sphere), classroom (secondary sphere), and school culture (tertiary sphere) levels. The main risk perceived in ICT integration was related to student achievement. Specific risks perceived to affect student achievement were: how technology supported teachers' notions of effective and quality teaching; loss of time and classroom control; and meeting cultural expectations. Findings presented in this chapter begin to answer the second research question, "What risks do secondary-level teachers associate with integrating ICT into the curriculum?"

Results showed that LRB and MRB teachers perceived similar risks, suggesting that these risks were rooted in cultural beliefs and values. However, risk perceptions did not impact MRB and LRB teachers' practices to the same degree. MRB teachers were less likely to be discouraged by perceived risks, and more likely to take risks experimenting in the classroom. These findings were consistent with the preliminary RTPS scores, thus improving the possibility of the RTPS measure being predictive of teachers' potential to take risks. Further, variations between cultural beliefs and practices could explain some of the variation between teachers' beliefs and practices, in the context of risk perceptions when integrating ICT into the classroom. Findings were consistent with prior research identifying relationships between teachers' openness to change, technology integration, and constructivist uses of technology in the classroom (e.g., Baylor & Ritchie, 2002; Subramaniam, 2007).

Now that teachers' individual perceived risks have been presented, they will be examined at the school culture level through use of Mary Douglas' (1992) grid-group typology from cultural theory. Topics such as social deviance, group membership, and role will be discussed in terms of cultural types and objects of concern will be outlined in Chapter 7, and addressed in detail in Chapter 8.

7 Reflexively constructing school culture

The previous chapter presented teachers' risk perceptions, in three areas of control: individual (primary), the classroom (secondary), and school culture (tertiary). The primary and secondary spheres of control were considered areas in which teachers felt they were able to manage choices and results, while the tertiary sphere addresses external cultural expectations and pressures. In Chapter 6, teachers' perceptions of school culture and the tertiary sphere were presented, but they were not examined from a sociocultural perspective. Culture is more complex than a single individual's experience, but individuals' repeated actions will construct culture. Gauntlett (2002) observes that people's everyday actions reinforce and reproduce a set of expectations, and that it is this set of expectations that construct "social forces" and "social structures." Groups of individuals will have similar dispositions, thus creating group expectations.

In the following discussion, perceptions of school culture give insight into the school culture type. The relationship between individuals (agent) and culture (structure) is understood through the phenomenon of reflexivity from the theory of structuration. Teachers' perceptions are a function of their dispositions, and are grouped together to create a picture of the school cultural type. Grid-group typology, from cultural theory, is utilized to assess schools' cultural types and related risk perceptions.

Analysis and classification of the EMS and NHS cultures are based upon excerpts from individual teachers' interviews, classroom observations, researcher field notes, and document analysis. The chapter first presents teachers' perceptions of school culture. Perceptions are then analyzed using insights from the theory of structuration to illustrate the impact of trust and reflexivity upon the group. Perceptions are then classified using grid-group typology from cultural theory, and perceived risks relative to the cultural type are presented.

Before presenting the analysis of school culture, it is important to clarify the context in which school culture is considered. Chapters 5 and 6 both outlined elements of school culture, such as limited funding for technology, faculty interaction, and affective response to students, to name a few, that directly impacted teachers' willingness to integrate ICT. While the focus of this research is teachers' risk perceptions in the context of ICT-integration, some of the sociocultural considerations presented in the following chapter are independent of technology use; but, they impact teachers' overall job satisfaction and perception of teaching. This discussion considers

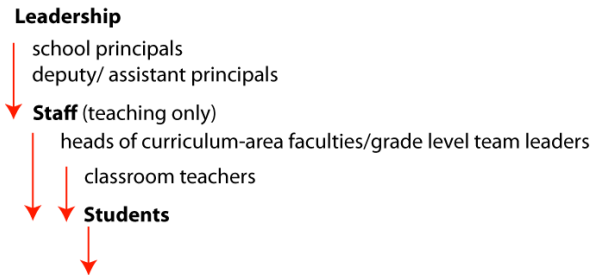
teachers' risk-taking in a holistic view of culture, rather than as an isolated phenomenon. The impact of school culture, and its varied elements, will be viewed in the context of integrating technology into the classroom and teachers changing their practice.

7.1 How school structures were perceived

While schools differ in the details of their organisational arrangements, many exhibit the same basic underlying structure. This is the case with EMS and NHS (see Figure 7.1).

Figure 7.1

Structure of school management, administration, and leadership within the schools



Levels are based upon the superior/subordinate structure most frequently mentioned in teachers' interviews.

7.1.1 School leadership

At EMS, when teachers were asked to describe "the school's leadership," they were most likely to begin speaking about the principal and the assistant principal. At NHS, they would mention the principal or deputy principal, as well as their head of curriculum-area faculties. It is important to note that although the teachers perceived principals and assistant/deputy principals as school leadership, how principals, assistants, and deputies identified themselves was independent of teachers' perceptions.

Research identifies leadership in the form of heads of discipline, department heads, etc., as middle leaders (Bennett, Newton, Wise, Woods, & Economou, 2003). Grade-level team leaders at EMS would be middle leaders. Kelly was the 6th grade team leader at EMS, but she did not include herself in school leadership. Beau did mention that Kelly was his team leader, but did not include her in his discussion of school leadership. The teachers at NHS discussed their heads of faculty in regard to day-to-day faculty operations, specifically in regards to changes in curriculum and instruction. Heads of faculty also transmitted information from the school

leadership to the curriculum-area faculty meetings. Full staff meetings at both schools were held approximately every two weeks.

School observations showed the principal at EMS was highly visible and had direct contact with teachers on a daily basis. When observations and interviews were taking place at the school, the principal would inquire if he could assist with the research project, and asked to be informed if additional resources or information were needed. While he was friendly, often making jokes, talking about the recent college football game, and asking after family members, he also maintained a level of professional distance. This distance would maintain a power structure, which reinforced the existing superior/subordinate hierarchy. Beau illustrated this power distance when he was asked, "How is the principal this year?" He stated, "When your boss asks you to come have lunch with him, and it's all good, then it's all good. It's good," (Beau, Interview 3). Through his word choice, Beau simultaneously illustrated the close connection he has with the principal, while maintaining the distance between himself as a classroom teacher and the principal as "boss."

Observations and interview responses revealed a very different relationship between the principal and classroom teachers at NHS. During the course of the project, the principal at NHS was not available to the project, nor did he offer assistance. Upon initial contact with the school, the principal put the researcher in contact with the IntelTeach program Master Trainer, who was the head of the Science faculty. She was always available for assistance and willing to answer project questions. It appeared that there was very little reason for most classroom teachers to interact with the principal on a casual basis. Simon and Judith both stated that they did not interact with the principal, but felt very comfortable with their heads of faculty. In the incident of the faculty bully, described by Elizabeth, teachers did not feel supported by school leadership; but, they did feel supported by other staff members. Judith perceived that teachers did not feel supported by the school leadership in regards to warning letters and students completing work for the School Certificate. In both cases, teachers felt betrayed by the school leadership, but they continued to support the hierarchy through fulfilling the duties of their subordinate roles to the principal, such as teaching, grading student work, and attending meetings. Judith noted that some teachers were not completing warning letters.

7.1.2 Peer relationships

In both schools, classroom teachers identified other classroom teachers as peers. Peers were identified across curriculum areas and between grade levels. Teachers in both schools generally felt their co-workers were approachable and helpful. Teachers felt that school leadership

treated them “as peers,” and this made them more approachable. In stating they were treated “as peers,” teachers are reaffirming that they understood they were not truly peers, and that a hierarchical power structure separated them from school leadership.

Within the teachers’ peer group at EMS, comments were made regarding an implicit hierarchy based upon years of experience working in the school. Research has shown that teachers with more seniority are often shown greater respect (Hofstede, 2001), and that leadership will often be derived from competence in the classroom (Bennett et al., 2003; Lieberman & Miller, 2005). Kelly illustrated this perception when discussing how teachers received new technology. She stated that it was not necessarily based on need, but how long you had been at the school. Beau perceived another implicit hierarchy based on curriculum area. He felt History was not as important in the school as subjects tested on the FCAT. The teachers at NHS were less likely to identify hierarchical structures within the faculty as whole unit, but were more likely to discuss faculty in terms of isolated curriculum-area groups. How teachers identify with hierarchies and leadership, as well as sub-hierarchies, will be explored through the use of grid-group typology.

The arrangement of teachers’ working groups was one of the biggest differences between the two schools: grade-level teams at EMS, and faculty departments at NHS. The physical structure of the groupings in the schools was briefly noted in Chapter 5. EMS teachers were located in dedicated classrooms which were clustered together along hallways. NHS teachers had faculty rooms with classrooms located in the close vicinity. Interestingly, even though EMS teachers were separated into classrooms, they identified a higher level of peer interaction than did NHS teachers. EMS teachers were able to discuss how teachers in other disciplines were using technology in their classrooms, as well as the other teachers within their grade-level team. NHS teachers did not claim to have any knowledge of what teachers outside of their own curriculum area were doing in the classroom. NHS teachers were able to identify, in their faculty, who was more comfortable using technology. The teachers assessed peers’ ability to use technology through casual observations in the faculty room, and only had a vague sense of how the same teachers used technology in the classroom.

7.1.3 Students

Students, while not a formal part of the working hierarchy, constitute a large part of the school culture. In the previous chapter, how teachers perceive their interactions with students was presented within the second sphere of control. Teachers tended to view students in terms of “classes,” choosing to manage the classes through an experimenting or limiting approach. Each classroom would assume its own hierarchy and power distance, which would also be influenced

by school expectations. School observations and researcher field notes revealed the community, beyond the school, as an additional layer influencing teachers' interactions with students.

Both schools were located in small town communities, therefore the teachers often interacted with students outside the school. In a smaller community, many of the teachers would live, and would have grown up, in the immediate area. Teachers knew their students through church, community sports, weekend get-togethers, they had gone to school with their parents, or had even taught their parents. This level of interaction between teachers, students, and parents creates a strong sense of community extending beyond the school. When teachers feel a stronger connection to the community in which they teach, they are likely to have a higher level of commitment to the group. Schools in small, rural, communities are more likely to have this type of close-knit relationship between community and school than is the case with urban or suburban schools whose staff and students are usually distributed over wider geographical areas.

Molly reinforces this idea of community identity through her development of a Gifted & Talented policy. She stated that there was an existing school department policy, but she felt NHS was "a different culture from Sydney schools" and required a specialized policy statement. The principal at EMS made a similar statement, he felt other people could not "come into their school and tell them how to run it."

7.2 High modernity in the context of a school

As previously outlined in Chapter 2, the theory of structuration includes three major tenets: separation of time and space, disembedding mechanisms, and institutional reflexivity. The discussion in this chapter focuses primarily on *institutional reflexivity*, defined as, "the regularised use of knowledge about circumstances of social life as a constitutive element in its organisation and transformation" (Giddens, 1991a). For this discussion, the *institution* is the school, which is the *structure*. A school is a socially constructed organization where individuals as *actors*, also referred to as agents, have specific roles. Each role is defined by a set of actions, which individuals repeat through duty and task fulfilment each day. These roles become elements of the individual as they are routinely performed, thus developing into the common disposition of individuals in groups; see Chapter 2, (Section 2.2) for a full discussion.

7.2.1 Trust in the structure

Over time, through the production and reproduction of actions, people learn how to interact in social encounters (Giddens, 1984). When groups of people repeatedly perform a series of actions, they are creating rules and organizations. Institutionalized rules become predictable, and individuals are able to trust certain actions and reactions will occur in given situations. Giddens (1991a, p. 19) describes trust as a form of commitment, which presumes a level of faith. In the context of a school, this means teachers will trust a superior is fulfilling the actions of their role, even if the actions occur where the teacher cannot observe them. Additionally, teachers are trusted to instruct students without direct supervision. In this organization, each individual in the school culture is an *actor*, and would have required tasks or *actions*. Actors in the organization trust that other members will fulfil the requirements their role. In fulfilling these actions, each actor applies a technical knowledge base, or *expert system*, which is independent of him or her. The expert system would have been learned during their training as a school leader or teacher, such as learning classroom management strategies or how to teach maths. The certificate or degree received upon completion of training is a *symbolic token*, which validates that the actor, as practitioner (school leader or teacher), can reasonably apply the expert system. Symbolic tokens and expert systems are *abstract systems*.

Abstract systems have value in the culture, and engender a level of trust. Trust in abstract systems does not necessarily create a trust relationship, but past trustworthy experiences are considered dependable in the present (Giddens, 1991a). For example, and to reiterate from Chapter 2 (Section 2.3.1), teachers base their teaching on state-level curricula (which can be viewed as expert systems). Teachers have to trust that each curriculum is appropriate. All teachers have to trust in, and apply, the curriculum to reach a level of standardization in education. The curriculum is not developed with a specific classroom in mind; therefore, it is disembedded from space. While the curriculum is sequential (grade level specific, paced curriculum), it can be applied at any time, and any number of times; therefore, it is disembedded from time.

In addition to disembeddedness and the relaxation of space and time constraints, the final tenet of structuration theory is *institutional reflexivity*. Reflexivity portends that, in modernity, daily life is routinized, and no longer has a direct link to the past and historical precedents. Therefore, the viability of actions can be assessed based on social knowledge, and adjusted to fulfil the current circumstances rather than adhere to traditional practices (Giddens, 1990). Considering this aspect of modernity, theoretically, teachers' classroom practices will not be chosen for the

sake of tradition; rather they should be chosen based upon positive student achievement. Through individual agency, teachers are able to assess their teaching, apply social knowledge regarding expectations and successful teaching practices to optimize their own teaching, and improve student learning.

Cultural change occurs through individual agency. In the context of technology integration, teachers would individually assess how technology integration would support their students' learning. Based on their individual assessment, they may or may not integrate technology into their teaching. Through the process of exerting agency, individuals will redefine actions as well as the structure; this is the duality of structure.

7.2.2 Structuration in context

A function of modern culture is the multitude of ways in which actors must trust abstract systems. This is especially important in high modernity, as actions are not solely based on tradition, and actions are essentially open to interpretation. In schools, leadership has to trust that teachers are teaching correctly, as there is simply not enough time, nor is it seen as appropriate, to visit every teacher's classroom for every class. Theoretically, teachers have to trust that innovations introduced into the school by leadership will support student learning and increase student achievement. At a certain point, individuals or groups must decide to trust, or actions would be in a constant state of revision; the culture would never reach a level of stability needed to function. Therefore, in day-to-day work, actors must accept that abstract systems are appropriate, constant, and trustworthy.

As abstract systems are accepted, and repeated, they renew expectations and standards within a social culture. When individuals or groups have trust, they are able to develop a level of security, as well as perceptions of risk and danger (Giddens, 1991a). Individuals and groups perceive risk when their security or values could be potentially threatened.

The EMS teachers felt at ease that the principal was fulfilling his duties and performing the correct actions. At NHS, there was suspicion that the principal was not fulfilling the expectations of his role, such as protecting teachers from a peer bully or appropriately assessing if a student should receive the School Certificate. Therefore, the principal's inappropriate actions caused teachers to question their trust in him. If actors are forced to reconsider trust in the superior/expert, it can cause insecurity within the culture. Judith said that she, and other teachers at NHS, began to feel unmotivated, questioning their efforts to make students

complete their work. Elizabeth commented that other teachers were “boycotting” the principal’s retirement dinner.

The previous example does not directly include technology use, but could have a significant impact on teachers’ willingness to experiment in the classroom and take risks. Research has shown that actors create a “dazzling” number of ways to attempt to maintain security within actions (Giddens, 1984, p. 23). On an individual level, teachers at NHS were beginning to mistrust the principal. This mistrust would not be restricted to bullying or School Certificates; they had begun to mistrust him more generally. The perception that leaders are untrustworthy can have serious implications for individuals’ willingness to accept new technology, adopt new behaviours, and engage in change. These patterns will be explored at the school culture level through grid-group typology.

7.3 Cultural theory

In this discussion, Mary Douglas’ grid-group typology from cultural theory is used to classify social relations as they are experienced by the individual on a cultural level (Spickard, 1989, p. 154). It is not appropriate to use cultural theory to classify an individual’s actions separate from a group (Rohrmann & Renn, 2000). In the previous section, the theory of structuration illustrated the reflexive relationship between individual experiences and culture: actors perform actions, actions are repeated, and become part of the structure. In the following section, teachers’ perceptions and experiences within their schools will be aggregated to develop a picture of the wider school cultures.

The schools are discussed together, rather than through two separate discussions. In cultural theory, groups are assessed within criteria of the grid and group dimensions (see Table 2.2), rather than against each other. In this study, both schools strongly exhibit traits of Hierarchical cultures, which would be a reasonable expectation for a workplace environment. Both schools are high-grid, but the school culture at EMS is high-group; while NHS is low-group at the school level. Thus, EMS is categorized as a Positional Hierarchy and NHS is an Isolate Hierarchy. Spickard (1989, p. 15) describes Isolate groups as a “repository for social fallout” from the Positional and Individualist groups. The following sections will examine the schools’ grid and group classifications in greater detail.

7.3.1 Grid: Hierarchy and autonomy

EMS and NHS both showed tendencies towards high-grid cultures, categorizing them as Hierarchical cultures. Hierarchical structures are not necessarily an absolute in school cultures; progressive schools developed as Egalitarian groups would not have a hierarchical structure. The Egalitarian cultural type could occur in schools practicing distributed or shared leadership (Spillane, 2005). EMS and NHS are both traditional public schools, and are therefore part of larger public school system hierarchies.

In schools, such as EMS and NHS, teachers are typically hired for a specific position (e.g., as a Reading teacher or department head). Teachers are given work contracts explicitly stating their roles, duties, and position within the culture. Therefore, individuals have a pre-defined and accepted role within the culture. Clearly defined roles imply a high-grid culture (defined by rules and role expectations). Therefore, individuals' level of autonomy is low, and there is little organic role competition in the group. While teachers' roles do not provide flexibility within the school culture, they are able to exercise individual agency (primary sphere) in teaching, which was illustrated in their ability to make choices in the classroom (secondary sphere).

This is not to say individuals' roles and expectations do not change; they can be redefined. In hierarchical cultures, the individual's supervisor or superior in the hierarchy would officially redefine roles. Several Phase 2 teachers' roles were redefined during the course of this project. In most cases, the teachers did not know why their roles were being redefined, they simply accepted the new role. For example, Danielle's role as an ESE teacher at EMS was restructured in the beginning of the 2007-2008 school year. As previously discussed, one of her new responsibilities was to teach Math. Danielle did not feel comfortable teaching Math, but did not ask the school leadership why her role was changing. She simply accepted the changes, and learned to teach Math. At NHS, Simon had a similar experience. The English faculty required him to try a writing unit in 2008. He was unsure why the new unit was being implemented; he guessed it was to raise students' School Certificate scores. While he was not particularly excited about the new unit, he did not question it.

While Simon and Danielle's reactions to new curriculum and redefined roles may initially seem passive, their reactions were a function of their roles. Hierarchical cultures are built upon trust between subordinates and superiors and group agreement on roles and behaviours, which are redefined as necessary. Considering this logic in terms of structuration theory, actors accept the new roles as a function of trusting decisions made by their superior. Teachers must trust the new role is appropriate, and is ultimately necessary within the school. They leave the decision to

the administrator (leader), trusting he or she is performing the actions of their role appropriately. Trust as commitment, in cultural theory, would be commitment to group goals.

Hierarchy has many implications in cultural classification. In terms of this study, the existence of hierarchy reinforces individuals' roles within the school, and perpetuates the group culture.

