INTEGRATING TECHNOLOGY in the CURRICULUM for ENHANCED LEARNING: A COMPARATIVE STUDY in ENGLAND and NORTH CYPRUS

by

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DECLARATION

This thesis is a result of my investigation and research and it has never accepted in its substance for any degree.

ABSTRACT

This research compared English and Turkish Cypriot teachers' pedagogical approaches to using Information and Communication Technologies (ICT) in the classroom and explored differing contexts of ICT use in the two countries. Research methods included self-completed questionnaires (121 teachers), semi-structured interviews (12 teachers and ICT co-ordinators) and three rounds of a modified Delphi technique (12 teachers) aimed at building consensus around what constitutes a model of practice. Two secondary schools in each country participated. Findings highlighted differences in access to resources between 'good' and 'improving' schools and between Turkish Cypriot and English schools. Access to reliable technology and basic ICT training are identified issues for Turkish Cypriot teachers whilst effective integration of ICT in teaching is identified as a key issue for English teachers. Turkish Cypriot and English teachers differed in their pedagogical approaches but instructivist teaching methods continue to be a major component of teaching in both Turkish Cypriot and English schools. The Delphi method proved a useful process to encourage mutual engagement toward shared goals, exploring different contexts of use and building consensus on a model of practice. The consensus building activity suggested some parameters for a model of practice, generated useful lesson plans and proved a potentially useful method for encouraging a sense of joint ownership for professional development in this area.

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interviews and three rounds of Modified Delphi method. I also thank to schools head teachers and deputy heads for their help.

DEDICATION

This study dedicated to my husband, Goktug Tenekeci, who is proud of my achievement in completing this work, my kids Birle and Askin for their sacrifices.

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List of Abbreviations

ICT: Information and Communication Technology (general technology)

ICTs: Information and Communication Technologies (specific technologies)

IT: Information Technology

UK: United Kingdom

NGfL: National Grid for Learning

BECTA: British Education Communications Technology Agency

OHP: Over-head projector

CAI: Computer Aided Instruction

LfT: Laptops for Teachers

IWBs: Interactive Whiteboards

IBL: Inquiry Based Learning

CPD: Continuing Professional Development

DfES: Department for Education and Skills

VLE: Virtual Learning Environment

UNESCO: United Nations Educational, Scientific, and Cultural Organization

CCA: Constant Comparative Analysis

Definitions of Terms

In the current study, there are important terms, which need to be clearly defined. These are as follows:

Information and Communication Technology (ICT) and Information Technology (IT)

ICT is used as an umbrella term, applicable to a range of digital communication devices and applications such as 'digital television, radio, internet, network hardware and software, videoconferencing, and distance learning' (Kumar, 2008, p.1). IT is a separate subject taught in schools whereas ICT constitute 'electronic and/or computerised devices and associated human interactive materials that enable the user to employ them for a wider range of teaching and learning processes' (Cox, 1999, p. 67)

Instructivist and Constructivist Approach

The 'instructivist' approach is closer to that traditionally applied in the classroom and teachers who implement this approach aim mainly to provide a broad standard knowledge to their students, with the emphasis on students being able to demonstrate their understanding by reproducing information or accomplishing tasks under instruction. By contrast, in the 'constructivist' approach, teachers typically try to encourage their students towards more self-direction within the learning process.

English Teachers

The term English teachers refers to teachers who are from the selected English secondary schools.

Turkish Cypriot Teachers

The term Turkish Cypriot teachers refers to teachers who are from the selected Turkish Cypriot secondary schools.

CHAPTER 1

THE RESEARCH DEFINED

1.1. Introduction

Over the past twenty years, the acceleration of change in technology spread by globalization has become the driving force behind economic growth and development programmes. This advancement of technology affects virtually every sector of modern life, including education. Today's technology in particular is setting parameters for economic growth, educational development, and relationships between countries in a way that has never happened before. The core objective of education (that students should learn) is unchanged, but the teaching strategies, the tools, the technology are radically changing traditional methods of delivery. Because of these changes, the whole concept of educational practice is being transformed.

Furthermore, the speed of the technology change is now so fast that schools cannot afford to sit back and wait: schools need to embrace new technology that improves the learning experience for students, in particular by teaching them ways to access information for themselves (Kelly et al., 2009). The academic focus needs to shift further towards 'learning how to learn', complemented by encouragement of lifelong learning and adaptability, since the tools in use today will rapidly be superseded as technology continues to advance (Wagner, 2010). In other words, schools need to teach students how to use today's technology tools to promote their individual learning skills, and gain the discipline of a lifelong learning agenda for the longer term (ibid). As a new shape to the global economy emerges, it will be a prerequisite that everybody at the very least achieves basic education and fundamental work skills and train in lifelong learning,

the essential requirements for education and training as determined by the International Labour Organization (2003).

The technological tools most often considered for enabling educational reform are primarily Information and Communication Technologies (ICTs) – which include digital television, radio, computers and the internet, network hardware and software (Kumar, 2008). When ICT is used appropriately, it has been shown to increase educational quality by providing the opportunity for teachers to make lessons more engaging, motivating and thereby an active process connecting lessons to real life (Tinio, 2002). However, simply having technology in the school does not necessarily improve learning or, in itself, promote good practice: there is a need for educationalists to make use of benefits that ICT offers to more broadly enrich the experiences of learners (Montaser et al., 2012). Once ICT facilities are available in the classroom, teachers need to look at the design of their curriculum, their use of appropriate pedagogy (ibid). This comes down to the readiness of institutions and teachers to adjust and upgrade their skills and competencies so that they can use these new and powerful tools at their most effective to develop their students' abilities.

In the educational environment, today's teachers and students have an opportunity to use various types of the resource offered by information technology. The internet, for example, can be used extensively by students to obtain necessary and pertinent information from original sources such as government offices, universities and companies, as the web is considered to be like a world-wide library (Paris, 2002). In other words, students can now access information whenever and wherever they want through use of the internet. Furthermore, the internet can also be used by

teachers to design collaborative learning activities, making lessons more effective, motivating and interesting for their students.

Both the Turkish Cypriot and English governments have linked improvements in the quality of education to investment in use of ICT in their respective schools (DfES, 2003; North Cyprus MONEC, 2005). It is necessary to educate learners for this new 'information age', and that for these technologies assist teachers to adopt and apply student-centred and constructivist education, the teachers themselves need to improve their own competencies in using ICT to achieve this more effectively (ibid). North Cyprus faces a particular challenge in securing finance to implement their ICT policy and to build ICT infrastructure in their schools (North Cyprus MONEC, 2005). To promote the use of new technology, the government received $1,850,000 US dollars from the European Union in 1997; however, an additional $1,000,000 US dollars is needed to equip all schools in North Cyprus with appropriate computer technologies (ibid). This financial shortage is now being addressed through funding from the European Union finally enabling Northern Cyprus schools to improve their computer facilities and also to encourage and train the teachers to use technologies in their teaching and learning (ibid).

It is now widely accepted that ICT form an important set of tools for improving teaching and learning for today's education. Their integration in school has been championed in developed countries for at least two decades (Haddad and Draxler, 2002, UNESCO, 2003; Isman et al., 2007). Following the announcement of the National Grid for Learning (NgFL) in 1997, schools in the UK started to use a range of ICT in the classroom confident that this would lead to future benefits for learning. Many other countries have taken similar initiatives to provide ICT in their

schools as a means of improving the quality of education. Despite this investment in a range of initiatives over what is now a number of years, for a number of reasons the impact of these policies on learning is actually rather hard to demonstrate (Pilkington, 2008). In particular, during this time the nature of the barriers to technology use have shifted in from straightforward lack of ICT teaching equipment, to the challenge of acquiring the necessary skills to use ICT more effectively (ibid). However, developing countries, are the countries cannot benefit from ICTs as defined by Okoli and Mbarika (2003) (see section 1.4 for more details about developing and developed countries), and are still at their infancy stage, when new technologies are not used by teachers in the classroom, it is often still due to the limitations of infrastructure provision, as much as to the high costs of access to associated ICT training.

Just as has happened in the UK, authorities in North Cyprus wish to implement ICT in the education system, but the lack of finance appears to be preventing the desired aim to integrate technology into all schools. Unfortunately, little research has been conducted in North Cyprus to investigate how ICT is currently embedded in the educational system. The research that has been conducted so far has focused on the use of technology in teaching science and mathematics (Isman et. al, 2007). The potential wider benefit of ICT may not be being realised in other subject areas, even if there is some evidence to suggest improvement in the areas of science and mathematics.

Just as in any other developing country, North Cyprus is also facing problems/challenges when introducing ICT facilities in their schools, not only because of a lack of ICT, but also because of a lack of embedding their use into the locally established cultural practice of teaching (North

Cyprus MONEC, 2005). A question emerges as to whether these problems can be seen (viewed simply) as the one of development lag, being no more than the same issues that developed countries first experienced, or whether there are specific local cultural contexts inhibiting technological advancement, leading to the conclusion that a different set of problems and strategies for dealing with them is needed for developing countries.

The Turkish Cypriot government has a policy to extend the use of ICTs into schools with the aim of raising standards in teaching and thus providing students with modern, internationally recognised, high quality education (ibid). However, the introduction of technology into the classrooms does not necessarily mean a radical improvement or transformation of learning overnight, as indeed has been the experience in the UK. Pilkington (2008) indicates that when technology was introduced, many English teachers continued in much the same way as before. Initially, at least, the new technology was used by many teachers mainly to support them in doing the same things they had always done rather than, for example, as a means of encouraging more collaborative student work, dialogic learning and teaching or supporting student advancement in self-directed learning activity.

However, Webb and Vulliamy (2006), in studying the impact on teachers of New Labour's education policy, claimed that 'ICT is making a considerable contribution to change in teachers' classroom practice' (p.152). They suggested that teachers' attitudes and the learning experiences of learners can be changed through the use of ICT. However, in the context of the wide legislative changes brought in by New Labour, the changes in ICT provision were only part of a raft of initiatives that also included the introduction of a more centralized, objectives-led and

subject-based curriculum. Moreover, it appears from their work that the provision of ICT suites actually led to a move away from individuals or pairs of children working in a self-directed way at one or two computers within the classroom in favour of more whole-class teaching, using the whiteboard in teacher-led activities. Arguably, this can be seen as a retrogressive move away from more progressive and constructivist pedagogic approaches. Nevertheless the New Labour initiatives were responsible for a massive investment in ICT resources in schools. It is also clear from Webb and Vulliamy's (2006) research that at that point in time only the initial barriers, those related to accessibility issues for teachers in using ICT in classrooms, had been overcome. In developed countries, such initial barriers of access have now shifted to those of 'technical support and maintenance, teacher time and professional development' to use the resources more effectively in teaching (Pilkington, 2008, p.1015).

1.2. Rationale

It follows from the above discussion that ICT has now become widely accepted as a core element in the education of students. Many countries in the world have recognized the important role ICT can have in improving the quality of teaching and learning (Pelgrum, 2001; Haddad and Draxler, 2002, Hennessy et al. 2005; Isman et al., 2007; Pilkington, 2008), and many countries have invested heavily in technologies at the least by simply increasing the quantity of the technology available, particularly computers, in schools (Pelgrum, 2001). Furthermore, it is predicted by many researchers that the significance of ICT in education will continue to increase in the future (Becker and Ravitz, 2001).

In the UK a range of technological applications are becoming a familiar learning environment for students within the auspices of the National Curriculum of England, and students are increasingly required to develop the necessary skills for using these applications within their everyday learning experience. The ratio of one computer for every three pupils, the highest in the European Union, is a result of very significant investment in ICT since 1997 by UK Government, totalling some £5 billion (inside government, 2009). Furthermore, educational technologies have now been in use in the UK for more than two decades. However, despite making substantial investments in ICT, there is remarkably little data or analysis about how schools are using computers and other ICTs. Even though technologies are seen necessary for today's education, a study of schools in the U.S., funded by the government, found that most did not really know how to use the technologies and neither were they concerned to learn how the available technologies were in practice being used (Jacobson, 1996). As Ehrmann concluded (1999), even though they lack adequate data about 'problems, solutions and achievements associated with ICT interventions', managers are nonetheless inclined to make substantial investments of time and money in it (p.2). There remains an active debate in the literature concerning the most appropriate or effective pedagogy for making best use of the opportunities offered through ICT to effectively teach the curriculum (Jacobson, 1996).

This lack of firm research evidence on ICT usage in education is not confined to developed countries. It is even more severe in developing countries where education data may in addition be unreliable. In these countries, such data as is available are generally related to quantification and numbers of expenditure, classroom, teachers and students (Puryear, 1995). The application of ICT-related issues and of ICT effects on people tend to be disregarded by researchers

(Montealegre, 1999). This finding is supported by Buchmann and Hannum (2001) who also noted this lack of qualitative educational research in developing countries. Fuller (cited in Buchmann and Hannum, 2001) suggests that while researchers in Europe have explored the factors that affect learning, such as the use of ICT, developing countries have as yet not done so.

In the light of the sparse and patchy data and analysis background identified above, this research study has set out to explore the particular problem in respect to the lack of such information about ICT usage in English and Turkish Cypriot secondary schools. Whilst in North Cyprus, government initiatives indicate a national commitment to the introduction of ICT in education, there is no feedback to inform the decision makers whether when ICT is made available in schools it is actually being used for educational purposes. Consequentially, the extent to which Turkish Cypriot schools are using ICT is largely unknown. Also and more importantly, this study has examined the particular pedagogical issues in North Cyprus and England respectively, regarding indigenous perceptions of a model of practice for using ICT in the classroom. The range of methods including a participatory approach, the 'Modified Delphi Technique', which was used to build a picture of consensus for a model of practice in teaching using ICT, derived from collaborative working by teachers in both countries to construct a model that they themselves would be able to use. Without such data and research, there would be little evidential basis for proposing policy formulation in the education sector.

1.3. Aims and Research Questions of the Study

Having established the 'need', the main aim of the research element of this study was to find differences between the English and Turkish Cypriot practitioners (teachers) in their beliefs about pedagogy and their use of ICT and how these beliefs shape their approach in the classroom. Necessarily, another aim of the study was to examine and quantify how and why (under what circumstances) ICT are being used in the respective secondary schools, through a comparative analysis of experience in England and North Cyprus. From this understanding, was developed the final aim to identify a model of practice that would emerge from the shared practical experiences and from building consensus between teachers in both countries, combining these with learning theory.

The study's aims were therefore threefold: 1) to explore the differences between practitioners' beliefs about pedagogy and their use of ICT in each country and how these beliefs shape their approach to using ICT in the classroom; 2) to research under what circumstances ICTs are being used in secondary schools, through a comparative analysis of experiences in England and North Cyprus; 3) to build consensus on what constitutes lesson plans for a model of practice (from the perspective of participating teachers) and from this consensus construct such a model for the integration of ICT into secondary school teaching which is sensitive to the individual contexts for their use in England and North Cyprus.

In order to reach these aims, the following tentative research questions, which were further refined after literature review, were set:

1. What are the pedagogical practices adopted by teachers in the respective secondary schools?
2. Under what circumstances are Information and Communication Technologies (ICTs) currently being used in secondary schools?
3. What can Turkish Cypriot teachers learn from the experience of teachers in England and vice versa?

Two secondary schools were selected in each country and the teachers in those schools asked the research questions separately. Using the collected data and the related issues emerging from research questions 1-2, the differences and similarities between the countries and the selected schools were explored. Research question 3 explores the lessons learned by each country's teachers as a result of the consensus building process (modified Delphi method rounds), as explained in the chapter three. Consequently, research questions 2 and 3 may also be seen as leading to deeper analysis and detailed comparison between the countries and schools.

1.4. Research Context

This section is divided into three sub-sections. The first presents background information on the global environment context. This is because, to understand the issues faced by teachers in their use of ICT, it is necessary to provide relevant contextual understanding of the global environment within which technological change is taking place. The second section provides an introduction to the particular context of education as carried out in North Cyprus. The third section discusses the England educational context.

1.4.1. Global Perspective

As well as the onrush of global changes in technology and the resulting affect on society, changes in education are also taking place.

> *"Every few hundred years throughout Western history, a sharp transformation has occurred... Fifty years later a new world exists."* (Drucker, 1992, p.95)

What we are experiencing is a change from a manufacturing to an information age (Dearing, 1997). In the education sector, this transformation can be seen in the introduction of film, television over-head projector (OHP) and whiteboards (Cuban, 1986) and, now, in the utilisation of the internet. Taylor (1999) indicated that 'it is estimated that the internet reached 50 million users in 5 years compared to radio that took 38 years to reach the same number, and television which took 13 years to reach 50 million users' (p.2).

Developed nations have appreciated the link between education and information technology for at least two decades whilst developing nations have only now started recognizing this phenomenon during the past 5 to 10 years. Within the United Kingdom, the former Prime Minister Blair commented:

> *"Education is about investing in our future: and it is in the marriage of education and technology that the future lies for Britain. Young people now in school will emerge into a world dominated by information and communication technology."* (Blair, 1996, online)

More recent comments by leaders in the Turkish Cypriot Education Department recognise that education and technology now play a pivotal role:

> *"Depending on the approach of 'lifelong learning for everyone' and the requirements of the new century, education systems have been turned into a structure which views computer technology as part of life. [for that reason] the curricula and the books are prepared in a manner to make use of computer*

technology in accordance with the understanding of pupil-centred, cooperative learning and constructive education" (TRNC Department of Educational Planning and Program Development, 2005, pp. 4-41).

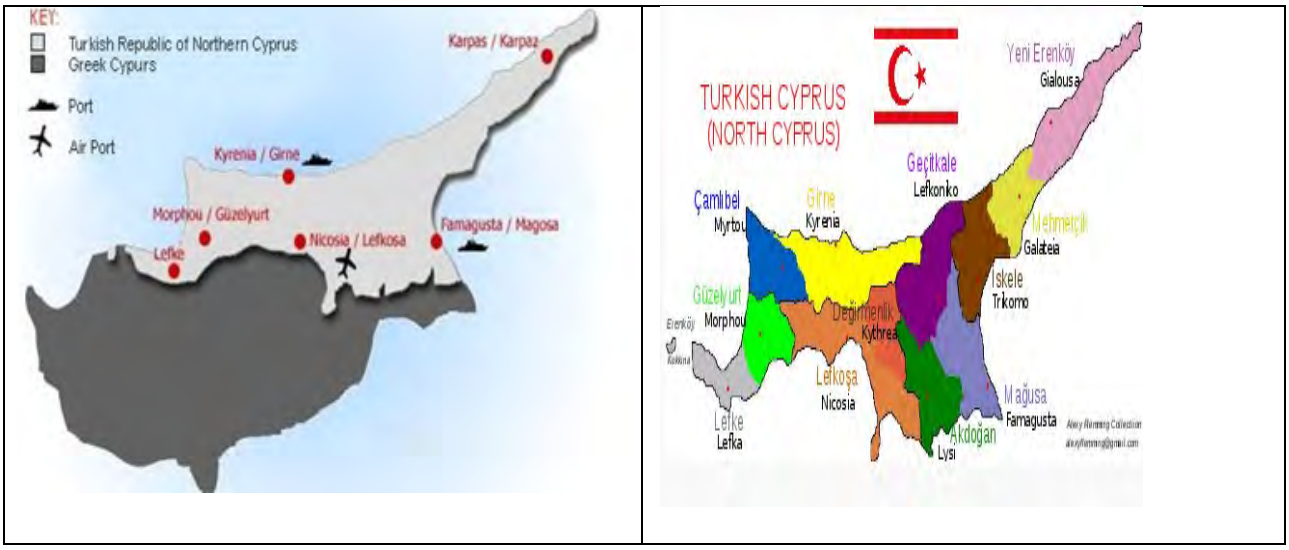
1.4.2. The North Cyprus Context

Cyprus is the third largest island in the Mediterranean and is a divided into north and south. The north is controlled by the Turkish Republic of North Cyprus while the south is controlled by the Republic of Cyprus. The United Nation administers a Green Line that separates the two. Also there are two British Sovereign Base Areas – in Akrotiri and Dikelya. From personal knowledge as a native, the following information relates to North Cyprus.

North Cyprus's capital city is Lefkosa (Nicosia) and based on 2011 census, the population of the country is 294,609 (TRNC State Planning Organisation, 2011, online). It is located at a crossroads of European, Middle East, Asian and African culture and trade.

Figure 1-1 Cyprus map

Figure 1-2 North Cyprus map



The Turkish Cypriot Government made a decision to spend large amounts of money to fund the implementation of ICT in schools. In 1997, the government spent $1,850,000 US dollars on ICT. To 2005, this funding has contributed to:

- computer laboratories for 44 secondary schools;
- implementation of 'mini pilot' laboratories in 11 primary school;
- installation of 200 computer-aided education system programs in 112 primary and pre-schools
- provision of 'special education' centred computer laboratories
- installation of approximately 30 computer laboratories in secondary schools

However, the government still needs a further $1,000,000 US dollars to complete the implementation of the proposed ICT projects in all schools. These include:

- the information project (to set up computer labs for 13 secondary schools, maintenance of 44 secondary schools' computer labs, the set up of central communication systems, implementation of computer systems to support teachers);
- the teacher academy computer project (which will, for example, set up computer labs and computer supported math and science labs),
- 'the studio and fiction' project (which will, for example, set up educational broadcast facilities); the computer program development project (to provide communication between schools and the education department);
- the schools management system project (for registration);
- the Education Department project (to establish a maintenance centre for computer labs, repairs and for maintaining computer technologies).

(North Cyprus MoNEC, online)

As North Cyprus is a developing country, many of its schools still lack computers in the classrooms, but there are existing European Union projects that would provide the funding to equip schools with computers.

1.4.3. The English Context

England as a country is part of the UK, with Scotland as the neighbour to the north, Wales to the west, the North Sea to the east and the English Channel to the south (Briney, 2011). As of 2011, England's population was over 53 million (Office for National Statistics, 2012, online).

The potential of ICT to transform teaching and learning was not substantially recognised until the 1960s. Although there were pilot initiatives carried out in schools in the UK in the early eighties (primarily through the introduction of BBC Acorn, RM 380Z and ZX Spectrum machines) it wasn't until the mid nineties that there was a major drive to provide computers in every classroom and (partly through parent power) such RM type machines were gradually replaced by what was by then becoming industry-standard PCs, using Microsoft software. The new Labour Government, in power from 1997, embarked upon utilising more fully the potential of ICT in teaching and learning, and established the National Grid for Learning (NGfL) to provide high quality on-line learning and teaching materials, with a primary focus on technology use in education and to encourage schools to specifically promote lifelong learning. The Government also provided the funding for infrastructure technology such as cable and networks, hardware and services and training for schools (DfEE, 1997). Overall, since 1980, the UK government has promoted a number of different initiatives. Some of these are presented in Table 1-1 below.

Table 1-1 UK government's ICT initiatives

1981	Information Technology Centres
1985 – 1988	Support for Educational Software
1986	Modems in Schools
1987	IT Equipment in Schools
1987 – 1993	IT in Schools Strategy Including Advisory Teachers, Learning Geography with Computer pack
1993 - 1994	Pilot Portable Computers for Teachers
1997	BECTA formed
1997	NGfL launched
1999 - 2002	ICT Training for Teachers and School Librarians
2000- 2001	Computers for Teachers
2000- present	ICT in Schools
2002-2006	Laptops for Teachers
2003-2004	The Schools Whiteboards Expansion project
2004- 2005	Hands on Support and Masterclass (focus on pedagogy side of ICT)

1.5. Significance of the Study

This research study has as one of its aims (Aim 3) to complement previous research in this particular area of educational practice by conducting a comparative case study of selected secondary schools in England and North Cyprus. To a considerable extent it is an exploratory initiative, since this study is the first conducted comparative study between England and North Cyprus and is the first study that has used an innovative approach: Modified Delphi Method, particularly in North Cyprus. Moreover, by using a modified Delphi approach to build a consensus between practitioners and their practice in these two very different countries, it is anticipated that new insights will emerge; not only into the similarities and differences between

the context of their practice, but also into some of the particular and individual factors that influence teachers in their use of ICT more generally, their beliefs about pedagogy and their perceptions of what constitutes a 'model of practice' in the use of ICT to support curriculum teaching.

1.6. Organization of the Thesis

This thesis has seven chapters; this first chapter encompasses the background, rationale, aims of the study, research questions, the research context and the potential significance of the study,

Chapter Two provides a literature review of the work that has been carried out and is related to the pedagogical approaches, as they are currently used by teachers in their profession, the use of ICT in the education system and the impacts its introduction has had upon teaching. As this study was carried out in two different countries, England and North Cyprus, an examination of the culture of pedagogy is provided. The chapter also considers the analysis that has been carried out about barriers and enablers for the integration of ICT in teaching.

Chapter Three focuses on the research methodology, research design and the data collection methods that have been used. It includes an explanation of how the research participants were selected and how the questionnaire, semi-structured interview and modified Delphi method were carried out, leading to a description of how the data were managed and analysed. Methodological limitations and ethical considerations are also described.

Chapter Four focuses on the analysis of data that was collected by questionnaire, semi-structured interview and modified Delphi method regarding teachers' perceptions on use of ICT, their pedagogical practices and the barriers and enablers they reported for the integration of ICT into their teaching.

Chapter Five focuses on addressing the research questions, a discussion of implications for the theory of how pedagogical approaches are defined in the literature review and by participant teachers in this study, how English and Turkish Cypriot teachers are different in their pedagogical approach- cultural differences and the barriers and enablers of technology use - as determined in the literature and by participant teachers. As a result of the discussion about pedagogical approaches (literature review and participant teachers beliefs) the model were constructed based on synthesis between what the teachers and theorists (literature review) said. Finaly, the strengths and limitation of the study are discussed, and recommendations and areas for further research are outlined, ending with a final conclusion.

In this Chapter One, the study's aims and research questions, research context and its significance were presented. The next chapter, details the literature review element of the study with supporting discussion as necessary.

CHAPTER 2

A REVIEW OF THE LITERATURE ON ICT ADOPTION AND ITS RELATIONSHIP WITH PEDAGOGY

2.1. Introduction

The major advances in technology interwoven with the acceleration of globalisation have brought about new challenges and opportunities for people all over the world. The resulting effect has to be addressed in many fields including that of education, as teachers need to teach their students the new methods of accessing information for themselves (Kelly et al., 2009). Addressing these new challenges has led to calls for reform in pedagogy and teaching methods because to use ICT effectively in education presupposes the implication that teachers' pedagogic practices need to be adapted (Montaser et al., 2012). This study focuses on teachers' pedagogical beliefs and how they use ICT and looks at the ways in which these beliefs shape their approach in the classroom, as well as the consequences of the beliefs teachers hold as to which are the barriers and enablers to technology use in teaching. Therefore, to understand the pedagogical beliefs and usage of ICT for English and Turkish Cypriot teachers, and how such beliefs impact on barriers and enablers of technology use, this chapter presents a critical synthesis of the established literature that underpins this area of research.

Although the goals of different countries may vary, common ones including developing and improving problem-solving, critical-thinking and teamwork skills, lifelong learning and using ICT to support more effective teaching and learning are shared (Pacific Policy Research Center,

2010). Recent policy documents sponsored by government agencies in both England and North Cyprus (DfES, 2003; North Cyprus MoNEC, 2005) subscribe to the view that it is necessary to integrate ICT across the curriculum, to achieve good integration of ICT in courses rather than teaching it in isolation. This reflects that this form of human capital investment is a driver of economic growth (Fedderke and Luiz, 2008). A potential major barrier to such integration is the readiness of teachers. They clearly need the appropriate infrastructure and training to use information technology, but they also need to be enthused with creativity to motivate students to use ICT in order to aid their learning across the curriculum. However, in the literature it is claimed that teachers lack readiness to meet the challenge because they lack a suitable pedagogy (a theory of how to teach using ICT) and that when infrastructure is in place, adoption of a suitable pedagogy is still essential to integrating ICT effectively across the curriculum (Cheung, 2001; Williams et al., 2000; Pelgrum, 2001; Olinzock and Okojie-Boulder, 2005; Pilkington, 2008; Voogt and Knezek, 2008). Other practitioners (including the research community) can show clear evidence of learning and teaching enhancement by teachers who are skilled in the use of ICT in a pedagogy led-way (Newhouse et al. 2002; Moore, 2005; Khirwadkar, 2007). Necessarily, this means knowing how to integrate technology through the appropriate use of pedagogy. The difficulty, however, is that at least until recently, there has been little clear guidance in this for teachers. Cognizant of these issues, the underlying policies of ICT integration across the curriculum together with teacher readiness to adapt are two crucial variables that could be explored by analysing the context, and pedagogical approach to, ICT usage in secondary schools.

The review of literature chapter is divided into seven sections: section 2.2 presents a working definition of Information and Communication Technology (ICT), including the distinction between learning IT as a separate subject and learning using ICT components across the curriculum; section 2.3 focuses on research that has investigated pedagogical issues, the instructivist and constructivist approaches and also how technology can be used with these approaches; section 2.4 presents the rationale for technology use by examining the impact of ICT upon teaching and learning, the justification for integrating ICT emanating from evidence of enhancement of learning; section 2.5 deals with the culture of pedagogy looking at cultural differences of pedagogy since culture shapes how teachers use technology; section 2.6 discusses barriers to and enablers of technology use in teaching; and section 2.7 presents a chapter summary with a list of modified research questions and hypotheses identified and emerging from the review.

2.2. Information and Communication Technology (ICT)

Information and Communication Technology (ICT) is regarded as a core element of basic education by many countries (DfES, 2003). It is not simply another subject but has the potential to be a valuable tool to enhance the quality of teaching and learning across the curriculum (ibid). In order to assess the evidence underlying such claims – which lie behind the recent emphasis upon ICT in England and North Cyprus education policy – it is first necessary to define 'ICT'.

2.2.1. Definition of 'ICT'

Cox (1999) states that there has been significant confusion between IT (Information Technology) and ICT, and that the distinction between the two must be preserved, even though each is important for teaching and learning. According to Cox (ibid), IT is a separate subject taught in schools whereas ICTs constitute 'electronic and/or computerised devices and associated human interactive materials that enable the user to employ them for a wider range of teaching and learning processes' (p. 67). Similarly, Kumar (2008) defines ICT as an umbrella term, applicable to a range of digital communication devices and applications such as 'digital television, radio, internet, network hardware and software, videoconferencing, and distance learning' (p.1). Lever-Duffy et al. (2005), however, report that some 'educators may take a narrower view' and predominantly 'confine educational technology [ICTs] primarily to computers, computer peripherals and related software used for teaching and learning' (pp. 4-5).

In this study, the term 'ICT' has been applied to any computer based technology, whether hardware, software or networked, and which can be used for teaching and learning purposes. Contemporary debates in the sphere of technology-enhanced learning focus on the importance that must be given to students learning with and through technologies across the curriculum as a tool to subject-learning (Moore, 2005). It is the latter, learning through computers across the curriculum that is the focus of this study: i.e. the use of ICTs to enhance the learning of other subjects, from geography to chemistry, English to art. These goals must be distinguished from a third, learning about computer technology and its applications as the separate subject of Information Technology or Computer Science, and which is not the subject of this review.

2.3. Pedagogical Issues

> *"Placing computers and software in the classroom is not enough. Discovering whether technology 'works' is not the point. The real issue is when and under what circumstance. Like any other tool, teachers have to come up with a strategy or pedagogy to make it work." (Viadero, 1997, p.16)*

The increasing availability of ICT has made possible new pedagogies in teaching and learning in a technology-rich environment, but the achievement of success has been inconsistent. For ICT to be used effectively in teaching, it seems a re-examination of basic teaching principles may be necessary since, as Webb and Cox (2004) state, 'the use of ICT is changing the pedagogical roles of teachers' (p.240), and indeed some believe that pedagogical principles have not yet been sufficiently developed to appropriately guide teachers in their use of technology (Olinzock, and Okojie-Boulder, 2005). It may even be that radical changes in teaching styles and approaches to learning are implied (Nichol and Watson, 2003). This is also the view of Voogt and Knezek (2008) and Viadero (1997), who state that it is now extensively recognised that the effective use of ICT in teaching necessarily implies changes to teachers' pedagogic practices. Yet, as Webb and Cox's (2004) study 'A review of pedagogy related to Information and Communication Technology' suggests, changes in teachers' pedagogy as a consequence of using ICT does not happen for all teachers.

To employ ICT at its most basic level, teachers must to trained how to use certain technological tools. Teachers also need to critically assess their pedagogical approaches to bring ICT into play in their classroom (BECTA, 2004). Likewise, in 1997, Viadero indicated that technology is valuable if teachers know how, when and under what circumstances they are able to apply an appropriate pedagogy to make the ICT work in their classroom. Evidence of teachers'

understanding of how technology could be better used with appropriate pedagogy as they gain experience with educational technology, has started to be documented in studies (Way and Webb, 2007).

Pedagogy compromises particular knowledge and skills as well as effective overall teaching practices (Windschitl and Sahl, 2002; Angers and Machtmes, 2005). Teachers' 'own pedagogical beliefs' (personal preferences) and 'values' are important elements that shape their use of technology in their classroom (Webb and Cox, 2004, p.237; Webb, 2005, p.722; Way and Webb, 2007, p.1). Hermans et al. (2008) found that teachers whose beliefs are more traditional will apply more traditional (instructivist) teaching methods, methods that are more teacher-centred and with little technology use, whereas teachers whose beliefs are more constructivist will be likely to apply more student-centred and wide-ranging use of technology. This may result in teachers using technology to strengthen their existing pedagogies or to enhance students learning and change their interaction with their students, as research literature suggests (BECTA, 2004).

This is related to affordance theory, in which Gibson (1979) proposes that the use of things [in this case; technologies] is determined by their affordances, where affordances are 'ecological' in relation to those properties of the environment that are relevant to the perceiver. Similarly, Webb (2005) states that choosing appropriate pedagogical approaches depends on teachers' understanding of 'the relationship between the affordance of a range of ICT resources and the detailed knowledge of the concepts, processes and skills in their subject' (p.727). Therefore, affordances are perceived opportunities, interactions and possibilities, that things may afford a user and can be taken as anything [technology in this context] that is accessible to individuals

[teachers] for them to employ. Therefore, teachers use available technologies according to their own perceptions of the opportunities they afford. How technology is used and whether from an instructivist or constructivist perspective, will very much depend on the individual teachers' beliefs and pedagogies, and their understanding of how ICT might be used to support either approach, as is explained in this section.

According to Way and Webb (2007), the use of technology transforms pedagogies in the following ways:

- a shift from instructional to constructivist educational philosophies;
- a move from teacher-centred to student-centred learning activities;
- a shift of focus from local to global resources; and
- an increase in the complexity of tasks and the use of multi-modal information.

(Way and Webb, 2007, p.1)

There are two conflicting pedagogical approaches, 'instructivist' vs. 'constructivist', that have traditionally been used in teaching (UNESCO, 2004; Giovannini et al., 2010). Merriam and Caffarella (1999) also argue that these learning approaches provide an overall basic framework for the activities of teaching and learning in classrooms. Reeves (1994) discusses these major educational philosophies/approaches and concludes that evidence of these in teaching and learning still continues throughout education and training. However, it is generally accepted that the evidence is not sufficiently robust to show that the instructivist approach is superior to the constructivist or vice versa (Duffy and Jonassen, 1992; Baylor and Kitsantas, 2005). According to Cercone (2004), 'the instructivist and constructivist approaches to teaching and learning are

considered to lie at either end of a continuum' (p.142). Way and Webb (2007) contend that because of the advent of ICT, teachers have started to move away from 'instructivist' toward a more 'constructivist' approach to pedagogy (and indeed that technology use encourages this shift), but as yet few studies have shown convincingly that this is the case. Indeed as noted earlier, the New Labour initiative which was responsible for installing so much computer infrastructure, hardware and software into schools may, ironically, have been associated with a trend away from more progressive, self-directed constructivist approaches toward (at least some) more whole-class, teacher-led, show-and-tell approaches (Webb and Vulliamy, 2006).

The 'instructivist' approach – also sometimes referred to as 'top-down' or 'direct' instruction – is an approach in which teachers believe that effective learning depends on presenting the content in a highly-structured way. The teacher using an instructivist approach in teaching: first defines the concept and then give examples of the subject to the students that demonstrate the idea. To engage the students, instructivists may adopt behaviourist theories and emphasise extrinsic rewards (Skinner, 1975), where teachers promise a incentive, such as if work is completed on time or appropriately, they are allowed to use the computer recreationally (Kearsley and Shneiderman, 1999). In this traditional approach, teachers may also use computers or other technologies for drill-and-practice, a technique known as Computer Aided Instruction (CAI). Teachers provide guidance and feedback (UNESCO, 2004) to students and give them opportunities to practice until they master the concept (Landmark Collage, 2005). As a policy viewpoint, UNESCO (2004) defines instructivist approach as a teacher-centred information-based technique where the role of the teacher is as a fact teller and the role of the student is as a listener. UNESCO (ibid) also specifies that in this approach memorisation is the method of

learning, and technology is used for drill and practice (UNESCO, 2004). In comparison, academic researchers such as Reeves and Reeves (2011), define the instructivist approach as a process of passing knowledge from teacher to students (one way communication) where the pace of the lesson is directed by the teacher. According to them, students obtain knowledge from the teachers who convey information through their experience and understanding. They also identified that there is a risk that the information given by teachers will not fully integrate with the workplace context. In addition to these aspects, it is noted that higher-order competencies are not being brought in to play as part of the teaching content.

Instructivist approaches have been criticised for not successfully stimulating the students' critical-thinking and problem-solving skills, important in the contemporary world, and failing to impart the expanding knowledge base that students need to know in a rapidly changing technological society (Hannafin and Land, 1997). This is why teachers are encouraged to apply more student-centred approaches, in other words more constructivist approaches, in their teaching to enhance the students' critical-thinking, problem-solving skills and their wider and deeper learning.

The 'constructivist' approach – also known as 'bottom-up', 'inquiry' or 'discovery' teaching – is an approach in which teachers believe that students can build knowledge by experiencing and interacting with phenomena as well as by interacting with their peers (UNESCO, 2004; Giovannini et al., 2010). The constructivist approach developed out of Piaget's theories of cognitive development in children (putting more emphasis on the individual where they develop their own conceptual framework through constructive play using objects in the environment) and

Vygotsky's idea of learning through collaborative and social interactions where the zones of proximal developments are created through interaction between the more and less experienced learners (Vygotsky expanded Piaget's idea of individual cognitive development and he put more emphasis on social interaction for learning) (French, 2007). The outcome in this approach being that learning is constructed from students experiences as facilitated by a significant other, such as parent or teacher, to guide activity and reflect on the outcomes of the activity experience. The constructivist pedagogy stresses that new understanding occurs when students acquire and organise new information, as shaped by their prior knowledge. One of the distinctive elements of the constructivist learning-environment is discussion in the class which helps students to establish meanings for themselves out of their joint learning experiences (Gibbs, 1995) or in other words out of student-student interaction (Pilkington, 2001). The value of dialogic interaction is particularly emphasised through discussion activities when students come into contact with alternative viewpoints, which impacts on students learning (Pilkington, 2001) training them to justify their own point of view (Wegerif, 2007). Furthermore, according to Pilkington (2001), the dialogic interaction can have an impact particularly on problem-solving and task-completion. In this approach, students typically discover a principle and then continually develop and test hypotheses about that principle for themselves, whereas in the instructivist approach this information would be given to students by their teachers. This approach allows students to observe and experiment with the content, and to acquire knowledge by themselves (commonly referred to as Inquiry Based Learning (IBL)) and turn this knowledge into meaningful information to develop their own understanding (Networker's Patch Panel, 2011); its theoretical foundations lie in constructivist psychology. In this method, the teachers' role is to facilitate learning (Merriam et al,. 2007), whereby teachers create opportunities and design the context

within which students can raise questions or make generalisations from their observations and experiments, with teachers being available for guidance and feedback.

For effective teaching and learning in the instructional and constructional learning environment, teachers designing the context must take into consideration individual differences. This is called differentiation (Tomlinson, 2001; Heacox, 2002). Teachers need to adhere to common curricular objectives, but can use different teaching methods and assessment techniques to differentiate their class (Tomlinson, 2001). Similarly, differentiated teaching is described by Heacox (2002) as 'changing the pace, level or, kind of instruction you [teachers] provide in response to individual learners' needs, styles, or interests' (p.5) In other words, since teachers know their own students' abilities and level, they can modify the content complexity to fit their students' attainment level and understanding. Differentiation is a way of designing meaningful learning for everyone in the classroom, as Diamond (2007) states that each student is unique and not all students learn in the same way. Teachers can use words such as 'all', 'most' or 'some' to check learning objectives when they use differentiation in their classroom (Belshaw, 2009). This means for example that teachers can identify what can be done by each student, delineating what can be done by *all* students, *most* students and *some* students and through doing this, they can employ differentiation in their classroom. Checking learning objectives assists teachers to find out whether those objectives are being achieved by students. Plenaries are a common means by which teachers check whether learning objectives are met. In constructivist environments, where students are expected to work collaboratively through group work activities, a plenary may be used to help students check each others' learning as well as their own (Davis, 1993). Through collaborative group work activities, students' social and communication skills as well as problem-based and

critical-thinking skills can be enhanced and greater depth of students' understanding occurs through the practice of 'dialogic' debating processes, i.e. involving students in exploratory talk and argumentation. This stimulates higher-order thinking and helps students to establish joint meanings, by working together and to be able to construct a more complete extent of the knowledge area being studied (Totten et al., 1991; Pilkington, 2001; Wegerif, 2007).

The collaborative learning environment often involves peer-assessment, constructively aligned with the 'cognitive apprenticeship' approach, where social interactions promote the process of achieving agreement through the discussion of content, and students understanding and their needs are regarded as a form of cognitive apprenticeship (Collins et al., 1989; van den Berg, 2006). Through these interactions, students are scaffolded, which means students get their required amount of support from their teachers and through their more mature or knowledgeable peers or mentors, which is very much the goal of 'cognitive apprenticeship' (Vygostky, 1978; Collins et al., 1989; Bruner, 1990). In other words, teachers support novice students to build up their reasoning skills by making assessment criteria visible to them so they understand how teachers do the marking. In addition to peer-assessment, in the constructivist approach self-assessment is also used to improve students' higher-order thinking skills enabling students to understand their own learning process, and improve their work further on in their learning process (Rolheiser and Ross, 2001). According to Race et al. (2005) and Brown et al. (1994), by involving students in peer-assessment or their own self-assessment, they consciously engage in evaluating their own learning, which will assist them in understanding what their teachers require. The most important point to be considered in these assessments is that the criteria should

be determined by students themselves with teachers' guidance and support, which means it can be truly aligned with the constructivist approach (ibid).

In the constructivist learning environment, students learn by 'doing', thus students are required to actively engage in experience based learning, one of the keys to their construction and acceptance of new meaning (Merriam et al., 2007). Experiential learning means to learn by direct experience or by doing (Kolb, 1984). Within a range of such approaches, situated learning is about creating authentic experiences as close as possible to real life (Brown et al, 1989). This is often associated with methods such as scenario, or problem-based, learning role play and project based learning (Oblinger, 2007). Through situated learning, students become engaged and motivated as activities take place in an authentic and meaningful manner (ibid). Humanist theories also align well with the constructivist approach (Lave and Wenger, 1991), as they emphasis student familiarity with the tasks upon which they are working and with their current level of understanding (Maslow, 1975; Rogers, 1983; Kolb, 1984; Knowles, 1988). The activities which take place in the authentic (real world) help students to develop their higher-order thinking skills, using their reasoning, problem-solving and critical-thinking skills to create their own solutions to the problem.

As a viewpoint from policy makers UNESCO (2004) states the constructivist approach is a student-centred and interactive approach where the teacher's role is to guide and mediate the students' learning and the student role is to investigate information. Students use the inquiry based learning method to learn. Research such as Webb and Cox (2004), who reviewed the literature on ICT and pedagogy with the aim of identifying teachers' pedagogical practice associated with the use of ICT, suggested that 'the use of ICT is associated with changes in

pedagogical practice in the classroom/lesson towards a more student-centred model involving collaborative learning' (p.275), and similarly Rakes et al. (2006), who examined the relationship between the ICT use and the use of constructivist approaches among the 4th and 8th grade 186 teachers from 11 rural school districts, suggested that when technology is integrated into teaching, teachers are more likely to adopt a constructivist approach.

In a student-centred constructivist classroom, the teacher may seek to use a range of technologies to help students to become more active and collaborative learners (Dexter et al., 1999, Jonassen, 1999). Technology-enriched classrooms are claimed to facilitate and encourage teachers to use a more constructivist pedagogy, because they rely to a lesser extent on prescriptive textbooks and the teacher's personal authority as sources of knowledge (Hopson et al., 2001). As can be seen from the above literature, it is often claimed by researchers that using ICT in the collaborative constructivist learning environment can support a deeper understanding of content by students and help them in their learning process, as well as assisting them in taking more control of their own learning. In part, this is because, in the constructivist approach, the process of learning occurs as a result of interactions: those between a student and an object as well as social interactions with the teacher and their peers. Vygotsky's social constructivism and Piaget's cognitive constructivism are both related to situated learning, which as mentioned above, is a form of experiential learning that emphasises the need for authenticity. This means that constructivist learning environments typically need to be situated. Also, this environment includes collaborative group work learning, as it is broadly rooted in Vygotsky's view of the social nature of learning that students learn effectively when they work collaboratively, because

then they socially interact with each other. This process is perceived to particularly enhance critical-thinking, reasoning, higher-order thinking and problem-solving skills.

Inquiry Based Learning (IBL) emerges from this student-centred philosophy as emphasised in the European Commission's recent report (Rocard et al., 2007). It is defined as;

> *"an approach to learning that involves a process of exploration, that leads to asking questions and making discoveries in the search for new understandings".* (National Science Foundation, 2000, online)

As can be seen from this definition, IBL focuses on questioning, critical-thinking and problem-solving for new understandings, and for this learning process students are expected to spend a considerable amount of time in the classroom.

Gaining and sustaining the students' attention is obviously a precondition for the success of self-guided inquiry (Bell et al., 2007). In Inquiry-Based Learning, students first choose a topic they are interested in, then they prepare some questions about the selected topic to obtain information and then synthesise them and finally they write a report and present their results in the classroom. Owens et al. (2002), explored how 'accessing information' promoted significant learning among students when they engaged with projects that include technology-enhanced and inquiry-based learning. They found that "inquiry" is not just reporting a topic; but that it requires 'students to move beyond the 'Who', 'Where', 'What' and 'When' questions that so often from the basis of classroom research projects' (p.617). According to them, well-designed inquiry-based learning by teachers engages students in the process of asking themselves 'what does this mean, and how can

I use this information?', in order to encourage them to create new connections for better understanding (p.617). They also suggested some key questions that need to be answered by teachers: 'When was the last time I really learned about something in depth? How did I go about learning it? How do I know I know this' (p.618), in order to construct an inquiry-based teaching environment. In this way, teachers examine their teaching methods by reflecting on their own learning motivations and processes. For the implementation of inquiry-based learning in teaching, teachers need to find an appropriate topic to stimulate student curiosity, meaning in broad terms that teachers show their students how to choose a topic, how to organize questions to understand the topic thoroughly, how to find resources about the topic and how to use the findings in a significant manner (Owens et al., 2002).

Owens et al. (ibid) found that the selected topic was performed better when students have previous knowledge of it. It is therefore important for teachers to guide students choice of topic, as they need to ensure that students choose a topic for which they have some previous knowledge, because too often students choose a topic that is too broad or narrow, or sometimes not sufficiently clearly defined, making the task difficult. Teachers play an important role in inquiry-based learning, as they provide guidance to their students for formulating the problem appropriately. Wepner et al. (2000) warn teachers who want to adopt constructivist pedagogy in their teaching, that the technology should not drive the learning. For effective teaching within the constructivist pedagogy, he suggests that learning should drive the technology. Some problematic issues are raised by academics about constructivism as a pedagogic approach, as they think that constructivism is well-documented, in that people have written a lot about it, so the facts about it as a theory of learning or knowing are clear, but it is not so far a well-documented theory of

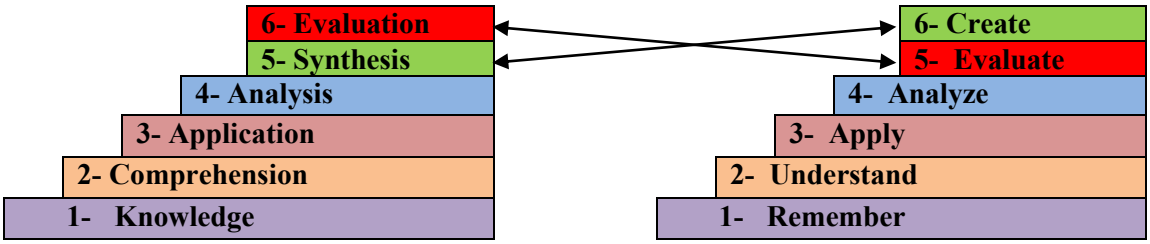
teaching (Fosnot, 1992). According to McCarty and Schwandt (2000), constructivists were mistaken in their 'belief that theory of best teaching can be derived from a theory of knowing' (p.79). However, Howe and Berry (2000) claimed that lessons or collaborative activities as teaching methods do not essentially require a specific learning theory in practice, and they also argued that 'it is surely impracticable to always rely on constructivist teaching technique' (p.32), where in practice, the instructivist, didactic approach to teaching may be combined with the constructivist view.

Combining different aspects of several learning theories on which to base pedagogy is evident in educational literature. Several researchers such as Ally (2004), Connole et al. (2004), Mayes and de Freitas (2004) have all constructed pedagogic models which derive from different learning theories. Ally (2004) states that the learning environment can include principles from instructivist and constructivist theories, and he relates specific teaching approaches to specific theories of learning, because he associates the teaching of facts with behaviourist-instructivist learning theory, and cooperative group work activities with constructivist learning theory. Furthermore, different types of knowledge and the process of learning need different teaching approaches (ibid).

In both pedagogical approaches, teachers often use something akin to Bloom's taxonomy (Bloom, 1986) to design their lesson plan as this provides a way to categorise learning objectives according to the levels of thinking required in different classroom activities and which can be measured by classification (White, et al., 2011). The three lower levels of Bloom's taxonomy are often emphasised in instructivist approaches as the main foci of learning for acquiring and

applying knowledge. The top three levels are often emphasised in constructivist approaches, which aim to develop students' learning through more self-directed dialogic (discursive) and collaborative group-work activities (e.g. inquiry, problem or project-based learning). This emphasises students' experience in evaluating, creating and constructing rather than acquiring a consistent, standard body of knowledge. After many years of use, and reflecting changes in education, Anderson and Krathwohl (2001), updated Bloom's taxonomy to be more relevant to 21th century education experience and practice, changing nouns to verbs where these verbs describe many objectives, activities and processes that teachers use in their daily teaching process. The following figure shows Bloom's taxonomy and revised version:

Figure 2-1 The six levels Bloom's Taxonomy and revised Bloom's Taxonomy



Adopted from Bloom et al. (1956) and Anderson and Krathwohl (2001)

As can clearly be seen from the above figure, Anderson and Krathwohl (2001) changed the category names from nouns to verbs and also slightly rearranged them. The verb form of categories is in considered more teacher-friendly than the noun form. Whilst the noun form describes the content which will be learnt by the students, the verb form describes what students

will to do with that content and how they will learn from it. Moreover, they inverted the order of synthesis (changing the name to 'create') and evaluation. Whilst they are synthesising to create, they try to embrace the reality that when students solve problems they can simultaneously create new learning.

These levels are considered to build on one another, as students cannot understand the topic if they do not first remember it, and cannot apply their knowledge if they do not properly understand it. All teachers generally aim to move their students up Bloom's taxonomy as they progress (Bloom, 1986; Anderson and Krathwohl, 2001). In other words, once students have satisfactorily learned the basic facts of the topic, a higher level activity will need to be constructed by teachers so students can progress to the next level. The revised version is considered by Anderson and Krathwohl to better reflect 21th century educational needs, as it has the potential to help teachers understand and implement the national standards-based curriculum. This version of Bloom's taxonomy is therefore provided in the table below:

Table 2-1 Structure of the cognitive process dimension of the revised taxonomy

Higher-order thinking skills <------ Lower-order thinking skills		Categories	Cognitive process
	Lower-order thinking skills	Remember	Retrieving relevant knowledge from long-term memory. • Recognising • Recalling
		Understand	Determining the meaning of instructional messages, including oral, written, and graphic communication. • Interpreting • Exemplifying • Classifying • Summarizing • Inferring • Comparing • Explaining
		Apply	Carrying out or using a procedure in a given situation. • Executing • Implementing
	Higher-order thinking skills	Analyse	Breaking material into its constituent parts and detecting how the parts relate to one another and to an overall structure or purpose. • Differentiating • Organizing • Attributing
		Evaluate	Making judgments based on criteria and standards. • Checking • Critiquing
		Create	Putting elements together to form a novel, coherent whole or make an original product. • Generating • Planning • Producing

(Based on Krathwohl, 2002, p.215)

According to Krathwohl (2002), when teachers apply the revised Bloom's taxonomy in their teaching, their students become more conscious of their own thinking about the activity and its purpose.

The above literature does not suggest that one teaching approach supersedes the other, rather that they complement one another. Therefore, teachers need access to appropriate continuing professional development (CPD) to be able to apply appropriate teaching approaches in their teaching as well as to support them to confidently incorporate technologies into the curriculum.

CPD is a program which is designed to improve teachers' professional knowledge and skills, so that, they may enhance their students learning (Guskey,2000). This definition is expanded by Fullan (1991), who also included 'the sum of formal and informal learning experiences throughout one's career from pre-service teacher education to retirement' (p.326).

Grant (1996) takes the digital age into account and provided a definition for CPD that consists of the use of technology. According to him, CPD is not simply another word for training, because this particular aspect of training needs to go further, including helping teachers to learn new skills and to expand new understandings into pedagogy, with the end result of helping them to explore new or advanced understandings of what can be derived from available content and resources. Particularly in this digital age, when educational technologies impact on teaching and learning, professional development of teachers includes support to help them put technology into their teaching practice and to understand the use of ICT to provide support for inquiry-based learning. Therefore, professional development is needed for teachers to enhance students learning when applying appropriate pedagogy and technology in their own practice.

The following table illustrates the characteristics of the instructivist and constructivist approaches as they have been defined above by UNESCO (2004) as a policy view, and as set out in other literature that demonstrate the views of academics who did research on these teaching methods.

Table 2-2 The characteristics of the instructivist and constructivist approaches

(UNESCO, 2004; and Academics such as Reevees, 1999; Brown et al., 1986; Kolb, 1984; Knowles; 1998; Lave and Wenger, 1991, Roger, 1983; Merriam and Caffarell, 1999; and others that mentioned above)

	UNESCO (view of policy)		Characteristics identified by Academics	
	Instruction	**Construction**	**Instructivist**	**Constructivist**
Classroom Activity	Teacher-centred Didactic	Student-centred Interactive	Teacher-centred Didactic	Students-centred Students are active
Teacher Role	High authority Source of facts, always an expert	Guider and mediator Collaborator, sometimes an expert	Teacher provides materials and standardised, structured information to students and he/she has authority in the classroom and is considered the expert	Facilitator and moderator. Provide guidance for students to inquire and discover information.
Student Role	Listener	Investigator	Listener, making sense of and applying information / instruction	Investigator, discovering and constructing their own meaning
Instructional emphasis	Facts Memorisation	Relationships Inquiry and Invention	Accurate reproduction of what the teacher says or does. Practice and repetition to enhance recall.	Making connections, between topics to create deeper understanding.
Demonstration of success	Quantity of knowledge	Quality of understanding	Accurate reproduction; successful task completion	Creative / original product demonstrating deep understanding.
Technology use	Drill and practice	Communication, collaboration, information access, expression	Drill and practice problems or use as a tool to engage and motivate students	To collect information, construct and represent meanings, communicate with others and collaborate
Source of information	Teacher	Multiple	Teacher with only a little student engagement	Multiple materials, such as teacher, internet books etc..
High order competencies	-	-	Emphasis on application	Emphasis on evaluation and creativity
Assessment	Norm referenced Multiple-choice items	Criterion referenced	Teacher assessed or automatic feedback and Test-scores.	Self-directed, Peer, and Value of process and product considered.

Figures 2-2 and 2-3 below summarise what the instructivist and constrictivist teaching theories include, based on the above explanations.

Figure 2-2 Instrucivist teaching theories (designed by the researcher of this study)

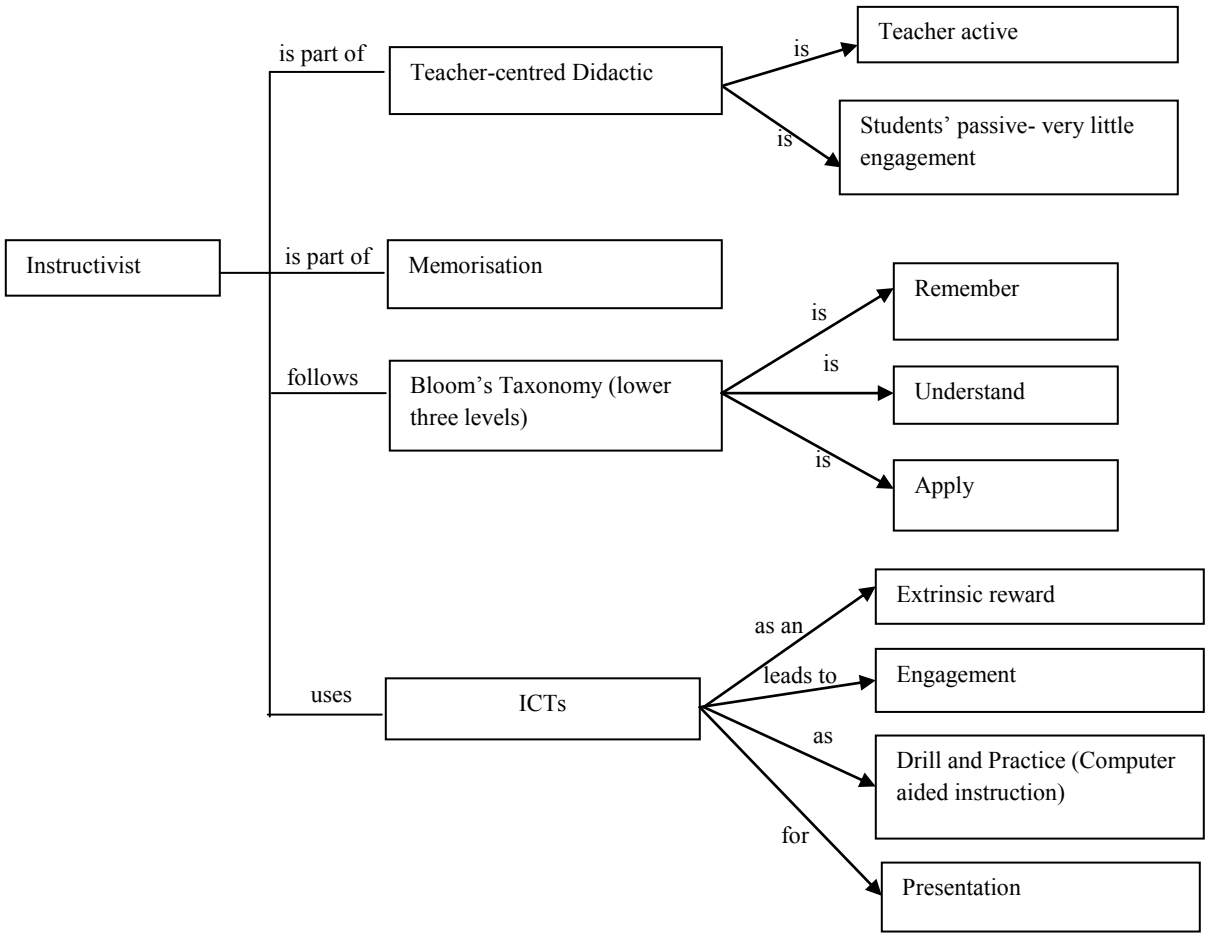
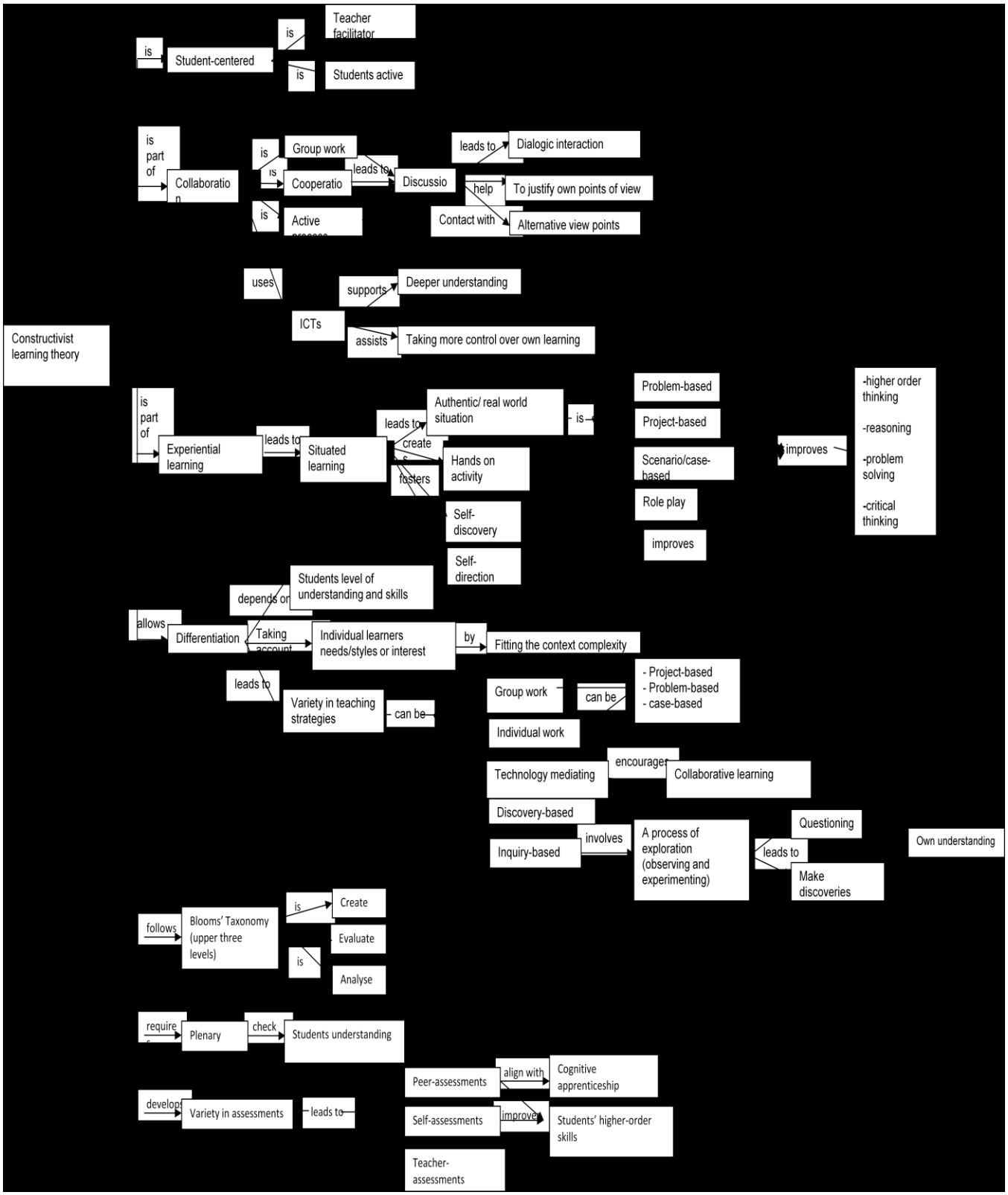


Figure 2-3 Constructivist teaching theories (designed by the researcher of this study)



For this study, having critically discussed and understood the constructivist, student-centred and instructivist, teacher-centred pedagogical approaches, the above two diagrams provide a new synthetic model of the two approaches which will be used to frame the empirical work discussed in future chapters.

More critically, in the instructivist approach, in order to achieve success students require teachers: to set them clear goals and boundaries; to give them access to high quality structured resources and information; and to provide them with the opportunity to do a great deal of practice with problems. Consequently, teachers are in the position to decide on every aspect of the students' learning and can direct students through the light of their own experiences and understanding. As this is a teacher-centred model, students are principally passive receivers of information as presented to them by the teacher, with technology being used for drill and practice. On the other hand, in the constructivist approach, students need teachers to construct and guide collaborative group work activities that help them to develop critical-thinking skills, to be creative, to take pride in their team's work and to learn to work together. It means that the constructivist method takes the focus away from 'teachers teaching' to 'student learning'. In this approach, teachers present a problem to the students and leave them to discover answers and solve this problem on their own, or in a group. The instructivist model discussed above guarantees the delivery of a standard structured body of knowledge whilst this latter approach does not, as the students are free to explore as they choose about the topic. The teacher still needs to check understanding and it may be more difficult to ensure coverage of the curriculum. Also, technology is used by teachers in the constructivist model to enhance students learning, which is explained in detail under the 'reasons to technology use' section, whereas in instructional context

it is used more for drill and practice and to enhance engagement. As a result of this individual synthesis, teachers who wish to use the constructivist approach in teaching need first to do a 'needs assessment', which means they should think about what students should learn from their lesson. Thus, teachers are required to identify sets of problems for investigation through learning group work activities. Table 2-3 show the individual synthesis for these two approaches to teaching based on my interpretation of the literature review.

Table 2-3 Comparison of instructivist and constructivist approaches

	Instruction	**Construction**
Classroom Activity	Teacher-centred	Student-centred
Teacher Role	High authority on decision making and directing students. (set clear goals and boundaries)	Teachers provide guidance to students (guider)
Student Role	Passive receiver (teachers provide all information needed)	Students are actively engaged in the learning process
The way of learning	Lots of practices or repetition on the subject (reproduction and application)	Problem-based, project-based, role play and discovery learning
Demonstration of success	Accurate reproduction or application (test performance on task)	A constructed representation of meaning e.g. presentation or problem solution
Technology use	Drill and practice, immediate feedback	Different types of technologies can be used for group activities to inquire and represent meaning
Source of information	Teacher and textbook	Teacher, peers and technological resources
Assessment	Teacher	Teachers, peers and self

In addition to teachers' beliefs or personal preferences about pedagogy, the actual pedagogical choices they make in practice can also be influenced by the organisational culture of a school (Hennessy and Deaney, 2004). As Davidson and Tesh (1997) indicate, even when schools provide greater flexibility to their teachers in their teaching approaches, or provide them with appropriate training, the school culture will continue to influence teachers' pedagogical approaches to teaching. More commonly, however, 'many organizational behaviours and decisions are in effect predetermined by the patterns of basic assumptions that are held by members of the organisation' (Shafritz & Ott, 2001, pp. 361-362). In other words, the organisational culture influences the behaviour of members as much as do the formal rules and structures.

One way in which this may happen is if a teacher has a strongly constructivist approach and is focussed on process-based learning, but the school prioritises performance in standardised tests and tends to favour an instructivist pedagogy.

After undertaking synthesis of the literature, and with a broad understanding of instructivist and constructivist approaches, the questions arose: 'is there a difference between North Cyprus and England?'. 'Is it the case that Turkish Cypriot teachers are more instructivist and English teachers are more constructivist?'.

The above literature also leads to the framing of **three** hypotheses that will guide the study:

- Teachers will be influenced in their choice of pedagogic approach by their personal values.

- Teachers will be influenced in their choice of pedagogic approach by institutional factors within their school.
- The topic being taught will influence the teacher's pedagogic approach and the selection of ICT resources.

2.4. Reasons for Technology Use

The rationale for the use of ICT in education is usually based on the belief that it has a positive impact on learning, teaching or on both (Newhouse, 2002). Many governments have invested heavily in ICT for their schools and they need to understand whether this investment has been worth the cost (Pilkington, 2008). A number of recent studies have provided evidence of this return on investment (particularly Akpan and Andre, 2000; Kulik, 2002; Harrison et al., 2002; Smokeh et al., 2006), which will be reviewed in this section. Most of this research was carried out in the United Kingdom (UK) where extensive research into the educational impact of ICT has been undertaken.