7.3.2 Group: Commitment to goals and insulation

In this discussion, *group* was assessed through the level of commitment individuals have to common cultural goals, and the level of insulation from other groups. The two schools diverged on the group dimension of grid-group typology. At the school level, EMS exhibited a tendency towards high-group, while NHS tended towards a low-group classification. Interestingly, NHS showed a high-group tendency at the curriculum-area faculty level. This result is not atypical of organizations, where different levels of hierarchy are often witnessed at different cultural levels (Douglas, 1992).

One of the strongest exhibitions of a high-group culture within EMS was the implementation of Word Walls in the classrooms. As previously mentioned, EMS was implementing a school-wide vocabulary program in the 2007-2008 school year. The program was introduced in a staff meeting before the school year, where they discussed how well they fulfilled goals from the prior year, solicited input from the staff, and presented goals for the upcoming school year. As part of this program each teacher would have a Word Wall in their classroom, and they were expected to refer to the vocabulary words during their lessons. It was observed that all teachers had a Word Wall in their classroom, and used the words in their lessons. At the end of the study, and as a result of it being a school priority, teachers were showing similar commitment and motivation towards integrating digital projectors into their teaching.

All of the EMS teachers were able to identify technology as a school priority as well, but systematic implementation was not apparent throughout the school. Beau observed that there was no consistency between teachers in their use of technology. Students could be in his 6th grade World Civics classroom being instructed with a digital projector and PowerPoint presentation; and, then go next door to Math, where technology was not being used. At the same time, he understood that technology use was not mandatory, and he could not expect standardization between classrooms. Teachers were expected to, and did, use First Class and GradeBook for email and electronic grading respectively. Pam and Kelly did not feel comfortable using either program, but learned them because it was a requirement.

Similar to EMS, teachers at NHS were not necessarily required to integrate technology into their daily teaching. Teachers at NHS were expected to use a variety of electronic reporting systems for grades, warning letters, and discipline referrals. System use was inconsistent, which could be a function of a low-group culture, and thus low commitment to group goals. Simon and Judith did not use email, and did not express an intention to learn. Elizabeth's experience of being taught how to use the referral system by the deputy principals is another example of this inconsistency. Additionally, Judith observed that several teachers in the Maths faculty were not sending out warning letters.

Unlike EMS, at NHS certain curriculum areas were required to teach technology skills as part of their syllabus. English was required to teach word processing (Microsoft Word), Science was required to teach databases (Microsoft Access), and Maths was required to teach spreadsheets (Microsoft Excel). Similar to the reporting systems, this requirement was not systematically implemented. Science and Maths taught databases and spreadsheets respectively; but, English as a faculty did not teach word processing. Again, this shows a low commitment to school-level group goals, thus supporting the low-group classification.

A stronger indication of the low-group culture of NHS was teachers' inability to identify school wide goals or initiatives. This trend was particularly evident when the year 10 School Certificate results were received at the end of the 2007 school year. Concerns relating to the School Certificate were presented in Chapter 6 Section 6.4.2. NHS Phase 2 teachers generally agreed that the School Certificate needed improvement, but there did not seem to be a consensus about how it needed to be improved. When asked about school priorities related to the School Certificate, all of the teachers had a different response. For example, Molly felt that high achieving students' test scores should be higher, while Simon felt the focus should be on improving literacy. It is not surprising that teachers all perceived different priorities relating to the School Certificate, but teachers were unable to identify if there was a school priority relating to the School Certificate. Concerns relating to the School Certificate process and results had not been addressed in the general staff meetings. Teachers did talk about the problem in curriculum-area faculty meetings and informally. Treating school-wide concerns on a curriculum-area faculty level, rather than a school level would make consistent articulation of school-wide goals difficult.

Teachers at both schools perceived insulation from other groups: EMS at the school-level and NHS at the curriculum-area faculty level. The teachers, and the principal, at EMS spoke about insiders and outsiders, relative to the school. Kerry made comparisons between EMS and other

schools in the area. She felt EMS teachers worked harder, and had better test scores. Teachers had felt comfortable having the assistant principal move into the principal role in 2008, because he "knew the school." As previously mentioned, the principal commented that "they did not want outsiders coming in to tell them what to do." EMS teachers did not show the same insider-outsider rules between grade-level and subject-area teachers. Teachers commented that they were comfortable going to other grade-level teachers, who taught in the same subject area as them, for curriculum advice or advice on student behaviour.

Most of the teachers at NHS had strong insider-outsider rules between the curriculum-area faculty groups. This was evident in comments such as Molly stating that the "Science department does a good job with teaching databases," and stating that "there was no reason to talk to teachers in other faculties." When teachers made statements regarding how things are done in "their discipline," they are exhibiting boundaries between the disciplines. Judith felt practical student-centred lessons were more suited for English because Maths was so structured, and Simon felt Science was more suited for technology than English. In the context of ICT-integration, teachers' perceptions of *how* their curriculum areas integrate, or did not integrate, technology are important aspects of the school cultures, and will be addressed in more detail later in the discussion.

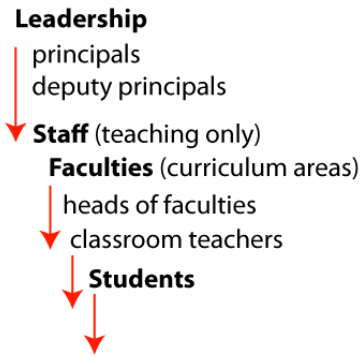
7.3.3 Sensitivity to hierarchal shifts

Each school's cultural risk perceptions will be assessed based on their grid-group classification as Positional and Isolate Hierarchical cultures. It is necessary to reiterate that NHS seemed to operate as a high-group Positional culture at the curriculum-area faculty level, and as a low-group Isolate culture at the school level. The Isolate culture does have a similar superior/subordinate structure as a Hierarchical culture, but there is lower group commitment.

Research has shown that curriculum-area faculties are often inclined to operate as separate cultures within the school, particularly in the context of ICT-integration (Hennessy et al., 2005) . As outlined in the previous section, and the two previous chapters, teachers at NHS were only marginally committed to school-wide group goals, but identified very strongly with their faculties. Therefore, the school hierarchy of NHS has been revised to reflect this structure, as seen in Figure 7.2.

Figure 7.2

Secondary hierarchical structure of NHS



The culture at EMS followed the structure previously outlined in Figure 7.1; teachers strongly identified with the school as a group unit, rather than their grade-level teams. The teachers at NHS had a stronger commitment to their curriculum-area groups, rather than the school. This assessment does not imply that NHS teachers did not identify with the school, but they were more likely to identify with the values and beliefs of their curriculum-area faculty rather than school-level values and beliefs. Therefore, NHS had a shifting cultural type between the Isolate (at the school level) and the Positional (at the curriculum-area faculty level).

7.4 Cultural risk perceptions of ICT integration

When considering risk perceptions, and possible management of perceived risks, it is necessary to understand the social dynamics of risk (Slovic, 2000b). Hierarchical groups are concerned with order and maintaining their "way of life" (Wildavsky & Drake, 1990). This perspective is articulated through the group's object of concern: behaviour as a product of group agreement. Group risk perceptions are articulated over three areas: social deviance, nature, and technology. This discussion is primarily concerned with risk perceptions relating to social deviance and technology, presented in Table 7.1.

Table 7.1

Hierarchical risk perceptions (excerpt from Table 2.3)

Social deviance	**Behaviours may disrupt preferred (superior/subordinate) form of social relations**	**High-risk**
Technology	Approve of processes and products as long as experts have given safety certifications	Low-risk

7.4.1 The "way of life" in the schools

Maintaining a "way of life" in a culture means creating actions and rules that perpetuate the culture: the reflexive monitoring of actors and actions within the structure (Giddens, 1984). In the case of NHS, teachers had said that the principal was not acting in a way they felt was appropriate. Through assessing repeated negative actions, such as allowing several students to receive School Certificates when they had not completed the necessary work, teachers began to question his competence. The teachers perceived a way of life that included fair evaluation of student success was appropriate in a school, and they felt the principal was not fulfilling a cultural expectation. As previously outlined (Section 7.2.2), the principal's actions violated teachers' levels of trust, and caused them to question the value of their own work.

As a Hierarchical culture, their object of concern is "behaviour as a product of group agreement." The principal's behaviour was not a product of group agreement. It is possible that this behaviour began a chain reaction of responses throughout the culture. It also possible that violation of the group's object of concern supported teachers' lack of commitment to group goals at the school level, thus reinforcing teachers' commitment to their faculties. Individuals' trust in experts, and superiors as experts, is an essential element in maintaining group commitment to the way of life.

Table 7.1 presents risk perceptions in Hierarchical cultures; technology is deemed low risk in the culture if it has been approved by experts. Giddens explains that in modern society, individuals operate in an inherently unstable "climate of risk" (Giddens, 1991a, p. 114). When experts change knowledge-claims, approvals of risk, or behaviours frequently, it creates a perception of instability in approved group behaviours. In NHS, due to low levels of trust in school leadership, it would be difficult for them to implement new technology in the school, as it would introduce additional risk into the culture. When individuals perceive too much risk, they can have a fateful moment, as explained in Chapter 2 Section 2.3.2. Such fateful moments will be explored further in Chapter 8.

At EMS, teachers felt the principal was competently performing the actions appropriate to his role, thus maintaining their way of life in the school. To reiterate, when the former assistant principal moved into the principal role, in the 2007-2008 school year, teachers commented that he "knew how the school was," and that he would be able to maintain the school to the same standard. Kerry commented that he was appropriate for a middle school: that he knew what middle school teachers and students needed. Therefore, it was perceived that he would be able to maintain the school's preferred way of life, and agreed behaviour – thus, actions would not

need to be assessed and adjusted, and a minimal amount of additional risk would be introduced into the culture. Teachers trusted the principal, and were therefore ready to accept new technology (digital projectors) when it was available in the school.

Within each way of life, there are cultural risk perceptions related to change. This discussion is specifically concerned with perceived risks related to social deviance and technology, in the context of ICT integration and teaching change. Chapter 6 outlined teachers' individual perceived risks, relative to the three spheres. The next section presents how teachers' general perceptions of risk in ICT-integration align with school cultures. The relationship between teachers' perceived risks, and school culture types, will be examined in Chapter 8.

7.4.2 Relative social deviance

In Hierarchical cultures, social deviance is considered high-risk. Teachers at both schools repeatedly spoke of adhering to state-level curriculum standards, maintaining classroom control, fulfilling expected role related duties, etc. In Hierarchical cultures behaviour is a product of group agreement, thus it is important to identify with which group teachers are agreeing – the school or curriculum-area faculties.

As previously stated, the EMS teachers' group commitment was at the school level, while the NHS teachers identified with their faculty groups. This structural difference has significant implications for social deviance, particularly in relation to technology use. Expectations related to technology instruction and integration have been presented several times throughout this discussion. One of the strongest illustrations of social deviance, relative to group commitment, is how teachers at NHS and EMS fulfil technology requirements.

At EMS, teachers were generally compliant when using electronic reporting tools, and working towards compliance when using email. Kelly and Kerry learned to use email because it was required. Teachers at NHS were less compliant; Judith and Simon patently refused to use email. The interesting point was how teachers at NHS implemented technology-related curriculum requirements, and viewed general technology integration. Referring back to the NHS English faculty, they did not explicitly teach word processing, even though it was required in the curriculum. Simon believed that they, as a faculty, felt students were independently using word processing software to write their papers. Whether this was an accurate perception of the English faculty or not, Simon identified so strongly with the English faculty, that he was able to justify non-compliance with the overarching curriculum through the perceived collective agreed behaviour of his faculty. Judith made the same case regarding general technology integration.

She felt it was not a priority for her to use technology, as the Maths faculty as a group did not use technology in their teaching. It is important to note that Simon and Judith both have low computer-efficacy, and could be using the faculty to legitimize their own non-compliance. This interaction between the individual and the culture will be explored further in the following chapter.

7.4.3 Technology

Technology is generally considered low-risk in Hierarchical cultures, if it has been sanctioned by an expert. In society today, technology is generally accepted as a permanent element in modern society. It is generally felt that technology can improve and enhance student learning if used appropriately (Hew & Brush, 2007; Loveless, 2007). In response to these beliefs, ICT-related skills have been written into state-level curricula in NSW and Florida to meet future work-force demands (Florida Department of Education, 2006; New South Wales Department of Education and Training, 2006b). State-level curriculum and educational research are expert systems in which school leadership and teachers would trust when considering technology integration.

In general, teachers at EMS and NHS were not opposed to technology and all acknowledged that technology had some value in the classroom. Teachers did perceive numerous risks associated with integrating technology in the classroom, but not necessarily with the technology itself. It is possible that teachers expressed a positive perception of technology because they knew it was the appropriate response, and expected behaviour in their group. This pattern would have been visible in the LRB teachers, who stated that they valued technology, but did not integrate it into their teaching. It is possible that teachers verbally stating group goals will begin to internalize the values and beliefs.

In the context of ICT-integration, it would be important to identify whom teachers perceive as their superior in the group, or the group expert. Technology, when approved by an expert is considered low-risk. Demonstration of technology acceptance by superiors, such as school leadership using technology themselves, would be an important step in school-wide integration. Additionally, technology integration would require new teacher role expectations, which would need to be explicitly outlined and approved by school leadership. At EMS, where teachers identified with the school-level group, they would be more likely to accept technology innovations sanctioned by the principal. Teachers at NHS proved to be more concerned with sanctioning from their faculty head, rather than the principal. Predictably, deviation between the individual and the group expectations, in relation to technology, was particularly evident in

the LRB teachers', as they used less technology. This will also be explored in the following chapter.

7.5 Conclusions

This chapter presented a classification of school cultures, theorized through the theory of structuration and grid-group typology from cultural theory. Analysis of school culture was based upon teachers' perceptions, interviews with key informants, and research field notes.

Teachers at both schools identified the principal as school leadership. But, this does not mean leadership was identified as the superior in the group hierarchy. NHS teachers were likely to identify their head of discipline as middle leadership and their direct superiors in the group hierarchy. In contrast, EMS teachers were likely to identify their school principal as their superior in the hierarchy.

Both of the schools showed high-grid characteristics, and were categorized as Hierarchical cultures. Schools' high-grid classifications were based on the existence of clearly defined roles, and a lack of role competition. This discussion is primarily concerned with culture at the school level; in which case, EMS was a high-group Positional hierarchy, and NHS is a low-group Isolate hierarchy. Although, NHS showed a tendency to be high-group at the curriculum-area faculty level, which suggests that the faculty groups were Positional. Group classifications were based on teachers' level of commitment to group goals, and members' perceived insulation from outsiders.

Hierarchical cultures are primarily concerned with behaviour as the product of agreement. They view social deviance as high-risk, and see technology as low-risk as long as it is approved by experts. These aspects of Hierarchical cultures will have significant impact on technology integration. Variations in technology-related risk perception would be partially related to teachers' perceived group commitment in the school. At EMS, the principal is superior in the hierarchy, and he would be able to approve new role-related behaviours and expectations associated with technology integration. NHS teachers had a stronger identification with the values and goals of their curriculum area, and they would defer to their heads of faculty or conventions of their discipline. Prior research has indicated teachers' beliefs regarding their subject area and technology are used to legitimize low levels of integration (Selwyn, 1999). Additionally, curriculum-area groups were strongly divided from each other, with very little crossover in group membership. Teachers at NHS had clear ideas of how their curriculum areas integrated technology, which has significant implications on technology integration.

In terms of technology integration, behaviours risking student achievement would not be supported in the school cultures. Chapter 6 presented teachers' notions of how technology supported effective and quality teaching (primary sphere), loss of time and classroom control (secondary sphere), and meeting cultural expectations (tertiary sphere) as perceived risks associated with technology integration. The interaction between teachers' perceived risks and school culture types will be examined in the next chapter.

8 An examination of perceived risks related to ICT-integration

The previous chapter classified EMS and NHS as Hierarchical cultures. Schools' classifications were based on the existence of clearly defined roles, a lack of role competition, teachers' level of commitment to group goals, and members' perceived insulation from outsiders. While both schools were Hierarchical cultures, they differed on their group classification: EMS showed high-group at the school level, while NHS was low-group. By the nature of schools' group classification (see Table 2.2) EMS could be further classified as a Positional Hierarchical culture, while NHS seemed to be more of an Isolate Hierarchical culture. Through the Hierarchical classification, theoretical assumptions can be made about the school culture, specifically about members' preferred way to life. More specifically, differences in school hierarchies can begin to explain differences in cultural perceptions of social deviance, agreed behaviours, and approval of new technology. Group members' perceived risks could be partially explained through cultural risk perceptions.

In Chapter 6, the discussion presented the spheres of control. These spheres are theoretical areas of relative control, based on teachers' perceptions of risks associated with the integration of ICT into teaching: individual (primary), classroom (secondary), and school culture (tertiary) spheres (see Figure 6.1). The main area of perceived risk was student achievement. In the primary sphere, risks associated with technology integration were related to how technology supported teachers' notions of effective and quality teaching; loss of time and classroom control were identified as risks in the secondary sphere; and, in the tertiary sphere, risks were associated with teachers' ability to meet cultural expectations. Teachers judged and evaluated risks in relation to their impact upon student learning, and overall student achievement.

In this chapter, the three spheres are examined in terms of cultural risk perceptions: social deviance, agreed behaviour, and technology, as well as the four risk-taking indicators. Spheres will be presented in the order of individual, cultural, then classroom to illustrate the reflexive relationship between individuals' and cultural risk perceptions. The discussion focuses on the classroom, as the aim of this research is ultimately to examine how teachers integrate ICT into the classroom (secondary sphere) and change their teaching practice.

8.1 Primary and tertiary spheres: Hierarchical culture

The primary risk perception concerning student achievement was shaped by a combination of teachers' individual values and the school culture. In structuration theory, influences on risk

perception would be considered in the second and third factors of reflexivity: the role of values (individual and cultural), and unintended consequences (perceived risks). The primary and tertiary spheres are considered relative to the original risk-indicators. The individual indicators: teaching-efficacy (TE), computer-efficacy (CE), playfulness & anxiety (Play&Anx) are associated with the primary sphere. The school culture (SCu) indicator is related to the tertiary sphere. The secondary sphere (the classroom), is not directly associated with an indicator, but it is where the risk-taking behaviours could be observed in teachers' practice.

The discussion will first examine risk perceptions in the primary and tertiary sphere, followed by the secondary sphere. Before perceived risks and risk-taking behaviours in the secondary sphere can be fully understood, mitigating influences from individual values and school culture must be considered. The primary and tertiary spheres related to the grid and group dimensions of the grid-group typology. Grid and group proved to have a reflexive relationship between individual autonomy and group commitment; for teachers to accept the role of teacher (grid) in a school, they would need to have a certain level of commitment to the values and goals of the school (group). As teachers repeatedly fulfil perceived or explicit cultural expectations of their roles, they reflexively strengthen the role, and thus strengthen the hierarchical group structure.

The following sections examine teachers' perceptions of their teaching role, and perceptions of technology within the teaching role. Considering the relationship between primary and tertiary spheres, there is significant overlap between the two areas. It is important to remember that teachers' perceptions of efficacy will be judged against their role in the school culture.

8.1.1 Primary sphere: Classification and choice (grid)

"Grid" is how the individual is classified in the culture, and how much personal choice they have within their role. In terms of teaching and computer-efficacy, as well as playfulness & anxiety, perceptions of performance and success in individuals' assigned roles would be relative to their perceived success fulfilling their role in the group. Perceived risks would be associated with teachers' perceived role and related efficacies. The primary sphere considers the individual's perceptions of their teaching and computer-efficacy, and related playfulness or anxiety in the context of ICT-related change.