2.4.1. Impact on Learning

Both quantitative and qualitative studies have been undertaken in an attempt to assess the impact of ICT on students and their learning (Harrison et al., 2002; European Schoolnet, 2004; Smokeh et al., 2006; Ramboll Managment, 2006). Quantitative studies have attempted to show the impact of ICT by establishing a relationship between the use of ICT and students' outcomes (i.e. exam results) based on statistical analysis, whilst qualitative studies have tried to understand how computers might change learning and teaching processes through observation in classrooms or by

gathering the opinions of teachers, students and parents. In addition, experimental studies have been conducted to examine how ICT affects the learning process of students. There have been discussions among teachers on how technology should be used and how students' learning could be improved by using technology in the classroom (Newhouse, 2002).

Several different types of ICT have been used to support and enhance students learning. Computer simulations are most commonly used in science and mathematics classrooms. Computer simulations motivate students, as well as enabling them to understand abstract concepts of physics phenomena (Squire et al., 2004). One example of a computer simulation is a manipulable three-dimensional simulation which helps teachers to bring more abstract topics 'to life' (Bell and Smetana, 2008). The literature mentions that content knowledge can be developed effectively by using computer simulations and that computer simulations also promote inquiry and conceptual change. Using computer simulation improves student understanding and achievement as reported in science subject areas, including biology, chemistry, physics and Earth and space science (Kulik, 2002). Akpan and Andre (2000) assessed whether showing a computer simulation of the process before an actual frog dissection could improve students' knowledge of frog anatomy. They compared four experimental conditions, 'simulation before dissection', 'dissection before simulation', 'simulation only' and 'dissection only', and concluded that student receiving 'simulation before dissection' and 'simulation only' learned and understood considerably more about frog anatomy than did students receiving 'dissection before simulation' or 'dissection only'. According to them 'the flexibility of these kinds of environments makes learning right and wrong answers less important than learning to solve problems and make decisions'(p.18).

Another example of the use of simulation by teachers is demonstrated by Hennessy et al. (2007), who examined secondary school science teachers' use of computer technologies to support student learning in science teaching. One of the participating teachers in this study who taught electric circuitry by using the 'Crocodile Physics' simulation programme, stated that using the simulation programme assisted students understanding of the topic and enhanced their learning because they directly interacted with the topic. Likewise Margaret Cox (2000) has reviewed the ICT-based simulations that have been used in schools over two decades and concluded that using simulations improved students understanding of scientific concepts as they used their own investigative skills to learn the concepts.

Game applications represent another type of ICT resource that has been used for learning and teaching complex subjects such as mathematics and history. Game research suggests that the features of games enhance students' motivation, learning and cognitive process (Garris et al., 2002; Rosas et al., 2003; Squire et al., 2004). For example, a study by Squire et al. (2004) examined the affect upon learning when a simulation game is used in physics to study electrostatics. The results of their study suggested that when computer games are used to solve scientific problems, then students adopted this way to think about scientific representations. Another study carried out by Shin et al. (2006) examined an application of handheld gaming for students learning in mathematics. Their study showed that these activities helped students, especially low-ability students, who otherwise fell below expectation in their understanding of mathematical concepts.

Learning with video games can also motivate students and make learning more effective. Rosas et al. (2004) investigated the use of educational video games in the classroom to assess the effect on students' learning and motivation. In their study, they used videogames which were designed for the first and second years of schools' educational goals of basic mathematics. Their study revealed significant differences between the mathematics group who used video games and those who did not. They concluded that there are positive effects on motivation and that educational video games can be a useful tool. Lee et al. (2004), set up the *Drill Skill Arena* software game which was developed for mathematics problems in second grades. An experimental group used the game, with a control group being observed only using traditional paper worksheets. They found that students, who were in the experimental group, solved practice problems some three times more efficiently than the control group. They also stated that students enjoyed using *Drill Skill Arena*. Squire (2004), examined the application in a classroom setting of Civilization III, a complex commercial simulation game. According to him, this game can increase students conceptual understanding, as they need to ask kinds of question by themselves and they also need to make some interpretations through game play. He concluded that world history is understood better by the successful students using the game and that these students developed high-level conceptual understanding about it. Therefore, the Civilization III simulation game would be beneficial in world history education.

Another evidence-based result about the impact of ICT on teaching and learning is using interactive whiteboards (IWBs) in the classroom. Using interactive whiteboards in teaching has a positive impact on learning (Fletcher, 1990; BECTA, 2003; Beauchamp and Parkinson, 2005). IWBs enable teachers to present information via combined text, pictures and audio. Stafford

(1990) used a statistical technique to examine 96 learning studies and from his study he reported that students' learning and achievement were related to interactivity (cited in Najjar, 1996). In the Nugent (1982) study, students reached the highest learning levels when information was presented to them via verbal (text and audio) together with nonverbal (pictures) means, compared to the same information presented via text only. A study undertaken by researchers at the University of Newcastle evaluating 'Embedding ICT in the Literacy and Numeracy Strategies' for the Department for Education and Skill (DfES) (Higgins et al., 2005) where IWBs were installed in several selected case study schools and teachers received proper training, showed that the performance of selected schools' students improved in the national literacy, mathematics and science tests compared with other schools. A similar study was carried out by Armstrong et al. (2005), who argued that the introduction of IWBs is more than just the installation of the board and software. This study noted that the teachers play a key role in promoting quality interactions and interactivity by integrating the software with the objectives of the lessons. Hence, proper training and support are needed to achieve this. Miller and Glover (2006) analyzed the use of IWBs for mathematic lessons in secondary school education to examine how the interactive whiteboard is used to improve mathematics teaching and to increase students' engagement in the subject. As a result of their analysis, they stated that improvements in teaching and learning in mathematics can be made through the use of interactive whiteboards.

The other ICT tool that can enhance student learning is network technologies**.** In 2003, Pilkington and Walker studied how ICT facilitated debate in a networked learning environment. They used Virtual Learning Environment (VLE) and assigned particular roles to various students. As a result of their study, they revealed that non-native speakers and distance learners are only

partially successful compared with face-to-face students engage in collaborative group work**.** Also that assigning different roles to students increased their consciousness of roles, which was effective, helping some students to deal with synchronous online discussion.

Overall, these empirical studies demonstrate that using ICT in teaching can enhance students' learning, engagement, motivation and understanding. Researchers note, however, that how much students learn relates to how a particular technology is used in the classroom. In other words, ICT is least effective and has only limited impact on teaching and learning when teachers fail to realize that ICT requires a new approach to pedagogy.

2.4.2. Impact on Teaching

Having considered the evidence relating to the impact of ICT on learners, it is now necessary to examine studies of how teachers integrate ICT into their teaching and the students' learning process. As Ramboll Management (2006) states, teachers cannot benefit from ICTs potential by using computers with unaltered teaching approaches. ICT has been introduced into schools during the last two decades, particularly in developed countries such as the UK. In addition to the infrastructure, hardware and software, the teacher's experience in using ICT is a prerequisite to the effective use of these resources in the teaching and learning process (Balanskat, 2006).

Most studies show that teachers' enthusiasm for using ICT to support learning is increased by their own use of ICT. The study of ITU (2004) reveals that the teachers who participated in the project had more positive attitudes towards technology use than those who did not. In the UK, the British Educational and Communication Technology Agency (BECTA) evaluated the DfES'

initiative of Laptops for Teachers (LfT), which was launched to increase teachers' and head teachers' access to computers. The study found that teachers' positive attitudes and confidence were increased by having their own laptop computers (BECTA, 2003).

Using technology could also help teachers to plan and prepare their lessons more efficiently by allowing collaboration between teachers (Higgins, 2005). There were different opinions about the efficiency savings brought about by using ICT amongst teachers, particularly when they stated that they had insufficient time to integrate ICT into teaching (Underwood, 2006). Other studies, such as the ICT Test Bed project, suggest the opposite: that teachers using ICT can save time in the medium and long term through re-use and collaborative sharing (Smokeh et al., 2006). This strongly suggests that there is a need to show teachers how they should effectively use ICT to save time.

Although a study of e-learning in the Nordic countries suggests that teachers are very positive about technology in general and believe that using ICT does not waste time once they achieve a certain level of competence, most of the teachers in the study did not report a positive impact of ICT on workload finding that teaching time was wasted as a result of trying to use ICT in school (Ramboll Managment, 2006). The study of ITU (2004), however, stated that technology provides a greater number of differentiated learning opportunities and thus enables students to work more independently. Therefore, teachers have more time to prepare lessons that meet the needs of individual students (ibid). Another impact of ICT on teachers is that ICT provides a means of cooperation between teachers through sharing curricula and lesson plans, saving individual preparation time (Higgins et al., 2005). The same result is reported by Harrison et al. (2002) and

Comber et al. (2002): the use of ICT makes lesson plan preparation more efficient and saves time. Teachers also have the opportunity to share and encourage good practice.

Most studies on the impact of ICT on teaching state that there is no infrastructure problem, particularly in developed countries, but more training is needed by teachers to support innovative pedagogy (Smokeh et al., 2006). In other words, there is not a problem with putting ICT in place but there is a lack of support to facilitate conditions and provide training in ICT. However schools, vary in the ICT resources they have available. Schools in richer and more urban areas tend to benefit from faster broadband speeds and those in more affluent areas will tend to have more modern computers than more rural and poorer areas (International Telecommunication Union, 2003, Underwood et al., 2005). These factors are related to 'barriers and enablers of technology use' as presented in this chapter.

The above mentioned studies demonstrate that there are different reasons for the use of technology in students' learning and in teaching. These reasons are listed below:

Table 2-4 Reasons for the use of Technology

Reasons
• Increased understanding of the subject
• Engagement and increased students' interest (motivation)
• Making learning more enjoyable
• Improving critical-thinking and problem-solving skills
• Time-efficiency

These different reasons for the use of technology in learning and teaching raise several questions: Are these reasons for technology use by secondary school teachers different between North Cyprus and England? Are Turkish Cypriot teachers' reasons for technology use more focused on motivating and engaging students whereas the English teachers' are more focussed on better learning and improving the students' problem-solving and critical-thinking skills, as well as motivating and engaging them?

2.5. Culture of Pedagogy

It has already been seen that teachers' values, beliefs and cultures may affect the pedagogies they adopt. Since this study is being carried out in two different countries, cultural differences regarding pedagogy also need to be considered. The dominate culture of education (Vrasidas and Kyriakou, 2008), organisational factors (Davidson and Tesh, 1997; Hennessy and Deaney, 2004) and teachers' beliefs are important factors that influence the integration of ICT into the classroom (Webb and Cox, 2004; Anderson and Maninger, 2007). As Erumban and de Jong (2006) and Singh (2006) state, individuals [teachers], who want to use new ICT, are generally influenced by their culture, their beliefs towards particular technologies, the degree of technology confidence, and willingness to use it. Thus, culture affects people's life by shaping how they see their world. This raises the question about what factors need to be known about the cultural environment to understand its effect on teachers' perception and their preference of a choice of pedagogy to use ICT.

It is essential to first define the culture and understand the dimensions of that culture, in order to properly carry out research on pedagogical practice across cultures. Culture has been defined by Hofstede (1980) as 'the collective programming of the mind which distinguishes the members of one group from another' (p.21). The collective programming of the mind, according to Hofstede et al. (2010), means a set of shared values and practices of a group who 'live or lived within the same social environment' (p.6) . Another definition of the culture, similar to Hofstede's, is given by Dimmock and Walker (2005). They define culture as 'a whole way of life of members of society or group of people' (p.7) which means a group of people who shared same customs, values, and experiences. McCracken (1986) argued that it is the individual's beliefs and assumptions that is the culture of the individual, formed by each person's everyday experiences.

A number of studies into cultural differences have reported that they have considerable impact on people's decision-making and behaviour (Leo et al., 2005; Dimmock and Walker, 2005; Lin and Peng, 2005; Erumban and de Jong, 2006; Singh, 2006; Anderson and Maninger, 2007). As cultural factors will impact on the educational use of ICT in schools, Hofstede's (1986; 2008) categorisation of educational settings, and Dimmock and Walker's (2005) societal culture models can be examined and appropriate dimensions used for better understanding these factors.

Hofstede's (2008) model was the first for analysing the impact of culture, and he originally identified four dimensions of culture which influence the way people interact and behave. These four dimensions are:

1. Small Power Distance Index vs. Large Power Distance Index (PDI):
2. Weak Uncertainty Avoidance Index vs. Strong Uncertainty Avoidance Index (UAI)

3. Individualism vs. Collectivism (IDV)
4. Femininity vs. Masculinity (MAS)

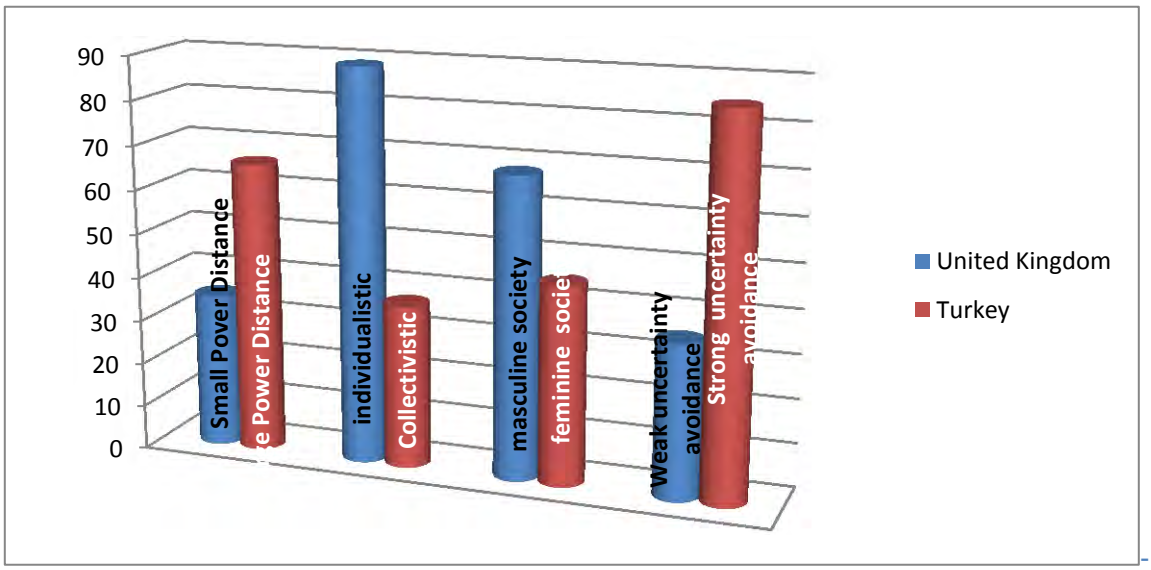
(Hofstede, 2008, slides 9-16)

In cultures that exhibit small-power-distances, teachers and students are considered equals. Teachers facilitate the student-centred education rather than it being teacher-centred. In a large-power-distance, the teacher has most of the authority and students do whatever they are told to do. In nations with strong uncertainty avoidance, teachers are considered the experts and students believe the teachers know every answer; in these circumstances, more structured learning environments are preferred. Where there is weak uncertainty avoidance, teachers are facilitators who allow more discussion in the classroom. In nations with high individualism, students expect to learn how to learn, and for them gaining competence is important than gaining certificates, whereas in nations with a high collectivist culture, students expect to be taught how to 'do', and gaining certificates is important than gaining more general competence. In societies with high 'masculinity', teachers openly praise good students and students compete in the class; failing in school is a disaster for students. In 'feminine' societies, teachers avoid praising openly and students, who have not been encouraged to compete in class, consider failing in school to be a minor incident.

According to Hofstede's cultural dimensions, England is a small-power-distance, weak uncertainty avoidance, individualist and masculine country. Hofstede did not study North Cyprus. However, the researcher of the study comes from North Cyprus and has experience of teaching and learning in schools there and can also take into account Hofstede's views on Turkey, since

the culture of North Cyprus is likely to be similar to Turkish culture. In light of this, it can be said that North Cyprus exhibits large-power-distances with strong uncertainty avoidance and collectivist and feminine characteristics. Thus, England and North Cyprus' cultures are very different in teaching and learning. Figure 2-4 below illustrates the Hofstede's comparison between Turkey and the UK. This has been given, because, Turkey and North Cyprus have similar cultural characteristics.

Figure 2-4 Comparison between UK and Turkey (Based on Hofstede, 2009)



As it can be seen clearly from the above figure, Turkey (and by inference North Cyprus) shows large power distance, is collectivist, feminine and has strong uncertainty, whereas England shows small Power distance, is individualistic, masculine and has weak uncertainty. To see how Hofstede's model relates to the instructivist and constructivist approaches see Table 2-5.

When comparing, England and North Cyprus, if North Cyprus were to follow the Turkish model, it would have been shown to be culturally very different (Hofstede, 1980).

When applied to entire countries, Hofstede's model implies homogeneity within each, implausible given the actual diversity of social, economic and cultural contexts within which different schools operate in each country, or indeed from which its teachers and students are drawn. Furthermore, its characterisation of 'feminine' and 'masculine' aspects of culture reveals a stereotypical perspective that the author has imported into the model, at least for terminological purposes. The model is undoubtedly reductive, but similar caveats are likely to apply to any schematic model of cultural differences of this kind. As a first approximation, however, Hofsted's model does suggest a way to approach cultural difference as a factor in pedagogic choice in the context of the present study, the heart of which is not first and foremost a study of cultural differences between the two countries. The extent to which teachers' beliefs and practices fit this simple schema will be investigated in the study.

The model presents a *prima facie* case for expecting certain of Hofstede's cultural factors to express themselves in a preference for either instructivist or constructivist pedagogy. Constructivism would seem to require a smaller power distance between teacher and student and an attitude of weaker uncertainty avoidance than instructivism. Furthermore, since a constructivist theory of learning is often associated with approaches such as active, discovery-based and group learning, fear of failure cannot be overpowering, suggesting the cultural traits collected by Hofstede under the heading 'feminine' might be more conducive than those described as 'masculine'. The aspect identified by Hofstede as 'individualism' may also be favourable to constructivist pedagogies, since it emphasises skills for self-education ('learning how to learn'), proactive participation by students and the development of competencies rather than following a content-based, product-oriented curriculum. While the categories of 'femininity'

and ’masculinity’ seem less coherent than the others, constructivism can also be tentatively associated with the former on this basis. If so, then we will expect to find that cultural factors persuade teachers in North Cyprus towards a more instructivist pedagogy than such factors do for teachers in England.

Table 2-5 Features of Hofstede’s model associated with constructivist and instructivist Pedagogies

Instructivist	**Constructivist**
Large Power Distance	Small Power Distance
Strong Uncertainty Avoidance	Weak Uncertainty Avoidance
Collectivism	Individualism
Masculinity	Femininity

Looking at the table above, however, may suggest that the constructivist approach conflicts with individualism, as individualistic cultures are considered anti-conformist and perceived as selfish, but people also need a sense of socio-cultural interdependence, and this may be lacking. It may be noted that Hofstede’s model has also been criticised because of the simplistic nature of the power distance dimension, as this did not sufficiently represent the core of the power relationships in different cultures, and for the use of the apparently stereotypical labels ‘masculinity’ and ‘femininity’, which can cause confusion, it being considered discriminatory (Dimmock and Walker, 2002). Dimmock and Walker (2002) have developed a model of societal culture that combines those of Hofstede and Trompenaars and Hampden-Turner, producing a revised version of Hofstede’s model designed to overcome its limitations. This model defines six cultural dimensions as the ‘core axes around which significant sets of values, beliefs and practices cluster’ (ibid, p.29). These are as follows:

1. Power-distributed/ Power-concentrated: This replaces Hofstede's power distance index. According to the authors, 'power is either distributed more equally among the various levels of culture or concentrated among relatively few' (pp.29-30). In power-concentrated cultures, inequalities are accepted as normal. In schools, students are expected to show respect to teachers and do as their teachers tell them; here a teacher-centred approach tends to be used. In contrast, in schools with a high power distribution, students expect to be *guided* by teachers.
2. Group-oriented / Self-oriented: This combines Trompenaars' and Hampden-Turner's (1997) individualism/ communitarianism category and Hofstede's (1991) individualism/collectivism dimension. This dimension captures whether people tend to concentrate on themselves or on the group to which they belong. In self-oriented societies, people first tend to consider themselves as individuals and only second as group members. Moreover, they are judged in respect to individual achievements. In contrast, in group-oriented societies, 'ties between people are tight, relationships are firmly structured and individual needs are subservient to collective needs' (Dimmock and Walker, 2002, p.30).
3. Consideration / Aggression: Dimmock and Walker (2002) built this dimension on Hofstede's masculinity/femininity. In 'aggressive' cultures, achievement is emphasised, competition is stressed and power is used to resolve conflicts. In these societies, the standards in school are based on the performance of the best students, academic achievement is very important and failing at school is a very serious problem. In 'considerate' societies, standards are based on the average student, social inclusion is very important and failing at school is merely unlucky.

4. Proactivism / Fatalism: Dimmock and Walker (2002) combined Trompenaars' and Hampden-Turner's (1997) 'attitudes to environment' category and Hofstede's (1991) 'uncertainty avoidance' dimension. This dimension refers to how different cultures act in response to and deal with changing conditions. In proactive societies, people think that they manage the changes and are open to new ideas, whereas in fatalistic cultures, people think that 'what is meant to be, will be' (p.31)
5. Generative / Replicative: According to Dimmock and Walker (2002), generative societies produce their own original ideas (such as policies), while people in replicative societies are likely to adopt the cultures' reforms and ideas of others.
6. Limited relationship / Holistic relationship: In limited relationship societies, people's interactions and relationships are normally limited by rules that are apply to everyone equally. In contrast, in holistic relationship societies, friendship is more important than rules.

Dimmock and Walker (2002) added as a caveat to their model, that some aspects of these dimensions can change over time, giving it an historical perspective that Hofstede's model lacked. After examining both authors' cultural dimensions, it has been decided to employ and focus on Hofstede's original four dimensions, as included in Dimmock and Walker's (2005) model under different names. The four dimensions were used, because Hofstede's model includes information about Turkey's culture enabling hypotheses to be generated based on this information.

The following hypotheses may be framed:

- If cultural factors affect the choice of pedagogy, it follows that these factors will differ between England and North Cyprus.
- Choice of pedagogy and the extent of ICT integration will be influenced by the teacher's knowledge of the particular student group.

Having reviewed the literature on pedagogy and culture and originating myself from North Cyprus and currently living in England, I might expect that England and North Cyprus would be different in their pedagogical and cultural approaches. English schools might be expected to use more contemporary, constructivist approaches, with North Cyprus using more traditional instructivist methods in which teachers deliver lectures and students listen passively.

In the UK over the last twenty-five years, the government has encouraged schools to adopt ICT as a main part of the curriculum structure. The UK government has launched a number of initiatives to put computers and computer technologies into schools so that teachers can integrate them into their teaching. The use of ICT is considered an important skill in this modern world, as most companies seek this ability in their staff recruitment, being the reason why the UK government encourages schools to adopt such technology (Brown et al., 2008). Tony Blair (1997), then the UK Prime Minister, noted:

> *"Technology has revolutionised the way we work and is now set to transform education. Children cannot be effective in tomorrow's world if they are trained in yesterday's skills. Nor should teachers be denied tools that other professionals are trained to take for granted. Standards, literacy, numeracy, subject knowledge—all will be enhanced by the Grid and the support it will give our programme for*

> *schools improvement."* (Tony Blair, UK Prime Minister, launching the National Grid for Learning, 1997, p.252)

Currently, not all countries are able to benefit from the developments that technology can offer. Significant barriers have been identified by many researchers explaining why some countries cannot take advantage of technological developments, including limitations in ICT infrastructure facilities, the high cost of developing infrastructure, the extent of teacher support and training, and unaffordable internet connectivity at the higher bandwidths. These are some of the key limitations faced by a developing country such as North Cyprus. Even when physical facilities and resources are made available to schools, there may still be various problems in using ICT that must be faced by countries, especially developing ones, related to an inherent resistance towards using new technology and bringing change to the pedagogical approach.

In North Cyprus, most public institutions still use traditional teaching methods where the teacher delivers lessons and students listen passively; teachers are said to be reluctant to use ICT in their teaching (Isman et al., 2007). The reasons for the overall lack of integration of technology into Turkish Cypriot schools are a wide variance in the degree of access to ICT, inbuilt teachers' training and beliefs on technology use and the relationship between the available technologies and preferred pedagogy. The Turkish Cypriot government has provided ICT resources such as computers, overhead projectors, printers and CDs to schools, but there are insufficient technological tools or training available for these technologies to be used in teaching. Training in North Cyprus focuses more on technical skills than on educational processes. Many Turkish Cypriot teachers use ICT to support traditional teaching methods, for example, students are

'passive consumers and receivers' of information as provided by teachers instead of 'active producers' of new information.

It is therefore expected that pedagogical approaches may show variations, or even significant differences, between England and North Cyprus. This presents an opportunity to exchange approaches between the two countries through the establishment of good scenarios of ICT use to all participant teachers. Based on these provided scenarios, teachers will produce lesson plans which work in both countries shedding light on the construction of a model of practice. This will include the elements of the 'good lesson plan' as well as technology and a 'modified Delphi method' will be used for consensus building *(teachers working together to produce lesson plans for the two countries stating what needs to be included in that plan to make the lesson more effective)*. In this way Turkish Cypriot and English teachers could learn from each other or learn creatively together, how ICT could be integrated effectively into the process of teaching and learning, and what a good lesson plan should include. The data to be collected in this study will include teachers' views of pedagogical approaches, cultural factors and barriers and enablers of technology use in teaching.

2.6. Barriers and Enablers of Technology Use in Teaching

Technology readiness is the factor that can be either a barrier or an enabler for technology use by teachers. The phrase 'technology readiness' describes the behavioural processes that lie behind the adoption of technological products, services (Parasuraman and Colby, 2001) and infrastructure. Technology readiness can be broken down into two components: the infrastructure

readiness of the schools and the ICT readiness of teachers, i.e. their acceptance of technology (Seng and Choo, 2008).

2.6.1. Physical and Technological Infrastructure

Effective ICT integration in schools depends on the availability of sufficient physical and technological infrastructure (UNESCO, 2004). Several researchers such as Williams et al. (2000) and Pelgrum (2001) had identified that there are insufficient computers in schools, a key problem for integrating ICT into education. According to Baskin and Williams (2006), physical infrastructure includes learning areas such as the classroom, computer labs, dedicated ICT resource rooms and libraries: in short, all of the space and furniture required for an ICT enhanced school environment. Technological infrastructure includes computers, broadband, internet access and the various other technological resources used in education (Baskin and Williams, 2006). Therefore, schools need to provide at least basic physical and technological infrastructure if they wish to integrate ICT effectively into the teaching process. In other words, the basic barrier and enabler of technology use in the schools is infrastructure: computers and other technologies, computer labs and internet access among others. Just having the physical and technological infrastructure are not enough, as teachers are likely to retain inbuilt beliefs about teaching and learning through ICT. Teachers' beliefs about the use of ICT might well be a significant consideration for the successful integration of technology in teaching and learning. Thus the first step is for teachers to accept the use of technologies. It is to be expected that there will be differences between England and North Cyprus in terms of barriers and enablers to technology use in the classroom. Equally, it was expected that North Cyprus would have greater

infrastructure problems and more negative teachers' beliefs about using ICT in their teaching, whereas in English schools, there are few infrastructures' problems, although problems with the teachers' outdated beliefs on technology use, such as those stemming from the availability of training in the classroom, would remain.

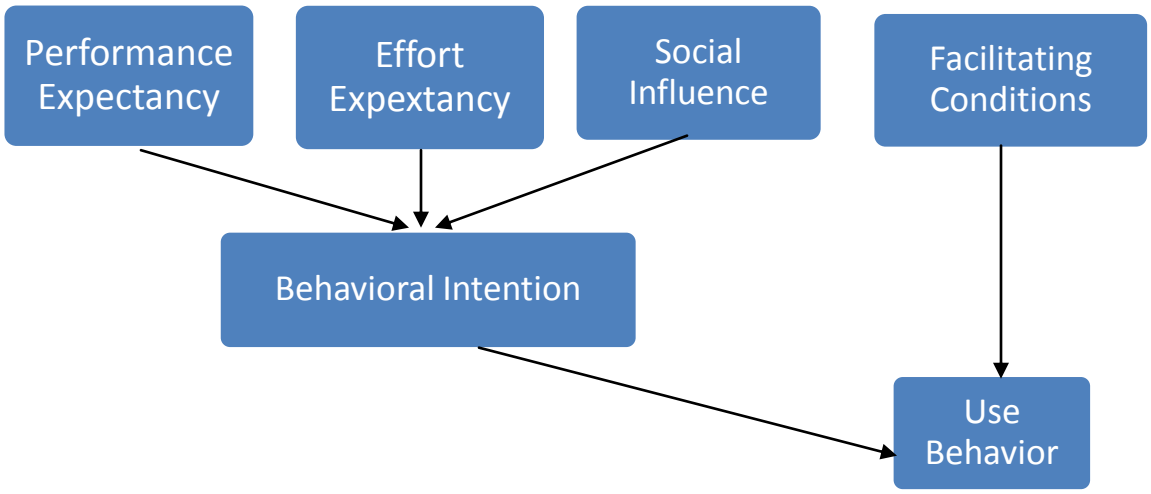
2.6.2. Teachers' Acceptance of Technology

The theories of Venkatesh et al. (2003) and Roger (2003) state that when people understand the potential value of ICT use, they will start to learn new technologies. Thus, these theories took this into consideration, while analysing barriers to and enablers of technology use by teachers in England and North Cyprus.

Venkatesh et al. (2003) developed a technology acceptance model which is named 'unified theory of acceptance and use of technology (UTAUT)' by reviewing and integrating eight different models (Diffusion of Innovations, Technology, Acceptance Model, Theory of Reasoned Action, Theory of Planned Behaviour, Combined TRA & TPB, Motivational Model, PC Utilisation Model and the Social Cognitive Theory) as used by a former study to explain technology usage behaviour.

The model aims to give an explanation of people's intentions when employing a certain technology and their subsequent usage behaviour. The study put forward a theory based on four constructs that are determinants of the acceptance of users and their usage behaviour: performance expectancy, effort expectancy, social influence, and facilitating conditions.

Figure 2-5 Unified theory of acceptance and use of technology (Based on Venkatesh et al., 2003)



The constructs are described below (Venkatesh et al. 2003, pp.447-453):

- **Performance expectancy** was the one factor which is a very strong determinant of the individual's intention to use ICT, as Venkatesh et al. (2003) theorised. It was based on a combination of five constructs from previous models, including extrinsic motivation, job-fit, relative advantage or outcome advantage and perceived usefulness defined as 'the degree to which a person believes that using a particular system would enhance his or her job performance' (Davis 1989, p320).
- **Effort expectancy** was based on a combination of three constructs from previous models and it is described as 'the degree to which a person believes that using a system would be free of effort' (Davis 1989, p.320). It is focussed on the people [teachers] beliefs about the ease of use of technology.

- **Social influence** was based on three constructs from existing models, including the subjective norm, defined as 'the person's perception that most people who are important to him think he should or should not perform the behaviour in question' (Fishbein and Ajzen, 1975, p.302)**.** Vanketesh et al. (2003) state that 'none of the social influence constructs are significant in voluntary contexts; however, each becomes significant when use is mandated' (p.452).
- **Facilitating Conditions** are 'objective factors that observers agree make an act easy to do' (Triandis, 1979, p.205) and these were based on three constructs from previous models including 'the degree of compatibility with existing practices and perceived behavioural control**,** including control over the resources and technologies' (Taylor and Todd, 1995, p.76). Thus, teachers need to receive training and support if they are to have positive attitudes towards technology use.

Another well-known theory that is used to explain people's adoption of new technologies is Rogers's Diffusion of Innovation (DOI) model. According to Rogers (2003), relative advantage, complexity, compatibility and observability of technology affect a person's judgment whether or not to employ a piece of technology. The definitions of these parameters are as follows:

- **Relative advantage:** 'the degree to which an innovation is perceived as better than the ideas it supersedes', that is whether the teacher perceives the adoption of technology to be advantageous compared with the use of existing resources and methods .
- **Compatibility:** 'the degree to which an innovation is perceived as being consistent with the existing values, past experiences and the need for potential adopters '. Teachers may

need institutional support and encouragement to adopt a specific technology in their teaching.

- **Complexity:** 'the degree to which an innovation is perceived as difficult to understand and use'. Teachers may consider the adoption of a new technology to be either beyond their capability or overly demanding of time and energy. In these cases, training and technical support are likely to be required for adoption to be successful,
- **Observability:** 'the degree to which the results of an innovation are visible to others'. Simply put, if a teacher sees that some technology is proving valuable to others, he/she is more likely to adopt it as well.

(Rogers, 2003, p. 16)

The acceptance model of Venkatesh *et al.* and Rogers's Diffusion of Innovation model is similar. Although they name and define the factors differently, when these models are examined, it can be seen that they are structurally almost equivalent. The only significant difference is the way in which Rogers separates out institutional support and technical training, whereas Venkatesh *et al.* separate out beliefs about ease of use from the provision of training. In order to make this clear, Table 2-6 presents the two models side-by-side.

Table 2-6 Two models of technology adoption

	Unified Theory Venkatesh et al. (2003)	**Diffusion of Innovation Rogers (2003)**
Teacher's belief that ICT can enhance performance of his/her job.	Performance expectancy	Relative Advantage
Teacher's belief that ICT is easy to use in teaching or learning.	Effort expectancy	Complexity
Effective use of technology by peers that can influence teachers' adoption of technology.	Social Influence	Observability
Provision of necessary support and training	Facilitating conditions	Compatibility and complexity

Performance expectancy and relative advantage in the scope of the present study are defined as the degree to which a teacher thinks that using ICT in teaching can increase her/his job performance. Perceived performance expectancy may be hypothesised to have a positive impact on the use of technology. Similarly, effort expectancy and complexity are defined as the degree to which a teacher believes that ICT is easy to use in teaching or learning, and are hypothesised to have a positive effect on technology adoption. Social influence and observability are taken to mean the effective use of technology by other teachers and the ICT policy of the school or government as it can influence teachers' acceptance of integration of technology; thus, it is expected that this can influence the teachers' adoption of technology in the same way that school ICT policy can encourage teachers to use technology. Facilitating conditions and compatibility include the provision of resources such as hardware, software and networks and support and

training by schools. A positive relationship between the presence of these facilitating conditions and use of technology by teachers in their teaching may be expected in this study.

However the question arises, is the issue actually adopting technology into the curriculum, and aligning it with learning objectives of the student? What are the barriers to effective integration of technology in education from the point of view of English and Turkish Cypriot teachers'? Does having a relatively few technicians hamper effective use of technology? Or is the reason the lack of equipment and maintenance?

In this study, it is important to understand teachers' beliefs because these are likely to determine whether teachers accept a change such as the introduction of the use of ICT in the classroom. These factors will be taken into consideration while interviewing teachers about technology use when investigating secondary school teachers' beliefs regarding the barriers to and enablers of technology. Thus, what are the barriers to and enablers of effective use of technology in teaching from the viewpoint of teachers in Turkish Cypriot and English secondary schools? Are these barriers and enabling factors of technology use different for North Cyprus and England? Is it the case that Turkish Cypriot teachers encounter greater infrastructure barriers whilst English teachers encounter greater training barriers to the use of ICT in their teaching?

This suggests the following hypotheses:

- Teachers are encouraged to adopt ICT if they believe its benefits will be proportional to the effort involved, if they believe the use of technologies is easy, if they are socially

influenced by the school or the department's ethos, and if suitable resources, support and training are provided by the school.

- The absence of any of these may be a barrier to adoption.

The extent to which these factors are present will be explored in this study.

2.7. Chapter Summary

This chapter has reviewed the literature on pedagogical issues, which discussed instructivist and constructivist approaches to teaching with ICT and considered which pedagogies are being used by teachers in schools. In this review, the term ICT was applied to any computer-based technologies, whether networked, hardware or software, which can be used for teaching and learning purposes. In order to establish how and why technologies are used, and whether incorporating ICT in teaching is likely to be helpful to teachers and students, the impact of ICT on teaching and learning (as far as can be ascertained from the research at the present time), was also explored. It was noted that there is little empirical evidence regarding these issues, particularly in relation to the position in North Cyprus at this time.

In order to identify differences between two countries' teachers' pedagogical approaches and their use of ICT, the culture of the pedagogy was explored. Examining the culture of pedagogy shed light on the potential effects of cultural differences, an important consideration in the context of the present research since ICT usage is considered in two quite different countries.

North Cyprus and England's pedagogical approaches and differences in their cultural attitudes to teaching were also discussed.

Furthermore, the barriers and enablers of technology use were examined in relation to technology readiness. The discussion of technology readiness established some prerequisites for schools and teachers wishing to integrate ICT into lessons as schools need to provide sufficient infrastructure and training and teachers need to accept the use of technology. In terms of teachers' acceptance of technology, Venkatesh et al.'s (2003) 'unified theory of acceptance and use of technology' model and Roger's (2003) 'diffusion of innovation' were examined.

The foregoing review of the literature led to modification of the tentative research questions that were presented in Chapter 1 in section 1.3. While the tentative research questions remained as they were, after this review of the literature these questions had sub-questions as presented in Table 2-7:

Table 2-7 Modified research questions that constructed from literature review

Research Questions
1. What are the pedagogical practices adopted by teachers in the respective secondary schools? a. What pedagogical approaches are applied by English and Turkish Cypriot secondary school teachers? b. Why and how teachers have been integrating ICT in their lessons to enhance teaching and learning within their classrooms?
2. Under what circumstances are Information and Communication Technologies (ICTs) currently being used in secondary schools? a. What do English and Turkish Cypriot teachers perceive to be barriers to effective use of ICT in teaching? b. What do English and Turkish Cypriot teachers perceive to be enablers of effective use of ICT in teaching? c. Are there any differences between English and Turkish Cypriot teachers in terms of the teaching approach they applied, the use of technology and available resources and training?
3. What can Turkish Cypriot teachers learn from the experience of teachers in England and vice versa? a. Are teachers in the two countries able to arrive at a consensus regarding what constitutes a model of practice in integrating ICT in lessons? b. Are there any contextual differences which teachers believe require a different approach to integrating ICT in lesson in the two countries?

As a consequence of this review, and in an attempt to answer these questions, the following hypotheses presented in the Table 2-8 have been formed:

Table 2-8 Hypotheses

• Adoption of technology: o Teachers will be more likely to adopt ICT if: ▪ They believe its benefits will be proportional to the effort involved ▪ They are socially influenced by the school or the department's ethos ▪ Suitable resources, support and training are provided by the school ▪ They believe the ICT resource is suitable for their particular student group o The absence of any of these may be a barrier to adoption.
• Interaction of ICT with pedagogy: o Teachers will be influenced in their choice of pedagogic approach to ICT by. ▪ Their personal values ▪ Institutional factors within their school ▪ The topic of the lesson ▪ Their knowledge of the student group
• Cultural differences: o If cultural factors affect the choice of pedagogy, these factors will differ between the U.K. and North Cyprus.

CHAPTER 3

RESEARCH METHODOLOGY, DESIGN AND DATA COLLECTION METHODS

3.1. Introduction

In this chapter, I critically evaluate and put forward my justification for the research methodology underpinning my research. The key issues discussed are significant as the nature of the applied research methodology informs the choice of data collection research methods and in turn those selected data collection methods verify the types of data collected and, conclusively, the analysis method.

The research project was a comparative case study of the pedagogical practice of teachers and their use of ICT in teaching by four secondary schools teachers, two in England and two in North Cyprus. The types of data collection methods used for this study comprised: questionnaires, semi-structured interviews and modified Delphi method.

This discussion begins by considering researcher reflexivity, an essential factor when conducting qualitative research (Finlay, 2006). The research aims and questions for this study are then presented, leading to discussion of the four elements that provide the theoretical framework of the research design, including: 1) epistemology: constructivism, 2) the theoretical perspectives: interpretivisim (symbolic interactionism), 3) the research methodology: a comparative case study, 4) data collection methods: questionnaire, interview and Modified Delphi Method. That is

followed by presenting the design issues relevant to this study, such as sampling, generalisability, ethical issues, validity, reliability and the limitations of the study. The chapter concludes with a brief summary.

3.2. Research Reflexivity

> *"The importance of the researcher in qualitative case study cannot be overemphasized. The researcher is the primary instrument for data collection and analysis. Data are mediated through this human instrument, the researcher, rather than through some inanimate inventory, questionnaire, or machines."* (Merriam, 1988, p.19)

In this study, my personal role as a researcher might be thought to be limited to asking straightforward questions leading to clear unambiguous responses. However, in qualitative research, the researcher themself plays an important role. According to Finlay (2002), the researcher is the main character 'who influences, if not actively constructs, the collection, selection and interpretation of data' (p.212). The author indicated that subjectivity in research may be taken as an 'opportunity' rather than a 'problem', but it is critical that researchers, who adopt a qualitative method, adopt reflexivity.

Undoubtedly therefore, the researcher (in this case, me) needs to understand how reflexivity should be taken into consideration. Reflexivity is the concept of awareness and defined as 'the researchers' awareness of the effect of their presence or subjectivity on what is being investigated' (D'Cruz et al., 2007). To address this, four elements: the aims and context of the study, and the language and bias of the researcher need to be considered (Crossley and Watson; 2003). These authors suggest that at the beginning of the research, the researchers have to be

aware of what they are looking for and the aims of the research. In this case, the study was done for academic interest. The researcher had been of comparisons and contrasts between North Cyprus and England education policies for the use of ICT in teaching and teachers' pedagogical practice (how they approach the application of ICT according to their particular pedagogic approach to teaching). Stemming from those potentially useful insights, provoked a desire to progress to consider secondary school level, again arising from direct personal experience. Given the influence of globalisation and technological change upon the education systems internationally, (developed countries being well ahead of developing countries – see chapter 1), it emerged that an informed comparison could be made of how and why teachers in these two countries use ICT in their teaching and the pedagogical approaches applied by English and Turkish Cypriot teachers. This would provide useful information for educational policy makers and secondary school teachers, particularly in North Cyprus, whose policy makers and teachers, might reasonably be expected to be well behind practice in England. Guidance by the academic supervisor, inspired the conclusion that by comparing these countries, an opportunity could be provided for both countries' teachers to work together to building a consensus on what a model of practice should include, which would be useful for teachers in both countries. Initially it was not clear to how reciprocal the learning would be as the presupposition was for a 'deficit' model of North Cyprus from being 'behind' in its use of technology. However, as the study progressed, it emerged that cultural and pedagogic viewpoints may be equally as important as technological process and that teachers from both countries may have something to learn from participating with each other. Discovering the extent to which this was true became the core aim of the study.

According to Crossley and Watson (2003), it is difficult for researchers to gain familiarity with an education system of a country without living or at least spending considerable time, in that

country. As a person who has lived in North Cyprus for many years and having now lived in England for more than five years, I am confident about my familiarity with the culture and the educational system of both countries. This was a major reason for choosing these settings for my research. I am also fluent in Turkish and have good English, the languages necessary for carrying out this study. Moreover, knowledge of both cultures is important, in order to be able to select strategies that would establish a rapport with the participants of the study.

Crossley and Watson (ibid) also indicated that researchers involved in cross-cultural/comparative research are required to be aware of 'potential biases and assumptions that they bring with them' (p.36). As a researcher, I understood that I had to be careful not to prejudge which system was better, and did not want to uncritically adopt the dominate culture's approach (that is the culture of England). Consequently, I decided at an early stage to concentrate on current practice in each research setting and understand the reasons for that practice. Questions such as 'How are the teachers using ICT', 'Which pedagogical approaches they are applying in the two research settings?', and 'What are the similarities and differences between these two countries?' were typical questions that guided the study. I was interested to find what cultural factors would be revealed. Having my own hypotheses about these countries' teachers' pedagogical practices, I wondered what if any similarities there would be which made this research particularly interesting.

3.3. Introduction to Research Design

As the aims of the study were presented in Chapter 1 in section 1.3, the main aim of this research was to explore differences between the English and North Cyprus practitioners (teachers) in their beliefs about pedagogy and their use of ICT and how these beliefs shape their approach in the classroom. The other aim was to produce a model through sharing practical experiences in each country by building consensus between teachers and then combining and integrating it homogenously with the learning theories. Furthermore, the study was to explore how and under what circumstances ICT is being used in secondary schools, through a comparative analysis between experience in England and North Cyprus.

A considerable body of relevant research exists about the pedagogical practice of teachers and their use of ICT (such as Duffy and Jonassen, 1992; Reeves, 1994; Merriam and Caffarella, 1999; Windschitl and Sahl, 2002; Webb and Cox, 2004; UNESCO, 2004; Angers and Machtmes, 2005; Webb, 2005; Baylor and Kitsantas, 2005; Hermans et al., 2008; Way and Webb, 2007) as discussed in the previous chapter. This has led to a growing realization of the value of teaching pedagogical practice in a meaningful way and the benefits of ICT to teachers and students and of the student-centred teaching approach. Such practice is rooted in personal perspectives and experiences within the learning culture. Carefully selected case studies and examples of knowledge gathered were shared between the practitioners in the respective countries, with the intention of demonstrating if teachers from the two countries could come to a consensus on what constitutes a good practice lesson and also to see how and why ICT is being integrated by teachers and what added value technology brings to subject teaching. This provided insights into

the ways in which different learning cultures, with their various approaches and practices applied appropriate pedagogic and technical solutions to suit the particular local contexts. It is also hoped to gain an insight into whether sharing solutions across cultures might benefit the professional development and practice of participating teaching staff.

Given the exploratory and explanatory aims of this study, which includes the 'how' and the 'why' about teachers' use of ICT and perspectives on their pedagogical practices, a broadly interpretive design has been adopted (Yin, 2003). In order to obtain the participants' individual perspective and an understanding of their actual experience, the epistemological framework of constructivism was applied. A comparative research methodology was employed since the study compared and contrasted two different countries (i.e. England and North Cyprus). I have termed this a comparative study, as Hantrais and Mangen (1996) state that 'a study can be said to... comparative if one or more units in two or more societies, cultures or countries are compared' (p.1). According to them, comparisons can offer 'fresh, existing insights, and a deeper understanding of issues that are of central concern in different countries' (p.3) which can lead to a broader vision of the educational process when compared to single country research. Comparative research is often adopted as complementary to a case study strategy (Stenhouse, 1979, Crossley and Vulliamy, 1984; Bray et al., 2007) and provides a greater opportunity to identify differences between two countries, than from only using a case study. The discipline of comparative education attaches importance to the link between cultural backgrounds and educational issues (Alexander, 2001) as this approach provides an opportunity to investigate how educational systems operate in different cultures, thereby illuminating differences and similarities. This feature of the comparative case study approach sits well with the current investigation, as it seeks to explore how the differences are exhibited between the two countries

in use and integration of technology in their teaching and their pedagogical approaches applied in the classroom. Consequently, the comparative case study approach was used to investigate and compare the two countries to provide an examination of the available resources and support and the cultural differences as reflected in the pedagogical practices of teachers in the two countries. As the intention is not to uncritically adopt the dominate culture's approach (that is the culture of England), the advantage of using the comparative case study approach allows the consideration of the added value of practice from either country, so that teachers may learn from each other's respective pedagogy (rather than copying the practices from an English secondary school and simply transferring these to a Turkish Cypriot secondary school).

A comparative research approach using a methodology based on case studies (see research methodology section), complements both the epistemology and the theoretical perspective of my study and facilitated an in-depth understanding of the teachers' perspectives on what good pedagogical practices includes and their current use of ICT in their natural context.

The theoretical framework of research design has been framed by Crotty (2003) as a four part hierarchy as presented in Table 3-1:

Table 3-1 Crotty's four part hierarchy

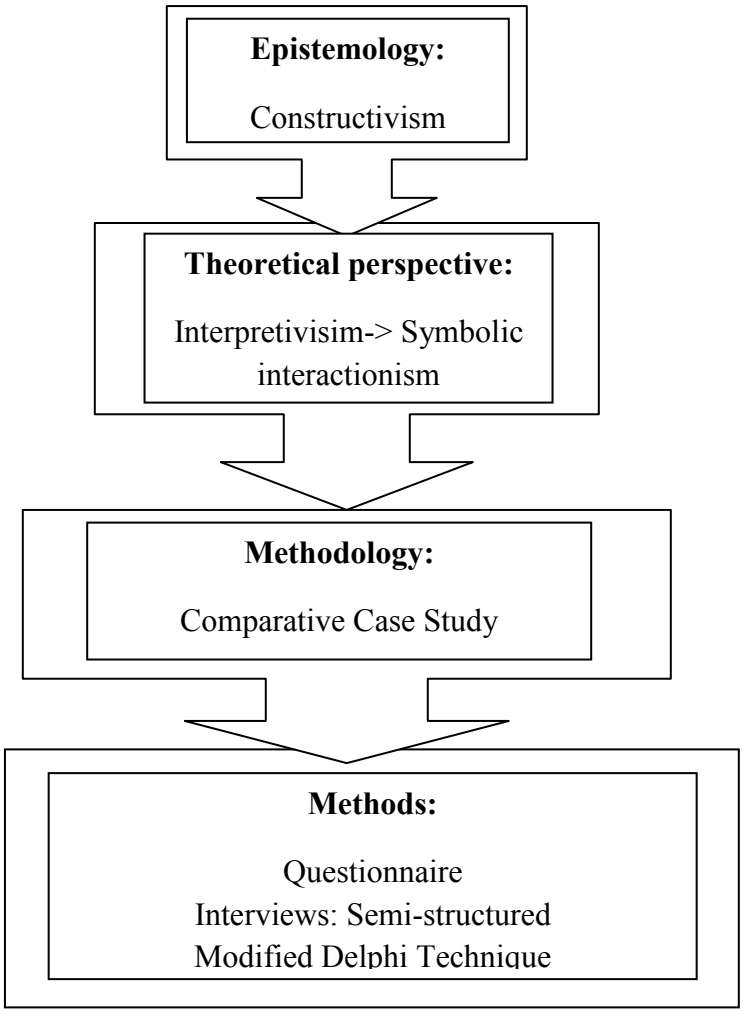
Hierarchy	Explanation
1. **Methods**	The techniques or procedures used to gather and analyze data related to some research question or hypothesis.
2. Methodology	The strategy, plan of action, process or design lying behind the choice and use of particular methods and linking the choice and use of methods to desired outcomes.
3. **Theoretical perspective**	The philosophical stance informing the methodology and thus providing a context for the process and grounding its logic and criteria.
4. Epistemology.	The theory of knowledge embedded in the theoretical perspective and thereby in the methodology

(Crotty, 2003, p.3)

Briefly, the epistemological stance of the researcher provides the assumptions for theoretical perspectives, which then underpin the chosen research methodologies that can only be properly understood by reference to methods in concert with the assumptions within these chosen methodologies (ibid).

Cortty's model was used to provide the outline for the research. Figure 3-1 outlines the four parts that design the theoretical framework of the research. The remainder of this chapter deals with each part in detail.

Figure 3-1 Theoretical framework of the research design (Adopted from Crotty, 2003)



3.4. Theoretical Framework of the Study

Each research study is underpinned by its theoretical framework. The issues and questions raised within the research were investigated through the chosen theoretical framework as based on Crotty's (ibid) model. In order to understand what and how pedagogical approaches are being applied and how and why technology is being used by individual teachers in their classroom, an interpretive design, underpinned by a constructivist epistemology, has been chosen.

Epistemology focuses on the nature of knowledge and its role is to help the researcher to understand how individuals or groups of people make sense of their world (Crotty, 2003). Constructivism epistemology (ibid), using an interpretive perspective, is therefore appropriate, as the integration of technology is essentially a social process and this research explores the resulting experiences of teachers and ICT co-ordinators (Rogers, 1995).

The interpretive perspective facilitates opportunities to obtain an understanding of how teachers have constructed and experienced the pedagogical practices that they apply in their teaching and in the use and integration of technology (Crotty, 2003). The nature of the research problem, revealing as it does an in-depth understanding from the teachers' perspective and from being undertaking in two different countries, leads to the methodology of a comparative case study (Yin, 1994). Subsequently, a comparative case study leads to the selection of the participants, analysis and verification of the data.

3.4.1. Epistemology: Constructivism

Constructivism is a philosophical theory that tries to understand how humans build understanding of their world they live in. Crotty (2003) defined the epistemology as'meanings are constructed by human beings as they engage with the world they are interpreting' (p.4). Therefore, constructivism is an appropriate perspective for this study, as teachers not only have the choice of whether to integrate or reject different pedagogical practices and the use of technology in their teaching, but the effect upon them by people who are influential regarding integration or rejection of that pedagogical practices and that technology (Venkatesh et al., 2003).

The integration of ICT into educational practice may be perceived as a social phenomenon, with the benefits that derive from its integration or level of use being comprehended differently by promoters of technology (government and school leaders) and by participants (teachers) (Rogers, 1995). This is relevant within the constructivist perspective, as Marriam (1998) states that 'reality is constructed by individuals interacting with their social worlds' (p.6). Likewise, Ackerman (2001) also expressed this point, claiming that 'knowledge and the world are both constructed and constantly reconstructed through personal experiences' (p.7).

As both individual teachers and ICT co-ordinators live and work together in wide ranges of social environments, 'multiple realities', as termed by Merriam (1998, p.4), may emerge because every teacher and ICT co-ordinator will have a different view of a particular instance. Examination of issues in such a context leads to the adoption of an interpretive approach.

3.4.2. Theoretical Perspective

Theoretical perspective is 'the philosophical stance informing the methodology and thus providing a context for the process and grounding its logic and criteria' (Crotty, 2003; p.2). Therefore, the theoretical perspective of this research study may be broadly considered as interpretivist: symbolic interactionism.

3.4.2.1. Interpretivisim: Symbolic Interactionism

According to Patton (1990), symbolic interactionism 'seeks to find the common set of symbols and understandings that emerge to give meaning to people's interactions' (p.75). Symbolic

interactionism's main principle is that the researcher can only understand what is happening in the research area if the researcher understands what teachers themselves believe about their world.

The three main principles of symbolic interactionism were summarised by Blumer (1969), as cited in Crotty (2003). These principles are presented in Table 3-2:

Table 3-2 Principles of symbolic interactionism

Principles of symbolic interactionism
1. That human beings act toward things on the basis of the meanings that these things have for them
2. That the meaning of such things is derived from, and arises out of, the social interaction that one has with one's fellows
3. That these meanings are handled in, and modified through, an interpretive process used by the person in dealing with the things he encounters

(Blumer, 1969 citied by Crotty 2003, p.72)

Therefore, symbolic interactionism can be understood by the concept that understanding of the world and its perceived meanings is through social interactions with others. This study aims to examine the teachers' pedagogical perspectives about what constitutes a model of practice for their use of ICT and, so an understanding of their acceptance of technology is essential. Table 3-3 sets out the link between symbolic interactionism and acceptance.

Table 3-3 Link between symbolic interactionism and acceptance

Symbolic interaction (Blumer, 1969)	**Acceptance of technology (Venkatesh et al., 2003; Roger, 2003)**
People act toward things that are available to them.	Individual believes that if technological resources, training and support are provided to them, then they use technology.
Social interaction is the factor that affects the people where the meaning of things such as use of technology is derived from it.	Individual believes that it is important that others think he/she should use the technology/
People's meaning (behaviour) is changed through their interpretive process with the things they come across.	Be persuaded to integrate with or make use of technology, implement innovation, and finally, change their behaviour.

By understanding the perception of each teacher and understanding how and why they are using technology in their teaching and what pedagogical approaches are being used in their teaching, the gap between the importance of integrating technology into teaching and the cultural differences between the teachers' experience in two different countries is emphasised. Given the aims of this research, employing symbolic interactionism is therefore appropriate.

3.4.3. Research Methodology: A Comparative Case Study

This study employed a comparative research methodology with a case study approach, to examine how and why teachers, who are the participants of research, use ICT in their teaching and to explore any differences between practitioners in their beliefs about pedagogy and their use of ICT, and how these beliefs shape their approach in the classroom. As referred to previously, the theoretical perspective that guided this study was symbolic interactionism. Therefore, it is most important to understand the research questions from each teacher and ICT co-ordinator's perspectives to clarify the research problem from this theoretical perspective. The in-depth study

of the research problem from the perspective of the secondary school teachers and ICT co-ordinators' in two countries, leads to the adoption of a comparative case study methodology: Yin (2003) defined a case study as 'the method of choice when the phenomenon under study is not readily distinguishable from its context' (p.4) .

The most important features of case studies is the in-depth investigation of a bounded system, based on wide-ranging data collection, and where the research study is carried out in its natural context (Merriam, 1998). The use of case studies is particularly valuable in examining the 'how' and 'why' aspect of a real life phenomenon which cannot be changed by the researcher (Yin, 2003).

The phenomena to be investigated in this case study are the issues of secondary school teachers' perspectives and experiences of pedagogical practice, how technology is used within preferred pedagogy, and the barriers and enablers of technology use.

Pilkington (2008) states that the main problem with large scale survey-based approaches and with some experimental and quasi experimental research, is that 'often detailed contextual information from rich qualitative data is lacking' (p.6). The advantage of smaller case studies is that they give a deeper understanding of the phenomena to be studied, something that large national or international studies often fail to achieve (Balanskat et al., 2006). Pilkington's (2008) review on 'measuring the impact of IT on students' learning', suggests a more holistic approach to data-gathering that includes richer contextual data collection rather than traditional experimental and survey-based approaches alone. Tolmie (2001) also concluded that a more qualitative approach is

required in order to understand teachers' pedagogical practices and determine ICTs impact on learning. This was also confirmed by my own experiences, as explained below.

A survey based approach has been tried out previously for this study instead of the interview method. However, it was concluded that almost impossible to design a satisfactory questionnaire for use within both countries. In North Cyprus, there is a little current use of technologies, and many of the technologies would not even be recognised. However, if only those technologies familiar to North Cyprus staff were to appear on the questionnaire, then this would not reflect the range and diversity of technologies in England. This supported the concept that an in-depth case analysis for each country was needed, beginning with schools in England, chosen because they were understood to be technology rich and to employ that technology in a pedagogy-led way. Questionnaires however, remain a valuable technique for discovering the 'background' or 'broad picture' when describing the two countries being studied, in particular to answer the 'how much', 'how many' or 'how often' questions that help to identify the infrastructure readiness of the schools; levels of use of ICT; and the number of years of training teachers have received. Furthermore, responses to both open and closed questionnaire items can assist in the sampling: i.e. to help identify indicators of representative coverage when selecting teachers for the interview in purposive sampling.

A case study approach was employed as a research methodology, but as this study was carried out in two different countries, a comparative methodology form of a case study approach was deemed the most appropriate.

The major benefits of using a case study approach in this research is to 'advance the knowledge and understanding' of what a model of useable practice includes from the teachers point of views and how and why teachers are using and integrating technology in their teaching and the resulting learning (educational) benefits)in the two different countries (Yin, 2003, p.3). The major strength of a case study approach stems from the use of multiple sources and techniques in the data gathering process (Denscombe, 2003). This helps to ensure the validity/trustworthiness of the data.

3.4.4. Research Methods

This is the fourth part of the theoretical framework that details the research methods used within this research study and are shown in Table 3-4.

The selected data collection tools and procedures all need to be robust if they are to satisfactorily reflect the teachers own insights and perspectives, and at the same time are to produce useful and relevant data. Questionnaires, semi-structured interviews and Modified Delphi Technique were all used when collecting the required data for addressing the questions of the study.

Table 3-4 Data collection methods

Research Questions	Data Collection Methods		
	Questionnaire	Interview	A Modified Delphi
1. What are the pedagogical practices adopted by teachers in the respective secondary schools? a. What pedagogical approaches are applied by English and Turkish Cypriot secondary school teachers? b. Why and how teachers have been integrating ICT in their lessons to enhance teaching and learning within their classrooms?		**X (n=12)**	**X (n=12)**
2. Under what circumstances are Information and Communication Technologies (ICTs) currently being used in secondary schools? a. What do English and Turkish Cypriot teachers perceive to be barriers to effective use of ICT in teaching? b. What do English and Turkish Cypriot teachers perceive to be enablers of effective use of ICT in teaching? c. Are there any differences between English and Turkish Cypriot teachers in terms of the teaching approach they applied, the use of technology and the available resources and training?	**X (n=198)**	**X (n=12)**	**X (n12)**
3. What can Turkish Cypriot teachers learn from the experience of teachers in England and vice versa? a. Are teachers in the two countries able to arrive at a consensus regarding a model of practice for integrating ICT in lessons? b. Are there any contextual differences which teachers believe require a different approach to integrating ICT in lesson in the two countries?			**X (n=12)**

3.4.4.1. Questionnaire

Hakim (1987 cited in Robson, 2002) suggests that the main attraction of the survey technique is its transparency, or accountability. Cohen et al. (2000) define a survey as follow:

> *"Surveys gather data at a particular point in time with the intention of describing the nature of existing conditions… the collection of information typically involves one or more of the following data gathering techniques: structured or semi-structured interviews, self completion of postal questionnaires, standardised tests of attainment or performance and attitude scales."* (p.168)

Surveys are generally used with large-scale studies, but can be also employed with a small-scale study as stated by Siraj-Blatchford and Siraj-Blatchford (2001), who defined it as 'to describe some particular characteristic or range of characteristics of a given population' (p.149). Surveys also provide a snapshot of the research area under examination (Denscombe, 1998). Similarly, Robson (2002) states that small-scale surveys can be used to identify the characteristic of a given population, but added that small-scale surveys may also be used to identify the sample selection for the main study. For this study, a small-scale survey provided a simple and straightforward approach to the study of teachers' perceptions about the availability, accessibility and training for ICTs, and this helped when selecting participants for the main study.

As established in the theoretical framework section, the principle behind this study is mainly interpretive (qualitative), but the closed quantitative questionnaire was used to demonstrate the 'background' or 'broad picture' within each school in the two countries, to justify and verify the selection of good and improving schools, to identify suitable representative participants for the study and select appropriate participants for the interview. Thus, purposive sampling, which is applied to access 'knowledgeable/experienced people' (Cohen et al., 2007), was used for the

selection process (for more detail about purposive sampling see the sampling section). The questionnaire provided a quick and systematic method to collect data from the larger (or a whole school) population and the questionnaire technique used closed quantitative questions to gather 'how much' and 'how often' style information in relation to training, ICT resources/infrastructure, use of technology in the classroom and teachers' competence levels. In April 2010, 198 short questionnaires (105 in North Cyprus and 93 in England) were distributed to teachers in four selected secondary school (for selection process see section 3.5.1) to establish the nature of currently available IT resources, their location/accessibility, their state of repair and availability of technical support, the teachers' expertise in their use of ICT and the basic training of staff.

The questionnaire had four sections with a total of 21 questions, mostly close-ended but having short answer-opportunities to add further comments. The sections of the questionnaire are presented in Table 3-5:

Table 3-5 Questionnaire sections

Section	Explanation
Section 1	Personal information
Section 2	Availability and accessibility of Information and Communication Technologies (ICTs)
Section 3	Continual Professional Development (CPD) training and competence level of teachers
Section 4	Other Comments

The personal information questions included the name of the school, the gender, age, and years of experience of the teachers, and the subject that the teacher taught. The question about the availability and accessibility of ICT include the types of ICT tools (i.e. hardware, software and network) being used in the school, how teachers perceived the support they got from their school in terms of maintenance and the use of ICT, where they used ICT resources, for how long (minutes) they used ICT each day, how they described their particular level of ICT skill, and what type of ICT support they had in their schools. The section three CPD training questions included the types of training teachers received, how many hours of training, their evaluation of competence level (self-assessment), and how they would describe their use of ICT level. Section four was for any other comments that teachers might wish to make (see Appendix 4).

These questions were designed to identify the teachers' personal information and to examine the competence level and the training that they have received. In designing the questionnaire, simple and clear language was used, avoiding any biased or leading questions and ensuring instructions were consistent. Furthermore, guided by the advice of Mertens (1998) and Robson (2002), the logical sequencing of the question order was checked and the layout made attractive.

Piloting Questionnaire

After a series of discussions with my supervisor, a questionnaire was drafted. The first draft of the questionnaire was pre-tested informally. Friends were asked to read the draft and provide constructive comments on the wording. The focus of the pre-testing was to obtain feedback about individual aspects and to have confidence that each question was clear, simple and unambiguous (Robson, 2002). Also, it tested the time needed to fill out the questionnaire.

In the pilot phase 1, advice was sought on the content and appearance of the questionnaire from an expert in Research Methods at the University of Birmingham, School of Education. His suggestions were used to improve the questionnaire prior to the commencement of piloting in North Cyprus. Pilot phase 2 in April 2010 involved teachers in North Cyprus in other than the selected schools and was intended to further enhance the validity and reliability of the questionnaire. Ten copies of the questionnaire were used for this stage. The questionnaires were emailed to teachers for them to complete.

Within a week, 10 out of 10 completed questionnaires were returned by e-mail from North Cyprus. Key changes were made after the two piloting phases: the inclusion of a covering note on the front page, and some wording and design issues within section two.

These changes can be seen in appendix 3 (pilot one) and appendix 4 (the actual questionnaire).

Conducting the Questionnaire

The survey was first conducted at the selected 'good' and 'improving' secondary schools in England where the 'good' school is well equipped with technologies and already uses ICT in teaching in a pedagogy-led way and the 'improving' school is equipped with ICT and is trying to integrate ICT in their teaching,. The 'good' schools were given 68 copies of the questionnaire, information sheet and consent form. The 'improving' schools were given 25 copies of the same documents as they had 25 teachers. Out of 93 questionnaires, 51 completed questionnaires were returned, 36 from 'good' secondary schools and 15 from the 'improving' schools.

The same process was employed in North Cyprus. The 'good' schools were given 35 copies of the questionnaire information sheet and consent form, as they have a total of 35 teachers. The 'improving' schools were given 70 copies of the same documents. Out of 105 questionnaires a total of 71 completed questionnaires were returned, 35 from 'good' secondary schools and 36 from 'improving schools'.

A copy of the questionnaire, information sheet and consent form used in this study can be found in appendix 4 and appendix 5.

Questionnaire Data Analysis

The first step of data analysis is data coding. The data was coded into a format with numerical codes using Microsoft Excel® program.

As advised by Mertens (1998), a fresh copy of the questionnaire was made and the responses coded on that copy. Also, as suggested by Robson (2002), the following numerals were used to represent the options for closed items; for instance, '1' and '2' were used to represent male and female. Although the plan had been to compile all the responses for the open-ended items, putting them into broad categories and coding them in a similar way as for the closed items, in fact no teachers responded to the open-ended question.

Further, descriptive statistics were used to show demographic data for the participants and also to evaluate:

- What types of ICT there are?

- Whether there are enough computers in their schools?
- What types of ICT-related support and training they have in their schools?
- How many hours of technology training they have received from their schools?
- How many minutes or hours they use ICT each week?
- How confident are they in their use of technology in the classroom (identified through their self-rated competence level)?

Numbers and percentages were used to show the results.

The results of the questionnaire were used to verify the selection of 'good' and 'improving' schools using the information obtained about the types of available ICT and training in the schools and the hours of use of ICT for teaching. The results were also used in a purposive manner to select participants for interviews: 6 teachers from the two Turkish Cypriot secondary schools and 6 teachers from two English secondary schools (12 in total), whose competence (self-rated) level was 'high', 'medium' and 'low', and who indicated in the questionnaires that they would be happy to participate in the interview process.

In order to maintain the anonymity and confidentiality of the participants, the teachers were given codes for their school, their name, and the questionnaire number. The four schools were referred to as school A, school B, school C and school D, and the participants were referred to by their initials e.g. AP or DM. The questionnaire numbers were referred with a number, e.g.1, 2, 3, For example, SchoolA-SK-2.