The first consideration in a Hierarchical culture is how individuals are classified, and how the individual accepts the classification. In a hierarchy, individuals would need to accept, and thus perpetuate, their classified roles. Teachers in both schools showed strong identification with their role as a classroom teacher, even if they had other roles in the school. Movement between

roles required agreement from teachers' superiors. This meant, when teachers wanted to take on a new role or responsibility, it had to be discussed with their superior. For example, when Molly wanted to assume the role of Gifted & Talented Coordinator, she first discussed the position with her principal. Teachers were not able to independently redefine their roles within the school; new roles were a product of agreement between the school leadership and the teacher.

Behaviour as a product of agreement in hierarchical cultures minimizes the possibility of individual deviance and risk. Teachers would assess their teaching-efficacy in relation to their teaching role. All of the Phase 2 teachers felt they were fulfilling the requirements of their role as a teacher – teaching the appropriate curriculum and producing positive gains in student results. It is important to note, that perceptions of "appropriate" were relative to teachers' individual interpretations. While there was consensus about the general aim of teaching, teachers had their own perception of what constituted quality teaching. Each teacher described how they taught differently (see Chapter 5), each method was relative to their idea of quality teaching (see Chapter 6). LRB teachers tended to employ more teacher-centred practices with little technology integration, while MRB teachers endeavoured to utilize student-centred teaching methods and integrate technology. Variations in teaching were not generally a problem in schools. School leaders and teachers identified that teachers do not "have to teach" in a particular way, but that they do need to adhere to curriculum standards.

While teachers had a high level of autonomy in the classroom, NHS and EMS employed a variety of tactics to help ensure teachers understood how they were to teach, which helps the group to achieve a level of agreed behaviour. Both schools had a mission statement, which defined teacher and student expectations. As a way to further clarify approved teaching methods, the schools sent teachers to professional development courses, conducted staff meetings, as well as curriculum pacing within the disciplines. Through these actions, schools convey preferences and values related to teaching, in the hope that a level of consistency will be achieved in student learning. These practices will also be address at the group and tertiary (school culture) level later in this chapter.

8.1.1.1 The role of technology in teaching

At EMS and NHS, teaching expectations were well defined through state-level curriculum standards, but ICT-integration was not explicit. This does not necessarily imply that ICT-integration is not present in the schools, but that teachers did not feel it was defined. EMS had made technology a priority in the culture, and technology integration was outlined in the Florida

Sunshine State curriculum standards (Florida Department of Education, 2006); but, the school did not explicitly state how teachers would integrate technology in their teaching. Integration was at the teachers' discretion. Similarly, NHS was technologically well equipped and followed the NSW ICT-integration guidelines in the discipline curriculum (Board of Studies, 2007a); but, beyond explicit skill instruction (e.g., spreadsheets, databases, and word processing) teachers were not required to integrate ICT into their teaching. MRB teachers, who were more likely to experiment with technology integration, created their own integration standards in the form of personal teaching goals. Molly and Danielle both stated that they had a goal of using technology in each subject area at least once or twice a week. LRP teachers did not set personal teaching goals related to technology integration.

The LRB teachers expressed views implying that technology was not part of their perception of teaching, that it was not necessary in teaching. They were able to understand how technology would be applicable in teaching and that it had *some* value, but they saw it as separate from what they considered successful teaching methods and strategies. They had similar perceptions of student-centred teaching methods, such as group work or practical lessons. LRB teachers believed that the risk of lost instruction time outweighed the gains of technology integration. They preferred to use methods that they knew were effective, and that would support student learning. For example, Judith had taught "the same way" since she began teaching in the 1970s. She had been successful using the same strategies for 30 years; she *did not* associate technology with successful teaching. Judith believed that ICT had a low value in teaching, relative to the importance of student achievement. She therefore had a negative affective response towards technology use, and perceived high risks associated with ICT-integration. She expressed the same feelings towards group work and practical lessons. Her primary concerns in both areas were loss of instruction time and classroom control, which would jeopardize student achievement.

MRB teachers believed that technology was integral for successful teaching, and they felt it was necessary to use technology in their teaching. They expressed similar perceptions of student-centred teaching methods and group work lessons. They felt ICT and student-centred methods allowed them to deliver course content to multiple learning styles, as well as increase student engagement. They felt technology supported these priorities. Therefore, they viewed technology as an essential tool for teaching, helping them to fulfil their teaching goals.

8.1.1.2 Integrating technology into the teaching role

Considering the hierarchical nature of the schools' cultures, it is likely that LRB teachers would integrate technology if explicit expectations were introduced at the appropriate group level. In EMS this would be at the school level, and at the faculty level in NHS. Explicit expectations would need to address the fundamental problem, that LRB teachers did not associate technology with quality teaching, therefore they did not perceive it as part of their role as a teacher. Without standardizing cultural expectations of ICT integration, it is possible that integration would not reach a level of agreed behaviour in the school culture and that it would not be routinized within the teacher role.

Kelly's perception of technology and teaching changed over the course of the study. Her development was a good illustration of a LRB teacher beginning to integrate technology into their perceived teaching role. In addition to changing her perception of technology in teaching, Kelly also began to experiment with new group projects in her teaching.

At the beginning of this project, Kelly was able to identify that technology could be used, but she had not yet identified a need to use it in her own teaching. At the beginning of the study, she still believed that her actions were appropriate for her role as a Reading teacher and her school context. At the end of this study, Kelly had identified a need to change her practice. She felt education was changing, which led her to believe she needed to change her teaching practice and her actions.

The process of Kelly becoming more open to using technology in her teaching was reflexive, as understood through structuration theory. She attributed this changing perception to the idea that technology was becoming the standard in teaching, as well as student-centred teaching methods. Over the course of the year, possibly longer, Kelly had been observing how technology was becoming more present in education. She stated being exposed to technology at trainings and through peer interaction. Through repeated exposure, she was starting to see how technology was being used in the classroom and began to feel "education was evolving to that." She was cautiously thinking about integrating technology into her teaching, and becoming more open to the idea of using new teaching strategies. She did implement Literature Circles in her teaching, which was a new teaching strategy for her; she did not use the strategy in all of her classes. She felt some classes would not be able to handle working in groups. While she was developing a desire to try new teaching strategies, she was limited by the high value she placed on classroom control. She identified the same risks when using technology and group learning projects, that students would be off-task.

Further supporting Kelly's developing beliefs of technology integration, in April 2008 the EMS principal decided to install digital projectors in all of the classrooms. This decision was a strong motivator for Kelly, as she considered using technology in the classroom. She felt this would change the technology expectations in the school, which aligned with her feelings that technology was becoming more prevalent in education. As Kelly changed her perception of technology integration, she began to perceive technology as less of a risk, which would be a function of valuing and developing a positive affect for technology. Seeing technology as an accepted tool in teaching would be a step towards agreed behaviour and perceiving technology as part of teaching. Additionally, accepting technology integration as an agreed behaviour in the school culture, is accepting that the role of teaching is changing. In the Hierarchical cultural type, technology use would be sanctioned by an expert (see Table 7.1), and at that point becomes low risk. When behaviours are not yet sanctioned, individuals would be unsure of appropriate use. Introducing a level of uncertainty related to technology integration, when many teachers are unsure of their own technology competence, increases the perceived risks related to using technology in teaching.

Kelly may have accepted that technology was part of teaching, but she was still very unsure of how to implement it in the classroom. She expressed a high level of teaching-efficacy and was highly motivated, but she emphasized a desire to have someone show her how to use technology. She expressed the perception that her Reading coach was familiar with using technology with the Reading curriculum, and would know what was appropriate. She did not feel competent using technology on her own, and needed support. Using technology inappropriately would be considered deviance in the teacher role.

8.1.1.3 The role of teachers: Efficacy and deviance

In a Hierarchical culture, it is a priority that individuals fulfil the tasks associated with their role. Repeating actions perpetuates roles and structures, and diminishes the individual's level of choice. All of the Phase 2 teachers identified student achievement as the top priority, and primary objective of their teaching role. Each teacher used methods and teaching strategies they felt helped them fulfil expectations of the role. This does not imply Phase 2 teachers were using the same teaching methods. The teachers employed a variety of teaching techniques (e.g., lecture, written tasks, small group work, etc.). The methods they used were accepted practices within teaching and generally proven to support student learning; further, the methods were accepted by the school culture. At the time of this study, teachers felt effective and successful using their chosen method of instruction and all had positive perceptions of their teaching.

Generally, teachers gauged their teaching-efficacy and level of success through a combination of standardized test scores, their own perception of student success, how other teachers performed with the same students, and student behaviour. LRP teachers were more likely to gauge efficacy and success based on standardized testing and classroom control, while MRP teachers focused more on the students' experience learning. Logically, teachers' perceptions of efficacy were closely aligned with their perception of quality teaching, and teacher or student-centred teaching methods.

While teachers had positive perceptions of their teaching, all of the teachers expressed some amount of anxiety related to their level of teaching-efficacy when integrating technology. Consider that the majority of teachers have been through a certified and standardized teacher-training course, in which they would have been exposed to accepted teaching methods. Teachers did not have standardized and accepted methods for integrating ICT into their teaching. This is not a new argument, but it does have implications relative to perceived deviance and risk when teaching with technology. In a hierarchical culture, experimentation with ICT-integration related teaching techniques would need to be approved by an expert or superior in the hierarchy. Perceived risks are related to social deviance and the potential that new methods would not support student achievement. Risk perceptions would be compounded by low computer-efficacy. When teachers had a low perception of their computer-efficacy, they perceived more anxiety and risk associated with integrating technology into their teaching. As previously outlined, MRB teachers felt they could "figure out" technology problems, while LRB teachers were limited by anticipated technology problems.

When teachers assessed their level of computer-efficacy, their perceptions were often based on external evaluations. They would typically cite tasks they felt peers or students were able to perform. Generally, teachers did not have an intrinsic sense of effective technology use, other than stating that "they could do what they needed to do." At the time of this study, LRB teachers, were not integrated technology into their teaching role, so assessments would have related to explicit tasks such as electronic grading.

In the current educational climate, teachers are often asked to apply new teaching methods or strategies integrating technology, which may or may not have an impact on student learning or have longevity in teaching. When teachers are repeatedly asked to adopt new practices, without success, they may begin to mistrust the expert (abstract system, knowledge, or supervisor) who has initiated the change. A natural response to too many possibilities and possible risk is for individuals to adopt a level of scepticism and become fatalistic about choices. When individuals

are presented with potentially risky changes, they can have a fateful moment. In the fateful moment, they may retreat from change and new choices and seek refuge in traditional beliefs, or they can become empowered and reskill.

At the beginning of the study, the four LRB teachers had a high level of expected anxiety and perceived risk associated with technology integration, primarily a function of their low computer-efficacy and teacher-centred classroom style. It is possible that LRB teachers' dependence on state-level standards and curriculum area conventions were a retreat to traditional methods, when faced with the risk of integrating technology into their classroom. MRB teachers did not have the same reaction to using new technology tools in the classroom. MRB teachers referred to standards and curriculum, not as a safety net protecting them from potential risk, but as a responsibility and expectation of their role as a teacher. The MRB teachers had a high level of computer-efficacy and playfulness, and low anxiety. They felt confident they could independently problem solve technology issues in the classroom, and did not perceive the same risk level as LRB teachers. Over the course of the study, it is possible that Kelly experienced a fateful moment resulting in a period of empowerment and reskilling. It was previously mentioned in this chapter that Kelly felt "this was the direction education was moving in," she wanted to engage in ICT-related change, and she was tired of asking for help. At the end of the study, she was feeling very positive about using new technology, and was highly motivated to improve their skills. Kerry had a similar experience. She was tired of asking for help, and decided if she wanted to meet her personal goals, she needed to reskill.

The examples discussed in the previous section illustrate that teachers' perceptions of efficacy and role expectations are influenced by the school culture. This close relationship illustrates the reflexivity between individual teachers and their culture. Before moving on to discuss the tertiary sphere, it is necessary to touch upon the influences of power and pressure upon the individual. While power and pressure are exerted upon individuals in a hierarchy, it is necessary for individuals to be willing to respond to pressures exerted by the group. Willingness, or individual commitment to the group, is ultimately an individual motivation. Without school-level ICT-integration expectations, why would LRB teachers begin integrating ICT into their teaching? If there is no pressure from the school (the group) to integrate ICT into their teaching, and they do not perceive social deviance through non-compliance, what is the motivation for them to begin using technology? Further, in this study, LRB teachers feel they were effective teachers. They did not believe that they needed to improve their teaching practice. Therefore, they were not motivated to integrate technology and change their practice.

8.1.2 Tertiary sphere: Commitment and pressure (group)

In this discussion, *group* is understood in terms of commitment and pressures at the school level. The concept of *group* is traditionally defined through its boundaries to the outside world. Boundaries are constructed through rules and group strength. To accept the pressures and constraints of a group, an individual would need to be sufficiently committed to the group to accept limitations on autonomy and choice. Commitment manifests as accepting a cultural role and performing the role specific tasks, and would imply a certain level of trust in the group leaders.

The tertiary sphere considers teachers' perceptions of the school culture. It relates to cultural pressures exerted on an individual, and their commitment to group values. Group commitment and hierarchical structure had a strong influence on technology-related risk perception, specifically in relation to social deviance. In the context of a school, teachers would have a predefined level of group commitment through its fundamental nature as a workplace. As previously outlined in Chapter 7, EMS teachers showed commitment to the school level group, which implies a Positional hierarchical cultural type at the school level. NHS teachers were more committed at the curriculum-area faculty level, which implies an Isolate hierarchical cultural type at the school level. NHS teachers did show tendencies toward a Positional culture at the faculty level.

When examining social deviance, it is necessary to consider individuals' personal agency, as well as cultural implications. The Phase 2 teachers all tended to accept the procedures, rules, and required curriculum of their school and curriculum area. Simon had stated that it is easier to do what is expected, rather than cause problems in the group. This statement was validated when he adopted a new English curriculum in 2008. Therefore, this is no reason to assume that his low level of technology integration and word processing instruction was social deviance, and that it was typical of his character. Rather, Simon's behaviour was illustrative of low commitment to the larger school culture. As previously stated, NHS was closer to the Isolate cultural type at the school level. In this type of culture, teachers would have a lower commitment to school goals. This was visible at NHS when they had difficulty identifying school technology goals. With a tendency towards low-group, there would not be sufficient commitment to maintaining structures and perpetuating the group.

In Isolate cultures, it is likely that perceived risks associated with technology would increase as there would be fewer trusted experts. The NHS teachers did not seem to have a trusted superior at the school level to validate technology, as they were questioning the principal. Fortunately,

teachers had a high level of trust in their heads of curriculum-area faculties, and generally deferred to the faculty level for validation using new tools or curriculum. This type of variance in group commitment has significant implications for leadership and perceived experts in the school culture, and thus approval of new technologies in the culture.

8.1.2.1 Positional: Group commitment at the school level

At EMS, technology innovation was still being developed during the 2007-2008 school years. Technology had been a priority at the school for many years, but they had lacked the funding to follow through with equipment purchases. The teachers were all committed to having technology in the school, and understood the school's financial limitations. Teachers' classrooms were typically equipped with only 2-4 computers and teachers did not have consistent access to the computer labs, but they all felt the school was working to provide them with additional equipment.

The importance of technology was stated in the school mission, thus reminding the community that technology is a priority. Kerry and the EMS principal both reaffirmed that technology was a priority in the school. A good illustration of teachers' group commitment in the school was Kelly's response to getting a digital projector in the classroom. Previously in this chapter, Kelly's evolving perception of technology was examined. An influential point in her change was the principal's decision to install digital projectors in every classroom. She stated that the school felt confident that funds for projectors would be available, and that it was a top priority of the school to increase the amount of technology in the classroom, even if the process was a bit slow. As a teacher representative on the school Advisory Board, Kelly was involved in the principal's decision to supply teachers with digital projectors. Through her involvement, she had a very high level of commitment in the decision. Involving teachers in this type of decision-making process increases their sense of ownership and value in group goals and increases group commitment (Leithwood & Reihl, 2003).

Kerry felt that increasing the amount of technology in the classrooms would change the schools' expectations for technology integration, which she felt was very motivating. The simple fact that Kelly felt motivated by the school's commitment to technology in the classroom shows a high level of positive affect and commitment to the group. Her previous comment that "education was going in this direction," illustrated a perception that technology use would be a school expectation and that technology integration was becoming the social norm. If technology was perceived as the social norm, Kelly would need to begin integrating technology to avoid the risk of social deviance.

Kelly's experience suggests several key trends for teacher change. Her experience is an example of a positive fateful moment of empowerment and reskilling. She was able to explore new student-centred teaching methods which she felt were appropriate for her curriculum, and she was motivated to learn how to use technology in her teaching. At the same time, she was involved in school-level cultural initiatives, thus developing ownership and value in cultural priorities. Both of these elements positioned, and supported, Kelly to continue taking risks in her classroom using new teaching methods and technology in her teaching.

8.1.2.2 Isolate: Group commitment at the faculty level

The NHS teachers said that their school was well equipped with technology. They were "told" at staff meetings that NHS was one of the best-equipped schools in NSW. Generally, the teachers did not agree with this statement, as they felt most of the equipment in their computer labs did not work properly. They felt broken computers should not be counted as usable equipment.

At NHS, as previously mentioned, teachers identified quite strongly with their respective curriculum-areas and faculties. Strong group commitment at the faculty level had an impact on teachers' risk perceptions and risk-taking behaviours. The two LRP teachers, Simon and Judith, did not integrate technology into their teaching, and perceived technology to be high risk in the classroom. When Simon discussed his technology use, he described himself as falling on the "low end of compliance." He was quick to qualify that he did *not* intend to mean he did *not* fulfil curriculum obligations. At the time this statement was made, he was not fulfilling curriculum obligations. Simon was not explicitly teaching word processing in his classes, which was required by the English curriculum. Simon's social deviance was not intentional; he felt not explicitly teaching word processing was the norm of the English faculty. It is important to note, it was not necessarily a policy of the English faculty to not teach word processing, but this was Simon's belief. He was operating under the assumption this was an agreed behaviour in the group and he felt he was meeting group expectations. Simon believed that, through his group membership, he was insulated from school level curriculum expectations.

It is possible that it was easier for Simon to invoke perceived traditions of his curriculum-area group, rather than teach word processing. Simon had a low perception of his computer-efficacy, and did not feel confident using technology in the classroom; further, he felt teaching word processing was not a good use of instruction time, because students were word processing their documents at home. His primary anxiety was that he was not able to assist students if they had problems using the computers during class. Simon identified two perceived risks: lost instruction time when teaching word processing in the classroom, and his own anxiety of not being able to

support students when integrating technology. Simon legitimized his lack of technology integration through his group membership. His belief, that the English faculty does not integrate technology or teach word processing, allowed him to minimize risks associated with social deviance, but still not meeting school-level expectations of technology integration.

In contrast, Molly perceived that teaching databases was a priority in the Science faculty, and that the faculty was fairly successful at doing so. She felt the Science faculty did a better job integrating the computer skill requirement than other faculties, because Science integrated explicit skill instruction into the curriculum. She had built the database lesson into a 7th grade Astronomy unit, but it was not necessarily her preference to teach databases along with her curriculum. Similarly to Simon, she perceived risks related to how much time it took to teach the computer-skills lesson, and ideally would have liked to have the skill taught in a computer class. Dissimilar to Simon, Molly had a high perception of her computer-efficacy, and did not have risk perceptions associated with using databases in class.

At the group level, the primary difference between Simon and Molly was that the Science faculty *did* teach databases, and therefore she complied and fulfilled the group expectations of her role. On a fundamental level, they both felt class time should be used for teaching subject area content rather than computer skills, but Molly felt she was expected to teach databases, and Simon perceived he was not. The two examples illustrate how group values are understood at the faculty level, which has significant implications for cultural change in schools with this type of hierarchy. Teachers in this type of culture are committed to the faculty, and therefore change initiatives must be focused at this level. Teachers place their trust and commitment in this group, therefore this is where they would value group behaviour through agreement, and avoid social deviance.