3.4.4.2. Semi-Structured Interview

Interviewing is one of the most common methods for collecting qualitative data, as it is ideal for exploring and then be able to describe the perceptions and beliefs of the interviewee. To enhance the validity, reliability and meaning of the conclusions, interviews need a methodical approach to data gathering, its analysis and description (Breakwell, 2006).

Semi-structured interviews fit between the structured and unstructured interviews. In that method, the interviewer normally put pre-established questions to participants. However, this does not restrict the interviewer from exploring emergent ideas, not just adhering to the interview questions identified beforehand. In brief, the interviewer would generally employ a standardised interview schedule with a list of questions established in advance, but the interviewer is also free to probe for other relevant information through additional questions (Robson, 2002; ESDS Qualidata, 2007).

Teachers were interviewed to find out which technologies they used, how and why they are used in their classrooms and their perspectives of barriers and enablers of technology use, and especially to find out their pedagogical perspectives for constructing a model of useable practice from the teacher perspective. In addition to the teacher interviews, ICT co-ordinators were also interviewed to obtain information about levels of ICT use and integration in the school. This triangulation served to check for inconsistencies in the teachers' responses and to ensure the validity or trustworthiness of the data.

The teachers' interview schedule was used to examine their general pedagogical approaches to teaching, how they generally used technology to enhance their teaching (their general preferred pedagogical approaches and pedagogical approaches for technology use), the examples of technology use by teachers in their teaching and the barriers and enablers of technology use in the classroom (see appendix 6 for the interview schedule). The interview schedule of teachers was put through a piloting process, teachers being key participants for this study (see piloting below). The interview schedule of ICT co-ordinators was used to examine the types of technology that their school uses, the types of training and support they provide to teachers, and to get their opinions about how ICT enhanced learning and teaching (see appendix 7).

Piloting Interview

'Pilot studies' can be defined as the specific pre-testing or 'trying out' of a particular research tool such as an interview schedule (Baker, 1994 cited in Teijlingen, 2002). There are several reasons for conducting pilot studies. These are presented in Table 3-6:

Table 3-6 Reasons for conducting a pilot study

1. Developing and testing adequacy of research instruments
2. Identifying logistical problems which might occur using the proposed methods
3. Collecting preliminary data
4. Assessing the proposed data analysis techniques to uncover potential problems
5. Modifying the words and the order of the questions

(Teijlingen, 2002, pp.34-35)

A semi-structured interview schedule for teachers was constructed and piloted in July 2009, as part of Module 4 (Using Sources/Producing Analysis in Research Method). The interview schedule was mainly built from the brief literature review. Subsequently, it was conducted with

four teachers from one of the Turkish Cypriot secondary schools which was a different school than selected schools.

This piloting experience proved very useful and much was learnt from it e.g. questions styles need to be clear and simple so can be easily understood by teachers, very much as Breakwell (2006) said when arguing that 'properly conducted pilot work pays off' (p.241). It minimizes the risks of discovering mid-way throughout a study that a very important issue has either been disregard or that specific questions cannot be understood by respondents. It was learnt that interviewing people for data collection is very different from conducting an ordinary conversation, as it requires many skills on the part of the interviewer to act as an active listener, including the ability of taking notes while listening, and not imposing his/her ideas on the interviewees. The interviewer should also have the ability to use probes and to ask follow up questions to try to discover information that the interviewees might not initially reveal, asking such questions in an apparently indirect but nonetheless constructive way.

Two techniques, tape recording (in 2 interviews), and taking notes (in 2 interviews), were used to choose which method would be better at providing adequate data. On balance, tape recording proved superior, as by playing back interviews to them, interviewers gained insights into how they handled of the questions became aware of aspects that had escaped them during the interview itself (Gal et al., 2003, 246). The use of tape recording does not eliminate the need for taking notes, but does allow concentration on taking more strategic and focused notes, rather than attempting a verbatim record of the discussion (Patton, 2002). For these reasons, tape recording helps a great deal, especially when categorizing and analysing the data.

Through the preliminary use of a pilot for the interview, it was confirmed that the semi-structured interview schedule is appropriate for addressing the research questions.

This experience of piloting helped in devising the actual interview schedule used to interview teachers in the selected secondary schools in England and North Cyprus. The preliminary data gathered through the pilot provided insights which were considered when devising the actual interview schedule.

Interview Data Analysis

The process of interview analysis is presented in this section. The first step involved transcriptions of the entirety of the teachers' interviews. This provided a complete record of the discussions and facilitated the analysis of data (Lewis, 2000).

In this study, grounded theory, which is often used in qualitative analysis, was not applied for the analysing the interview data because categorisations had been done first using the literature review, and then the emergent themes were examined. Consequently, the qualitative responses from teachers' interviews were examined via the narrative analysis. Narrative analysis was explained by Richmond (2002) as a method that is an effective way for researchers to learn, investigate and analyse the participants' perspectives in order to understand their experiences in real life. Cohen and Crabtree (2006) also indicated that narrative analysis is an important method used in social science research, allowing the researcher to understand the participants' personal, social and cultural experiences.

Powell and Renner (2003) provided the basic steps of the narrative analysis method, as used in this study to analyse the qualitative data. These basic steps are presented and explained in Table 3-7.

Table 3-7 Narrative analysis steps

Step	Explanation
Step one	The researcher organises the data corresponding to questions, to identify similarities and differences in the participants' answers. In this step, data was ordered in accordance with interview questions and all teachers' responses and answers were examined to identify similarities and differences.
Step Two	The researcher provides the code and descriptive label (name) for each category. Powell and Renner (2003) give two approaches for categorising data: present and emergent categories. The present category approach allows the researcher to identify and start with a list of categories from research literature and then to search the data for a text matching those categories. In the emergent category approach, the researcher first reads through all the data to find the categories related to the data, rather than using predetermined categories. This study utilised both approaches: initially a list of categories was established through the literature review, and was extended by emergent categories through reading all the research data. The NVivo software programme was used for this analysis.
Step three	After the researcher categorised the data into categories, the categories that begin to appear as important emerge through counting the number of times a specific theme occurs, in addition to the researcher beginning to identify the relationships between the identified categories. Powell and Renner (2003) states that counting a specific theme or category helps the researcher to roughly estimate relative importance and they suggest that when two or more categories appear together in the data, these categories may have a cause and effect relationship.
Step four	In this step, the researcher makes use of quotations from interviewees to identify the data that relates to the identified categories and sub-categories. Briefly, this step cuts and sorts all the data. Powell and Renner (2003) indicate that the researcher can use different types of techniques to cut and sort the data so that the researcher can work with a hard copy or by using computer software like NVivo. The important aspect is that the researcher should have a way to identify the source of all data that has been cut and sorted, by group, site, country and date.

The narrative analysis method was therefore more appropriate, because as explained above, this method allows for the development of categories in advance. In this ways, some initial aspects of phenomena could be developed by the researcher. This approach still allows for the possibility that other themes will emerge from the field study.

After the interviews were analysed to compare and contrast England and North Cyprus situations, establishing the similarities and differences between these countries, schools were involved in cross-case school partnerships, allowing discussion about their respective views about pedagogy and the integration of ICT, in order to learn from each other. Therefore, the three rounds of a 'Modified Delphi Technique' were used in the final phase of research to exchange views and build a consensus on some of the good scenarios of ICT use and to reflect on what they have achieved/learned from each other or through the sharing process.

3.4.4.3. Modified Delphi Technique

In the third, developmentally-targeted phase, constructed scenarios (lesson plans) were sent to participating English and Turkish Cypriot teachers. This was done to explore the underlying objectives of each school, teachers' pedagogical perspectives for a model of useable practice and to identify the barriers and enablers to adoption of particular technologies and particular ways of working with them. It provided the teachers from each country an opportunity to work together and redesign provided scenarios (lesson plans) according to their requirements enabling me to identify what model of practices were included from the teachers' point of view.

Focus group discussions were initially considered as the best method to obtain participants' perceptions on what they perceived were model of practices. However, the Delphi technique was also examined in detail, and it was decided to employ the modified Delphi technique rather than focus group, as the purpose of the final phase was to achieve a consensus building on a model of practice and barriers and enablers of ICT use in their classroom. In the next section, the justification of why the modified Delphi technique rather than focus group discussion was chosen, is presented.

Fontana and Frey (2000) stated that in 1956, Merton, Fiske and Kendall originated the term focus group 'to apply to a situation where the researcher/interviewer asks very specific questions about a topic after having completed a considerable research' (p.703). Another definition of the focus group suggested by Krueger (1994) is that a focus group is a 'carefully planned discussion designed to obtain perceptions in a defined area of interest in a permissive, non-threatening environment' (p.18). However, Gatewood and Gatewood (1983), and Fowles (1978) state that there is a problem with focus group meetings as focus groups often 'suffer from follow-the-leader tendencies and show reluctance to abandon previously stated views' (cited in Nelson, 2002, p.5). This is the reason why the 'Delphi technique' was developed to overcome the focus group's shortcomings. Using this technique a group of experts can discuss the issues anonymously to reach consensus. According to Jones and Hunter (1995), the Delphi method can be used in different areas such as health, education and training research for building consensus in a group-based discussion. Thus, as experienced teachers (not experts as explained in detail chapter 3 of section 3.4.4.3) have a voice about model of practice, the Delphi method fits well with a participatory approach. In the Delphi technique, participants do not need to work face-to-

face, as this method was developed to obtain information from participants in proximity or apart (Custer et al., 1999; Blow and Sprenkle, 2001). Similarly, Ziglio (1996) mentioned that the Delphi method would allow the chosen experienced teachers, if geographically dispersed, to participate from their respective countries when time and financial restrictions make face-to-face meetings difficult to arrange. This is another reason why the Delphi technique was used, as I carried out this study in England and North Cyprus and I have limited time and financial resources as a student researcher.

Generally, the Delphi method is applied to build consensus among experts who have differing views and differing perspectives. The Delphi method allows the participants to solve a problem as a group by using an iterative process of problem discussion, reflection and feedback about the problem (Jones and Hunter, 1995; Rayens and Hahn, 2000; Sharkey and Sharples, 2001). It also offers an opportunity for research participants to learn from each other as they work together to produce a group decision about the problem. In brief, it is a method for eliciting expert opinions and its aim is to provide a practical means of obtaining the opinions of a group.

Larson et al. (2004) state that focus groups are not an appropriate instrument to build consensus or evaluate the impact of an educational event and they suggest that when the researcher wants to build consensus, the Delphi method is more appropriate because they think:

> *"The focus group process relies on an open, trusting environment that does not attempt to persuade or coerce people's opinions. Any attempt to build consensus has the potential to discourage divergent thinking: the process that yields a diversity of ideas and is crucial to high quality focus group results. Tools such as the Search Conference and the Delphi technique are more appropriate methods when consensus building is the purpose." (*Larson et al., 2004, p.2)

Therefore, as the main aim of this study was to build a consensus on a model of practice by teachers, the use of this method is appropriate.

Often, for the Delphi technique, three rounds are used in which case the researcher needs to prepare the questionnaires for each of these rounds. The process starts by providing some information about the subject to the participants through an open-ended questionnaire, and in subsequent rounds, participants are able to rate the items set out in the first round according to their importance and also to suggest changes on the way the items' have been phrased. Finally, in round three, a consensus is built about which are the important items. As this study aims to build a consensus on what emerges as important informed by what the teachers perceived to be a good model of practice in teaching, the Delphi technique is an appropriate method. Physical constraints meant that, in this study, email and a conferencing system (Skype programme) were used as tools to gather the data, with constructed scenarios (lesson plans) being provided to teachers at the beginning, and a modified Delphi technique then being used, adapting the technology to support this technique. The modified Delphi technique is similar to the Delphi technique regarding the selection of experts for sequenced rounds, and also in building a consensus at the end of the rounds (Custer et al., 1999). Before presenting the main modification of Delphi I made in my study, it is worth mentioning that the teachers who were selected for this modified Delphi study were not ICT experts but could be considered experienced teachers in their subject, in accordance with Berliner (2001) 'the acquisition of experience does not automatically denote expertise'. The definition of 'expertise' in teaching is particularly difficult as it takes different forms in different cultures and further, what may constitute expert teaching also changes by the decade. However to establish a base for this study, a prototypical model of expertise is described and then employed to identify teachers who are experts. John Hattie and his colleague Richard Jaeger (Hattie, 2003),

conducted a study comparing expert teachers with experienced and novice teachers, wherein they identified five major dimensions of expertise of teachers, as presented in the following table.

Table 3-8 The five dimensions of expert teachers

• They can identify essential representations of their subject: o Experts possess knowledge that is more integrated, in that they combine new subject matter content knowledge with prior knowledge; can relate current lesson content to other subjects in the curriculum; and make lessons uniquely their own by changing, combining, and adding to them according to their students' needs and their own goals. o Experts are more opportunistic and flexible in their teaching. They take advantage of new information. o They tend to spend a greater proportion of their solution time trying to understand the problem to be solved as opposed to trying out different solutions. o They do not write lesson plans but could easily describe the plans in their heads.
• They can guide learning through classroom interactions: o Expert teachers increase the probability of feedback occurring (which often involves allowing for, and certainly tolerating, student errors). They build climates where error is welcomed, where student questioning is high, where engagement is the norm, and where students can gain reputations as effective learners. o Expert teachers are more effective scanners of classroom behaviour, make greater references to the language of instruction and learning of students, whereas experienced teachers concentrate more on what the teacher is doing and saying to the class. o Experts are more dependent on context than experienced teachers.

- They can monitor learning and provide feedback:
    - Expert teachers are more adept at monitoring student problems and assessing their level of understanding and progress, and they provide much more relevant, useful feedback.
    - Experts use this feedback information to develop and test hypotheses about learning, they are adept at evaluating possible strategies while seeking and adding further feedback information to ascertain the effectiveness of their teaching.
    - Experts develop automaticity so as to free working memory to deal with other more complex characteristics of the situation, whereas experienced non-experts do not optimise the opportunities gained from automaticity.

- They can attend to affective attributes:
    - The manner used by the teacher to treat the students, respect them as learners and people, and demonstrate care and commitment for them are attributes of expert teachers.
    - Expert teachers, like experts in most domains, show more emotionality about successes and failures in their work.

- They can influence student outcomes:
    - Expert teachers engage students in learning and develop their students' self-regulation, involvement in mastery learning, enhanced self-efficacy, and self-esteem as learners.
    - Expert teachers provide appropriate challenging tasks and goals for students.
    - Expert teachers have positive influences on students' achievement.

(Hattie, 2003, pp.6-11)

When above table is examined, it is difficult to say definitively that the selected teachers are experts per se, and this is the reason why they were instead described as experienced teachers in their own subject areas. With these characteristics of expert teachers identified, the main modification of the original Delphi method can be presented.

The main modification is starting the process by carefully selecting items (ibid), as in this study, with carefully constructed scenarios (lesson plans) with all including technology use. These scenarios (lesson plans) were constructed based on examples of the use of ICT (from teachers' responses) at the interviews and using the matrix table (to be presented in chapter four) as an analytical framework. Based on this study configuration, this is a modified Delphi technique, and as Roman (2010) states, this modified method is suitable and feasible for doctoral research when researchers work alone. This modified Delphi study has facilitated two different countries' teachers to take joint decisions about what model of practice includes in teaching. It has resulted in a model for practice in teaching, which can be accessed online by participants and other teachers in the two countries.

Six teachers from England and six teachers from North Cyprus, twelve teachers in total, from those who were engaged in the second phase, interview, participated in first and third rounds and 4 (two from England and two from North Cyprus) of them participated in the second round of this modified Delphi study. They were a mixture of men and women, all between the ages of 20-49, with at least two years experience in the use of computers and computer technologies.

As well as advantages, the Delphi method also has some drawbacks related to a low response rate and demanding time requirements, as mentioned by other researchers (e.g. Ludwig, 1994; Witkin and Altschuld, 1995). Due to the need for multiple feedback rounds, there could be a low response rate, as teachers need to be motivated to maintain robust feedback. The Delphi technique can also be time-consuming, as it is iterative and sequential (Hsu and Sandford, 2007) and sometimes it is difficult to get responses on time from the participants. To overcome these drawbacks, several emails were sent to participants to inform them how important their responses were for the study and to encourage them to complete on time. I received all participating teachers' responses to my three rounds of modified Delphi study, but there were problems getting responses on time, due to demands on teachers' time.

As mentioned above, the traditional Delphi technique employs a sequenced round, often including three rounds, three rounds being generally sufficient to collect the needed information from participants, and in most cases the researcher(s) can reach a consensus. Jones and Hunter (1995) describe the three rounds of Delphi method which are presented in Table 3-8 below:

Table 3-9 Delphi method's three rounds

Round	Description
Round 1	Either the relevant individuals are invited to provide opinions on a specific matter, based on their knowledge and experience, or the team undertaking the Delphi expresse opinions on a specific matter and selects suitable experts to participate in subsequent questionnaire rounds: These opinions are grouped together under a limited number of headings and statements drafted for circulation to all participants on a questionnaire;
Round 2	Participants rank their agreement with each statement in the questionnaire: The rankings are summarised and included in a repeat version of the questionnaire;
Round 3	Participants re-rank their agreement with each statement in the questionnaire, with the opportunity to change their score in view of the group's response: The re-rankings are summarised and assessed for degree of consensus: if an acceptable degree of consensus is obtained the process may cease, with final results fed back to participants; if not, the third round is repeated.

(Jones and Hunter, 1995, p.377)

From these considerations, three rounds were employed, which were modified as follows in order to address this study's aims,:

1. **Round 1:** In the first round of the modified Delphi phase, the information sheet (see appendix 9 for the general information sheet and Round one information sheet), which included explanations about the three rounds of the modified Delphi technique, were sent via email to 12 teachers, identified from the results of the questionnaire and the participating interview process of this study. In the same email, a document which included the constructed lesson plans along with open-ended questions was sent to participating teachers (see Appendix 9). The aims of conducting this first round were to

triangulate interview results by: identifying which plans were picked by participating teachers; their reasons for that; and to check that the chosen lesson plans and reasons were consistent with what they had said. Also, the first round enabled pairing up the teachers who volunteered for the second round of this modified Delphi phase.

Each teacher examined the six lesson plans (scenarios) and chose their three preferred lesson plans – ideally, these were the ones that they would like to adopt for use in their own classroom – and their ranked choices and reasons for selecting their three preferred plans were collected. The teachers' reasons for not selecting the other lesson plans (scenarios) were also collected. However, at this stage, it was unlikely that a consensus on the reasons for choosing plans would be obtained.

Following this first round, all the responses were compiled, then, teachers who volunteered for the second round were paired (one teacher from England and one teacher from North Cyprus with similar preferences). Two teachers from England and two teachers from North Cyprus volunteered for the second round of this modified Delphi phase to redesign their similar preferred lesson plan. Teacher5-AP-E from England and Teacher10-BO-CY from North Cyprus paired up to redesign a lesson plan (scenario 5), which was the first preference for both teachers, and Teacher3-RB-E from England and Teacher12-HY-CY from North Cyprus paired up to redesign a lesson plan (scenario 6), which was the third preference for the English teacher whereas it was the first preference for the Turkish Cypriot teacher. Participants respond anonymously.

2. **Round 2:** In the second round, all 12 teachers were sent an email to inform them about the paired teachers for the online communication process (see Appendix 9) and an open-ended questionnaire was sent to each volunteer teacher to identify their requirements were they to use and adapt their preferred lesson plan in their own teaching (see appendix 11). This open-ended questionnaire was not collected and analysed, as its aim was to help teachers to prepare for their online discussion. A day and time was arranged which was suitable for the paired up teachers to communicate with each other online via the Skype programme and I translated English teachers' opinions and suggestions into Turkish for Turkish Cypriot teachers, and I translated Turkish Cypriot teachers' opinions and suggestions into English for English teachers. They started with the two different sets of requirements and discussed how they could resolve the different sets of requirements in their preferred lesson plan. They were also asked to identify as necessary the outstanding matters that remained to work differently in the two classrooms. Together they redesigned their preferred lesson plan which would apply to both countries' teachers' classroom with identification of the elements that still need to be different between the two. The similarities and differences are considered in this round.

Feedback was given to the whole group to explain the joint decisions taken. The feedback workshop from round two was designed to highlight the different requirements for making that scenario a working reality for each teacher's classroom, subject and level of student. They made decisions about designing their lesson plans for how to use ICT in the classroom in a pedagogy-led way and these were fed back to the group to explain what their individual concerns had been and how they arrived at a plan that would work in both

countries. The changes that might be needed to be able to use the ICT effectively in the way suggested were highlighted in this way. Again, participants responded anonymously.

In round 3 these modified lesson plans were shared with the other 12 participating teachers to get their comments.

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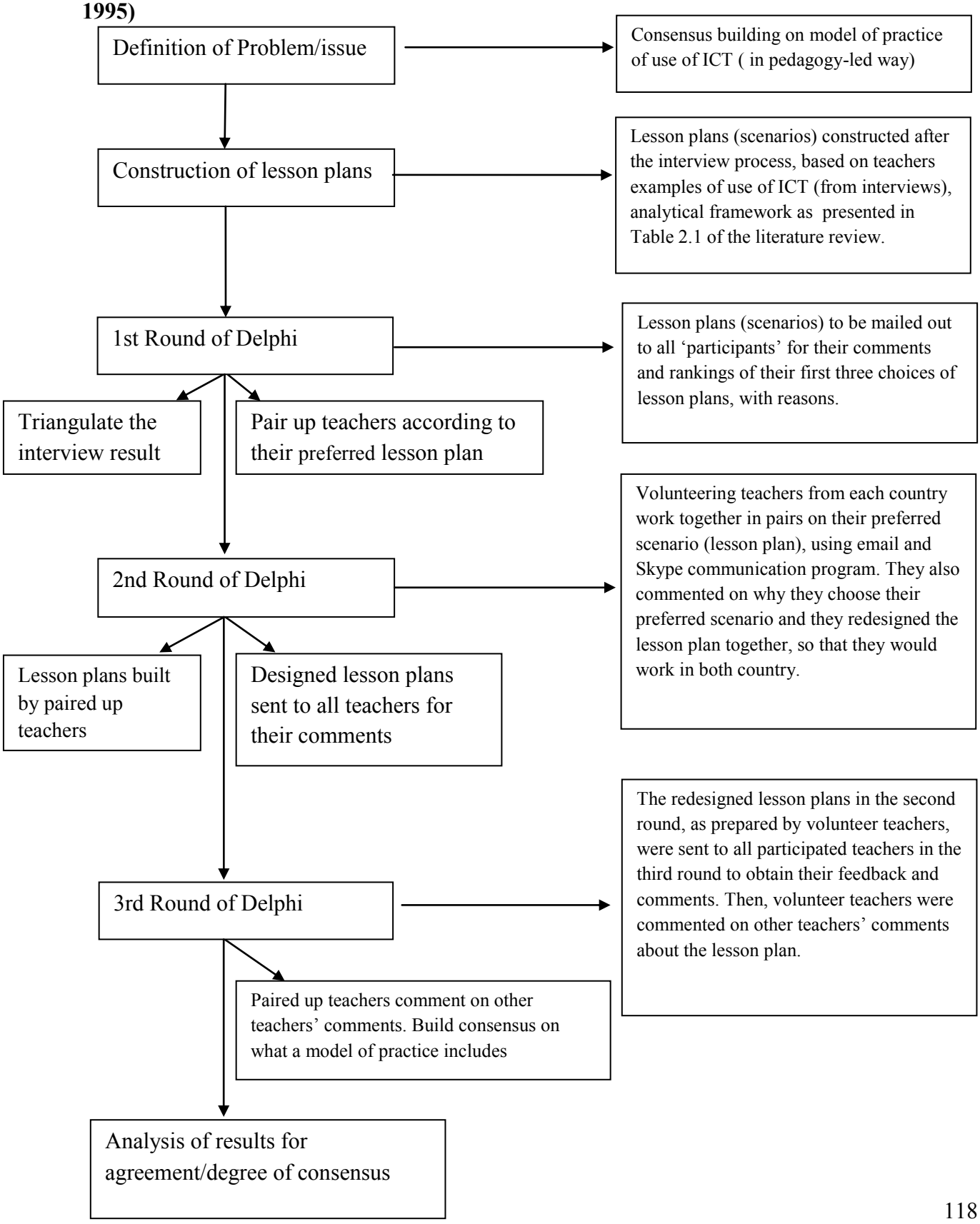
3. **Round 3:** In the third round of research, two redesigned lesson plans were sent to all teachers. Each teacher chose a lesson plan other than their own, which they thought they might like to try with their own group, commenting on why and how this lesson plan might need to change in order to use ICT effectively in a pedagogical-led way. The results were fed back to the group, and the teachers who had designed the lesson plans looked at the other teachers' comments on their designed lesson plan and commented on their comments. At this point, the consensus about what would work (in North Cyprus and England) and which scenarios represent good pedagogy-led practice emerged.

This study included twelve teachers in the first round, four teachers in the second round and twelve teachers in the third round again. One can argue that fewer participants might reduce the validity of the result, but according to Edwards (2001) fewer participants do not necessarily reduce their validity and a richer contextualised result can come from involving fewer participants in a more intensive process in the timescale of research. The road map of the modified Delphi technique is presented in Figure 3-1 below. The data for this modified Delphi study was collected over a 3-month period starting from 05-October-2011 with each round,

consecutively, taking three weeks. For example in the first round all teachers completed their questionnaires in three weeks. After three weeks, the second round was started and that also took three weeks to be completed. As Ludwing (1994) states in her unpublished dissertation, 'a drawback to Delphi was that the questionnaire method may slow the process greatly as several days and weeks may pass between rounds' (p.54). Electronic technology was used in the three rounds of the modified Delphi phase to obtaining rapid feedback from teachers as suggested by Witkin and Altschuld (1995). They indicated that one of the important advantage of the electronic technology is 'the potential for rapid feedback' (Witkin and Altschuld, 1995, p.204).

Figure 3-2 Road map of 'Modified Delphi Technique' (adapted from Jones and Hunter, 1995)



Analysis of Modified Delphi Technique

After the data gathered during the three-rounds of the modified Delphi study was entered into Microsoft Excel worksheets, the NVivo version 9 software program was used as an analysis tool. Use of Microsoft Excel worksheets helped the viewing of the text of each teacher's response. As open-ended questions were used to seek participant teachers' opinions, the data was qualitative. To analyse the modified Delphi technique data, the techniques found in Glaser and Strauss (1967), in particular the constant comparative analysis (CCA) method was used. By contrast, a narrative analysis method was used to analyse the interview data, because categorisations were done first using literature review and then the emergent themes were examined, but in the modified Delphi analysis data emerged directly from the participant teachers as they produce a model of practice together. By this process the researcher examines the data to get information about certain views that can then be coded into categories. In other words, every time a paragraph/word of text was selected and coded, it was compared with all those paragraphs/words previously coded that way. Glaser and Strauss (1967) identified four stages of the constant comparative method:

1. Comparing incidents applicable to each category,
2. Integrating categories and their properties,
3. Delimiting the theory, and
4. Writing the theory.

(Glaser and Strauss, 1967, p.105)

In the first two stages, the researcher uses the open coding process. In this process, the researcher examines and identifies similar comments or incidents and groups them to form categories by

asking questions to each comment, comparing them and identifying similarities and differences between the comments (ibid). Thus, in this modified Delphi study, to form categories, each sentence and paragraph of each teacher's answers was examined to seek answer to the same questions: 'What is going on here?' or 'What categories are suggested by that sentence or paragraph?' or 'How does this fit?' In this way, categories were created. Then, each new comment was explored again for similarities and differences. These created combined categories based on their meaning (the categories are reduced in this way). From this, the concepts and theory began to develop. In the third and fourth stages, the researcher examined and read all data until the iterations converged, thereby refining the theory or concepts further (ibid).

Chapter 4 provides a comprehensive report on the data analysis of the three rounds of the study.

3.5. Design Issues

Research design deals with the decisions a researcher makes when planning his/her study, not only for the methodology, strategy and methods of data collection, data analysis plan and piloting, but also for sampling, generalisability, ethical issues, validity, reliability and the limitations of the study. This section discusses the design issues relevant to this study.

3.5.1 Sampling

In this study, a non-probability/purposive sampling technique was adopted to select countries, schools and teachers. This technique is suitable for case studies because there is no intention to generalize findings to the whole population. It is also appropriate as two countries and four

secondary schools have been specifically chosen for this study: two from England: a 'good school', well equipped with technologies and already uses ICT in teaching in a pedagogy-led way, and an 'improving school', equipped with ICT and is trying to integrate ICT in their teaching, and two from North Cyprus: one representative of a 'good' and one of an 'improving' school. These choices were made for several reasons, as discussed in the following sub section.

The study was deliberately designed to access 'experienced; teachers in both countries, i.e. those who integrate technologies into their teaching process to enhance learning. This applied to both countries, the teachers being asked about their experiences, competencies and confidence level of integration of ICT in their teaching, so that in-depth information could be acquired from those who are in the best position to provide it.

3.5.1.1. The Selection of Countries

A number of issues influenced the choice of North Cyprus and England. First, the rationale for choosing North Cyprus is because I have had some experience of working there as an assistant ICT teacher at secondary school level and am interested in studying how ICT, a new phenomenon in that country, is used. The rationale for choosing England is because I am now a resident in England and am aware of how England has influenced the systems and culture of the researcher's native country in areas such as education and life-style, and particularly in schools, as in England, research on the use of technology, started more than four decades ago.

My language and 'cross-cultural' skills (Jones, 2001, p.10) enabled me to negotiate access to the schools and to interact directly with the research participants. These experiences and skills were

important in several ways. Firstly, Lincoln and Guba's (1985) concept of the 'human-as-instrument' has important implications for the 'trustworthiness' or 'validity' of qualitative research (p.250). Since the researcher is always the key interpreter of meaning that is gathered from participants and also the main data collection tool (Anderson and Arsenault, 1998), it is important I am sensitive to any cultural confusion and misunderstandings, if the findings are to be considered trustworthy. The importance of language and cultural familiarity was also stressed by Crossley and Watson (2003), because in this way credibility of the findings can be enhanced, but there is no guarantee that the researcher's interpretations fully match the participant's meaning. After having made these important decisions about the research, the next stage was the selection of schools.

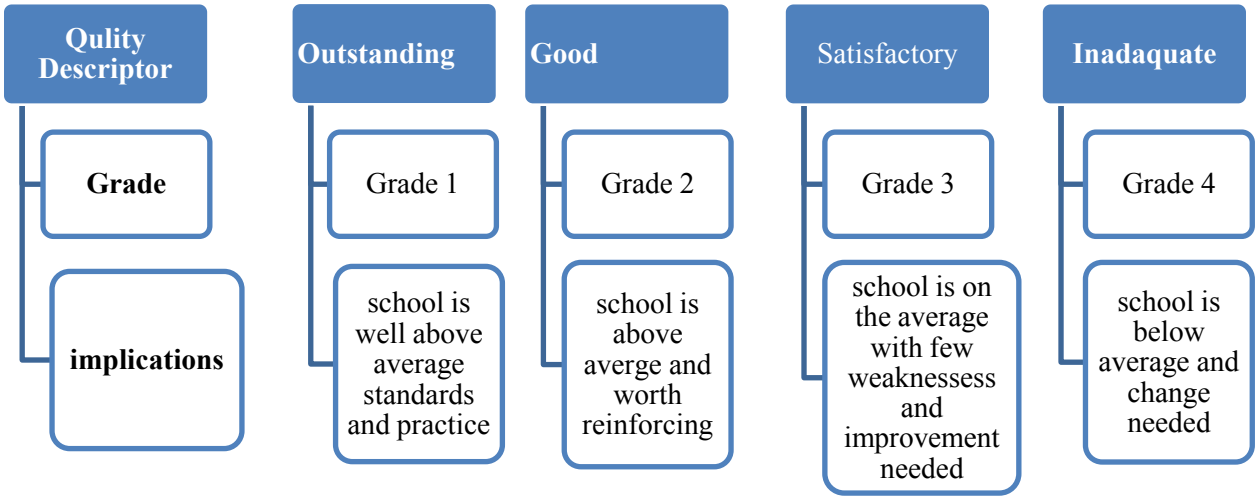
3.5.1.2. The Selection of Schools

Four secondary schools were selected for this study: one 'good' and one 'improving' school from each country. '*Good schools',* are those well equipped with ICT and used it as a teaching tool, and '*improving schools,*' are those beginning to become equipped with ICT and trying to integrate ICT into their teaching. The reason for choosing both 'good and improving schools' types is that information about the differences between these two types of schools can emerge, as most schools in North Cyprus were identified as '*improving schools'*. Therefore, different levels of technology application in schools can be identified to establish which pedagogical approaches are being applied

The main selection criteria for the English schools (in the West Midlands) were reports produced by Ofsted (The Office for Standards in Education, Children's Services and Skills). Ofsted is a

government department that monitors and examines the performance of schools and other institutions providing education to people of all ages. Ofsted also produces reports to parliament on the quality of education in England and gives advice on educational policy to the United Kingdom government. Their reports classify schools as 'outstanding', 'good', 'satisfactory' or 'inadequate' (see Figure 3.3). This information provided a list of potentially 'good and improving' schools. The final selection of the 'good school' was based on recommendations by an expert who has regular involvement with these schools and who knows them well from the perspective of an IT/ICT consultant/specialist as he delivers training on the use of ICT within the classroom to impact on learning and teaching in education management industry and worked as a head of learning support centre in one of school in England. The meeting with the expert was organised through established contacts, and structured discussions took place. The selection between the suggested schools was finalised after the websites of the two schools suggested by the expert had been reviewed.

Figure 3-3 Ofsted's quality descriptor, grades and implications (Based on Ofsted, 2005)



ICT use in schools is judged by Ofsted on seven strands: vision and leadership; curriculum; teaching and learning; assessment; continuing professional development (CPD); resources; and standards. These strands were used to evaluate use and integration of ICT by the schools.

School A was selected as a ‘good’ school, and school B as an ‘improving’ school based on Ofsted reports as presented in Table 3-9.