8.1.2.3 Leadership as trusted experts

A key element in changing practice is the freedom to experiment with different teaching methods, such as integrating technology. If teachers were not repeating the actions of their role, it could be interpreted as social deviance, which is considered high-risk. Risk perception is minimized by routinizing actions. In Hierarchical cultures, individual autonomy and freedom of choice are often constrained, in an effort to stabilize and replicate the culture. Changes in this type of culture have to be introduced by the perceived superior, leader, or expert in a group. In a school, leadership would have to support and sanction changes which may deviate from long-standing and proven (agreed) teaching behaviours. Whom teachers perceive as leaders or experts would be relative to their group commitment. Teachers' perceptions of leaders and

experts, in the context of change, would have serious implications. If superiors and subordinates were able to develop a trusting relationship, perceived risk could be minimized.

Individuals accept agreed constraints placed on their role as classroom teachers. One type of accepted constraint is illustrated through disappointing or difficult situations teachers faced as group members. For example, Beau did not receive a Smartboard after he completed the training, even though it was promised. After a year of asking for the Smartboard, he simply decided to stop asking. He was disappointed, but accepted that the school leadership was not going to supply him with the equipment. Beau's commitment to the group and trust in the principal allowed him to accept the disappointment of not receiving the promised equipment, but it was not without consequence. Each time Beau asked for the equipment, and did not receive it, he became more disillusioned with the school leadership and less trusting. As trust diminishes, group commitment becomes weaker, and could move towards low-group. In a change initiative, school leadership should be particularly sensitive to teachers' level of trust in the group. The earlier discussion demonstrated how Kelly's commitment to the group and her personal investment in the school's priorities allowed her to maintain trust in adverse circumstances.

Trust in, and support from, superiors is not always a benefit in the culture. For example, Judith did not feel as though she could teach spreadsheets to some of her classes with behavioural issues. To support her, the head Maths teacher taught spreadsheets to her classes. While the head teacher was presumably supporting Judith and hoping to reduce anxiety generated through teaching spreadsheets to some classes, he was in fact reinforcing her perceived risk – legitimizing risks perceived when teaching spreadsheets. Through his actions, he reflexively redefined Judith's role as a teacher through assuming the responsibility of teaching spreadsheets. If he takes her classes in the future, which she implied could be a possibility; he would continue to redefine her role – that she does not need to teach spreadsheets to her classes. Judith would accept her role being redefined, as she perceived her head teacher to be trustworthy. This does not mean the Maths department and school expectations have changed, but through the department head's actions, she will perceive different expectations.

In a Positional culture, it would be the responsibility of a teacher's perceived leader (superior) to begin the process of merging use of technology into teacher perceptions of teaching. For Kelly and Kerry to feel secure changing their perceptions of technology integration, it was necessary for a trusted superior to validate the change. At EMS, the principal would be considered an expert; not necessarily an expert in technology, but in relation to teaching goals and school

expectations. By making technology a priority and supplying subordinates with the appropriate tools to fulfil the expectation, he reinforced the value of technology integration within the group. Additionally, he created an explicit expectation – use this technology to teach – which gave Kelly a clearer understanding that, if she used the technology, she would fulfil the expectation. His endorsement of digital projectors assured the teachers that the technology was low-risk and of benefit. While this reduced some of the teachers' perceived risks, it still did not tell them exactly how they should be using the tool in their teaching.

Teachers' perceptions of technology, as distinct from their perceived computer-efficacy, are influenced by the group. The information and views put forward by the school leadership would be valued in a hierarchical culture. Therefore, when teachers are told that technology will support student achievement, they would adopt this perception. This is independent of their perceived level of computer-efficacy, or even if they value it in their personal life. It does not necessarily mean they will begin to use technology; but, if they are committed to the group, they will be able to identify the group goal of technology integration. When teachers are able to identify group goals and values changes in practice can follow.

8.2 Secondary sphere: Observable perceived risks

In the secondary sphere, teachers' individual perceptions (primary) interact with schools' cultural expectations (tertiary), and are visible through teaching practices. Throughout the day teachers make judgments in relation to individual and school cultures' risk perceptions, but the classroom is where these judgments can be observed.

According to Giddens (1990, p. 16), the "dynamism of modernity derives from the separation of time and space." Teachers were able to perceive risks relative to the teaching, disembedded from space and time. Chapter 6 presented the classroom as a constructed *space* where teaching occurs, while *place* is the physical classroom. In the teaching space, the ability to control the classroom when integrating technology was a frequently identified risk. When considering technology integration in the classroom, teachers closely linked *time* to the amount of time available to teach students, as well as perceived time available to prepare for teaching.

8.2.1 Hierarchy within the classroom

The traditional classroom is inherently hierarchical, supported the balance of power in the teacher-student relationship (Bray & Favero, 2004). In terms of cultural theory, teacher-centred classrooms would most closely resemble the Isolate culture. The teacher, in an Isolate culture,

would determine goals and behaviours in the group. Students would be clearly defined by the *student* role and the teacher would define students' level of autonomy. As students are not necessarily in classes voluntarily, they may not be committed to group goals (learning). The teacher would determine social deviance in the culture of the classroom, but the students may not identify with "obedience and authority" of the hierarchy. A student-centred classroom could take on a variety of cultural types, depending on the combination of teachers and students. Ideally, a student-centred classroom would take on an Egalitarian culture, where all learners are active, equal, and have a high commitment to group learning goals.

LRB classrooms were more likely to mirror the traditional Isolate culture. The teachers strictly controlled their classrooms, and exerted discipline. MRB teachers seemed to be working towards a more Egalitarian culture where they tried to construct spaces in which students had the autonomy to explore their learning and work together. For example, Molly often used unstructured student-centred approaches in teaching, particularly with her extension classes. She wanted students to have control over their learning, and preferred to act more as a guide and resource in the classroom.

8.2.2 The classroom embedded

As previously discussed, the classroom can be viewed as a micro-culture within a school. Each combination of teacher and students (16-30 in a class) creates a group with its own hierarchy and power structure. Teachers may assume multiple roles in the school culture, but the classroom space and place physically define the individual in the role of teacher. How much power exerted by the teacher would be a function of the classroom culture and their preferred teaching style.

Teachers perceived several risks related to the classroom *place* and *time* of teaching. Place and time are situated together in an agreed *space* which could be changed through technology integration.

8.2.2.1 Place: Physical influences of the classroom on the value of technology

Classrooms tend to be physically closed places. Individuals and groups interact with this place, and will develop a *sense-of-place* according to their level of attachment, satisfaction, and symbolic meaning with the space (Stedman, 2002). An in-depth evaluation of teachers' sense of place is beyond the scope of this discussion, but presents a preliminary exploration of risk perceptions related to technology integration in the classroom.

In classrooms at both schools, desks were arranged in rows, facing a whiteboard or projector screen; or they were grouped into sets of four or five desks (see Appendices F-M). NHS teachers were usually in the same rooms throughout the day, while groups of students rotated in and out every 50 minutes. Judith and Simon did not have dedicated classrooms, but they were usually in the same room. Judith and Simon showed very little attachment to their classrooms places, which were not decorated and tended to have litter on the floor. Of the four NHS teachers, only Elizabeth had computers in her dedicated ESE classroom. While the NHS teachers did not have technology in their classrooms, each faculty had a computer lab available for class use, as well as small computer clusters for individual student use.

Three of the EMS teachers had dedicated classrooms. Kerry did not originally have a dedicated classroom for Career Planning. The class was assigned to a computer lab in the second year, which was shared with other classes. She used a section of her office for after-school tutoring. All of the teaching spaces at EMS were well decorated and clean. Teachers exhibited attachment to their spaces, and spoke of plans to improve or change the classroom configuration. The classes at EMS had a wide range of technology access in the classrooms. Kelly and Beau's rooms were the least well equipped, with only two computers each. Danielle, similar to Elizabeth, had the most computers and technology tools in her ESE classroom. ESE classrooms will be specifically addressed later in the discussion. The computer labs were on the other side of campus, and were not easily accessible.

Symbols in the physical classroom place reflect cultural values and beliefs. For example, in most classrooms the school mission and behavioural statement would be posted in the room for symbolic reinforcement and referencing. Through posting the school mission in classrooms, students and teachers were aware of school expectations. In both schools, computers were not generally present, or were minimally present, in the classroom and therefore did not present technology integration as a priority. This was observed throughout the school, not only in the Phase 2 teachers' classrooms. The teachers at NHS had regular access to computer labs, but they did not feel the lab technology was reliable. Teachers at EMS did not perceive that using the computer lab was a possibility in their teaching due its distance from their classrooms' and limited availability. EMS teachers focused on the school bringing the resources directly into their classroom, such as digital projectors and Beau's application for a class-set of laptops.

In both schools, the physical separation of the computer lab from the teaching classroom reinforced the conceptual distance between teaching and technology. In most disciplines, teachers would have the necessary teaching tools in their classroom, such as microscopes for

Science and books for Reading. The proximity of these items in the teaching place embeds the tool in the teaching role. By separating technology tools from the teaching place, it is easier for teachers to disembed technology from teaching.

8.2.2.2 Time: Efficacy and preparation

When teachers discussed moving their classes from the teaching classroom to the computer lab, they expressed the perceived risk that it was distracting for the students and that instruction time was lost. Time constraints in teaching are often a concern. An increased focus on accountability at the school and faculty level, as well as standardized testing has compounded time pressures. All of the teachers perceived this risk, but how it influenced teaching varied between LRB and MRB teachers.

Teachers did not feel they were able to teach all of the required course content effectively before state-level test dates: Florida FCAT, March (Florida Department of Education, 2008a); NSW ELLA and SNAP, May (New South Wales Department of Education and Training, 2008). EMS teachers skipped chapters or units in an effort to cover as much crucial material as possible before the tests. NHS teachers were on paced curriculum schedules, and all classes needed to take unit tests at the same time. They often had to move forward in units quicker than they would have liked, regardless of class understanding and progress. If instruction time was lost, teachers felt it would directly impact on student learning and resulting test scores. The LRB teachers in this study were more concerned with time lost and test scores than were the MRB teachers. Regardless of how *much* impact teachers felt the loss of time had on student learning, teachers felt time spent trouble-shooting technology in the classroom and student transition time to technology was a risk to total instruction time.

The time spent physically moving from desks to computers or to the computer lab was perceived as a risk. MRB teachers conceded transition time was costly when they began integrating technology into their teaching; but, they felt that once transitions between class work and computer work were routinized, students were quicker and able to stay on task. The MRB teachers were able, and motivated, to adapt to the physical separation and transition to in-class computers or the computer lab. Molly and Elizabeth had routinized transitions between the computer lab and the classroom in their practice, and Danielle discussed routinization between the technology stations within her classroom. LRB teachers perceived transition time as a barrier to technology integration. Their lack of technology integration did not allow their classes to develop normalized behaviour when transitioning to technology. Therefore, they never reached a point of routinization in technology integration, and it would never reach a

point of agreed behaviour in the classroom. Without routinization, it would be difficult for teachers to have repeated positive experiences with technology integration. Without positive experiences, it would be difficult for teachers to develop their computer-efficacy. If they had repeated negative experiences, such as loss of classroom control or lost instruction time, they would be less likely to attempt to use technology in teaching.

According to Giddens' first factor of reflexivity and differential power (see Section 2.3.3), some individuals or groups are better able to appropriate specialized knowledge (Giddens, 1990, p. 54). The MRB teachers had significantly fewer barriers in their teaching and computer-efficacy limiting them from technology integration. At the time of this study, it would have been difficult for any of the LRB teachers to begin a process of routinizing technology integration into their classroom. LRB teachers felt that learning to use technology and integrating it into their teaching would take too much preparation time, and they were generally correct in this assessment. When Judith was in the IntelTeach program, she spent the entire course learning how to use Microsoft Excel to teach spreadsheets in her classes and did not feel comfortable using the software at the end. Teachers with low computer-efficacy, and high-anticipated anxiety, would require extra planning and training time to be able to use technology in the classroom. Until they are able to improve their level of confidence and competence using technology, they would perceive technology integration as high risk. Essentially, unless given explicit directions of what to teach, conceptualizing a technologically integrated lesson would potentially be beyond their ability.

8.2.3 Space: Classroom control and affective response

There is an extensive body of literature devoted to the study of classroom control, teachers' perceptions of classroom control, and student behaviour in class (e.g., Evertson & Weinstein, 2006). Classroom control was frequently cited as a perceived risk associated with ICT-integration, but MRB teachers did not generally perceive it as barrier to technology integration. LRB teachers often saw loss of classroom control as a reason not to use technology in their teaching.

The following section examines classroom control in the context of social deviance from school expectations as perceived risk within a hierarchy. In this discussion, teachers' perceived classroom control was influenced by two desires: a) to maintain a cultural power structure they personally feel is effective in the classroom, and b) to fulfil the power structure they feel is expected by the school or curriculum area faculty. In both cases, the power structure was relative to how much autonomy and experimentation was allowed within the group.

8.2.3.1 Two affective responses to the class

As outlined in Chapter 6, teachers tended to have two affective responses to the class: experimenting and limiting. When considering technology integration in the classroom teachers gauged the class response to integration as positive or negative. All of the teachers perceived risk related to classroom control and technology integration, but as with risks related to time, MRB and LRB teachers dealt with the risks differently. LRB teachers were more likely to label certain classes as "difficult," and perceived the class reaction to technology integration as a risk. MRB teachers were willing to work with more difficult classes. Perceptions of classroom control were related to teachers' notions of quality teaching. An adage often applied in teacher training is that less noise will come out of a well-controlled classroom. Student-centred environments will typically have more chatter and movement than a traditional teacher-centred classroom. When teachers considered technology integration and student learning, they would cite students being off-task during the lesson as a perceived risk.

LRB teachers perceived "difficult" classes as a significant risk when integrating technology, and were classified as having a *limiting attitude* towards their classes and technology integration. They perceived loss of classroom control as social deviance from their role as teacher, and a threat to the hierarchical power structure of the traditional teacher-student relationship. They were classified as *limiting* because their focus was on controlling students' behaviours in the classroom, rather than focusing on learning.

LRB teachers expressed higher anxiety towards students being off task and causing trouble. Talking loudly and throwing objects were two forms of trouble observed by the researcher in the lessons. Teachers felt they were unable to solve technology problems in the classroom, which meant they would be difficult to react instinctively to a changing classroom environment during teaching. If an LRB teacher was confronted with a technology problem in the classroom, they would need to seek assistance which could potentially sacrifice classroom time, and create downtime when students could become off-task. Kerry felt that difficult classes needed to be tightly structured when using technology, and that she would "plan for the worst" when teaching them. If Judith anticipated risks, she would simply not do the lesson. She felt technology integration presented too many risks and that it was not worth the effort, which she legitimized through her curriculum area. Kelly also avoided using student-centred teaching methods in classes that she felt were "not able to work together." As ICT-integrated projects are often based on student-centred teaching methods, LRB teachers are faced with two types of perceived risks.

MRB teachers were classified as having an *experimenting attitude* towards their classes and technology integration. Teachers were labelled as *experimenting* because they were willing to try new teaching methods in the classroom, and "see how it goes." Like LRB teachers, they perceived risks, but they felt potential gains in students' experiences in learning out-weighed the potential lost time or classroom control.

A significant part of their experimenting attitude was a high level of computer-efficacy. MRB teachers' lack of technology anxiety minimized fears of lost classroom control, as they did not have to worry about technical problem solving in the classroom. They were able to instinctually make decisions during interactive teaching, and adjust to the classroom environment. Danielle mentioned that sometimes she just "hides her eyes" when she integrated a new technology tool in her teaching and expects the class to be off-task. Molly stated that she was willing to accept the risk that students might be off-task at times, but she preferred them to spend time experimenting themselves rather than being tightly structured. When possible, MRB teachers in this study did not exercise strong hierarchical power in their teaching. They were more likely to work with their students as a guide in student-centred instruction. They did not exclude difficult classes from group work or technology integration. Additionally, they expressed the notion that they learned how to be better teachers from their students, and would adjust their instruction accordingly. MRB teachers did not perceive that risk associated with ICT-integration and student-centred teaching methods out-weighed the benefits of multiple delivery methods and increased student engagement in the classroom.

In summary, teachers are dealing with two levels of perceived risk in the classroom space when integrating technology: affective response to the class and teaching style, as well as perceived computer-efficacy. MRB and LRB teachers identified classroom control as a risk. To the LRB teachers, losing classroom control and thus teaching time was not worth the risk, but they also anticipated lost instruction time if they had problems using technology while teaching. Therefore, LRB teachers' potential to take risks and integrate technology in the classroom must be addressed in terms of time and anxiety using technology. MRB teachers were not limited by their computer-efficacy or problems with technology integration. The MRB teachers were willing to experiment with teaching methods, as well as experiment in the classroom if there were problems using technology. They had strategies they employed if there were problems, such as having the students help solve technology issues. In the end, both sets of teachers identified loss of classroom control as a risk, but MRB teachers felt that integrating technology in their teaching was worth the risk. Although, MRB teachers would be faced with fewer risks, as they

had higher computer-efficacy and were able to problem solve if there were technology-related issues while teaching.

8.2.3.2 Cultural expectations and hierarchical control

The group perception of how well a teacher controls the classroom would be linked to anticipated student achievement, and therefore have a significant effect on their teaching-efficacy. For example, when Beau discussed Kelly's years of teaching experience he noted that she did not use technology, but she had excellent classroom management. He identified a wish to develop similar classroom management as he acquired more teaching experience. In this statement, he identified this as a valued skill. Kerry reiterated this value in regards to new teachers at EMS; they had good classroom management skills.

These collective comments implied that hierarchical classroom management was valued by the culture. Initially at both schools, the expected level of classroom control was more closely aligned with the teacher-centred style. Most of the classes observed at NHS were teacher-centred. Classrooms at EMS were a mix of teacher and student-centred methods. As outlined in the previous section, the teacher-centred style would be highly structured and limit students' autonomy in the classroom. NHS seemed to support a teacher-centred hierarchical classroom control style. This was illustrated through Molly's perceived risk of peers judging her classroom control and teaching method.

Chapter 6 illustrates how teachers routinely labelled the mood of their classes before observation, that they were "weird" or "fussy" on the given day. Teachers were frequently self-conscious of their level of classroom control during observation, even teachers with a high level of teaching-efficacy. There were many reasons for teachers to exhibit some level of anxiety about being observed, but they consistently commented on the class behaviour and management. This implies it was important that if observed behaviours in the classroom were deviant, that the teacher was aware of the behaviour, and that it was under control.

MRB teachers were trying to use student-centred approaches with technology integration as frequently as possible. At a school culture level, for student-centred approaches and technology integration to be adopted school-wide, methods would need to be routinized and normalized to be accepted in a hierarchical culture. Making these kinds of changes can be extremely challenging for the teacher and the school leadership. For example, LPB teachers who had been successfully teaching for many years would have difficulty motivating to change. If a teacher had a low perception of their computer-efficacy and did not value integrating technology into the

curriculum, but had been routinely told they were a successful teacher, why would they change their proven teaching methods? In Judith and Simon's case, they had both taught successfully for over 20 years. The school reinforced their perception of success by giving them top classes. If a school does not outline specific guidelines and expectation supporting technology integration, establishing a new social norm and agreed behaviour would be difficult in a hierarchical culture. Without clear expectations, teachers would have no reason to change a successful teaching practice.

In the context of technology integration, supporting teachers to change their practice and integrate technology will not happen without a culture of experimentation. School leaders would need to make specific adjustments in the culture to facilitate change, as well as cultivate a trusting relationship between the teachers and school leadership. EMS was beginning to make these cultural adjustments to facilitate experimentation. These adjustments could be seen in such things as supplying technology in the classroom, as well as setting cultural priorities and, for the most part, following through with promised actions.