Table 3-10 Ofsted reports for School A (2008) and School B (2009)

Strands	School A	School B
1.Vision and leadership	Leadership and management at all levels are outstanding. The head teacher provides a very high calibre of leadership that has resulted in a sustained history of continuous improvement in all areas of the school's work.	Leadership and management are satisfactory, and the school has demonstrated a good capacity to improve in recent years. Leadership and management are satisfactory and the school has made good progress in raising standards from three years ago; this is despite a period of considerable staff change, including the recent departure of the head teacher to another school after three years of service.
2.Curriculum	There has been heavy investment in ICT technology, which is used very well in other subjects. All pupils can log onto the school network from home via terminal services. Staff and pupils make very good use of this facility to access their work, e-mail and school-based software.	The curriculum has improved substantially since the previous inspection. The school is rightly proud of its ability to match the needs and interests of individual learners through courses. (Teachers and pupils have started to use new technologies as they log onto the school network from their home).
3.Teaching and learning	The quality of teaching is consistently good and often outstanding. The school's involvement in innovative ICT projects such as e-mentoring and e-learning days provide pupils with excellent opportunities to develop workplace skills.	Teaching and learning are satisfactory. In the best practice, students were engrossed in interesting activities that matched their abilities well. They develop a good understanding of the diverse cultures represented in modern Britain and the worldwide community through activities such as developing the 'RE Village'. One benefit of the Humanities College status has been the development of international links with schools in Tanzania and Texas. There are also links with a further eight schools and communities worldwide. Also, the Aspire technology and engineering centre near Tenbury Wells.

Strands	School A	School B
4.Assessment	Procedures for assessment are clear and used by the head department to set targets. Also, there is an active school council and pupils are encouraged to develop and express their own thoughts and opinions through lessons such citizenship. Self-assessment ensures that pupils understand how to improve their work and pupils are often invited to comment on the quality of their lessons at the end of units.	Arrangements for assessing pupils' attainment and progress and the use of the assessment to help teachers plan their lessons are satisfactory with some good features. An appropriate whole-school assessment policy is in place. Targets are not always clearly defined and there is little reference to targets in annual school reports.
5.Continuing professional development (CPD)	There is recognition that all teaching and non-teaching staff are supported well through a clear policy for continuous professional development. Also, the school has a comprehensive programme for teachers' professional development and training. This CPD has been discussed with school' head teacher and she mentioned that they have 6 or 7 CPD in a year on technology use and integration into subject teaching.	Through a good training programme, nearly all teachers in the school are confident enough to use the new technology to advantage in their subject.
6.Resources	There has been heavy investment in ICT technology.	School introduced new technology to alert parents, and rewards for students. Also, the school has successfully tracked student progress and instigated programmes that helped to avoid underachievement
7.Standards	Standards in specialist subjects, such as design and technology (DT), and ICT, are above average or better (p.4). Standards in these subjects have risen markedly since 2000.	The school has made good progress in raising standards from three years ago.

According to the Ofsted reports, School A is an outstanding school and School B is a satisfactory (improving) school.

Unfortunately, similar reports are not produced for North Cyprus. Therefore, for the selection of the two schools: school C and school D in North Cyprus, I contacted the General Directorate of the Secondary Education Division of the Minister of Education, who recommended two schools, one of which is better equipped with ICT resources than the second, which is an 'improving school'. Then, to confirm that the 'good' and 'improving' schools have similar characteristics to the selected English schools, I held discussions with the head teachers of both schools to check whether as far as possible they have met Ofsted's criteria. My intention was to measure each school against these Ofsted's criteria. After having discussed the Oftsed evaluation/grading table, it was found that the 'improving' school was performing better than the 'good' one. Therefore, I decided to contact all secondary schools, 15 in total, in North Cyprus, to check whether they were matching the Ofsted grading system, with the aim of finding one school which had good ICT equipment and used ICT in their teaching, using the Ofsted evaluation/grading table for evaluation (see appendix 1 for Ofsted evaluation/grading table. Explanations can be found in appendix 2). It was found that most schools were in the 'improving' category and it was difficult to find a 'good' school having good ICT equipment and properly integrating ICT into subject teaching. From my own careful examination of the circumstances, the 'good' school recommended by the Department of Education was instead designated as an 'improving' school and the school that was recommended by the Department of Education as 'improving' was made the 'good' school for the aims of this study. The allocated status for study aims was based on my own observation, informal discussions with head teachers and checking whether the schools met the Ofsted grading table criteria. It should be noted that it would not be realistic to expect all Ofsted criteria could in practice be met by schools in North Cyprus.

Since comparative research was being employed, the characteristics of the secondary schools needed to be similar. These similar characteristics may be listed as presented in Table 3-10 below;

Table 3-11 Similar characteristics of the selected schools in the two countries

• All state secondary schools
• Schools sizes are approximately the same
• The schools are mixed gender
• Socio-economic background of students is middle class
• Computer lab and internet access are available

Having identified the characteristics/criteria for the selection of schools, access to teachers needed to be considered. For the two schools in England, I and my supervisor visited the selected schools to explain the aims and intentions of the study, the nature of their involvement and invited them to take part in this study. The purpose of making contact with the head-teacher and making preliminary visits to schools was to establish personal contact with key members of staff whose support for the project would be vital. For the two Turkish Cypriot schools, more formal access arrangements were necessary, and a letter was sent to the North Cyprus Ministry of Education setting out the research instruments including a questionnaire, to get permission to access selected schools. Individual letters were not sent to the Turkish Cypriot schools, because they were informed by the Ministry of Education. However, I personally decided to make contact with the selected schools' head-teachers, to speak to them about the project in advance, and to make personal contact with key members of staff. After receiving written confirmation of

approval from both schools in England, and from the North Cyprus Minister of Education, the next stage of the process could begin.

3.5.2. Generalisation

Research, which employs a case study approach, has often been criticised for its findings, as they are not generalisable (Gomm et al., 2009) especially when compared with survey research findings. It is important to note straight away, that generalisation is not the prime purpose of a case study (Yin 2003; Bryman, 2008). The purpose of a case study is to provide detailed idiographic knowledge from a holistic in-depth study of a single bounded system or programme by focusing on relationships and processes using multiple sources and methods (Denscombe 1998).

Generalisation from these cases should not be seen in 'statistical' terms (Yin, 2003; Bryman, 2008), but rather as the 'fit' (Lincoln and Guba, 2000) it could have with other situations. Findings on how and why ICT is being used in secondary schools in North Cyprus and England can throw light on the likely issues and factors involved in achieving the integration of ICT in other parts of the two countries. Also the lesson plans that were produced at the end of this study could be shared with other secondary school teachers in North Cyprus and England, as this gave them an idea of how ICT could be used effectively in a pedagogically-led way in current teaching.

This particular study focuses on the understanding of 'concepts' (Punch, 1998) and how these can inform other research, theory and programmes (Huberman and Miles, 2002). It is therefore in its capacity for illumination, allusion, vicariousness, fittingness or comparability (Schwandt, 2001; Schweisfurth, 1999) that should be the focus of this case study's assessment of any generalisations.

3.5.3. Ethical Issues

Since the study dealt with different cultures and involved several stakeholders, ethical values for conducting the research were carefully respected. Ethics itself is an extremely important aspect of research. It is akin to a vein which runs through the whole body of research. Its application begins at the very conception of the research idea, and its implications remain even after the research itself has been completed. This study was carried out with highest importance being placed on ethics. The School of Education at the University of Birmingham and British Educational Research Association (BERA) guidelines were used.

Written informed consent letters were sent and distributed to all teachers involved in the pilot questionnaire as were the actual questionnaire surveys. Also all interviewees were asked to give verbal consent to the pilot and the actual study. Furthermore, all modified Delphi participants were also asked to give consent verbally. Strict codes of confidentiality and anonymity, including the right to withdraw and the confidentiality of the storage of data, were adhered to. In addition, participants were asked for their permission for a tape recorder to be used in the interview and in the second round of the modified Delphi phase. The right to withdraw, and confidentiality, were

also mentioned at the beginning of the modified Delphi study and participants were asked for their permission for a tape recorder to be used in the second round.

The names of people were changed to pseudonyms at an early stage of the analysis. Each participant's transcripts and audio tapes with their names have been stored securely in a cabinet for a minimum of 2 years. After these 2 years transcripts will be erased and audio tapes destroyed.

One of the principles of ethical research is the importance of providing feedback when using human 'subjects'. It is ethical to keep them informed about how their data is being used. All those who agreed to participate were thanked by email. A final thank you letter was sent with a attachment that included the summary of the findings.

3.5.4. Validity and Reliability

To validate interpretations, interview transcriptions and summaries of analysis were sent to the participants to obtain their feedback, and their responses were used to cross-check the interpretations from the participants' standpoints. The findings of this study were presented in the form of direct quotations from the interviews, in order to present the participants' words as accurately as possible. Also, transcriptions and translations of data were checked with native English and Turkish speakers as this study is comparative and there are two different nationalities. Moreover, for theoretical validity, when the final explanation was written it avoided being selective or unrepresentative, so as to accurately reflect people' perceptions. This means

that both positive and negative perceptions of the participants were included. It is always difficult for a researcher to avoid interpretation through the eyes of the researcher's own cultural understanding when looking at two different cultural settings. However, by juxtaposing alternative perspectives of native speakers with my own, and by systematically seeking commonalities and differences between the ideas generated, including actively seeking alternative meanings across the different voices of participants, it may be expected that those issues and understandings which are of key concern to the participants would emerge, and that I would be able to select and present these to the reader.

Thus, in accordance with Cohen et al. (2007), a reflexive approach is the one of the practical ways to reach better validity and to minimise any bias in the study. Every attempt was made to do this by engaging actively in critical self-reflection about potential sources of bias, such as personal background (Maxwell, 1996). In this study, I engaged in critical reflection by questioning my own participation in the research process as well about my own personal values, perceptions and my knowledge of the participants and the themes and principles of the research.

In addition to the above, I triangulated the findings by interviewing two groups of staff i.e. teachers and ICT co-ordinators, which allowed a comparison to be made between those groups. Furthermore, I also sought to triangulate the findings of interviews by using the first round of the modified Delphi method.

In terms of reliability, Lincoln and Guba (1985) state that the researcher who carries out the qualitative study, should seek to show a level of trustworthiness that brings confidence in their

findings. Therefore, detailed explanations were provided about the aims of the research, the process of how the research was carried out and how study influenced by my history, the decisions in the selections, and the design of the research. As Lincoln and Guba (ibid) suggested, I have provided an 'audit trail' so other researchers could review my work.

3.5.5. Limitations of the Study

Generalisation constituted a limitation for this study. The fact that the study cannot be used to generalize the findings for the context of England's and North Cyprus' use of the ICT in the teaching process, poses a limitation. For example, if findings should reveal that English teachers employ ICT in a pedagogically-led way in the cities of the selected secondary schools, it could be argued that this might correspond to the situation in other parts of the country, but it certainly does not confirm that this is the case. For this reason, I am unable to describe effectively the wider picture of the magnitude of the impact of ICT on students learning in all areas in England and North Cyprus.

Another limitation of the study is the relatively low number of participants involved in the modified Delphi phase. The modified Delphi rounds relied upon the views and expertise of only twelve teachers who integrated technology in their classroom and have high competence levels of ICT use. This leads to the question, are 12 teachers sufficient for a robust study? However, it is sufficient as in recent years, Romano (2010) mentioned that as few as nine participants are enough for the Delphi study.

Notwithstanding this, the paper can add to the bank of knowledge on the pedagogies of ICT integration and suggests a model of practice in the selected areas, which could serve as a benchmark against which others may make comparison.

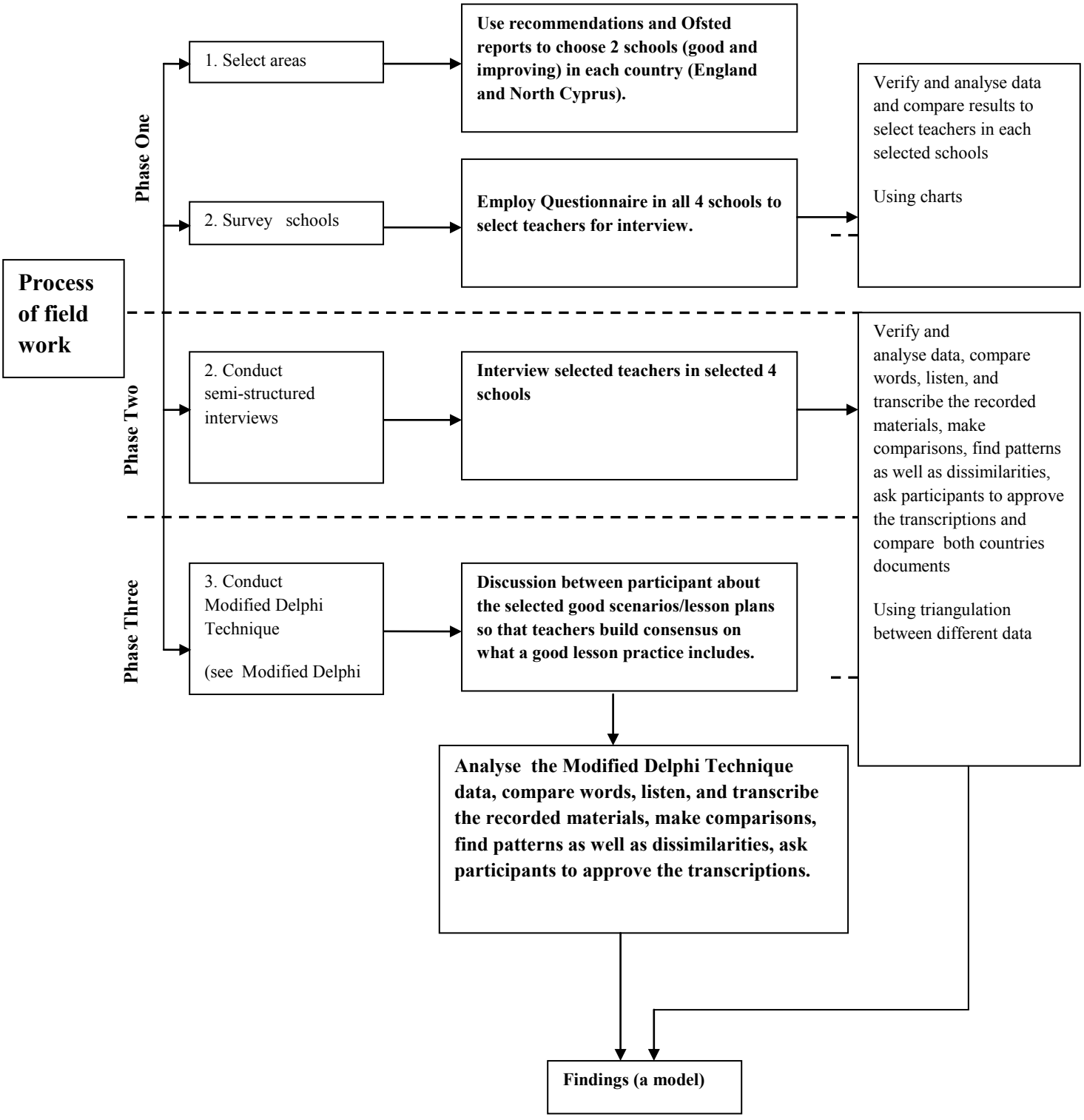
3.6. Chapter Summary

In this chapter, the researcher has sought to provide the research reflexivity and give an overview the research approach adopted and to identify and justify epistemological and methodological stance that were adopted and the research methods that were used to collect data, as well as how data was analysed. The chapter concluded with a range of issues including the employed sampling method, limitations of the study, generalisation, ethical issues and how validity and reliability was assured. The finding of this study in next chapter will provide evidence of how successful the researcher has been in applying what was discussed in this chapter.

Table 3-12 Overview of the research questions and phases

Research Question	Phase 1 of the study *Questionnaire*	Phase 2 of the study *Semi-structured interview*	Phase 3 of the study *Modified Delphi method*		
			Round One	**Round Two**	**Round Three**
1. What are the pedagogical practices adopted by teachers in the respective secondary schools?		1. How would you describe your teaching style (your naturally preferred approach)? Why do you prefer this approach? 2. Can you tell me about how you typically use ICT in your teaching and if and how ICT/technology might enhance your teaching? 3. Can you think of a class that you used ICT in last week and tell me how and why you used it?	Is there any kind of technology that you would like to use in your teaching that you have not yet used? What would you like to try and why? Are there any issues or problems in trying this? 2. Could you please give reasons why you chose these lesson plans? (Please give reasons for each lesson plan you choose). 4. Could you give me any reasons why you did not choose the other lesson plans (scenarios)?		What do you particularly like about these lesson plans?
2. Under what circumstances are Information and Communication Technologies (ICTs) currently being used in secondary schools?	- Availability and accessibility of Information and Communication Technologies (ICT) - Continual Professional Development (CPD) training (see appendix 4)	4. Is there any kind of technology that you would like to use in your teaching that you have not yet used? What would you like to try and why? Are there any issues or problems in trying this?	3. Could you please comment on any difficulty using these lesson plans in your classroom?		
3. What can Turkish Cypriot teachers learn from the experience of teachers in England and vice versa?				Could you please identify your requirements in order to use and adapt this preferred lesson plan in your teaching? How are you going to change this lesson plan to fit it with your current class teaching? (see appendix 11)	As we are trying to build consensus on best practice of use of ICT effectively in teaching, what would you like to change in this lesson plan ?and Why?

Figure 3-4 Road map of Research Methodology



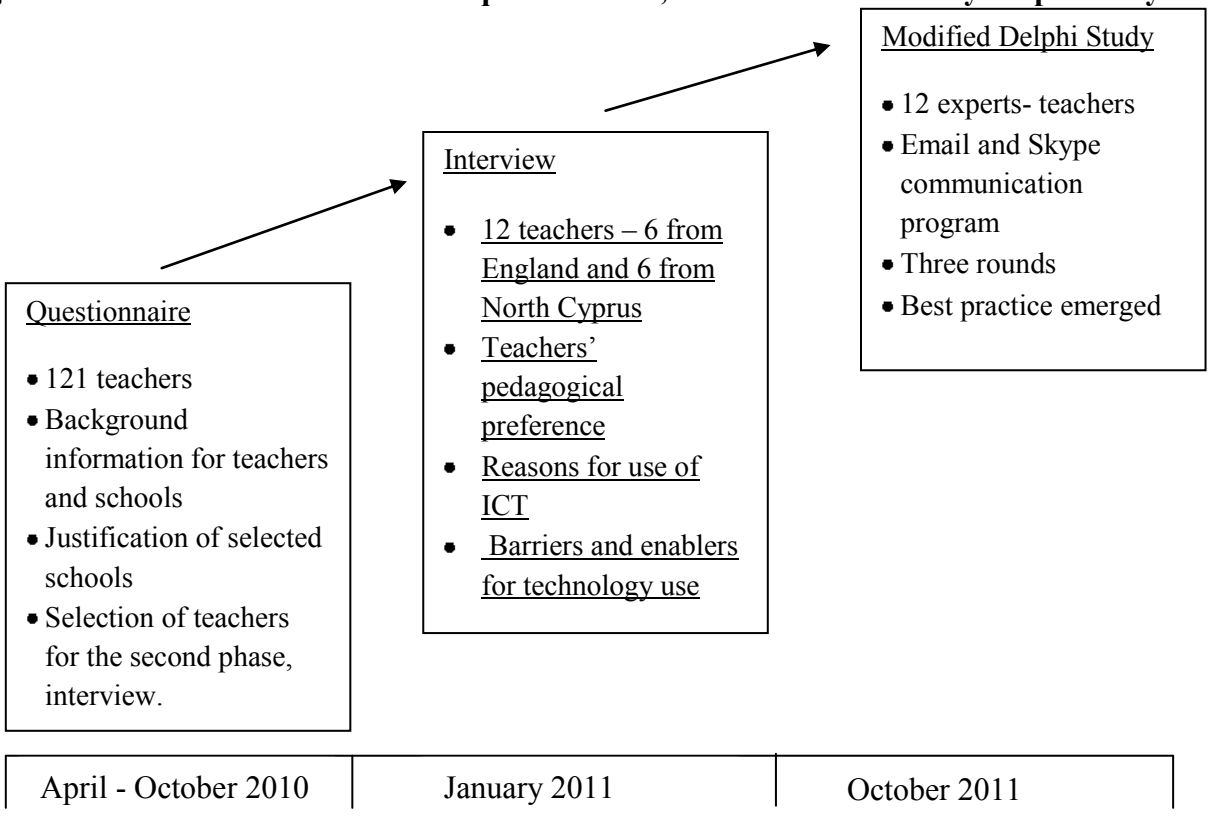
CHAPTER 4

ANALYSIS AND FINDINGS

4.1. Introduction

The previous chapter focused on the methodological framework, methods and instruments used in this study, and the methods for data analysis. This chapter presents the findings of the three phases of study: the questionnaire, interview and Modified Delphi Method data gathered from teachers and ICT co-ordinators in secondary schools in England and North Cyprus. The chapter is divided into three main sections: the first deals with the questionnaire data, the second with the interview data and the third with the Modified Delphi Method data. Figure 4.1 illustrates the timeline for the three phases in this investigative study.

Figure 4-1 The research timeline: the questionnaire, interviews and modify Delphi study



In this chapter, the term English teachers refers to teachers who are from the selected English secondary schools and Turkish Cypriot teachers refers to teachers who are from the selected Turkish Cypriot secondary schools.

4.2. Questionnaire Analysis

This section discusses the findings of the self-completed questionnaires reflecting the perceptions of English and Turkish Cypriot secondary school teachers about the IT resources available to them, location/accessibility, state of repair and availability of technical support, their self-rated of competency in using ICT and the basic training that they had received. The purpose of using the questionnaire was threefold: to demonstrate the 'big picture' within each school in the two countries, to explain and justify the chosen selection of good and improving schools; and to guide further purposeful sampling, as the questionnaire provided a quick and systematic method to collect data from the larger population. This method was employed to select the most appropriate and representative participants within the selected schools as not all school staff could be interviewed by the researcher.

This section is divided into three parts dealing with these three purposes. The first part has two sections, the results of English schools questionnaires and the results of Turkish Cypriot schools questionnaires, presenting the 'big picture' ('background') within each of the schools in the two countries. The second part explains and justifies the chosen selection of good and improving secondary schools in each country. The third part describes how teachers were chosen for the interviews.

The Excel software package was used to calculate the percentages required for analysing the closed questions. Descriptive analysis was used to describe the participants' and case schools' characteristics, to explain and justify the selection of good and improving secondary schools, and to describe how teachers were selected for the interview process to answer specific research questions. The analysis was simple and straightforward. Only a single open question was put to each participant teacher but allowing them the opportunity to make any further comments. It is important to note that none of English teachers responded to the open question. Personally attributed this to the fact that some teachers said the closed questions in the questionnaire covered everything and no further information was needed or as Babbie (2001b) states, people tend to prefer ticking boxes rather than writing answers.

Table 4-1 Sample profile

Country Name	Number of Schools
England	2 schools (one 'g*ood school'* and one '*improving school*')
North Cyprus	2 schools (one 'g*ood school'* and one '*improving school*')
	Total: 4 schools

4.2.1. Background (Big Picture)

For the purposes of discussion, these results are presented in two sections. The first section examines the demographic information about the English and the Turkish Cypriot secondary school teachers. Descriptive statistics about the findings have been provided to the questions as presented in Table 4-2:

Table 4-2 Questions provided by descriptive statics

• In what ways did the secondary school teachers use ICT?
  o What types of ICTs were available?
  o Were there sufficient computers in their schools?
  o Were these computers well maintained?
  o Did the school employ dedicated IT staff?
  o Where did they generally use ICT?
  o How many minutes or hours per week did they use ICT?
  o How would they describe their level of ICT use in classroom practice: professional development, personal use and/or administration?
  o What types of ICT support training did they have in their school?

• What type of ICT related Continuing Professional Development (CPD) training have the selected secondary school teachers received? Upon completion of this training did they feel increased confidence in using ICT?
• How did the selected teachers evaluate their stage of adoption/integration of ICT level into their teaching practice?

The following section presents the findings gathered from each English secondary school; the subsequent section presenting those from each Turkish Cypriot secondary school.

4.2.1.1. The Results of the English Schools' Questionnaires Demographic Information

The participants in this research were 24 male (48%) and 26 female (52%) secondary school teachers who taught different subjects and were from two different schools – one 'good' and one 'improving'.

The majority of the teachers (36% and 30%) in the two secondary schools were in the age groups 20 to 29 and 30 to 39, with only 22 % aged between 40 and 49 and 12 % aged 50 and over. The

teachers taught different year groups in their schools (note: these different year group labels are different in North Cyprus, the year group label for students having the same chronological age being provided in brackets for clarity). 74 percent (37) taught year group 7 (6 in Northern Cyprus), 84 percent (42) taught year group 8 (7 in Northern Cyprus) and 94 percent (47) taught year group 9 (8 in Northern Cyprus). Teachers who participated in this research were from five different ranges of teaching experience. Some 36 % had taught their subject for one to five years. Around 32 % had taught for five to ten years. Some teachers (16%) had taught from ten to fifteen years and only 12 % had been teaching for fifteen years or more. Also, the participating teachers were from five different ranges of experience of using computers in their teaching. Some 46 % had been using computers for one to five years, 36 % for five to ten years and 12 % for ten to fifteen years, with only 2 % of teachers in this study using computers in teaching for fifteen years or more.

The extensive information is set out in the following two tables that provide the demographic information of the English secondary school teachers who participated in the survey.

Table 4-3 Distribution of English teachers according to gender, age and year groups they teach

Type of school	Gender		Age				Year groups		
	Male n (%)	Female n (%)	20-29 n (%)	30-39 n (%)	40-49 n (%)	50 + n (%)	7 n (%)	8 n (%)	9 n (%)
'good'	17 (48.57)	18 (51.4)	11 (31.43)	13 (37.14)	8 (22.86)	3 (8.57)	24 (68.57)	28 (80)	33 (94.29)
'improving'	7 (46.67)	8 (53.33)	7 (46.67)	2 (13.33)	3 (20)	3 (20)	13 (86.67)	14 (93.33)	14 (93.33)
Total	24 (4)	26 (52)	18 (36)	15 (3)	11 (22)	6 (12)	37 (74)	42 (84)	47 (94)

Table 4-4 Distribution of English teachers according to the number of years of teaching experience and the number of years using computers in teaching.

Type of school	Years of Experiences				Years of using computers technologies			
	1-5 n (%)	5-10 n (%)	10-15 n (%)	15+ n (%)	1-5 n (%)	5-10 n (%)	10-15 n (%)	15+ n (%)
'good'	12 (34.29)	13 (37.14)	6 (17.14)	4 (11.43)	17 (48.57)	14 (40)	4 (11.43)	0
'improving'	6 (40)	3 (20)	2 (13.33)	2 (13.33)	6 (40)	4 (26.67)	2 (13.33)	1 (6.67)
Total	18 (36)	16 (32)	8 (16)	6 (12)	23 (46)	18 (36)	6 (12)	1 (2)

As can be seen from the above tables there seems to be a relatively small number of teachers with 5-10 years experience in 'improving' schools compared to the 'good' one. This may indicate a higher turnover of mobile and able staff transferring to work at good schools.

Availability and Accessibility of Information and Communication Technologies (ICTs)

This section addresses the question: in what ways do English secondary school teachers use ICT? It examines the following topics: availability of ICT resources in the schools, teachers' beliefs about whether there are sufficient computers in the school and whether they are well maintained, the availability of dedicated IT staff in the school, the location of ICT equipment, the number of minutes teachers use ICT in their teaching, their level of ICT use in the classroom practice, their professional development, their personal use and administration resources, and the types of ICT support and training in their school. The tables and figures provided in this section demonstrate the results for each selected school in England.

Participants were asked what ICT tools are available in terms of hardware, software and a

network for them to use in their school (question 2.1, see Appendix 4). Table 4-5 below shows the percentage of common ICT tools available for the English teachers in 2010.

This study found considerable variation in the availability of ICT tools in England. The English teachers' listed the available hardware, software and network tools as follows:

- Hardware: 'computers', 'laptops', 'overhead projectors', 'printers', 'scanner', 'electronic whiteboards', 'PSPs', 'cameras', 'video cameras', 'notebooks', 'voting system', 'MP3 Players';
- Software: 'Microsoft Word – Excel – Access - Power Point' (Microsoft office programs), 'Publisher', 'video and sound editing software', 'educational games', 'simulations', 'design software', 'subject specific software' and;
- Network: 'internet', 'real smart', 'VLE', 'e-portal, 'p drive-intranet'.

The above are the ICT tools that emerged as the most commonly available tools in English secondary schools. The result of the survey and the percentage score for the availability of tools reported are shown in Table 4-5 below. As can be seen, the most commonly available tools were; 'internet', 'laptops', 'computers', 'VLE', 'Microsoft office programs', 'intranet', and 'cameras'. These can be regarded as near universally available tools. Over three-quarters responded that the following were available; 'overhead projectors', 'interactive whiteboards' and 'printers', and less commonly available with between a third and a half of respondents reporting their availability were; 'scanners' 'educational games' and 'PSPs'. Some third to a quarter of respondents reported the availability of; 'subject specific software', 'simulation' and 'video cameras'. Less than a tenth

of respondents reported ‘video and sound editing software’, ‘publisher’, ‘voting system’, ‘e-portal’, ‘designing software’, ‘real smart’, ‘p-drive’, ‘notebooks’, ‘MP3 players’ and ‘mobile phones’ were available in schools. For clarity, Table 4-5 below shows the differences between the availability of reported tools in each individual school, presented in descending order of availability based on the total percentage scores with the actual number of responses in brackets.

Table 4-5 Distribution of ICT tools in English schools

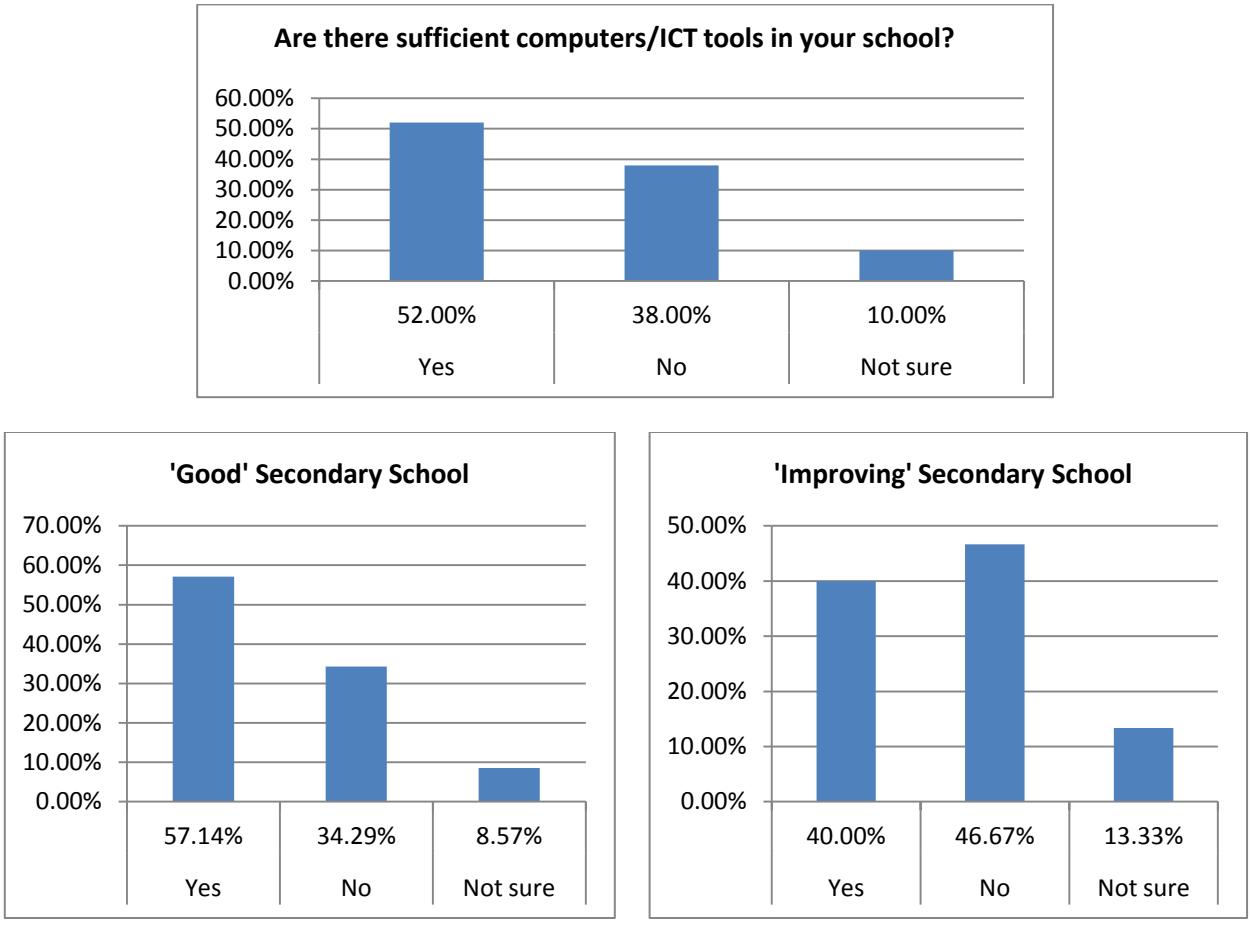
ICT Tools	Availability % (n)		Total (%)
	'Good' secondary school	'Improving' secondary school	
Internet	100 % (35)	100% (15)	100%
Laptop	97.14 % (34)	93.33% (14)	96.00%
Computers	91.43 % (32)	100% (15)	94.00%
Microsoft office programs	94,29 % (33)	87.67% (13)	92.00%
VLE	91.43 % (32)	93.33% (14)	92.00%
Intranet	91.43 % (32)	93.33% (14)	92.00%
Camera	91.43 % (32)	86.67% (13)	90.00%
Overhead projector	94.29 % (33)	73.33% (11)	88.00%
Electronic whiteboard	75.43 % (25)	93.33% (14)	78.00%
Printers	77.14 % (27)	73.33% (11)	76.00%
Scanner	51.43 % (18)	66.67% (10)	56.00%
Educational games	45.71 % (16)	46.67% (7)	46.00%
PSPs	48.57 % (17)	0% (0)	34.00%
Subject specific software	31.43% (11)	13.33% (2)	26.00%
Simulations	31.43 % (11)	13.33% (2)	26.00%
Video Camera	34.29 % (12)	0% (0)	24.00%
Publisher	25.71 % (9)	0% (0)	18.00%
Video and sound editing software (e.g. San serif)	20 % (7)	13.33% (2)	18.00%
Voting system	22.86 % (8)	0% (0)	16.00%
Designing software	17.14 % (6)	6.67% (1)	14.00%
E-portal	20 % (7)	0% (0)	14.00%
Notebook	17.14 % (6)	0% (0)	12.00%
MP3 Player	17.14 % (6)	0% (0)	12.00%
Real smart	17.14 % (6)	0% (0)	12.00%
P drive	17.14 % (6)	0% (0)	12.00%
Mobile Phone	5.71 % (2)	0% (0)	4.00%

The results shown in Table 4-5 indicated that the Department for Education had devoted much effort to provide schools with a diverse range of software and hardware to support subject

teaching. However, it can also be seen that the school designated 'improving' had a narrower range of resources available with several tools reported at 0. Moreover some essential hardware, nearly universally reported as available in the 'good' school, is not universally reported as available in the improving school, including equipment such as office programmes, cameras and overhead projectors. Access to printers also appears more restricted in the improving school though conversely the availability of an electronic whiteboard is universal in the 'improving' school. It may be expected that subject teachers with access to these tools are better positioned to modify their teaching methods, affording them opportunities to present their lessons more effectively.