8.2.3.2.1 Cultural expectations of Special Education

ESE classrooms did not seem to have the same constraints as mainstream classes. Elizabeth and Danielle, both ESE teachers, were the two highest MRB teachers in the study. They both expressed a strong desire to give their students the best possible learning experience. They felt they were able to do more in the classroom because of the smaller class size, and that they had their students for longer during the day. They both also felt that mainstream classroom teachers dealt with a wide variety of learning and behavioural issues, as they do, but that mainstream teachers did not have the training or the time to properly attend to students' needs.

It is possible, with the intensity of ESE students' needs that a lower level of hierarchical control could be exerted upon the student group. Elizabeth stating that "a good day is when no one gets hit" gives some credibility to this assumption. Additionally, the ESE teachers did not have the same testing pressures as mainstream teachers. Danielle stated that her students would take the test, but it was assumed that they would not do as well as the other students.

This study does not present an in-depth discussion of ESE classrooms, but it is important to acknowledge that Danielle and Elizabeth both perceived that their classrooms were different from the "regular classroom." They both felt it was easier for them to experiment with their teaching due to smaller class sizes and additional time with their students. In short, they did not have the same restrictions on their teaching, which would be present in a traditional classroom.

They both felt they had the freedom and teaching space to experiment with their teaching, in an effort to help their students learn as well as possible.

8.3 Conclusions

This chapter has described how individual risk perceptions of ICT-integration in the classroom relate to schools' cultural types. This was presented using the three spheres of control. The three spheres of control exhibited a reflexive relationship, in which the individual cannot be separated from the group. The discussion presented several of the complex relationships occurring in the context of technology integration, primarily emphasizing the importance of teachers' commitment to group goals and relative risk perception in conjunction with individual perceptions of their role as a teacher.

In the primary sphere, individual teachers' teaching roles were clearly defined (grid) in each school through school missions and standardized curriculum, but the role of technology in teaching was not well defined. In the context of ICT-integration, if teachers are going to integrate technology in the classroom it would be necessary to integrate technology into their perceived teaching role. Teachers need to perceive that these new teaching methods were the social norm and agreed behaviour in the culture before change could take place. In a hierarchical culture, change and technology are high risk if they are not approved by group experts. In the context of a school and ICT-related change, approval from experts often means approval from school leadership. Teachers would base their perceived levels of efficacy, or deviance, on social norms and agreed behaviours, which would then influence their perceived risks related to technology integration. Prior research has theorized that "general" exposure to technology is not as critical as specific task-relevant experience in change (Mueller et al., 2008, p. 1532). The findings presented in this thesis came to a different conclusion, teachers' experiences show that general exposure normalizes practices, and integrates them into teachers' perceptions of the teaching role. The teachers should be exposed to technology through both methods.

To exert change pressures on individuals, group members must have commitment to the group. The tertiary sphere considers group commitment in terms of isolation from outside groups, commitment to group values, and trust in group leaders. NHS and EMS school cultures were both Hierarchical, but high group commitment was exhibited at different levels within the hierarchy. NHS teachers were committed to their curriculum-area faculty groups, and showed a more Isolated group culture at the school-level. EMS teachers were highly committed at the

school-level, but not at the grade-level teams, which implied a Positional culture at the school level. Varying areas of group commitment affected teachers' perceived risks. LRB teachers legitimized not integrating technology in their classrooms, through perceptions that their curriculum area and discipline faculty "did not use technology." NHS teachers felt their faculties would insulate them from school and NSW DET expectations, and that only expectations within the discipline needed to be fulfilled.

School-wide change can be affected through teachers' group commitment. Individuals in Hierarchical cultures will look to supervisors and trusted experts for social norms and agreed behaviours in the culture. This means that schools need to identify where teachers perceive group commitment when change initiatives are presented. At EMS, change can be instigated from the school level, as the principal was deemed trustworthy. At NHS, teachers placed more trust in the heads of their curriculum areas, rather than the principal. This implies that heads of faculty at NHS would be instrumental in establishing new agreed behaviours, and helping teachers to integrate technology into their perceived teaching role.

Individual perceptions of the teaching role and group commitment to technology integration can be witnessed through teachers' practice in the classroom, the secondary sphere. The secondary sphere includes: the physical space where teaching occurs; the time constraints of teaching; and, the constructed classroom space. MRB teachers understood technology and experimentation as part of the teaching role, while LRB teachers saw it as separate, deviant from their teaching goals, and high-risk. LRB teachers saw classroom control as a risk when integrating technology and when using student-centred teaching methods. If LRB teachers were considering technology integration or student-centred teaching methods, they would not try new approaches in "difficult" classes. LRB teachers felt that some classes were more likely to be difficult and out of control when they tried new teaching methods, and felt that loss of classroom control put student learning, and overall achievement, at risk in these classes. LRB teachers perceived that a high level of control was an element of being a successful teacher. MRB teachers did not typically find a loss of classroom control or "difficult" classes to be a limiting factor in their teaching. The MRB teachers were more concerned with student engagement and learning than classroom control. They felt technology and student-centred methods improved students' overall engagement and learning in the classroom, so they were willing to experiment with new teaching methods.

In a Hierarchical culture, schools need to help LRB teachers reformat their perceived teaching role, through appropriate trustworthy channels, to integrate technology and experimentation.

Schools would need to find ways to motivate teachers to experiment in their teaching, while making them feel in control, effective, and successful. Teachers would need to feel empowered and capable of entering into a reskilling endeavour. Reskilling and integrating technology into the teaching role would require focused efforts in all three spheres of control, to create reflexive change from both the individual and culture. The next chapter will present these findings in relation to the main research questions, along with contributions to original knowledge and suggestions for future research.

9 Conclusions, implications, limitations, and further research

The previous chapters have presented a detailed exploration of teachers' individual perceived risks, risk-taking habits, and school culture in the context of ICT-related educational change. The following discussion summarises the conclusions of the study, framed, initially, in relation to the three research questions.

9.1 Questions addressed in the study

The focus of the research is captured in the following statement: Teachers' personal and cultural values and beliefs influence their risk perceptions and risk-taking behaviours in the context of ICT-related educational change. The discussion will now address each of the three research questions employed to explore the research statement.

9.1.1 Question 1

The study presented an original Risk-taking Potential (RTP) questionnaire. The questionnaire was based upon previously tested measures examining teachers' perceptions of teaching-efficacy, computer-efficacy, playfulness & anxiety, and school culture. The first research question asked:

1) **Do the indicators predict secondary-level teachers' risk-taking behaviour and their potential to integrate ICT into the curriculum?**

Phase 2 teachers' scores, presented in Table 4.12, showed that there was not a singular linear relationship between teachers' indicator scores and their risk-taking potential scale (RTPS) score. Findings imply that the indicators are not individually predicative of teachers' potential to take risks, but can be predictive when aggregated as an RTPS score. The primary function of the RTPS score was to identify teachers who would exhibit more or less risk-taking behaviour. The resulting risk-taking potential scale (RTPS) scores were able to identify teachers who were more or less likely to take risks in the context of ICT-related change. Validity of RTPS scores was confirmed through triangulation with Phase 2 interview and observation data on teachers' ICT-related risk-taking behaviours in the classroom.

The risk-taking indicators had been previously identified in the literature as factors influencing teachers' ICT-integration (see Chapter 2 Sections 2.6 and 2.7). The RTP questionnaire is the first measure to consider the four indicators in terms of risk-taking, and be able to identify teachers who would show more or less risk-taking behaviours in the context of ICT-related change.

Additionally, the questionnaire was able to identify some of the complex interactions occurring between the four risk-taking indicators, specifically differences between teaching and computer-efficacy in relation to teachers' RTPS scores. While prior studies considered teaching and computer-efficacy in regard to characteristics of teachers who integrate and those that do not (e.g., Mueller et al., 2008), the RTP questionnaire reveals how all four indicators combine and potentially influence teachers' levels of ICT-integration.

Predictably, cultural risk perceptions strongly influence risk-taking behaviours. In the context of ICT-related change, teachers judge risks in terms of individual and cultural values. Similarly, at this time, research calls for school context to be studied along with the individual teacher (cf., Hew & Brush, 2007; Lawless & Pellegrino, 2007, p. 594). The RTP questionnaire includes teachers' (agents) perceptions of experimentation in their school culture as a portion of their RTPS score, but it does not provide a sociocultural perspective of risk perceptions in the larger school culture (structure). To develop a sociocultural understanding of teachers' risk perceptions, the study categorized teachers through their potential to have more (MRB) or less risk-taking behaviour (LRB). Categorization by potential risk-taking behaviours establishes teacher dispositions in the context of ICT-integration and teacher change. Dispositions provide a starting point to examine individuals' collective risk perceptions through the theory of structuration and grid-group typology, thus ICT and change-related risk perceptions at the cultural level. This is a new way to evaluate individual teachers' and schools' potential to engage in ICT-related educational change.

9.1.2 Question 2

Prior to this study, teachers' ICT-related risk perceptions had not been identified in educational research. The literature had shown that teachers need to be risk-takers and that they need to take risks (Section 2.8), but there has been little documented understanding of what this means in the context of ICT-related change. Risk analysis starts with risk identification (Vose, 2008, p. 5). When risks have been identified, better-informed decisions can be made in change-related situations. The aim of this study was to identify teachers' perceived risks. Considering this, the second research question asked:

2) **What risks do secondary level teachers associate with integrating ICT into the curriculum?**

The discussion presented perceived risks using the idea of the three spheres of control. The over arching cultural value perceived by teachers, and therefore the main area of risk perceived in

relation to ICT integration, was high student achievement. Teachers identified several risk perceptions, related to student achievement, when integrating technology into teaching:

- How technology supports notions of effective and quality teaching (primary sphere)
- Loss of classroom control (secondary sphere)
- Time: lost instruction time and lesson preparation time (secondary sphere)
- Fulfilling cultural expectations (tertiary sphere)

Perceived risk varied in intensity between LRB and MRB teachers, depending on their willingness to experiment in their teaching, their notions of quality teaching, and preferred teaching method. These findings are consistent with prior research stating that teachers' openness to change is an important indicator in technology integration (e.g., Baylor & Ritchie, 2002). What is important to note is that MRB and LRB teachers identified the same risks, but their perceptions of how technology aligned with quality teaching strongly influenced risk-taking behaviours in their teaching.

MRB teachers felt quality teaching improved students' engagement and ownership in learning. They were more likely to use technology, student-centred teaching methods, and group work in the classroom. They were willing to try any teaching method that would improve learning, and they felt technology generally supported quality learning. They felt they were able to problem-solve any technology or classroom issues that might arise, so perceived low risks associated with time and classroom management. They were also willing to accept a certain amount of necessary adjustment in their teaching, and were willing to amend lessons that may not have gone well.

LRB teachers tended to discuss student achievement in terms of grades or test scores. They were more likely to use teacher-centred methods in the classroom, and less likely to integrate technology or use group work in their teaching. LRB teachers did not necessarily see technology supporting their notion of quality teaching, and therefore perceived high risks associated with student achievement. Compared to MRB teachers, LRB teachers had generally lower perceptions of their personal teaching and computer-efficacy, and perceived higher risks associated with problem-solving technology issues, time, and classroom management.

MRB and LRB teachers were equally concerned with meeting group expectations, whether the group was at the school or curriculum-area faculty level. Risk perceptions were influenced by group expectations in relation to social deviance and agreed behaviours in the two school

cultures. Additionally, risk perceptions regarding group expectations were reflexively related to teachers' teaching-efficacy, computer-efficacy, as well as playfulness & anxiety.

Teachers' risk perceptions were illustrated through the idea of three spheres of control: individual (primary), classroom (secondary), and school culture (tertiary). The three spheres provide a way to conceptualize the interaction between individual teachers, the classroom, and the school culture. In all three spheres, perceived risks when integrating ICT into the classroom were judged against the costs to student learning and overall student achievement. As previously stated, while teachers perceived similar risks, risk-taking behaviours between MRB and LRB teachers were closely related to their conception of quality teaching. Their conceptions of quality teaching were legitimized through their group commitment.

Findings were able to show that when teachers were committed to a group, they would adjust their values to match those of the group culture. Kelly and Kerry perceived that technology was a priority at the school level at EMS, and began to increase their use accordingly. They increased their use even though they perceived significant anxiety when using technology, professionally and personally. On the other hand, Judith and Simon did not feel that their curriculum-area faculties used technology, and therefore, did not feel they needed to use technology in their teaching. While the legitimation of teachers' low technology use through their curriculum area is consistent with prior studies (e.g., Hennessy et al., 2005), the theoretical framework of this thesis is able to examine teachers' risk perceptions on a sociocultural rather than a curriculum perspective. Risk perceptions are highly contextualized and they can vary greatly between groups and cultures. The similarity of risk perceptions between all of the teachers validates a common disposition between the teachers and common values between the two schools, even though they were in Australia and the United States.

9.1.3 Question 3

The interaction between teachers' perceived risks, and those of the school culture, had not been addressed in previous educational research. Therefore, the third research question asked:

3) How does school culture interact with secondary-level teachers' risk-taking when they are integrating ICT into the curriculum and changing their teaching practice?

Risk perceptions were closely aligned with teachers':

- Acceptance of role in group
- Group commitment

- Trust in group experts

Both schools were classified as Hierarchical culture exhibiting high-grid traits. EMS was categorized as a Positional hierarchy, as it showed tendencies towards high-group as the school level. NHS seemed to exhibit low-group traits at the school level, and was therefore more of an Isolate hierarchical cultural type; but, the culture was Positional within individual curriculum-area faculties.

Teachers' role acceptance in the group would imply a commitment to group goals, and would therefore reflexively perpetuate the groups' values and goals. Teachers would perceive risk in choosing actions that did not align with their role: such actions would be seen as deviant. Neither of the schools had a clear plan for technology integration in the classroom, therefore teachers were not provided with guidelines for agreed behaviour when considering using technology in the classroom. The schools had not integrated technology into the definitions of the teachers' roles.

Generally, LRB teachers did not feel that technology supported learning, or that its use was not part of their role as a teacher. The risks they associated with using technology and integrating it in the classroom would be considered an unnecessary high-risk deviation from their role as a teacher. Therefore, there was no reason for them to change their practice and integrate technology into their teaching. MRB teachers felt that technology supported student learning and their teaching goals, so they felt using technology was part of their role as a teacher. MRB teachers often expressed the perception that finding new and improved ways to engage students was part of their teaching. These teachers saw technology, student-centred teaching methods, and group work as ways to engage students; and, they were willing to experiment with new methods. Past studies have said that teachers who are open to change will be more inclined to integrate technology (Baylor & Ritchie, 2002). This study suggests that it is not that they are "more open to change," but that they see changing and adapting as part of improving teaching. They see change and inquiry as part of their role as a teacher. Overall, teachers at both schools exhibited acceptance of their role in the school. Teachers did not show role competition, and worked to meet group expectations associated with their role.

At the group level, teachers in the two schools showed differences in the structure of commitments: teachers at EMS were committed to the group at the school-level, while NHS teachers were committed to the group at the curriculum-area faculty level. As previously mentioned, neither of the schools had developed technology integration plans, nor were there

specific, explicit expectations to use technology in the classroom. Therefore, teachers who were not integrating technology were not deviating from the group's explicit agreed behaviours. Teachers in both schools felt that there were implicit expectations to integrate technology in the classroom, but only in relation to certain curriculum areas. When necessary, LRB teachers would use perceived curriculum-area group values to legitimize their lack of technology integration. This finding was consistent with prior research stating that teachers will use subject culture practices to rationalize their lack of ICT-integration (e.g., Selwyn, 1999). In terms of grid-group typology, teachers, specifically NHS teachers, felt insulated from wider school-level expectations, as long as they were fulfilling the expectation of their curriculum areas. This finding has important implications in regard to how innovations are implemented in schools in the future, and how risk perceptions are understood in school cultures.

NHS did have explicit curriculum expectations for teachers to teach computer skills in English, Science, Maths, and Physical/Health Education. Teachers generally complied with the NSW curriculum expectations, but Simon did not (see Section 8.1.2.2). He felt that the English faculty did not require him to teach word processing, thus insulating himself from group perceptions of social deviance. Group isolation, and protection, from other discipline-based groups was common at NHS. NHS teachers were found to be high-grid and high-group at the level of curriculum-area faculties, while they showed tendencies towards an Isolate culture at the school level. It would be difficult to institute school-wide technology integration if teachers did not identify with school level initiatives. The teachers, like Simon, were not committed to school-level group goals and values, but were committed to curriculum-area group values and goals. Systemic changes at a school showing this type of culture would need to happen at the level of curriculum-area faculties, rather than at the school level. This would require middle leaders, such as heads of disciplines, to manage change that might have originated from the principal.

These findings are in line with previous research stating that schools need to support a culture of experimentation to facilitate risk-taking and change (e.g., Hew & Brush, 2007), but adds that experimentation has to be supported by the appropriate superior level in the hierarchy. In a Hierarchical culture, such as EMS and NHS, technology is low-risk if it is approved by a superior. Whom teachers identify as the superior in the hierarchy, will influence their risk perceptions and risk-taking behaviours. For group members in a Hierarchical culture to accept change and take risks, they must trust group experts; in this context, experts would be school leadership. In a school, school leadership approval would minimize the threat of social deviance when experimenting with technology integration and new teaching practices, thus supporting a

culture of experimentation. At EMS, as a Positional culture, this approval would come from the principal. At NHS, approval would come from the head of the curriculum-area faculty. When group members do not trust experts they will not be comfortable taking risks. Technology integration at NHS would need to be addressed at the curriculum-area level, as well as the school level, because teachers did not necessarily trust the principal and deferred to their heads of discipline for leadership. Therefore, the principal's approval on technology usage would not fully alleviate perceptions of social deviance. Approval from school leadership would still be necessary, even though the NHS school culture is Isolate at the school level. The school is still a hierarchy, and therefore, approval from school leadership would help ensure technology integration was consistent across the school.

Overall, teachers' individual risk perceptions showed consistency with the schools' grid-group types. Through this model, the research was able to identify the reflexive relationship between individual teachers and their group commitment in school cultures, in the context of technology integration. In terms of the theory of structuration, if teachers do not perceive a need for change, such as Judith, they will not exert agency and make changes in their behaviours. Theoretically, if teachers feel they are fulfilling cultural expectations and achieving goals, there would be little reason to change their teaching practice. Using the theoretical framework presented in this discussion, the sociocultural interactions between teachers' motivations to change, and school expectations of change, can be examined in terms of grid-group typology.

The previous section summarized findings relative to each of the research questions. The next section will present limitations of the research. Limitations of the research will be followed by a comprehensive summary of the research, presented through theoretical innovations and a discussion of the original contributions to knowledge.

9.2 Limitations of the research

This was an exploratory study of a relatively under-researched area (risk perceptions and ICT-integration in secondary education). As such, it suffers from a number of limitations that can now be overcome by follow-up studies, particularly if they are not restricted by the logistical constraints of PhD research.

The first limitation of this study arises from the small sample sizes used, in each phase of the research. Not achieving a representative sample size did not jeopardize the study. The research does not claim to be generalizable to the larger teaching community. A sufficient number of responses were collected to validate the internal reliability of the RTP questionnaire, and create

scales for Phase 2 participant selection. Two case study schools, a total of eight teachers, participated in Phase 2 of the research. This was a small sample size and results are, of course, not readily generalizable to the teaching population at large. Douglas (1992) and Giddens (1991b) both state that their theories are best used for social analysis rather than creating generalizable empirical data. Therefore, while not generalizable in the conventional sense, the sample sizes were appropriate for an application of the theoretical framework in an exploratory study.

Additionally, participants were volunteers. It can reasonably be assumed that teachers volunteering to participate in interviews and classroom observations would have a positive view of their teaching. Questionnaire results showed that all of the Phase 2 teachers had a high level of teaching-efficacy. It was also difficult to ensure teachers volunteering would be truly representative of the more or less risk-taking behaviour scale designations. Out of the eight Phase 2 teachers, seven of the teachers were representative (in this sense) while Beau was in more of a middle ground due to his TE score and failure to complete the Play measure.

An additional limitation to consider is cultural bias. In this type of ethnographic analysis, the researcher is inextricably part of the process, particularly when the researcher interprets data through theoretical and thematic coding processes (Flick, 2002). If a researcher is too involved in the group they are studying, they are subject to bias through their personal experiences. If they are too removed from the group, they can lack sensitivity to cultural nuances. Ideally, a project such as this would have a second researcher code teachers' interviews, or observe classrooms, to ensure coding and observational reliability, and minimize bias. A second researcher was not an option in this study due to funding limitations. While a second researcher was not available to the study, the constant comparison method did allow some control for bias through member checking during the Phase 2 interview process. Additionally, findings were validated through triangulation with classroom observations and field notes.

As well as cultural bias, there were limitations associated with gaining access to cultural groups and developing trust with participants (Neuman, 2005). In this study, I was not a member of either school community, nor was I part of the wider school communities. As stated in Chapter 3 (Section 3.3.5), in NSW I was viewed as a non-Australian outsider. In Florida, I was an outsider because I lived in Australia and had never lived in the southeastern United States. I was given a certain amount of insider status in both communities, having worked as a secondary-level teacher prior to commencing my postgraduate studies. Also, working for well-respected universities in both regions gave me credibility within both communities. Being an outsider in

both schools helped to reduce some aspects of cultural bias, while my past teaching experience and university affiliations helped to develop a trusting relationship between the teachers and myself.

In addition to researcher bias and trust, there were several logistical issues related to conducting research in two different countries and school systems. The primary difference between the two school systems was the structure of secondary school in the two locations. In NSW, grades 7 and 8 are included in secondary school, while they are considered middle school in the United States. Also, teachers in Florida were grouped in grade-level teams, while NSW teachers were grouped in subject area faculties. While there are some differences between middle schools and secondary schools, they did not have a significant impact on this study.

On a logistical level, there were difficulties in both samples. Primarily, it was not possible to conduct first, second, and third rounds of interviews and observations in both schools at the same time. The largest impact on Phase 2 data collection schedules was the NSW DET ethics process (SERAP), which took approximately six months to complete. Time spent completing the SERAP process put the NSW Phase 2 data collection six months behind Florida. Therefore, the NSW teachers were interviewed and observed over a six-month period; Phase 2 in Florida was over a full year. Additionally, there were limitations related to school calendars, particularly summer and mid-term breaks. The reversed summer holidays did not pose a significant problem in the research, as the school break NSW is only six weeks and most of the Florida data collection took place between the summers of 2007 and 2008. The research schedule also had to account for school breaks between terms, testing weeks, and other assorted school functions and holidays.

While Phase 2 in NSW was over a shorter time, all interviews and observations were done at the same time. For the Florida collection, the first interview round was done through Skype, and the observations were done within a few days of the second interviews and observations. Due to travel restrictions, it was not possible to travel to Florida to conduct classroom observations alongside the first interviews. Additionally, the third Florida interviews were conducted over Skype, and the observations (with shorter interviews) were done several weeks later. I was unable to travel to Florida to do the third interviews in an appropriate time frame from the second interviews, but was able to travel several weeks later to conduct the observations and short follow-up interviews (see Table 3.8 for data collection dates). Member checking allowed data validation from the Florida observation findings to minimize inconsistencies related to delayed classroom observations.

9.3 Theoretical innovations in the research

The research presents several innovations in understanding teachers' perceptions of ICT and school culture. Primarily, the research presents a new area of consideration in teacher change research, as teachers' risk perceptions when integrating ICT have not previously been examined in educational research. This method is particularly important at this time, when school leadership research states that teachers need to be prepared to take risks in order to participate in educational change (Ertmer, 2005; Fullan, 2001). Teachers often have access to resources and training, but they need to be prepared to take risks in the classroom. This study presents a way to begin assessing what type of support is needed, and where it is needed, in the context of ICT-related educational change.

The most significant innovation in this study is the development and application of the theoretical framework. The two primary theories, the theory of structuration and grid-group typology from cultural theory have been widely applied in sociology and anthropology, but they have not been applied together in educational technology research. The depth and breadth of social analysis and ethnographic work employing the two theories provided a rich body of knowledge to draw upon, and adapt to the educational context.

The theory of structuration provides a conceptual framework through which the agency of individuals and the structure in which they operate has a reflexive relationship. The concept of institutional reflexivity provides understanding for the impact of trust in school culture, and how trust impacts on individuals' willingness to engage in risk-taking behaviour. A school that is able to engender trust in the community would be able to support a culture of experimentation. Without trust, individuals would not be comfortable engaging in experimentation and risk-taking with technology in their teaching practice. With trust and confidence in the school, teachers were willing take risks and experiment with changes in their teaching practice. Teachers' willingness to experiment and change their teaching practice to align with school priorities and values implies commitment to the school culture as a group. Grid-group typology was employed to classify school cultures, in an effort to gain a better understanding of the school cultures' risk perceptions. Schools were classified as Hierarchical cultures, EMS was Positional and NHS was Isolate. Through school culture classification, assumptions could be made about perceived risks, particularly in relation to technology. Understanding how technology acceptance relates to the cultural hierarchy is an important element of creating better support structures for teachers as they learn to integrate ICT into their teaching. This aspect of the theoretical framework is particularly important when considering how teachers

accept new technologies in the classroom. In a Hierarchical culture, new technologies are generally considered low-risk if they are approved by an expert.

The discussion proposes that due to the hierarchical nature of school environments, it is difficult to consider the individual independent of the hierarchy. Viewing school culture through cultural theory, and considering the reflexive nature of individuals' roles within the hierarchy give a much more realistic view of teachers within a school. Through this method of analysis, this study has revealed some implications between theory and practice – why teachers make the choices they do in the classroom. Findings from this study show that there is a strong link between teachers' preferred teaching method and their potential to take risks. This association is primarily rooted in teachers' perceived risks related to classroom control when integrating ICT and using group projects, which would be typical practices in student-centred classrooms. Teachers are able to legitimize not integrating ICT into their practices through their group membership within the school. These findings are consistent with previous studies on the languages of legitimization (e.g., Maton, 2000).

An additional innovation in the research is the international nature of the study. Education is becoming increasingly more globalized, as communication and access to resources is increased through technology (Baron et al., 2003). This study presents similarities in teachers' dispositions in two schools: similar anxieties and risk perceptions in regard to ICT-tools and change. Differences in teachers' technology integration were contextual and related to their perceptions of quality teaching, even in two different school systems.

9.4 Summary of the main contributions to knowledge

The first contribution to research in the area is partly a methodological one: the development of the Risk-taking Potential (RTP) questionnaire and the resulting risk-taking potential scale (RTPS). The RTP questionnaire was found to poses adequate internal reliability, the resulting scale (RTPS) was validated through triangulation with Phase 2 results. Results from the RTPS indicated whether teachers would show more or less risk-taking behaviour in the context of ICT-integration. This finding addresses the first research question: "Do the indicators predict secondary-level teachers' risk-taking behaviour and their potential to integrate ICT into the curriculum?" The MRB teachers identified through their RTPS scores proved to demonstrate more risk-taking behaviours, were more likely to experiment with technology in the classroom, and more likely to employ student-centred methods in the classroom. The LRB teachers were less likely to show risk-taking behaviours, were less likely to use technology in the classroom,

and did not use student-centred techniques in the classroom as often as the MRB teachers. Therefore, the RTP questionnaire, and associated indicators, were able to identify teachers' potential to take risks in the context of ICT-integration.

A second contribution to research was the identification of teachers' risk perceptions in the context of ICT-integration. These findings answered the second research question: "What risks do secondary level teachers associate with integrating ICT into the curriculum?" The primary risk, also the most important group goal, identified by all teachers, was student achievement. Teachers identified several risk perceptions (see Section 9.1.2) that they felt impacted student learning, and thus overall student achievement. The thesis presented the idea of spheres of control, as a way to conceptualize teachers' risk perceptions. The most important aspect of teachers' risk perceptions was the relationship between risk perceptions and teachers' conceptions of quality teaching. While MRB and LRB teachers perceived similar risks, MRB teachers showed very different risk-taking behaviours, because they had a different conception of quality teaching, as well as of their role as a teacher. Teachers' conceptions of quality teaching related to their curriculum-area identification, which related to their group commitment.

The third contribution to research is a better understanding of the interaction between schools' cultural types, and individual teachers' risk-taking behaviours and risk perceptions, in the context of ICT-integration. These findings addressed research question number three: "How does school culture interact with secondary-level teachers' risk-taking when they are integrating ICT into the curriculum and changing their teaching practice?" Individual teachers' behaviours and actions reflexively create the values and beliefs of school culture. Considering this, it can be argued that teachers' perceptions of the teaching role can be addressed through their commitment to school culture or curriculum-area faculties. Through the use of grid-group typology, it was possible to assess teachers' role in their groups, as well as teachers' commitment to group goals.

Both schools were classified as Hierarchical, showing high-grid tendencies. Teachers in both schools showed limited movement between roles. Their roles were clearly defined, and there was little competition for status within the cultures. At the school-level, EMS was high-group Positional culture and NHS was a low-group Isolate culture, but NHS was high-group at the curriculum-area faculty level. High-group cultures imply commitment to group goals, and insulation between groups. The object of concern in both cultures was "obedience and authority," which implies that behaviour is a product of agreement. Social deviance, from the

agreed behaviours, was perceived as high-risk in both schools. Technology, as long as an expert or superior in the hierarchy has approved it, is considered low-risk. Examining ICT-integration through groups' perceived risks associated with social deviance and technology is a new perspective in educational change and technology integration.

Differences between teachers' group commitment in EMS and NHS, and teachers' relative trust in experts, could potentially be an important aspect of successful technology integration in schools. Research has identified that middle leaders must be included in school change initiatives. This study presents a sociocultural rationale for, and examination of, middle leaders' place in school hierarchy, and their importance in *some* schools. Middle leaders would be particularly necessary in schools where the top leadership was not viewed as trustworthy, particularly in schools where teachers show high levels of commitment to curriculum-area groups, or other sub-groups within a school culture. Further research will be needed, targeting teachers' group commitment specifically, and investigating the interaction between internal hierarchies.

Interesting findings regarding teachers' perceived teaching roles arose out of the research, and have significant implications in technology-related training. LRB teachers' conception of their role, as a teacher, did not tend to include technology. It could be argued that it is not LRB teachers' perception of technology that needs to change, but their perception of their role *as* teachers so that it comes to include technology integration, the capacity to take risks, and change. Considering the hierarchical nature of the two school cultures, it was understandable that LRB teachers felt the group defined their role. At NHS, LRB teachers did not perceive that their role responsibilities required technology use. Judith and Simon both spoke to this point, stating that their curriculum areas did not use technology. This perspective has significant implications for how school cultures define teachers' roles in the future. Considering that teachers in this study were willing to adopt technology if it was a group priority, it implies that the group can redefine teachers' roles to encourage technology use, experimentation, and risk-taking behaviours. But, until the group redefines teachers' roles, there is little to no motivation for them to change their teaching practice, particularly if they generally perceive anxiety when using technology. Hierarchical groups, such as EMS and NHS, are able to change teachers' roles, as they are both high-grid cultures. By the nature of this categorization, the group defines the individuals' roles. When individuals adopt responsibilities and expectations of their new roles, they will begin to reflexively redefine their own conception of teaching to include technology. Through this kind of process, school leadership could begin to create a culture of

experimentation in the school, which would support developing ICT-integration and changes in teaching practice.

9.5 Suggestions for future research

The conceptual framework of the risk-taking indicators, the theoretical risk framework, as well as many of the findings presented in this study present a new area of ICT-related educational research. There is a need for further research to explore aspects and implications of the findings presented above.

While the RTP questionnaire proved to be reliable and valid, it is a new measure and should be subjected to further testing and revisions. Teachers' risk-taking behaviours and risk perceptions identified in this study should be included in the RTP questionnaire. Revising the questionnaire to include findings, specifically playfulness and anxiety items related to teaching, will make the measure more specific to risk-taking in the context of ICT-related integration and educational change. Additionally, initial findings showed a connection between teachers' preferred teaching style, student or teacher-centred, and their risk-taking potential in the context of ICT-related change. This is a significant finding, and will require further research to fully explore the relationship between teaching method, perceived risks, and risk-taking behaviours. Future research would need to determine teachers' risk perceptions associated with using student-centred, constructivist, or group-based teaching methods. It will be necessary to include the findings in a revised version of the RTP questionnaire, to continue to examine teachers' risk perceptions in conjunction with the four indicators.

It will also be useful to continue assessing school cultures using the theory of structuration and the grid-group typology theoretical framework. Both theories specifically address risk and change, and this study has proven that they can be usefully applied in the context of ICT-related educational change. Now that some commonalities in teachers' risk perceptions have been identified, it is necessary to examine additional schools and teachers to test findings from this research. Further testing would attempt to confirm if teachers have similar risk perceptions and if their perception of quality teaching influences their risk-taking behaviours. Further, it would be necessary to examine additional school cultures in terms of their object of concern, grid, and group structures, to continue exploring the application and validity of grid-group typology in educational research. The theoretical perspective can give schools insight into the structure of their culture, and thus, the most efficient ways to foster innovation and change in the culture. Grid-group typology has the particular advantage of specifically addressing new technologies in

culture. This has significant implications for future work on professional development and teacher training.

9.6 Concluding statement

The following statement guided the research: “Teachers’ personal and cultural values and beliefs influence their risk perceptions and risk-taking behaviours in the context of ICT-related educational change.” This thesis has shown that the relationship between individual and cultural notions of risk is reflexive. Considering the duality of reflexivity, risk perceptions need to be addressed at the individual teacher level and at the school culture level. In modern society, individuals will need to be computer literate to operate in the workforce. State and national-level departments of education have responded to this need by trying integrate ICT and information literacy related skills into the curriculum. For students to develop ICT and information literacy, they must be taught by teachers who are ICT and information literate. Examining the barriers that exist in this process through risk perception identifies specific areas where teachers have anxiety. If such anxiety is addressed, then teachers may feel capable of experimenting with technology integration and changing their teaching practice. Findings from this study show that teachers who are willing to take risks and use technology also tended to use student-centred teaching methods. Those who are not willing to take risks, remain as traditional teachers – possibly effective, but not evolving to meet the changing needs of a modern society.

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11 Appendices

Appendix A
Participant information sheet

The University of Sydney

Centre for Research on Computer Supported Learning and Cognition (CoCo)

NSW 2006 AUSTRALIA

Faculty of Education and Social Work

Education Building A35
Telephone +61 2 9351 4708
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PARTICIPANT INFORMATION SHEET

Research Project

"Teacher change: Individual and cultural risk-taking in the context of ICT integration**"**

(1) What is the study about?

The study will investigate the process in which teachers learn to apply new teaching practices in the classroom and facilitate educational change. This change process will be investigated on individual teacher and school culture levels. Teachers will be asked to share views and ideas regarding their personal change process as a teacher, changing teaching practice, and their perceptions of school culture.

The research has chosen to study teachers' views regarding of ICT integration – utilizing ICT in the classroom, effectively facilitating ICT literacy in student learning in Australia and the United States.

(2) Who is carrying out the study?

This study is being conducted in the CoCo Research Centre, Faculty of Education and Social Work, The University of Sydney. Chief Investigator – Professor Peter Goodyear and PhD Student – Sarah Howard.

(3) What does the project involve?

The research project will occur in two parts: Phase 1 and Phase 2.

Phase 1: The first part of the project consists of filling out a questionnaire. The questionnaire will ask you about: teaching experiences, school culture, and how you use a computer. You will be asked to reflect on experiences, categorize how you feel when

performing different tasks, and discuss teaching and learning. Information from Phase 1 will be used to select participants for Phase 2.

Phase 2: The second part of the research project is a case study. The case study includes three interviews and two classroom observations over the 2007-2008 school years. Additionally, the researchers will examine school and district policy documents. First, the interviewer will visit your school and conduct the first interview. In the following two visits, the researcher will observe, as you teach a class, then conduct an audio recorded interview. In the interview, you may be asked about events in the class, or to reflect on past questionnaire or interview responses, discuss future teaching plans, etc.

(4) How much time will the study take?

The questionnaire, Phase 1, should take approximately 20 minutes to complete. In Phase 2, each of the three interviews will be approximately 30-45 minutes in length. Over the course of the 2007-2008 school years, interviews will be a total commitment of 1.5 to 2.25 hours. The observations should not require additional commitment outside of the classroom.

(5) Can I withdraw from the study?

The study is voluntary - you are not under any obligation to participate. You may withdraw your participation or audio recording from the study at any time.

(6) Will anyone else know the results?

All aspects of the study, including the results, will be strictly confidential. Only the researchers (Professor Peter Goodyear and Sarah Howard) will have access to information about participants. A report of the study may be submitted for publication, but individual participants will not be identifiable in such a report.

(7) Will the study benefit me?

The study will not benefit you immediately. The results will help improve educational change at your school, inform your own teaching, and ICT integration.

(8) Can I tell other people about the study?

Yes.

(9) What if I require further information?

Please contact **Sarah Howard** (email: s.howard@edfac.usyd.edu.au, mobile: 0402 542 323) if you have any questions or if you would like to participate in the study.

If you would like to know more at any stage, please feel free to contact Sarah Howard, CoCo Research Centre, Faculty of Education and Social Work, The University of Sydney (Phone: 02 9036 5001, International phone +61 2 9036 5001, Email: s.howard@edfac.usyd.edu.au).

(10) What if I have a complaint or concerns?

Any person with concerns or complaints about the conduct of a research study

can contact the Manager, Ethics Administration, University of Sydney at (02) 9351 4811, international +61 2 9351 4811.

This information sheet is for you to keep.

Appendix B
Risk-taking potential (RTP) questionnaire

The University of Sydney

Centre for Research on Computer Supported Learning and Cognition (CoCo)

NSW 2006 AUSTRALIA

Faculty of Education and Social Work

Education Building A35
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Questionnaire ID:_____
to be completed by research officer

Questionnaire

Teacher change: Individual and cultural risk-taking in the context of ICT integration

July 2007

First, a few questions…

1. Please, describe your school. Choose as many responses as necessary.

☐ Public/Government
☐ Religious affiliated
☐ Single-sex – girls
☐ Non-selective☐ Selective
☐ Independent
☐ Co-educational
☐ Single-sex – boys
☐ Other:_____

2. How long have you been teaching at your school?

☐ 1-2 years
☐ 6-8 years
☐ 11-15 years
☐ 20+ years
☐ 3-5 years
☐ 9-10 years
☐ 16-20 years

3. How long have you been teaching (in total)?

☐ 1-2 years
☐ 6-8 years
☐ 11-15 years
☐ 20+ years
☐ 3-5 years
☐ 9-10 years
☐ 16-20 years

4. What grade/s do you teach? Choose all that apply.

☐ 6 ☐ 7 ☐ 8 ☐ 9
☐ 10 ☐ 11 ☐ 12

5. What subjects do you teach? Choose all that apply.

☐ English/Writing ☐ Foreign Languages ☐ Geography
☐ History/Civics ☐ Religion ☐ Maths
☐ Science ☐ Special Education ☐ VET
☐ Visual/Performing Arts ☐ Other:_____

I. Teaching and school culture

The questions in this section ask you to consider how you feel about your teaching and your school. **There are no right or wrong answers, and your responses are completely confidential.**

Please read each question carefully and indicate your agreement regarding teaching and your school. Tick the most appropriate box between "Strongly Disagree" (1) and "Strongly Agree" (5). Please try to not skip questions or leave blanks. If you do not feel comfortable answering any questions please mark the "Not Answered" column (0).