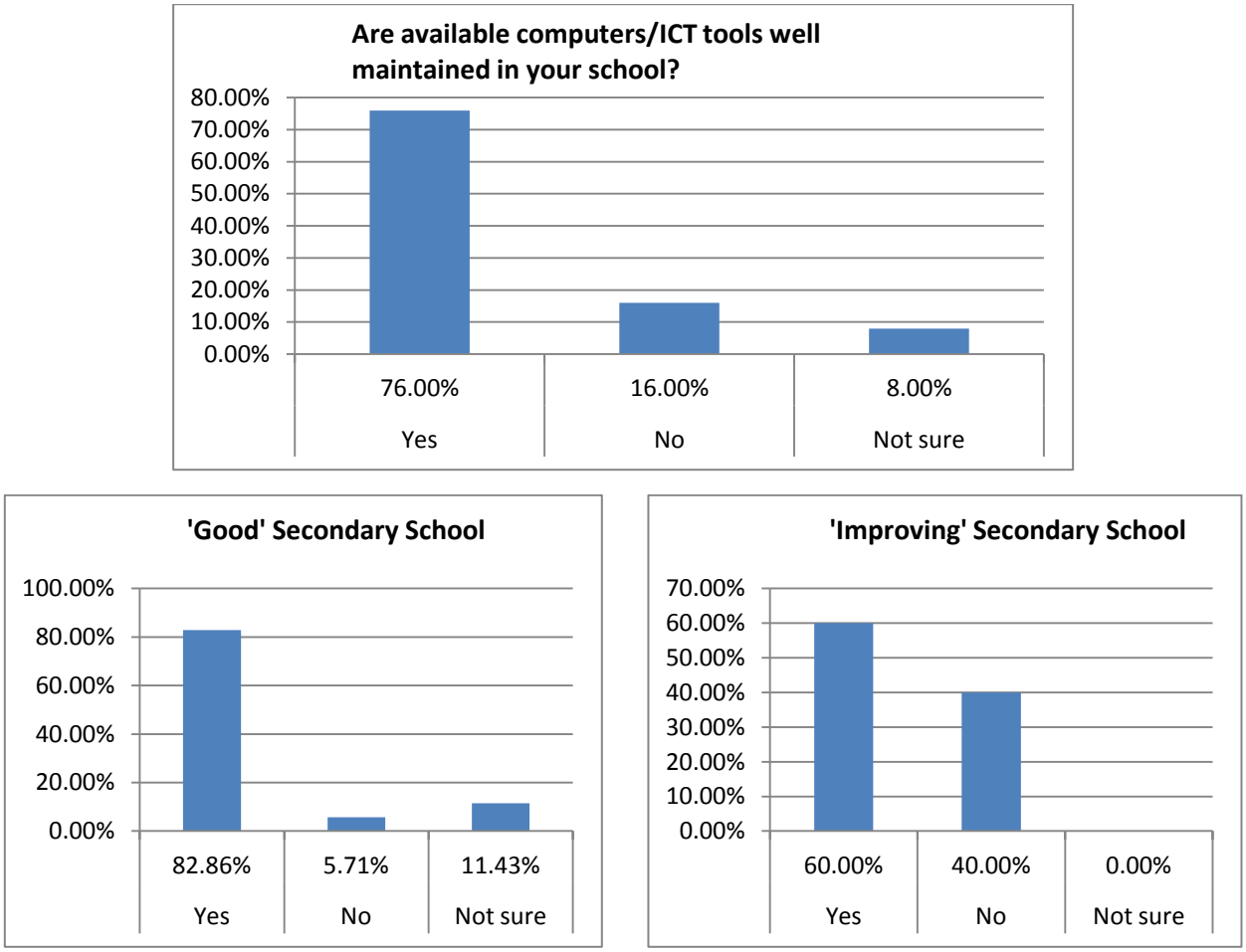
Teachers were also asked to indicate their beliefs about the sufficiency of computers/ICT tools for use in their schools. More than half the teachers (52%) believed that there were sufficient computers/ICT tools in their schools whilst 38 % believed the availability was inadequate. Only 10 % of teachers were undecided whether there were sufficient computers/ICT tools in their schools. It should be taken into consideration that these teachers may not use ICT tools very often although there is no information as to why this is the case. Consequently, overall the selected secondary schools in England are split about the sufficiency of ICT resources though, the majority tend towards the positive. Again, looking at the differences between the schools, the 'improving' school is less convinced they have sufficient resource with the majority of respondents tending to the negative. The bar chart provided below gives a clear idea of the differences between the teachers' responses.

Figure 4-2 English teachers beliefs about whether there are sufficient computers in their schools (Values shown as %)



Most teachers (76%) thought that computers/ICT tools were well maintained whilst only 16 % thought otherwise. Some 8 % of teachers were unsure whether they were well maintained or not. Almost half the teachers in the 'improving' school thought computers were poorly maintained. Looking at the differences between the schools, it emerges that the 'improving' school is less convinced they have well maintained resources. The bar chart below illustrates the differences.

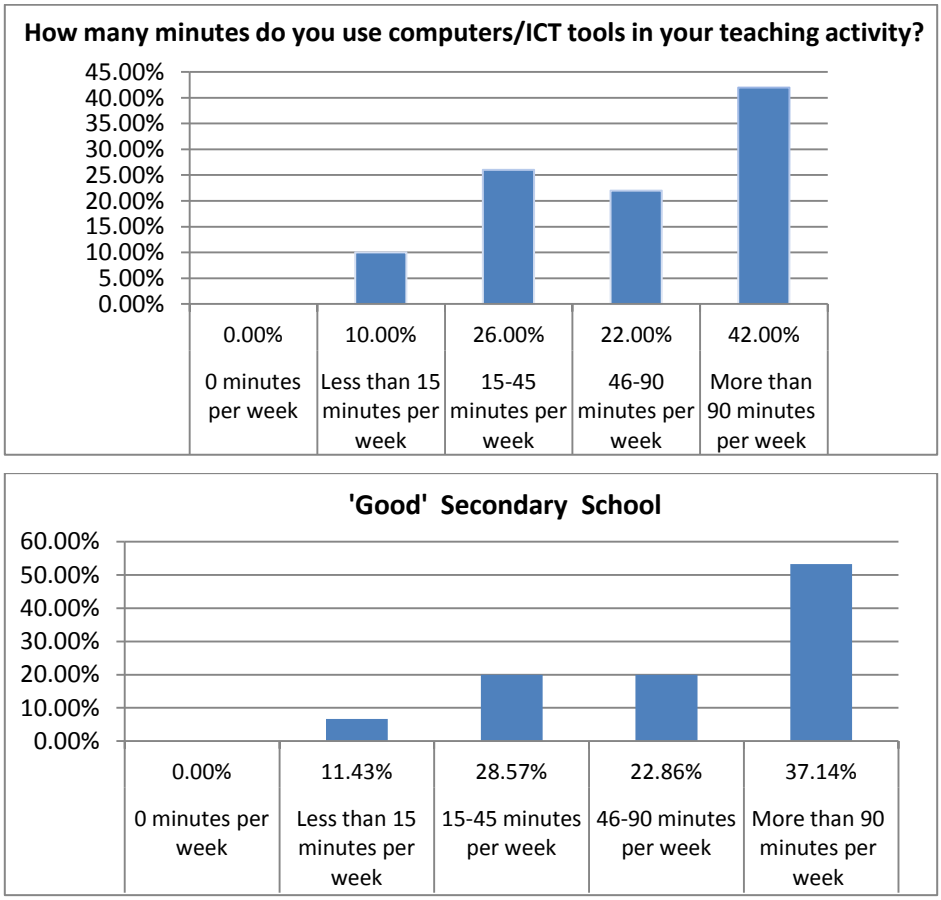
Figure 4-3 English teachers opinions about whether available computers/ICT tools are well maintained in their schools (Values shown as %)

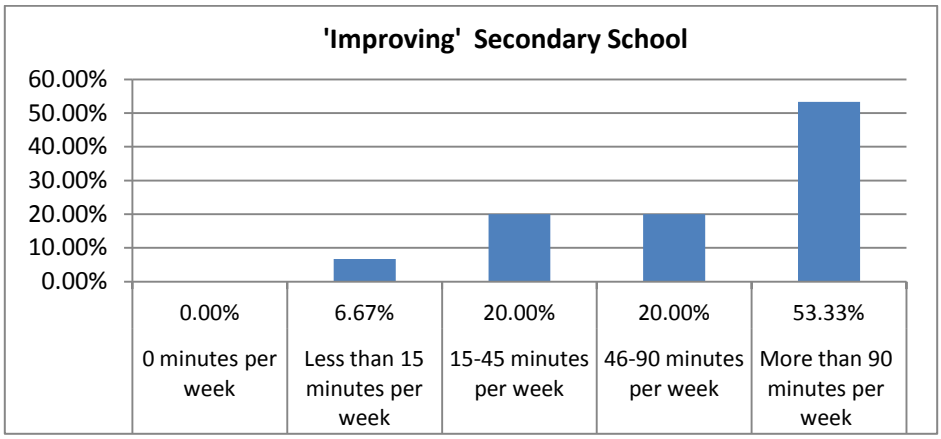


Teachers were asked to indicate how many minutes they used ICT tools in their teaching activities in each week. Their responses were scored in the following ranges: 0 minutes per week, less than 15 minutes per week, 15-45 minutes per week, 46-90 minutes per week and more than 90 minutes per week. Just under half of the teachers used ICT tools more than 90 minutes per week. About a quarter used ICT tools between 15 and 45 minutes per week and just under a quarter used ICT tools between 46 and 90 minutes per week. Only 10 percent of teachers used ICT tools for less than 45 minutes per week. Also, there were no teachers who responded with 0

minutes per week, meaning that all teachers use the technology for at least 15 minutes per week. This shows that most English teachers in the selected secondary schools use ICT tools in their teaching. There were only minor differences in patterns of use between the 'improving' and 'good' schools, with more teachers in the improving school reporting over 90 minutes of use. This may suggest that resource availability, rather than willingness or time to use those resources, could be a greater limiting factor for the 'improving' school. For clarity, Figure 4-4 shows the teachers responses using bar charts.

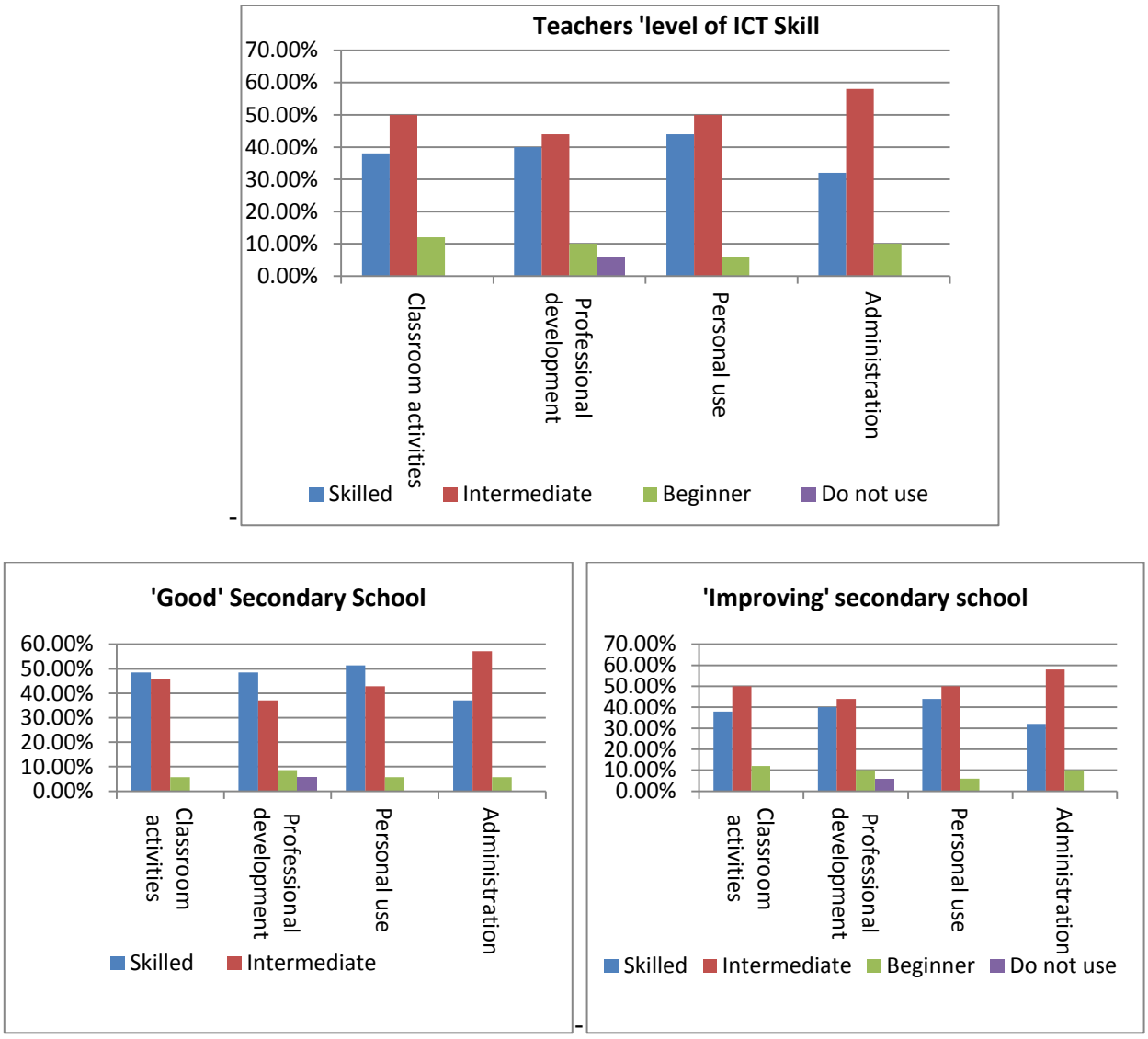
Figure 4-4 How many minutes English teachers use ICT tools in their teaching activities (Values shown as %)





The teachers were asked to specify their level of ICT skills for classroom practice, professional development, and personal and administrative purposes. For the classroom practice, half the teachers specified their level of ICT skill as 'intermediate', whereas only 12 % believed that their level of ICT use was at 'beginner' level. The remainder of the teachers specified their level of ICT level as 'skilled'. For professional development and personal purposes, just under half the teachers considered themselves at 'skilled' or 'intermediate' level in the use of ICT tools and only some 10 percent believed that their level of ICT use was at 'beginner' level. Over the half of teachers specified their level of ICT skills as 'intermediate' whereas only 32 and l0 % respectively of teachers considered themselves 'skilled' and 'beginners'. However, it can also be seen that over half the teachers in 'improving' school considered themselves 'intermediate' for all purposes whereas half the teachers in 'good' school considered themselves 'skilled' for three purposes: classroom activities, professional development and personal, and 'intermediate' for administrative purpose. This result may show that teachers in 'good' schools use technology more than teachers in 'improving' school. For clarity, Figure 4-5 shows the teachers responses using bar charts.

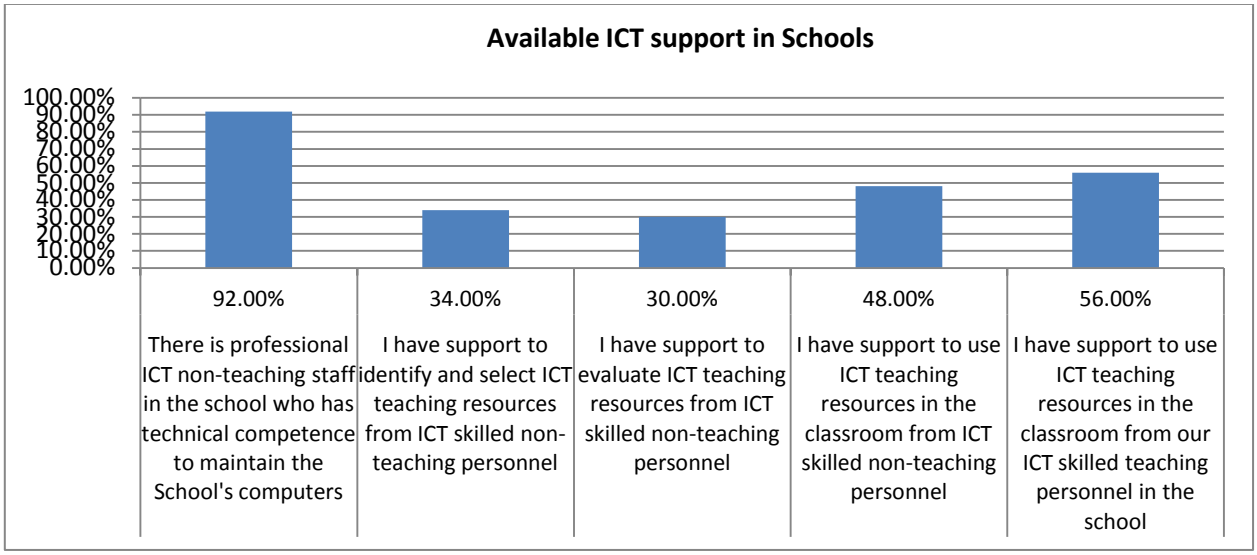
Figure 4-5 English teachers' levels of ICT skills

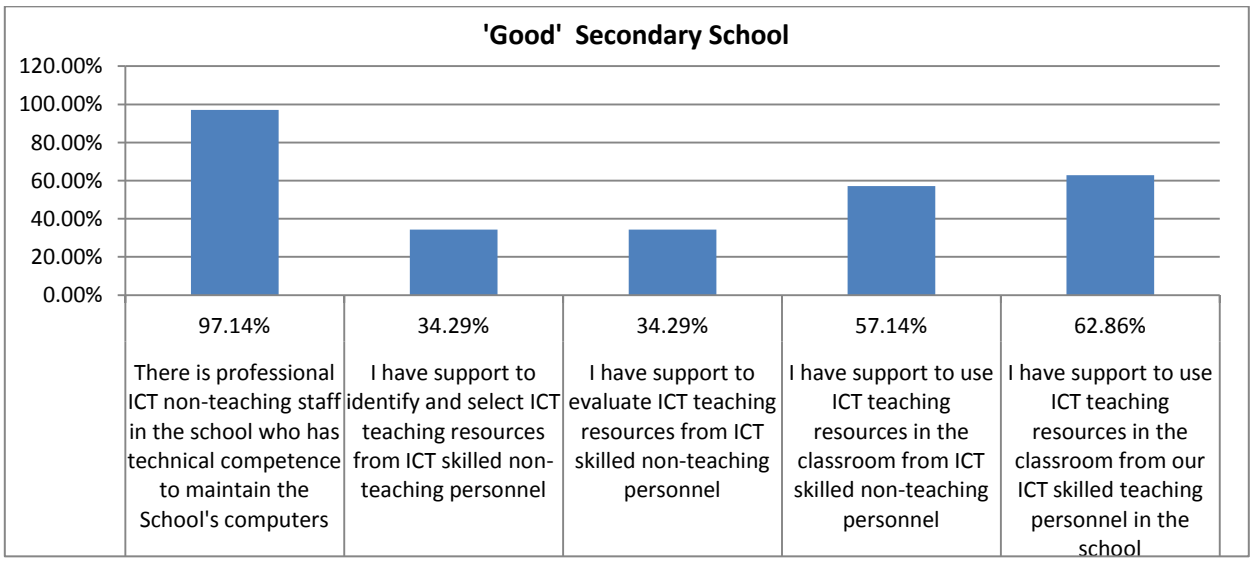


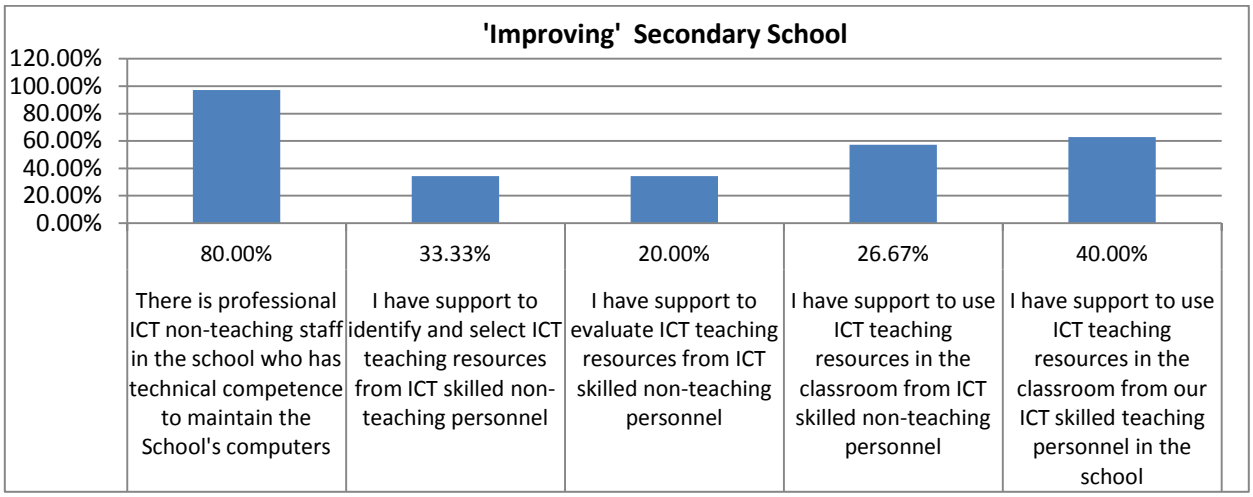
Furthermore, teachers were asked to indicate the types of ICT related support they have in their school. Almost all teachers agreed that 'there are professional ICT non-teaching staff in the school who have technical competence to maintain the school's computers'. Most also indicated they received support for using equipment/applications in the classroom from either a non-teaching ICT specialist or a teacher with specialist ICT skills. There was a much lower response

regarding support in choosing and evaluating software/hardware to support their teaching. The graphs (presented in Figure 4-6) show the findings on maintenance-support in more detail and broken down by school. It can be seen that compared with the good school, the improving school showed considerably less confidence about having the classroom support and support from a non-teaching specialist they needed.

Figure 4-6 Available ICT support in English schools (Values shown as %)







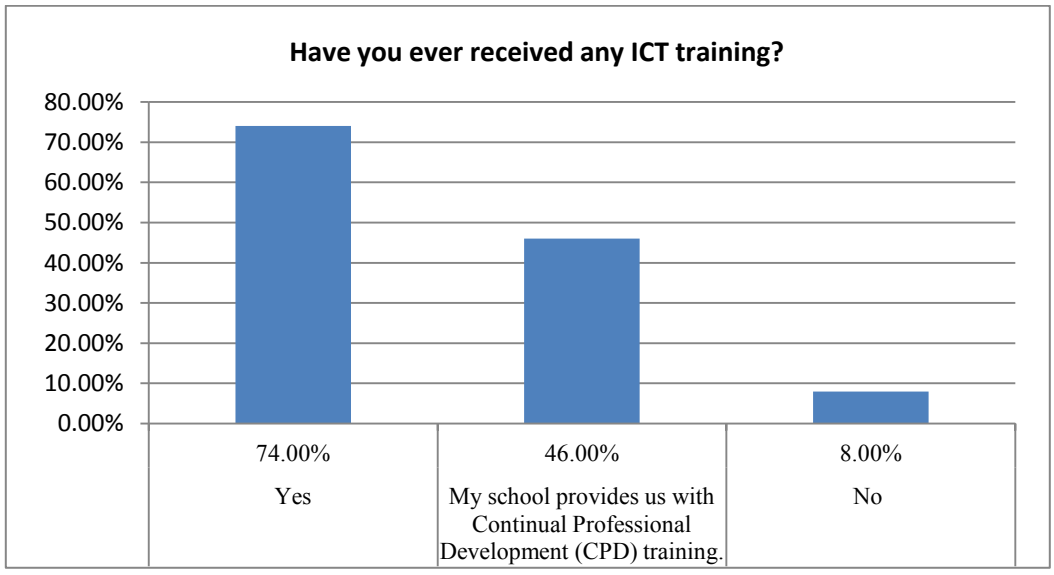
To conclude this section on the kinds of resources available to schools, it emerged that some tools including laptops, computers, access to the internet, projection equipment and/or electronic whiteboards are nearly universally available to support teaching in these English schools, as is some degree of specialist ICT support to maintain the computers. Access to more diverse kinds of ICT equipment and software programmes was much more variable. In general, a pattern emerged with a poorer level of resource being reported by the improving school than in the good school, and this extended to the provision of non-teaching IT specialist support to maintain computers and help teachers use resources in their classrooms.

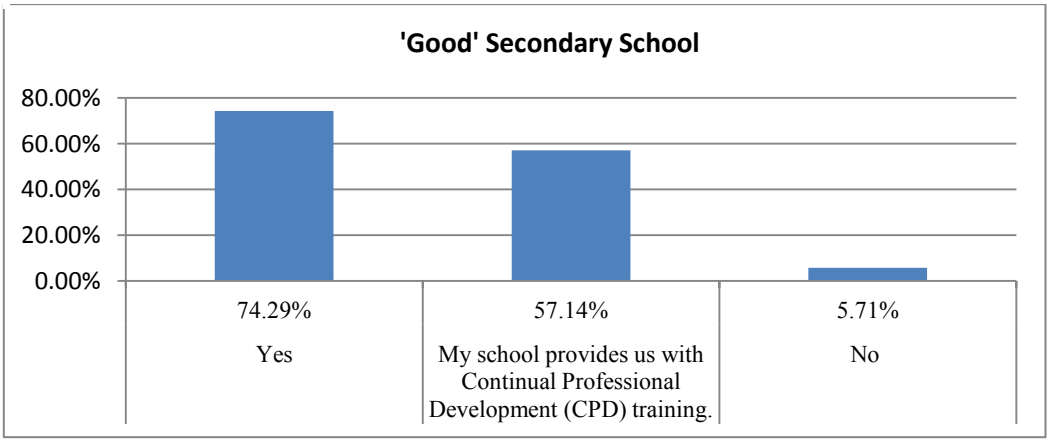
Continuing Professional Development (CPD) training

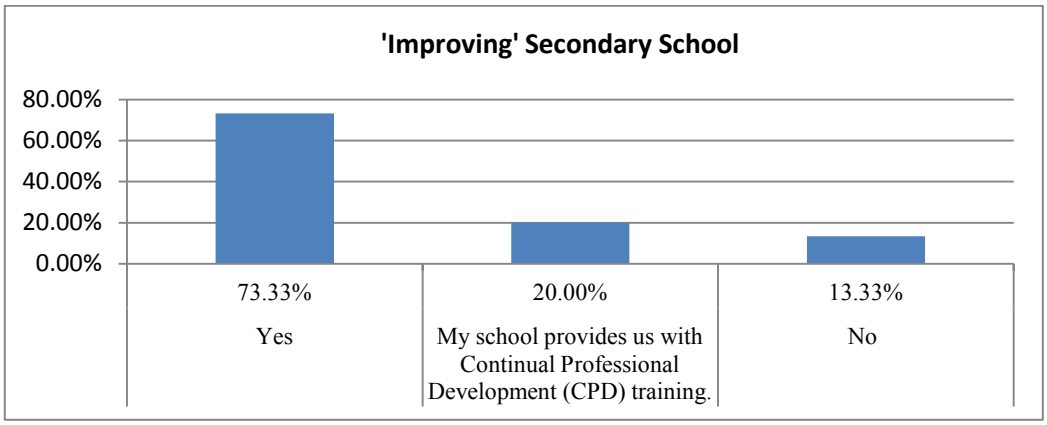
This section addresses questions regarding CPD training, its availability and types. Teachers were asked to state whether they have ever received any ICT training. The majority of teachers, around 74 %, responded that they had received ICT training and this training was provided by their schools, with 46 % of the teachers responding that their schools provided them with Continuing Professional Development (CPD). Only 8 % responded that they had received no ICT training at

all. Around 74 % of teachers in both 'good' and 'improving' schools reported that they had received training from their schools. However, it is notable that the staffs at the 'improving' school have less Continued Professional Development (CPD) training in this area than does the good school. Figure 4-7 illustrates the teachers' responses.

Figure 4-7 ICT training in English schools (Values shown as %)





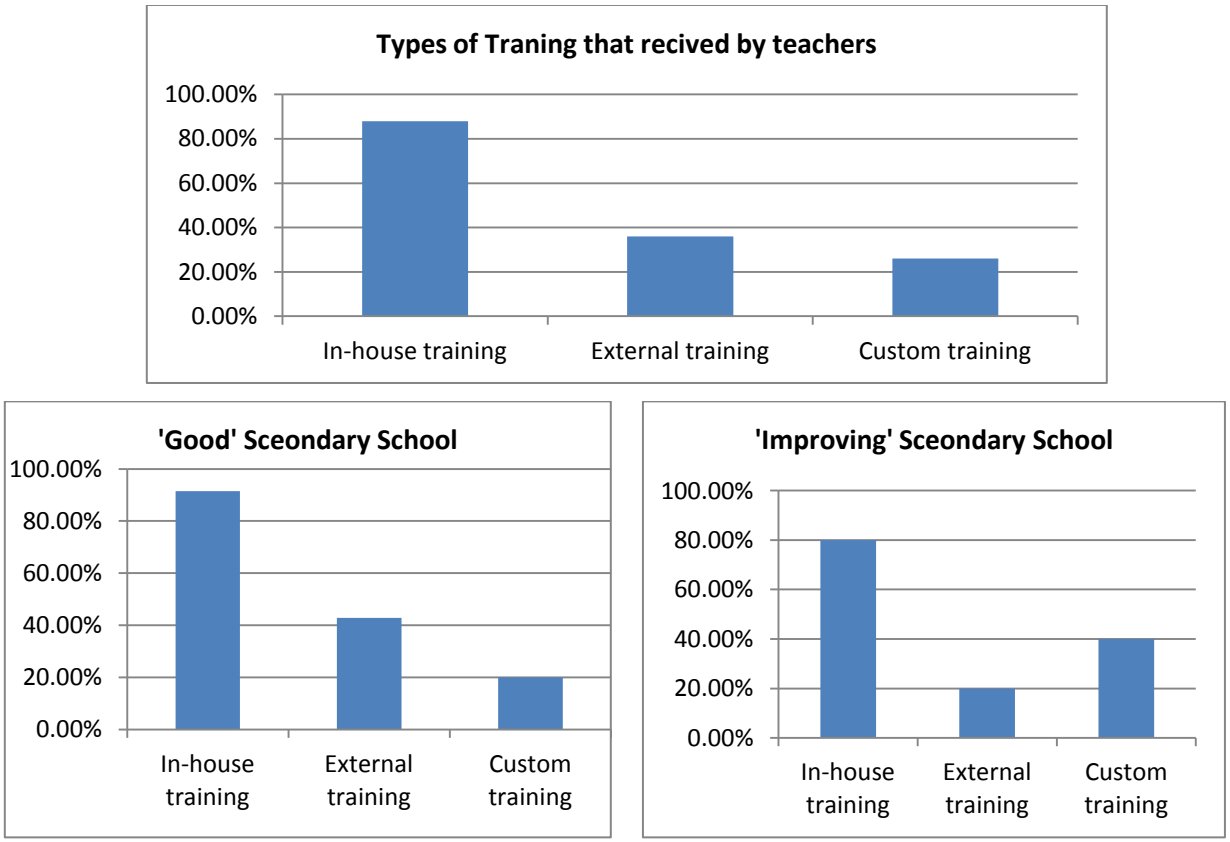


Next those teachers reporting that they had received ICT training were asked: What types of ICT related Continuing Professional Development (CPD) training have been received by teachers from selected secondary schools? The section examines the in-house training, external training and custom training received by teachers who were asked how they would evaluate their confidence level after they have received such training, on a scale 1(low) – 5(high).

First, teachers were asked to determine the types of Continuing Professional Development (CPD) training that they had received. 88% percent of teachers responded that they have had 'in-house training', which means training held in the school and delivered by school staff using school equipment, with around 36 % responding that they have had 'external training' meaning the teachers travelled to a training venue outside their school and training was delivered by another service provider using their own equipment. Around 26 % of teachers responded that they had received 'custom training' which means an outside expert consultant came to the school to deliver training for school staff using school equipment. A few teachers had received two or three different types of training. This shows that almost all teachers had received one or other type of the three categories of training. Almost all teachers in both 'good' and 'improving' schools had

had in-house training. However, it is clear that teachers at the 'good' school had more external training than custom training whereas teachers at the 'improving' school had more custom training than external training. The Figure 4-8 shows this information using a bar chart.

Figure 4-8 Continuing Professional Development in English schools (Values shown as %)



Subsequently, after asking about the types of CPD trainings teachers had received, they were asked to evaluate how their confidence level of using ICT tools had improved after having had the training.