1. Your teaching

This part asks you about your teaching. Please read each statement and answer with your first instinct.

Please indicate if your agreement with the following statements.

	Strongly Disagree	**Disagree**	**Neutral**	**Agree**	**Strongly Agree**	*Not Answered*
I feel that I successfully educate students.	1	2	3	4	5	0
I generally look forward to teaching.	1	2	3	4	5	0

	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree	*Not Answered*
I feel satisfied with my job in this school.	1	2	3	4	5	0
I sometimes feel it is a waste of time to try to do my best as a teacher.	1	2	3	4	5	0
I am encouraged to experiment with content, techniques, and materials in my teaching.	1	2	3	4	5	0
I am able to discipline students in my class.	1	2	3	4	5	0

(Lee, 1992)

2. Your school

This part asks you about perceptions and experiences related to your school. Please read each statement and answer with your first instinct.

Please indicate if your agreement with the following statements.

	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree	*Not Answered*
You can count on most staff members to help put anywhere, anytime – even though it may not be part of the official assignment.	1	2	3	4	5	0
Most of my colleagues share my belief and values about what the central mission of the school should be.	1	2	3	4	5	0
I feel accepted and respected as a colleague by most staff members.	1	2	3	4	5	0
There is a great deal of cooperative effort among the staff members.	1	2	3	4	5	0
I am provided with appropriate teaching and classroom resources.	1	2	3	4	5	0
The principal sets priorities, makes plans, and sees that they are carried out.	1	2	3	4	5	0
The principal knows what kind of a school he/she wants and communicates it to the staff.	1	2	3	4	5	0
The principal lets staff members know what is expected of them.	1	2	3	4	5	0

Teachers are involved in making decisions that affect them and school policy.	1	2	3	4	5	0
In this school, I am encouraged to experiment with my teaching.	1	2	3	4	5	0
The principal is interested in innovative and new ideas.	1	2	3	4	5	0

(Lee, 1992)

13. How often do you meet with other teacher on lesson planning, curriculum development, guidance and counselling, evaluation of programs, or other collaborative work related to instruction?

	0 hours	1-5 hours	6-10 hours	11-15 hours	16-20 hours	21+ hours
*Please indicate how **much time per month, on average**…*						

II. Using computers and technology

The questions in this section focus on how you use technology and computers. Please read the different scenarios and tick the appropriate response.

1. How you learn to use technology

Imagine that you are given new software for your job that you have never used before. The following questions ask you to indicate whether you could use this unfamiliar software under a variety of different conditions. Please read each scenario.

If you think that you would not be able use the software to complete the job under the conditions described, then circle or mark "I couldn't do that" (0). If you believe that you would be able to use it, then try to estimate how confident you are with your capability to learn enough to complete the job, and mark the most appropriate response between "Not at all confident" (1) and "Totally confident" (5).

I believe that I could complete the job using the new software…	**Couldn't do that**	**Not at all confident**	**Not very confident**	**Moderately confident**	**Quite confident**	**Totally confident**
…even if there was no one around to tell me what to do	0	1	2	3	4	5
…even if I had never used a package like it before	0	1	2	3	4	5
…if I had only the software manuals for reference	0	1	2	3	4	5

…if I had seen someone else using it before trying it myself	0	1	2	3	4	5
…if I could call someone for help if I got stuck	0	1	2	3	4	5
…if someone else helped me get started	0	1	2	3	4	5
…if I had a lot of time to complete the job for which the software was provided	0	1	2	3	4	5
…if I had just the built-in help facility for assistance	0	1	2	3	4	5
…if someone showed me how to do it first	0	1	2	3	4	5
…if I had used similar software before this to do the same job	0	1	2	3	4	5

(Compeau, 1995)

2. How do you feel when using technology?

The following questions ask you how you would characterize yourself when using computers. For each set of adjective below, please tick the number on the answer sheet that best matches a description of yourself when you interact with a computer, software package, or internet application.

If you feel you are unable to answer a question, please mark "0" in the "Not Answered" column.

When I use ICT I feel more…

	Strongly Disagree	**Disagree**	**Neutral**	**Agree**	**Strongly Agree**	*Not Answered*
Spontaneous than **Intellectually stagnant**	1	2	3	4	5	0
Bored than **Curious**	1	2	3	4	5	0
Experimenting than **Mechanical**	1	2	3	4	5	0
Conscientious than **Erratic**	1	2	3	4	5	0
Playful than **Serious**	1	2	3	4	5	0
Questioning than **Routine**	1	2	3	4	5	0
Flexible than **Constrained**	1	2	3	4	5	0
Unimaginative than **Creative**	1	2	3	4	5	0

The following questions characterize how you may feel when using computers and technology. For each description, please tick the box indicating your agreement with each of the statements regarding how you interact with a computer, software package, or internet application.

If you feel you are unable to answer a question, please mark "0" in the "Not Answered" column.

Please read each item carefully and choose your first instinct.

	Strongly Disagree	**Disagree**	**Neutral**	**Agree**	**Strongly Agree**	*Not Answered*
I feel insecure about my ability to understand messages on the computer.	1	2	3	4	5	0
I look forward to using a computer for work.	1	2	3	4	5	0
The challenge of learning about computers is exciting.	1	2	3	4	5	0
I am afraid that if I begin to use computers I will become dependent upon them and lose my reasoning skills.	1	2	3	4	5	0
I dislike working with "machines" that are smarter than I am.	1	2	3	4	5	0
I feel apprehensive about using computers.	1	2	3	4	5	0
It scares me to think that I could make mistakes I cannot correct by hitting the wrong key.	1	2	3	4	5	0
You have to work in IT to really understand how to use the computer.	1	2	3	4	5	0
I have avoided computer because they are unfamiliar and somewhat intimidating to me.	1	2	3	4	5	0

(Heinssen, 1987)

3. Last semester, how many times did you use technology (i.e. software, computers, internet) in a lesson?

	0	1-2	3-5	6-9	10-15	16+
*Please indicate how **many times**…*						

If possible, please briefly list some of ways you used technology in a lesson, or why you did not.

4. Have you met with your school's technology coordinator to discuss technology integration and lesson planning? ☐Yes ☐ No

5. Please use the space below to provide any additional comments regarding teaching, your school, or technology.

Thank you for your time and responses.

Appendix C
Interview schedule

The University of Sydney

Centre for Research on Computer Supported Learning and Cognition (CoCo)

NSW 2006 AUSTRALIA

Faculty of Education and Social Work

Education Building A35
Telephone +61 2 9351 4708
Facsimile +61 2 9036 5205
Email p.goodyear@edfac.usyd.edu.au

Interview ID:_____
to be completed by research officer

Interview

Teacher change: Individual and cultural risk-taking in the context of ICT integration

July 2007

I. General perceptions of teaching and school

The following questions will ask you about your perceptions regarding teaching and yourself as a teacher. Feel free to answer the questions in as much or as little detail as may be comfortable for you. Remember you are not obligated to answer any of the interview questions if you do not wish.

A. Your teaching

1. (REF)Please describe your school. Your classroom.
   (TYP)What does a typical lesson look like in your classroom?
   (TYP)How would you describe your teaching style? Your preferred style?

2. (REF)How do you feel about teaching as a profession? Personally?
   (TYP)What is a typical example illustrating this belief or perception?
   (CRT)Is there a specific event in your professional or personal history that illustrates this belief or perception? Please describe it in detail.

3. (REF)Are you satisfied with teaching? How much of the time do you feel this level of satisfaction?
   (TYP)What is a typical example or situation illustrating your level of satisfaction?
   (CRT)Is there a specific event in your professional or personal history that illustrates this level of satisfaction? Please describe it in detail.

4. (REF)How successful do you feel in educating students?
   (TYP)Is there a typical example or situation that illustrates this feeling of success?
   (CRT)Is there a specific event in your professional or personal history that illustrates this belief or perception? Please describe it in detail.

5. (REF)What risks do you associate with changing your teaching practice?
   (TYP)Is there a typical example or situation that illustrates these risks?
   (CRT)Is there a specific event in your professional or personal history that illustrates these beliefs or perceptions? Please describe it in detail.

B. Your school

1. (REF)How would you describe your school community, in your own words?
   (TYP)What is a typical example illustrating this belief or perception?
   (TYP)What is a typical level of interaction between teachers? Intra-departmental and inter-departmental.

2. (REF)What type of leadership style, do you feel, is used by the administration?
   (TYP)What is a typical example illustrating this belief or perception?
   (CRT)Is there a specific event in your experiences at this school where you have interacted with the leadership style? Was this a positive or negative experience?

3. (REF)Do you feel supported by the school administration? Have they helped you solve problems related to your classroom? Are they aware of the problems faced by teachers in the classroom?
   (TYP)What is a typical example that illustrates this belief or perception?
   (CRT)Is there a specific event and specific problem in your experiences that helped shape this belief or perception? Please describe it in detail.

4. (REF) How active is the faculty and staff in decision/policy making in the school?
   (TYP)What is a typical event where the faculty or staff might be involved (or not

involved) in decision making at the school?
(CRT)Is there a specific event where you were involved in decision making at the school? What this a positive or negative experience?

5. (REF) Do you feel teachers have control over decision making in their own curriculum or classroom? Are they encouraged to experiment with curriculum and teaching?
(TYP)What is a typical example illustrating this belief of perception?
(CRT)Is there a specific event regarding your own curriculum or classroom that helps shape this belief or perception? Please describe it in detail.

2. Using computers and technology

This part of the interview will ask you about how you use computers and technology. There are no right or wrong answers. The questions are looking for your personal beliefs and associations with these tools.

A. Using computers and technology

1. (REF)How do you prefer to learn new computer, software, or technology related skills? Independently? In a class? With a friend? Other methods?
(TYP)What is a typical example illustrating this method or style?
(CRT)Is there a specific event in your professional, educational, or personal history that helped shape this method or style?

2. (REF)What type of support to do you use to answer possible technology related questions or problems? Manuals? Online tech support? Forums?
(TYP)What is a typical example illustrating this preference?
(CRT)Is there a specific event in your professional, educational, or personal history that helped shape this preference?

3. (REF)How would you rate your technology related skill level? In your personal use? Professional use?
(TYP)What is a typical example illustrating this perception?
(CRT)Is there a specific event in your professional, educational, or personal history that helped shape this perception?

4. (REF)Do you feel you use technology differently for personal and professional needs?
(TYP)What is a typical example illustrating this preference?
(CRT)Is there a specific event in your professional, educational, or personal history that helped shape this preference?

5. (REF)What risks do you associate with changing how you use technology?
(TYP)Is there a typical example or situation that illustrates these risks?
(CRT)Is there a specific event in your professional or personal history that illustrates these beliefs or perceptions? Please describe it in detail.

B. Playfulness and anxiety when using computers and technology

1. (REF)Do you feel confident when trying new technology related tools or applications? In your personal use? Professional use?
(TYP)What is a typical example illustrating this perception?
(CRT)Is there a specific event in your professional, educational, or personal history

that helped shape this perception?

2. (REF)How do you feel challenged by computers or technology? In your personal use? Your professional use?
   (TYP)What is a typical example illustrating this perception?
   (CRT)Is there a specific event in your professional, educational, or personal history that helped shape this perception?

3. (REF)When you are using new technology related tools or applications what is your first reaction when you are faced with “problems”? In your personal use? Professional use?
   (TYP)What is a typical example illustrating this perception?
   (CRT)Is there a specific event in your professional, educational, or personal history that helped shape this perception?

4. (REF)If you were given enough time, would you be able to learn “anything you wanted” regarding technology related skills?
   (TYP)What is a typical example illustrating this perception?
   (CRT)Is there a specific event in your professional, educational, or personal history that helped shape this perception?

5. (REF)Do you experiment using technology? In your personal use? Your professional use?
   (TYP)What is a typical example illustrating this perception regarding experimentation?
   (CRT)Is there a specific event in your professional, educational, or personal history that helped shape this perception?

3. Defining terms

This section asks you about a few different terms. Feel free to answer the questions as you wish. Your responses do not necessarily need to relate to teaching.

1. How do you define technology?

2. How do you define culture?

3. How do you define risk-taking?

D. Are there any topics we have not covered that you would like to discuss?

Thank you for your participation.

Appendix D
Observation schedule

The University of Sydney

Centre for Research on Computer Supported Learning and Cognition (CoCo)

NSW 2006 AUSTRALIA

Faculty of Education and Social Work

Education Building A35
Telephone +61 2 9351 4708
Facsimile +61 2 9036 5205
Email p.goodyear@edfac.usyd.edu.au

Observation ID:_____
to be completed by research officer

Observation

Teacher change: Individual and cultural risk-taking in the context of ICT integration

July 2007

Structured observation schedule for Phase 2, Observation x

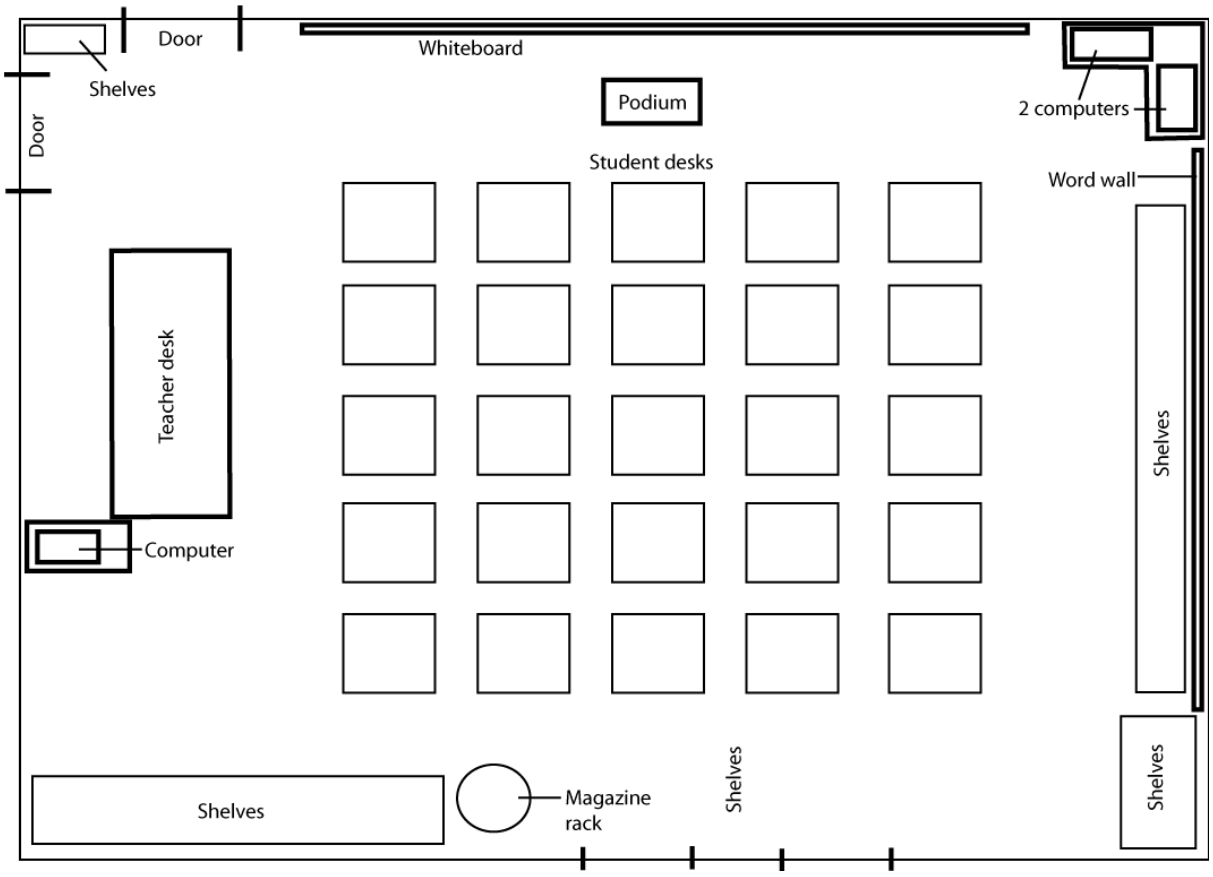
Event, Uses…	**# of occurrences** (use hash marks)
…new technology skill	
…new technology tool	
…new technology concept	
…technology lab	
…class laptop set	
…library resources	
…other technology resource	
…teacher-centred technique	
…student-centred technique	
…internet research based lesson	
…group work based lesson	
…software based lesson	
…presentation software/ hardware	
During teaching…	
…abandons technology use	
…has alternate lesson prepared	
…uses technology spontaneously	
…students helping with technology	
…technology specialist is in class	

Additional comments or notes regarding observation:

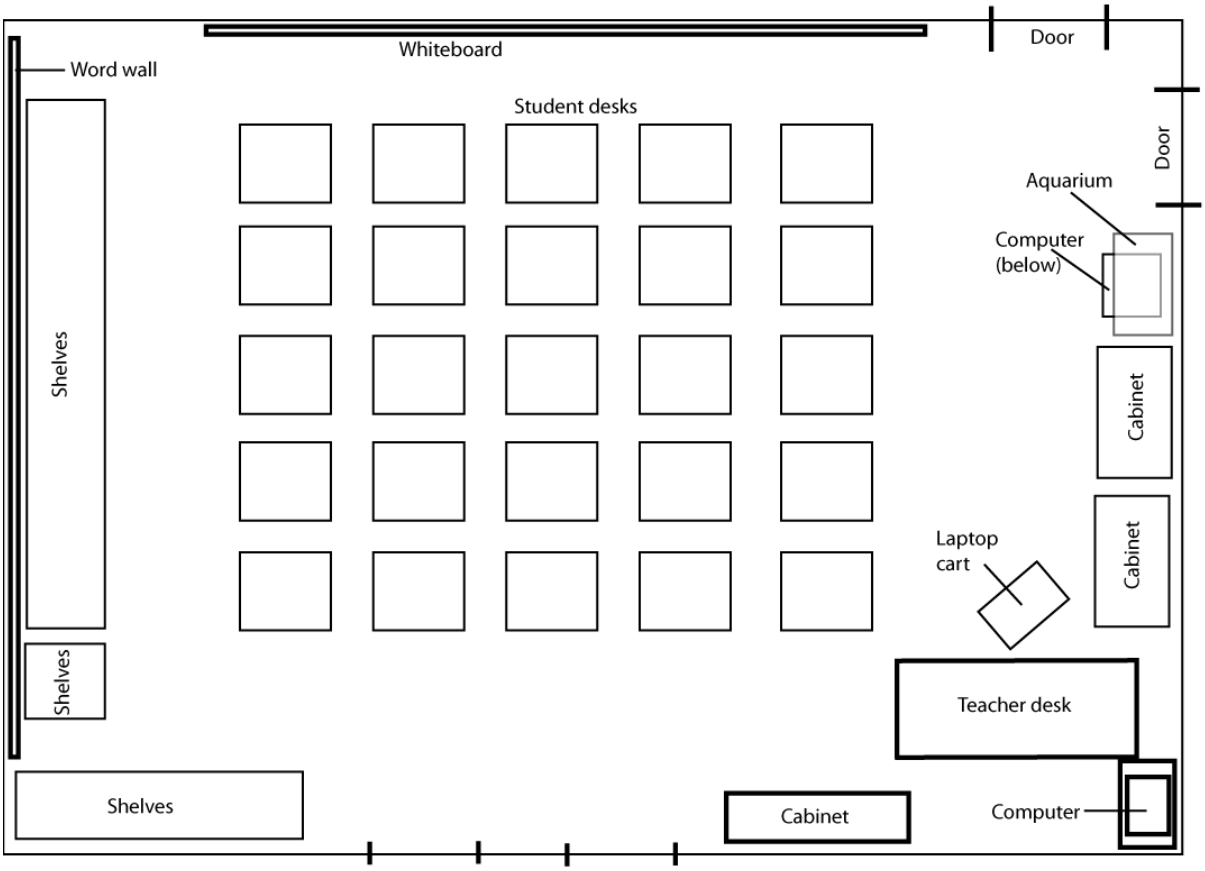
Appendix E
Phase 2 coding scheme

Main code	**Sub-code**
Classroom	
	Affect
	Subject area
	Time
Community	
	Parents
	Students
	Teachers
Definitions	
	Playfulness
	Risk-taking
	Technology
Example	
Grid-group	
	Autonomy
	Grid
	Group
	Hierarchical
	Identity
	Power
	Trust
ICT	
Individual	
	Goals
	Learning
	Motivation
	Values
Perception	
Personal	
Reflection	
Risk	
Risk-taking	
	Anxiety
	Computer-efficacy
	Experimentation
	Playfulness
	Teaching-efficacy
School	
	Access
	Culture
	Curriculum
	Decision making
	Expectations
	Leadership
	Role
	Values
Teaching	
Testing	
Training	

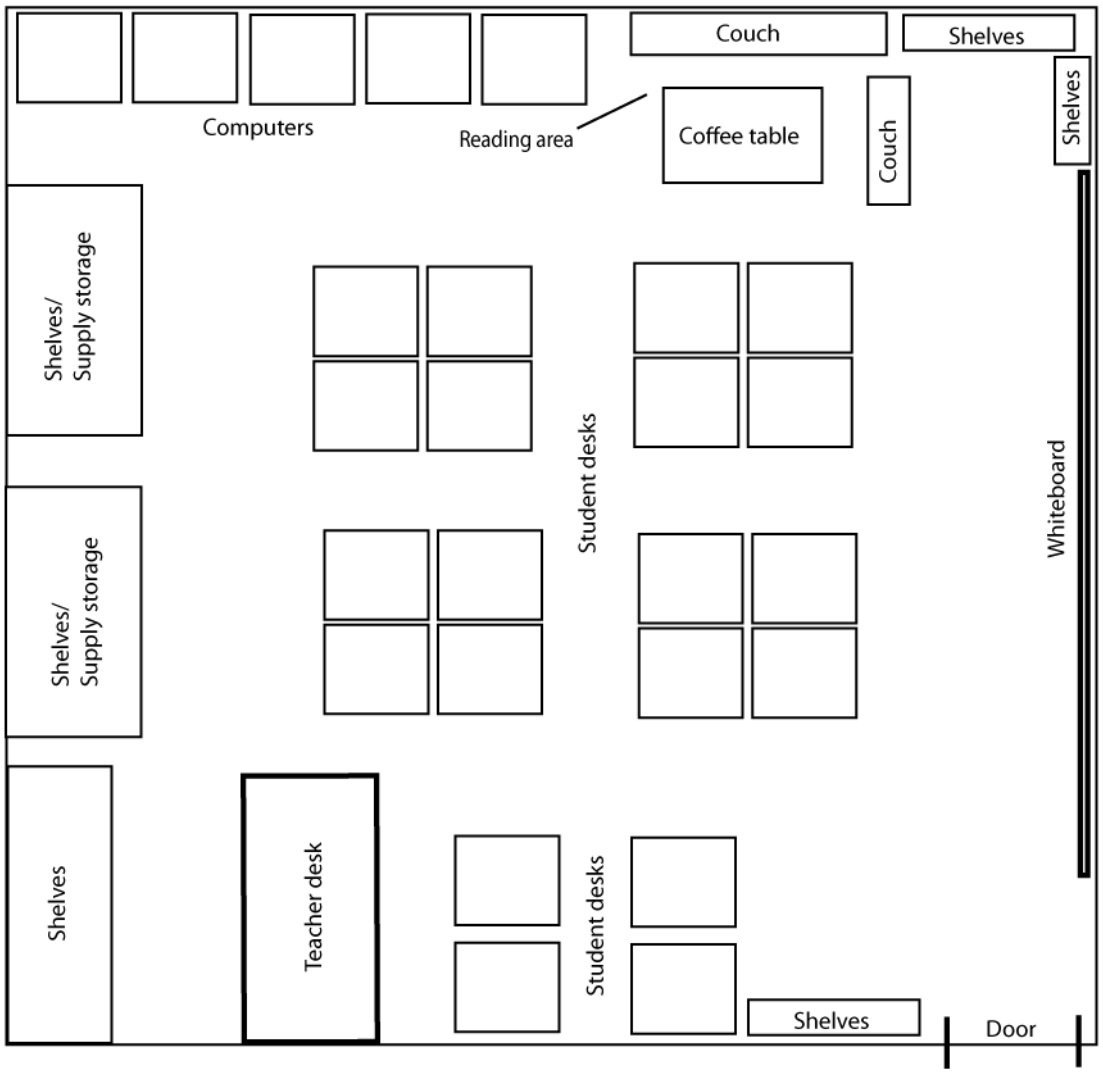
Appendix F
Kelly's classroom floor plan



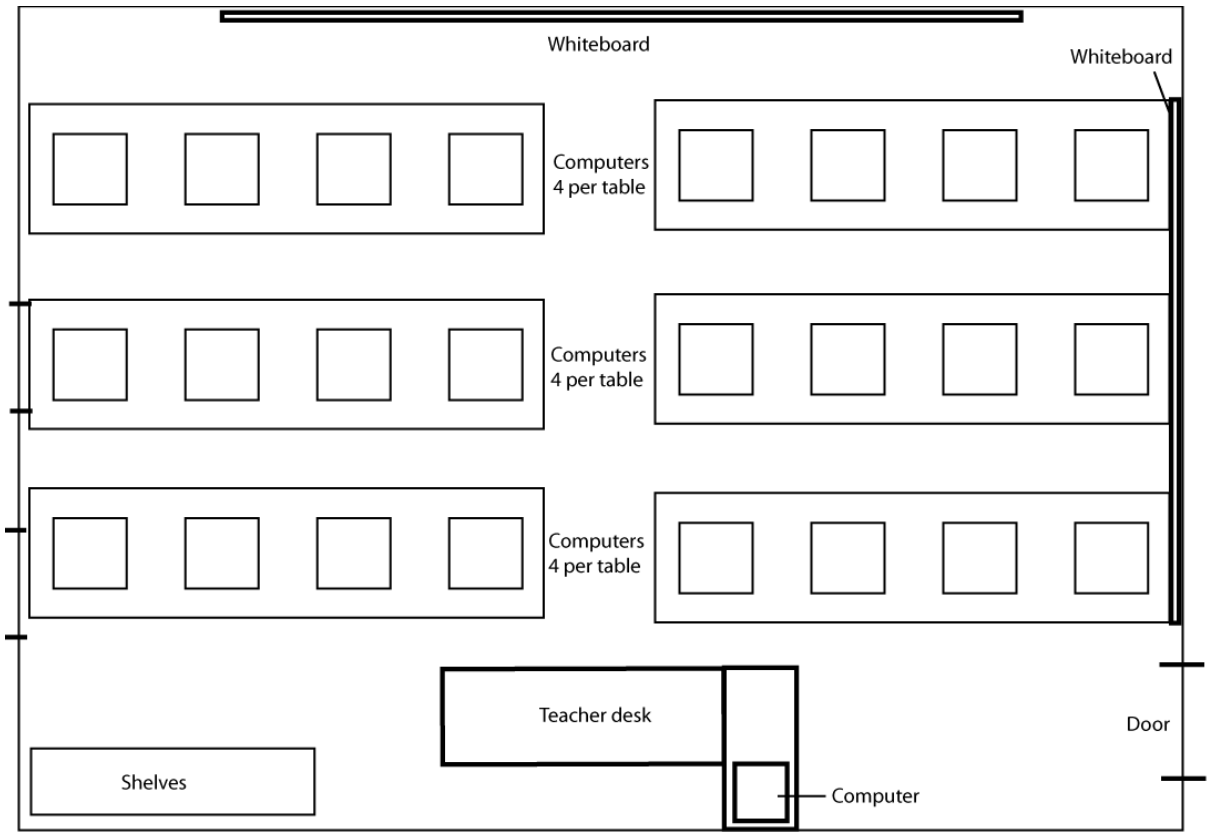
Appendix G
Beau's classroom floor plan



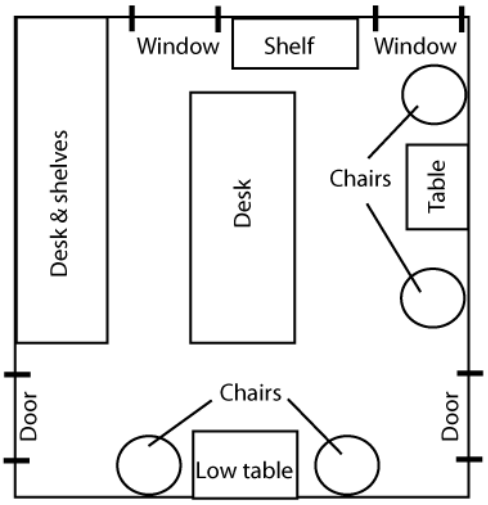
Appendix H
Danielle's classroom floor plan



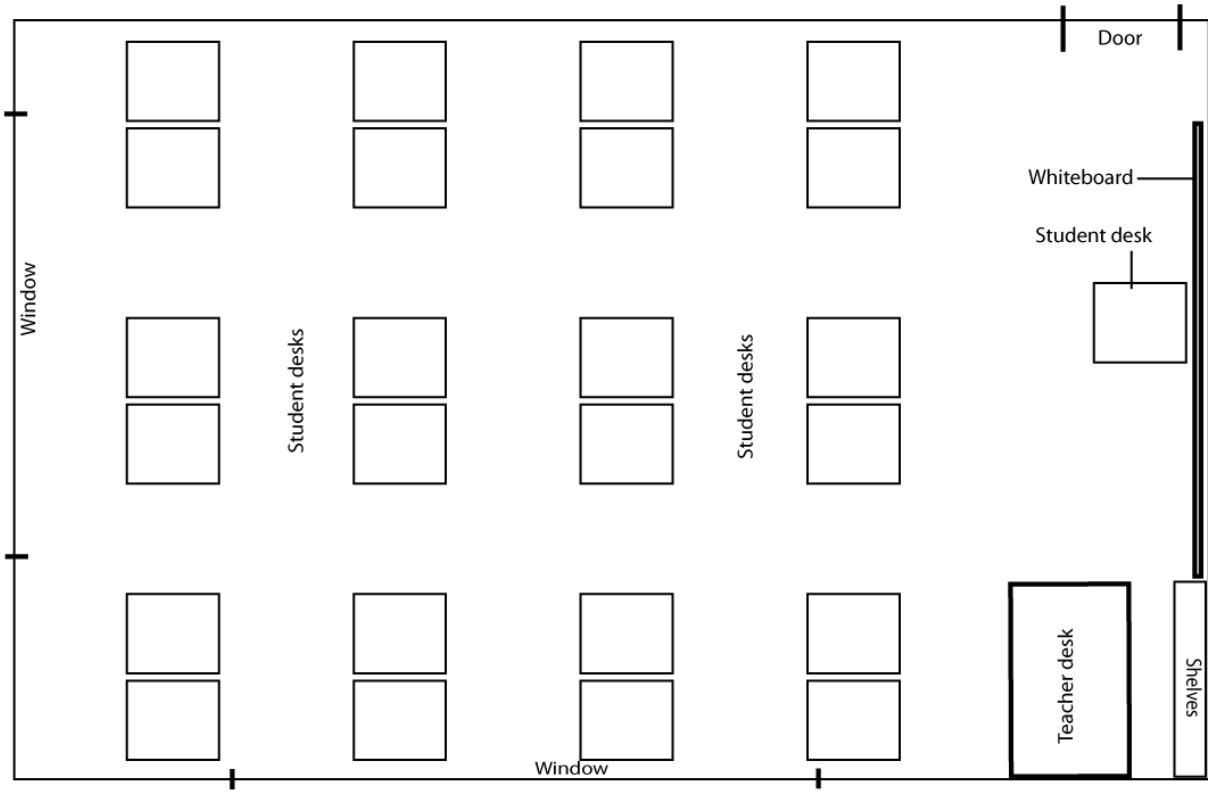
Appendix I
Kerry's classroom floor plan



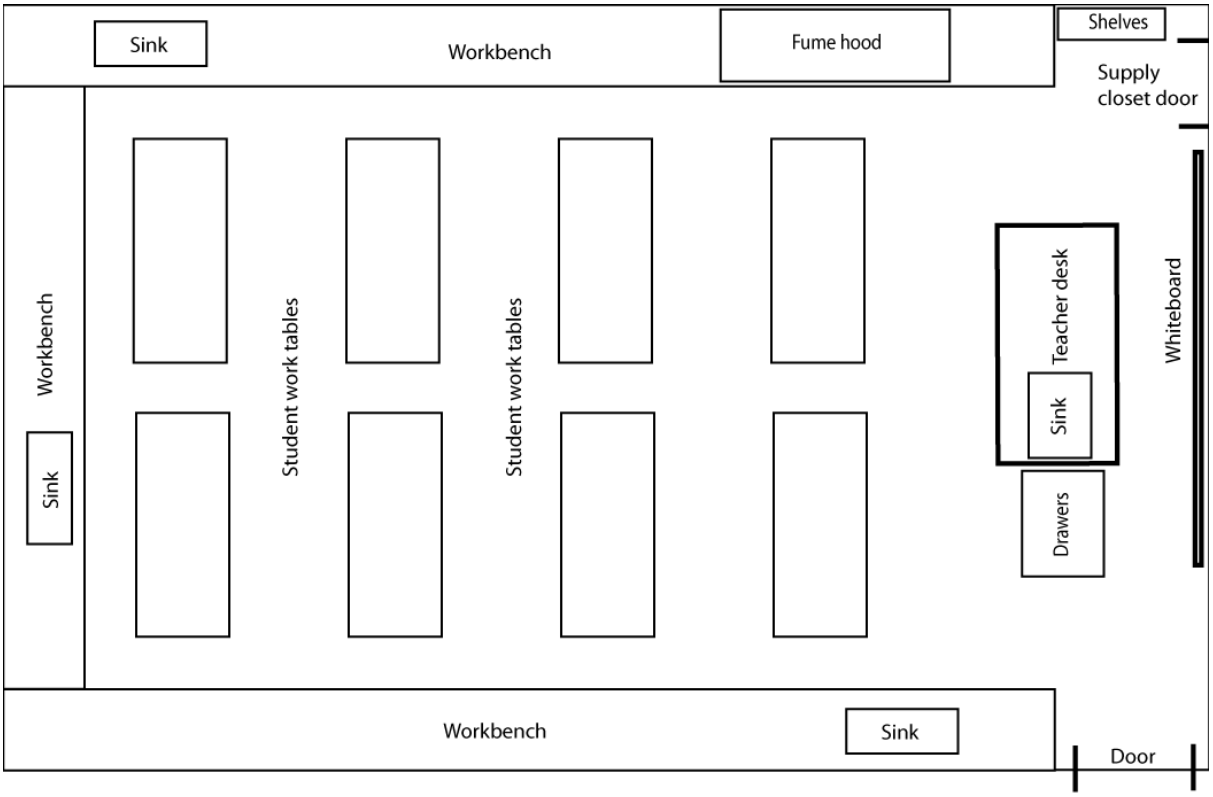
Kerry's office floor plan



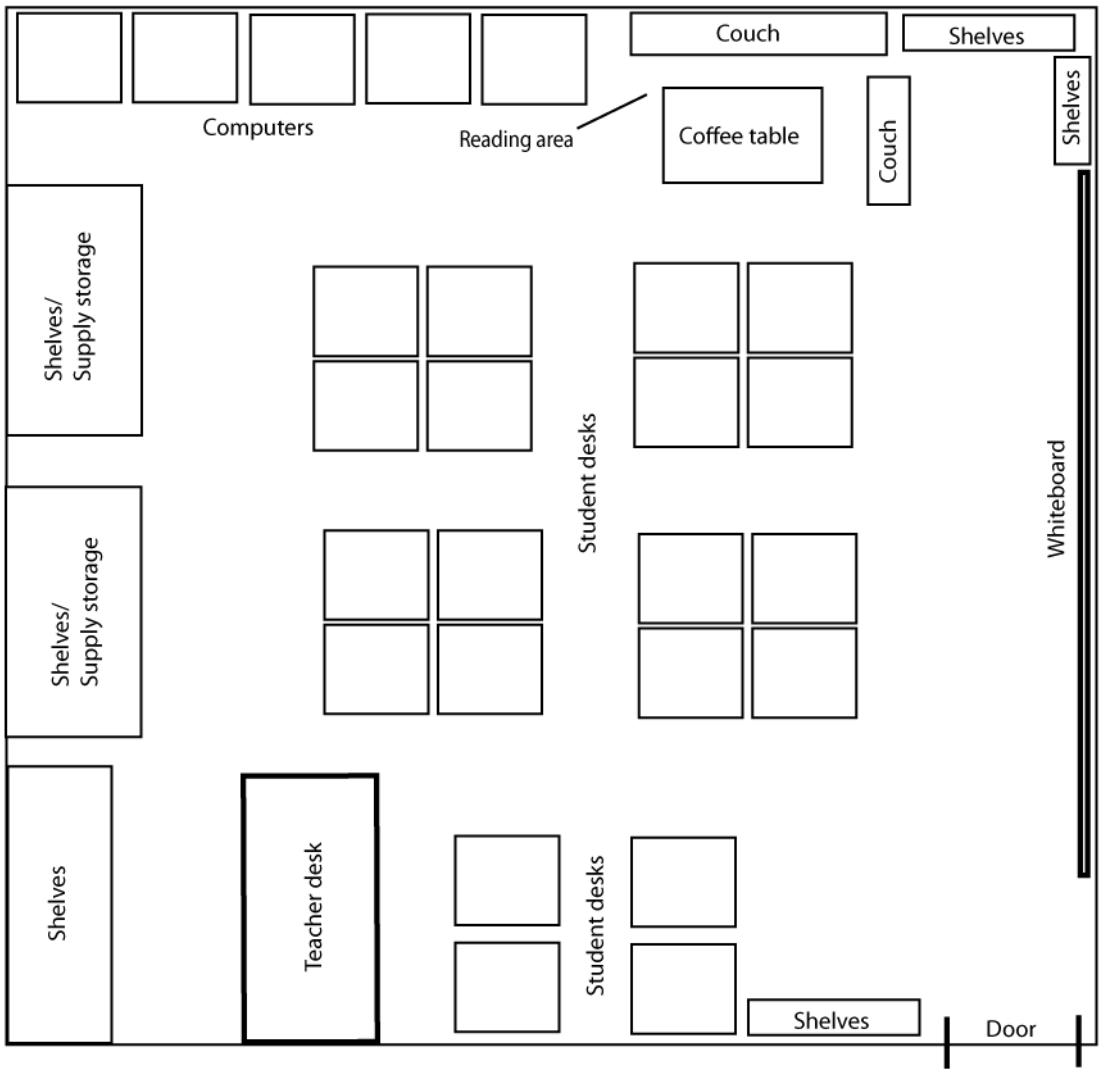
Appendix J
Simon's classroom floor plan



Appendix K
Molly's classroom floor plan



Appendix L
Elizabeth's classroom floor plan



Appendix M
Judith's classroom floor plan