In-house Training: The majority of teachers, who have had 'in-house training' and answered this question, evaluated their confidence level as 4 (18 teachers), 5 (9 teachers) and 3 (9 teachers) on the scale 1 (low) – 5 (high). Only 1 teacher felt less confident and evaluated his confidence level at 1. Table 4-6 below shows this information, and it may be noted that no teachers evaluated their confidence level at 2. Also noteworthy is that not many teachers at the 'improving' school provided their confidence level after this training – it seems likely that the teachers at the 'good' school found this kind of training helped them to increase their confidence level.

Table 4-6 English teachers' confidence level after in-house training

Training type	Confidence level	'Good' secondary school Number of teachers	'Improving' secondary school Number of teachers	Total
In-house Training	1(low)	0	1	1
	2	0	0	0
	3	9	0	9
	4	16	2	18
	5 (high)	7	2	9

External Training: The majority of teachers, who have had 'external training' and answered this question, evaluated their confidence level at 3 (9 teachers) and 4 (9 teachers) on the scale 1 (low) – 5 (high). 6 of them felt highly confident and evaluated their confidence level at 5. Only 1 teacher evaluated their confidence in levels 1 or 2. As can clearly be seen from Table 4-7, the majority of teachers at the 'improving' school evaluated their confidence level at 3 whereas teachers at the 'good' school evaluated their confidence at 4.

Table 4-7 English teachers' confidence level after external training

Training type	Confidence level	'Good' secondary school Number of teachers	'Improving' secondary school Number of teachers	Total
External Training	1(low)	0	1	1
	2	1	0	1
	3	2	7	9
	4	7	2	9
	5 (high)	4	2	6

Custom Training: The majority of teachers, who have had 'custom training' and answered this question, evaluated their confidence level at 3 (8 teachers) on the scale 1 (low) – 5 (high). Only 3 of them evaluated their confidence level at 4, and only 1 of them at level 2. There were no teachers who evaluated their confidence level at low (1) or high (5). Teachers at both 'good' and 'improving' schools who received custom training, evaluated their confidence level at 3. However, some teachers at the 'good' school evaluated their confidence level as 4 with some at the 'improving' school evaluated their confidence level at 2.

Table 4-8 English teachers' confidence level after custom training

Training type	Confidence level	'Good' secondary school Number of teachers	'Improving' secondary school Number of teachers	Total
Custom Training	1(low)	0	0	0
	2	0	1	1
	3	4	4	8
	4	3	0	3
	5 (high)	0	0	0

Overall, the above tables show that the teachers at the 'good' school seem to find such training helpful and increase their confidence level. Also teachers at the 'good' school seem more confident than the teachers at the 'improving' school which may be related to the available funding and training opportunities for the teachers at the 'good' school.

Teachers Stage of ICT Adoption/Integration Level

This section addresses the question: how English teachers evaluated their stage/level of adoption/integration of ICT in their teaching? It examines the teachers confidence level about ICT adoption/integration, using the teachers self-rated stage level responses, and most importantly, 3 teachers were selected whose stage (confidence) level in the adoption/integration of ICT in their subject teaching were high, medium and low, for the interview as discussed in the following section. Before presenting the results in percentages, explanations of stages need to be given. They are presented in Table 4-9.

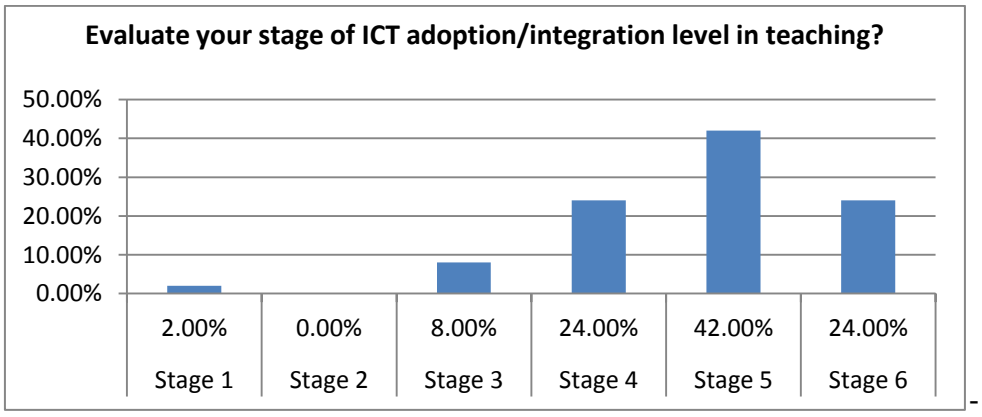
Table 4-9 Stages of ICT integration/adoption

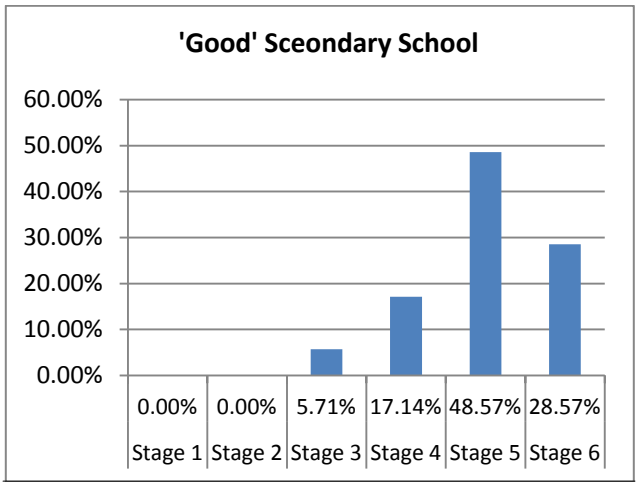
Stage	Explanation
Stage 1: Awareness	I am aware that technology exists but have not used it for teaching. I am not confident about using computers in the classroom
Stage 2: Learning the process	I have basic computing skills but have difficulty or lack confidence in using technology for teaching
Stage 3: Understanding and application of the process	I am beginning to understand the process of using technology for teaching and can think of specific tasks in which it might be useful.
Stage 4: Familiarity and confidence	I am gaining a sense of confidence in using computers for teaching and am starting to feel comfortable in using the computer in lessons for specific tasks.
Stage 5: Adaptation to other contexts	I think about the computer as a tool to help me in teaching when planning lessons and have used a range of applications as instructional aids.
Stage 6: Creative application to new contexts	I can apply what I know about technology in the classroom. Therefore, I am able to use it as an instructional tool and integrate it quite confidently into the curriculum including adapting examples to meet the needs of new learning situations.

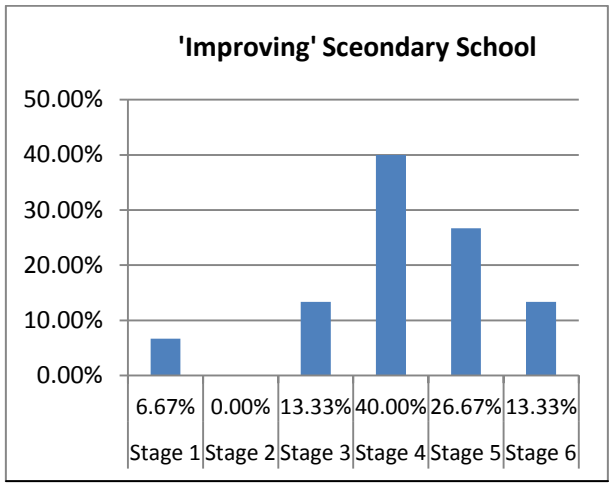
The highest proportion of teachers (42%) saw themselves at stage 5. 24 percent of teachers

responded that they were at stage 4 and 24 percent saw themselves at stage 6, with no teachers responding that their level of ICT use was at stage 2. Only 8 % of teachers responded that they were at stage 3 with 2 % responding that they were at stage 1. However, when teachers at both 'good' and 'improving' schools responses were examined separately, it was notable that while the highest proportion of teachers (48.57%) at the 'good' school evaluated themselves at stage 5, the highest proportion of teachers (40%) at the 'improving' school evaluated themselves at stage 4. This is confirmed the conclusions in the previous section that teachers at the 'good' school have more confidence than teachers at the 'improving' school. Figure 4-9 shows the teachers responses using bar charts.

Figure 4-9 English teachers' evaluation of their stage of ICT adoption/integration level in teaching







4.2.1.2. The Results of Turkish Cypriot Schools' Questionnaires

Demographic Information

The total number of participants in this research were 21 male (28.6%) and 50 female (71.4%) secondary school teachers who taught different subjects and from two different schools- one 'good' and one 'improving'.

Just under half (44.3% and 41.4%) respectively of these teachers were in the age range 20 to 29 and 30 to 39, whilst only 14.3 % were 40 to 49. Interestingly, there were no teachers aged 50 or over in the two Northern Cyprus secondary schools. The teachers taught at different year groups in their schools. 56.3 % (40) taught year group 6 (compared with 7 in England), 68.3 % (48) taught year group 7 (8 in England) and 80.2 % (57) taught year group 8 (9 in England). Teachers participating in this research were from five different ranges of lengths of teaching experience. Some 34.4 % had taught their subject for one to five years, 31.4 % for five to ten years, 20.3% from ten to fifteen years and only 10.4 % of research participants had been teaching for fifteen

years or more. Also, the participant teachers were from five different ranges of years of experience using computers in their teaching. Some 48.4 % had been using computers for one to five years, 29.5 % for five to ten years, 14 % for ten to fifteen years and only 2.81 % of teachers had been using computers in teaching for fifteen years or more.

For clarity, the following two tables provide the demographic information of the Turkish Cypriot secondary school teachers who participated in the survey.

Table 4-10 Distribution of Turkish Cypriot teachers according to gender, age and year groups they teach

Type of school	Gender		Age				Year groups		
	Male n (%)	Female n (%)	20-29 n (%)	30-39 n (%)	40-49 n (%)	50 + n (%)	6 (7) n (%)	7(8) n (%)	8 (9) n (%)
'good'	6 (17.1)	29 (82.9)	20 (57.1)	13 (37.1)	2 (5.7)	0	22 (62.9)	27 (75)	24 (68.5)
'improving'	14 (39)	22 (61)	11 (31.4)	16 (45.7)	8 (22.9)	0	18 (50)	21 (60)	33 (92.3)
Total	20 (28.6)	51 (72.4)	31 (44.3)	29 (41.4)	10 (14.3)	0	40 (56.3)	48 (68.3)	57 (80.2)

Table 4-11 Distribution of Turkish Cypriot teachers according to the number of years of experience and the number of years of using computers in teaching.

Type of school	Years of Experiences					Years of using computers technologies			
	0-1 n (%)	1-5 n (%)	5-10 n (%)	10-15 n (%)	15+ n (%)	1-5 n (%)	5-10 n (%)	10-15 n (%)	15+ n (%)
'good'	2 (5.71)	18 (51.4)	8 (23.4)	6 (17.1)	1 (2.86)	15 (43.4)	12 (34.2)	5 (14.2)	2 (5.7)
'improving'	0	6 (17.3)	14 (39.4)	8 (22.2)	6 (17.3)	19 (52.7)	9 (25)	5 (14.4)	0
Total	2 (2.81)	24 (34.4)	22 (31.4)	14 (20.3)	7 (10.4)	34 (48.4)	21 (29.5)	10 (14)	2 (2.81)

It can be clearly seen from the above tables that the 'good' school is predominantly 'female' and the 'improving' school is also considerably female. This may be a cultural issue, though it is beyond the scope of this thesis to examine this question. However, this ratio is quite different in English schools where the genders were roughly evenly split and with equal numbers of female and male teachers in selected schools.

Moreover, teachers in the 'improving' school are older and more experienced than those in the 'good' school and this may relate to mobility and urban vs. rural situations. In other words, the lower incidence of those with under 5 years of experience at the 'improving' school may indicate a high turnover of younger more mobile staff with sufficient experience to move to a good school, as teachers in North Cyprus need to gain experience before they can move to a 'good' city school. However, in England if the same phenomenon is taking place, it is happening about 5 years later – i.e. it is teachers with 5-10 years of experience that are in shorter supply at the 'improving' school and compared with the 'good' school. In England, however, good schools

may be more likely to be in rural settings and teachers with families of their own may find these schools and locations more attractive at a later stage in their career.

Availability and Accessibility of Information and Communication Technologies (ICTs)

This section provides the answer to question: in what ways do Turkish Cypriot secondary school teachers use ICT? This section is examined through following topics: ICT tools available at schools, the teachers beliefs about whether there are sufficient computers in the school and whether they are well maintained, the availability of dedicated IT staff in the school, the location of use of ICT, the duration of use of ICT, the teachers' level of ICT use in classroom practice, their professional development, personal use and administration, and the types of ICT support training in their school. The tables and figures provided in this section demonstrate the results for each selected schools and combine both schools data results to show the general situation in the Northern Cyprus case schools.

Participants were asked (question 2.1, see Appendix 4) what ICT hardware, software and network tools were available for them to use in their school. Table 4-12 (below) reports the percentage of common ICT tools that were available for participating Turkish Cypriot teachers in 2010.

This study found variation in the availability of ICT tools in Northern Cyprus. According to Turkish Cypriot teachers' responses, the available hardware, software and network tools can be listed as follows:

- Hardware: 'computers', 'overhead projectors', 'printers', 'scanners', ' whiteboards';

- Software: 'Microsoft Word – Excel – Access - Power Point' (Microsoft office programs) and;
- Network: 'internet'.

These reported ICT tools emerged as the most commonly available in Turkish Cypriot secondary schools. The results of the survey and the percentage score for the availability of tools reported are shown in Table 4-12 below. As can be seen, the most commonly available tools were; 'internet' and 'computers'. Over three-quarters responded that the following were available; 'Microsoft office programs' and 'printers'. Only about a half of respondents reported 'overhead projectors' and 'whiteboards' were available. Around a quarter of respondents reported the availability of a 'scanner'. Less than a ninth of respondents indicated that 'laptops' were available. Table 4-12 shows the differences between the reported availability of tools in each individual school, presented in descending order of availability based on the total percentage scores.

Table 4-12 Distribution of ICT tools in Turkish Cypriot schools

ICT Tools	Availability % (n)		Total (%)
	'Good' secondary school (n=35)	'Improving' secondary school (n=36)	
Internet	94.28% (33)	88.88% (32)	91.54%
Computers	91.40% (32)	89.40 % (32)	90.14%
Microsoft office programs	83.40% (29)	77.77% (28)	80.28%
Printers	77.10% (27)	75.00 % (27)	76.05%
Overhead projectors	63.40% (22)	52.77 % (19)	57.74%
Whiteboards	52.20% (19)	50.00 % (18)	52.11%
Scanners	40.00% (14)	30.50 % (11)	35.21%
Laptops	17.14% (6)	0	8.45%

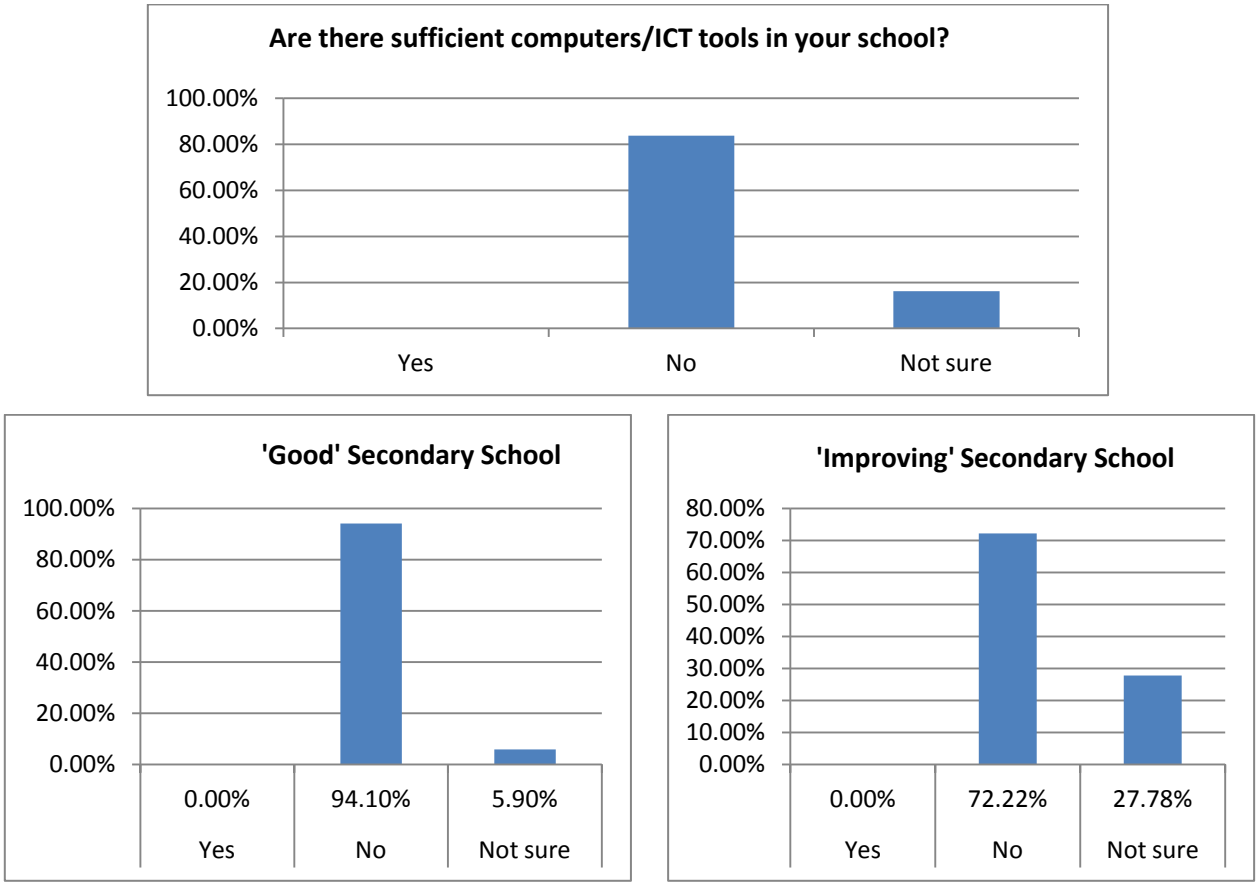
The results in Table 4-12 indicated that the Northern Cyprus Minister of Education had also devoted effort to provide schools with different types of ICT tools to support subject teaching. However, as previously for English schools, teachers reported less availability of resources in the improving school than in the good school. Whereas in English schools the provision of either overhead projection facilities or electronic whiteboards was near universal for both English 'good' and 'improving' schools, in Turkish Cypriot schools, the availability of printers was higher than projection facilities. However, there is relatively good level of access to Microsoft office programmes. A much narrower range of tools is available than in English schools. Availability of tools drops off sharply and quickly falls below half of respondents reporting their availability. The following table summarises the distribution of ICT resources in each countries.

Table 4-13 Distribution of ICT tools in English and Turkish Cypriot Schools

ICT Tools	Availability % (n)	
	England secondary schools (n=50)	Turkish Cypriot secondary schools (n=71)
Computers	94% (47)	90.14%(64)
Overhead projector	88% (44)	57.74%(41)
Printers	76% (38)	76.05%(54)
Scanners	56% (28)	35.21%(25)
Electronic whiteboards	78%(39)	52.11%(37)
Laptops	96%(48)	8.45%(6)
Cameras	90%(45)	
Video Cameras	24%(12)	
PSPs	34% (17)	
Notebooks	12%(6)	
Mobile Phones	4%(2)	
Voting system	16%(8)	
MP3 Players	12%(6)	
Microsoft office programs	92%(46)	80.28%(57)
Publisher	18%(9)	
Video and sound editing software	18%(9)	
Educational games	46%(23)	
Subject specific software	26%(13)	
Designing software	14%(7)	
Simulations	26%(13)	
Internet	100%(50)	91.54%(65)
Real smart	12%(6)	
VLE	92%(46)	
Intranet	92%(46)	
E-portal	14%(7)	
P drive	12%(6)	

Teachers were also asked to indicate their beliefs about whether there were sufficient computers/ICT tools for use in their schools. The majority of teachers (83.80%) believed that there are insufficient computers/ICT tools in their schools whilst 16.20 % were unsure. Interestingly, not a single teacher believed there were sufficient ICT tools in their school. This means that in Northern Cyprus, teachers are dissatisfied with the level of computers/ICT tools availability in the schools. A bar chart is provided in Figure 4-10 below.

Figure 4-10 Turkish Cypriot teachers beliefs about whether there are sufficient computers in their schools (Values shown as %)

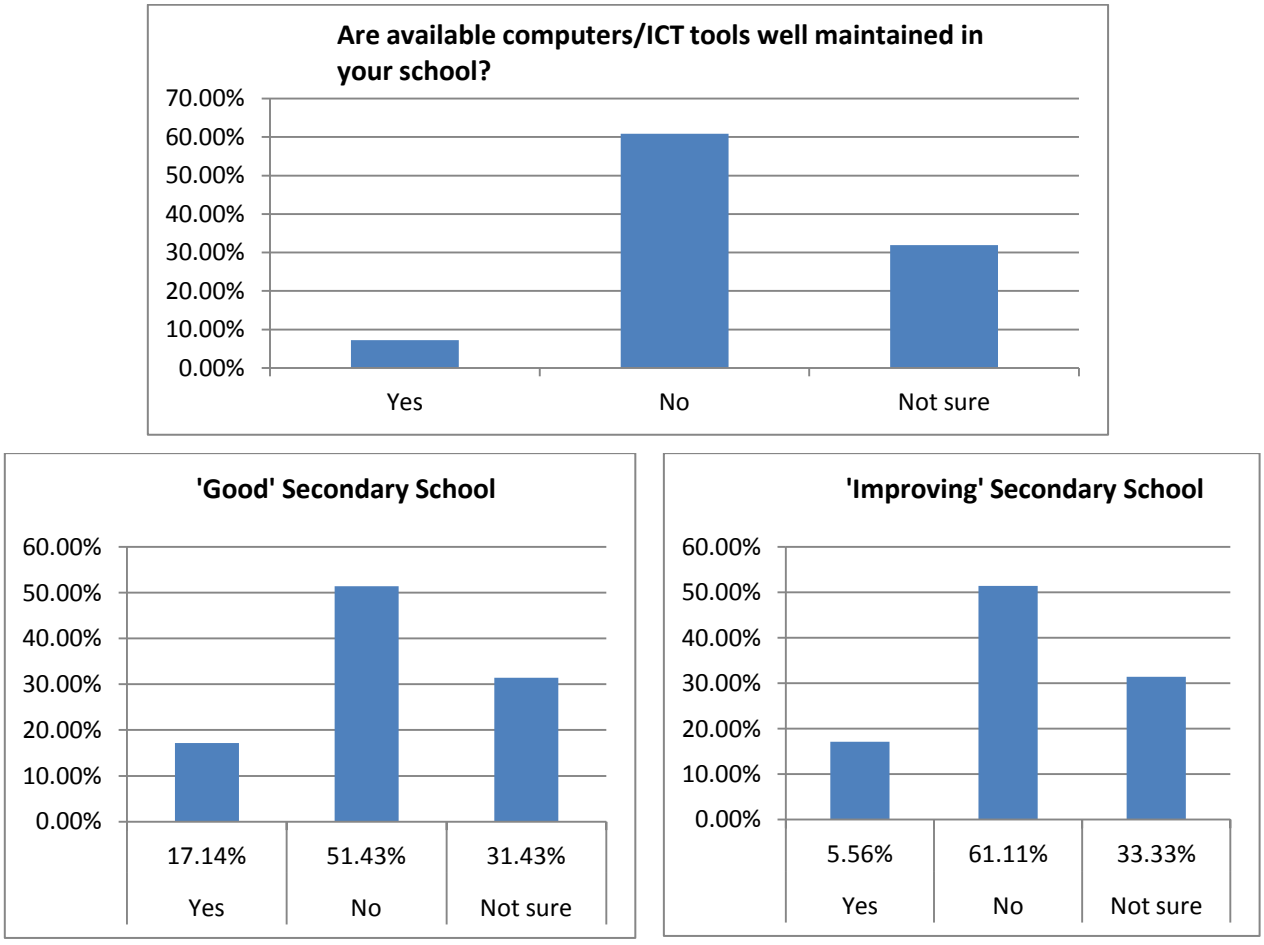


Interestingly at first sight the 'improving' school has fewer 'no' responses than the 'good' school but the number of unsure may indicate a lack of confidence in making the judgement rather than the perception that they have greater resources.

The majority of teachers (60.90%) thought that the computers/ICT tools were not well maintained while less than an eighth of them thought they were well maintained. A quarter of teachers reported that they were unsure whether they were well maintained or not. Looking at the differences between the schools, the 'improving' school seem less convinced that they have well

maintained ICT tools. This result is similar to the English schools but the difference is that while almost half the teachers at the 'improving' school reported that resources were poorly maintained, it can also be seen (Figure 4-3) that more than half of them reported resources were well maintained whereas this is very low for the North Cyprus 'improving' school. The bar chart below illustrates the differences.

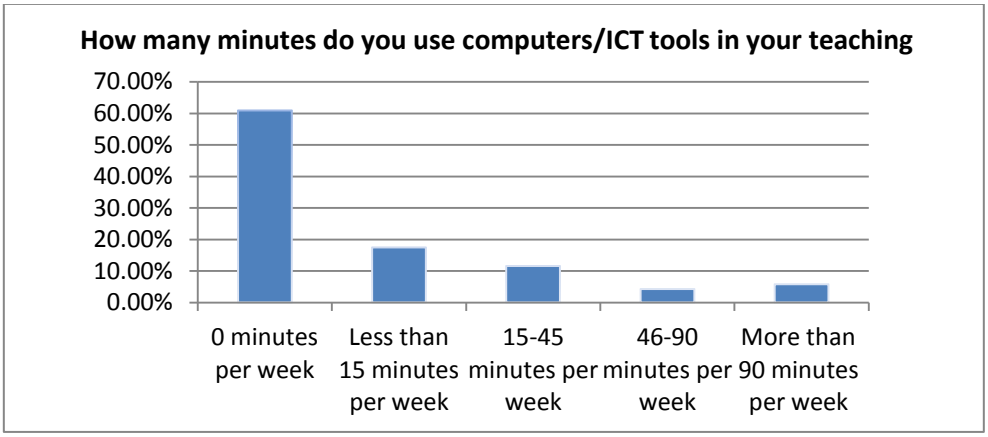
Figure 4-11 Turkish Cypriot teachers opinions about whether available computers/ICT tools are well maintained in their schools (Values shown as %)

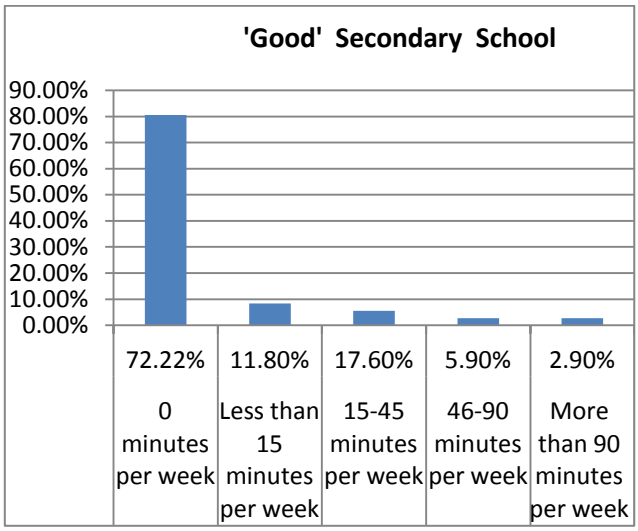


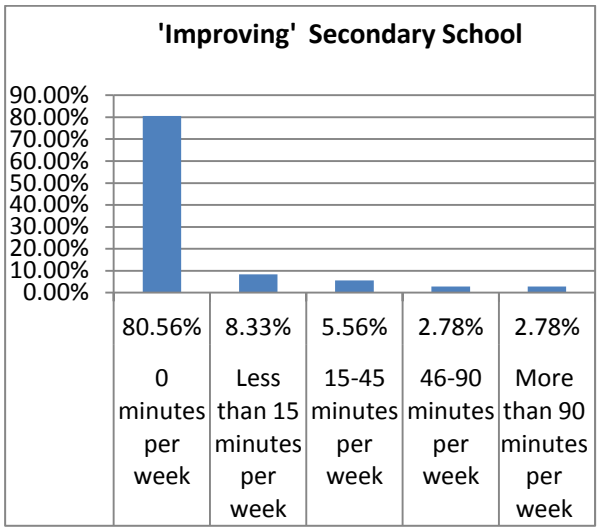
Teachers were asked to indicate how many minutes they used ICT tools in their teaching

activities in each week. Most teachers, 60.9%, in Northern Cyprus did not use ICT tools at all, 17.4 % of teachers used ICT tools for less than 15 minutes per week and around 11 % for between 15 and 45 minutes per week. Only 4.3 % of teachers use ICT tools between 46 and 90 minutes per week and 5.8 % of teachers, in fact the specialist ICT teachers, used ICT tools more than 90 minutes per week. This result shows that the majority of Turkish Cypriot teachers did not use ICT in their teaching even when teachers have the opportunity to use available tools. The patterns of use between the 'improving' and 'good' schools were similar with more teachers in the 'good' school reporting between 15-45 minutes use. In comparison, English schools undoubtedly use ICT tool more than do Turkish Cypriot schools. The bar chart at Figure 4-12 shows Turkish Cypriot teachers responses.

Figure 4-12 How many minutes Turkish Cypriot teachers use ICT tools in their teaching activities (Values shown as %)



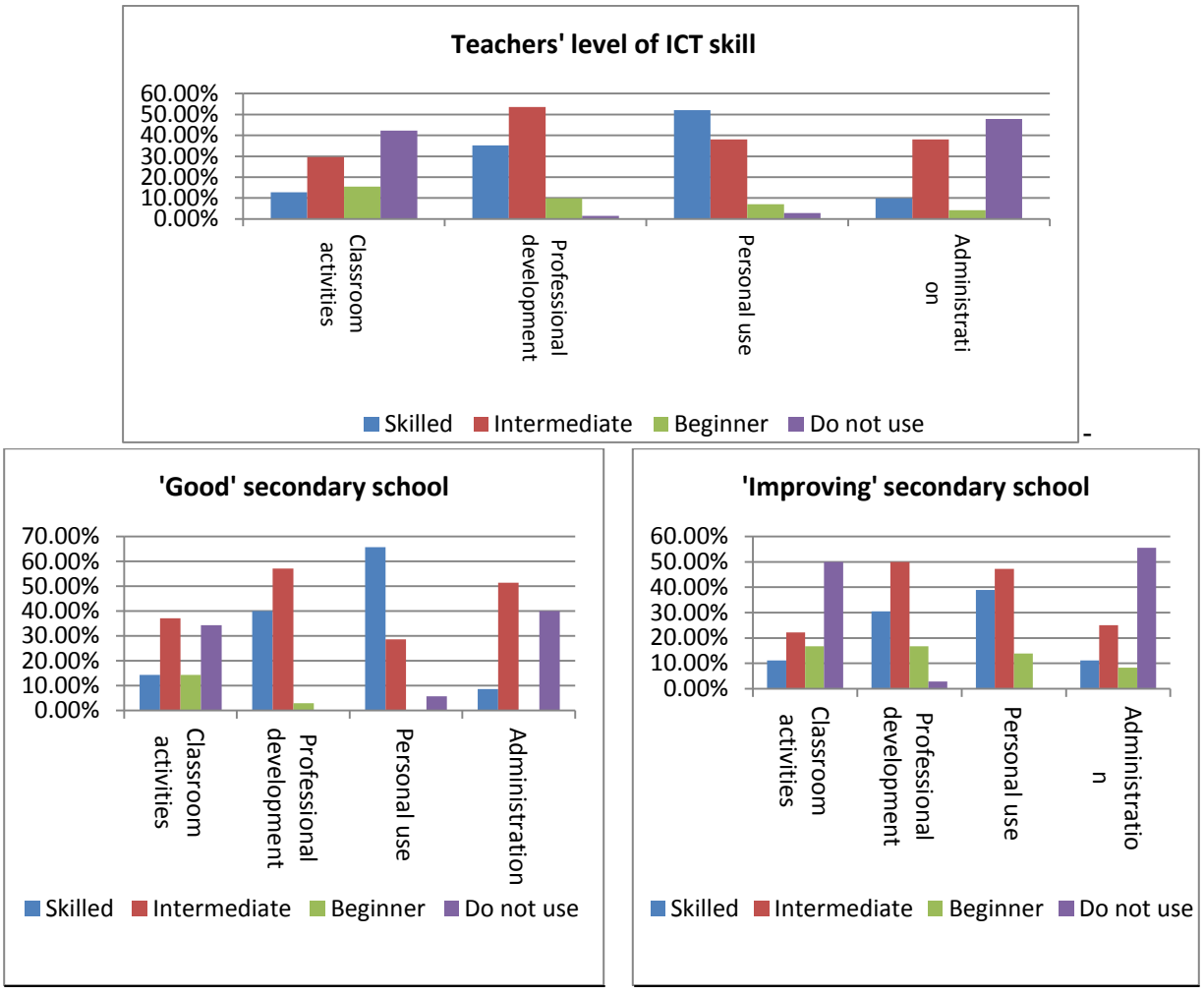




Turkish Cypriot teachers were also asked to specify their level of ICT skills for classroom practice, professional development, personal and administration purposes. For the classroom practice and administration, almost half the teachers specified that they did not use ICT tools for classroom practice whereas around a quarter of teachers specified their level of ICT skills as 'intermediate'. Around half of this quarter of teachers considered themselves at the extremes of 'skilled' and 'beginner' for classroom practice and less than a tenth of the teachers considered themselves at 'skilled' and 'beginner' for administration. For professional development, half the teachers considered themselves at 'intermediate' level whereas just over a quarter of them believed that they were 'skilled'. Only 9 % considered themselves at 'beginner' level. For personal use, half the teachers considered themselves at 'skilled' level whereas just over a quarter of them believed that they are at 'intermediate' level. Only 7 % of them considered themselves at 'beginner' level. This shows that teachers were more confident using ICT in their professional development and personal use than in their classroom and administrative work. However, it can also be seen that over the half of teachers in the 'improving' schools and more than a third in the

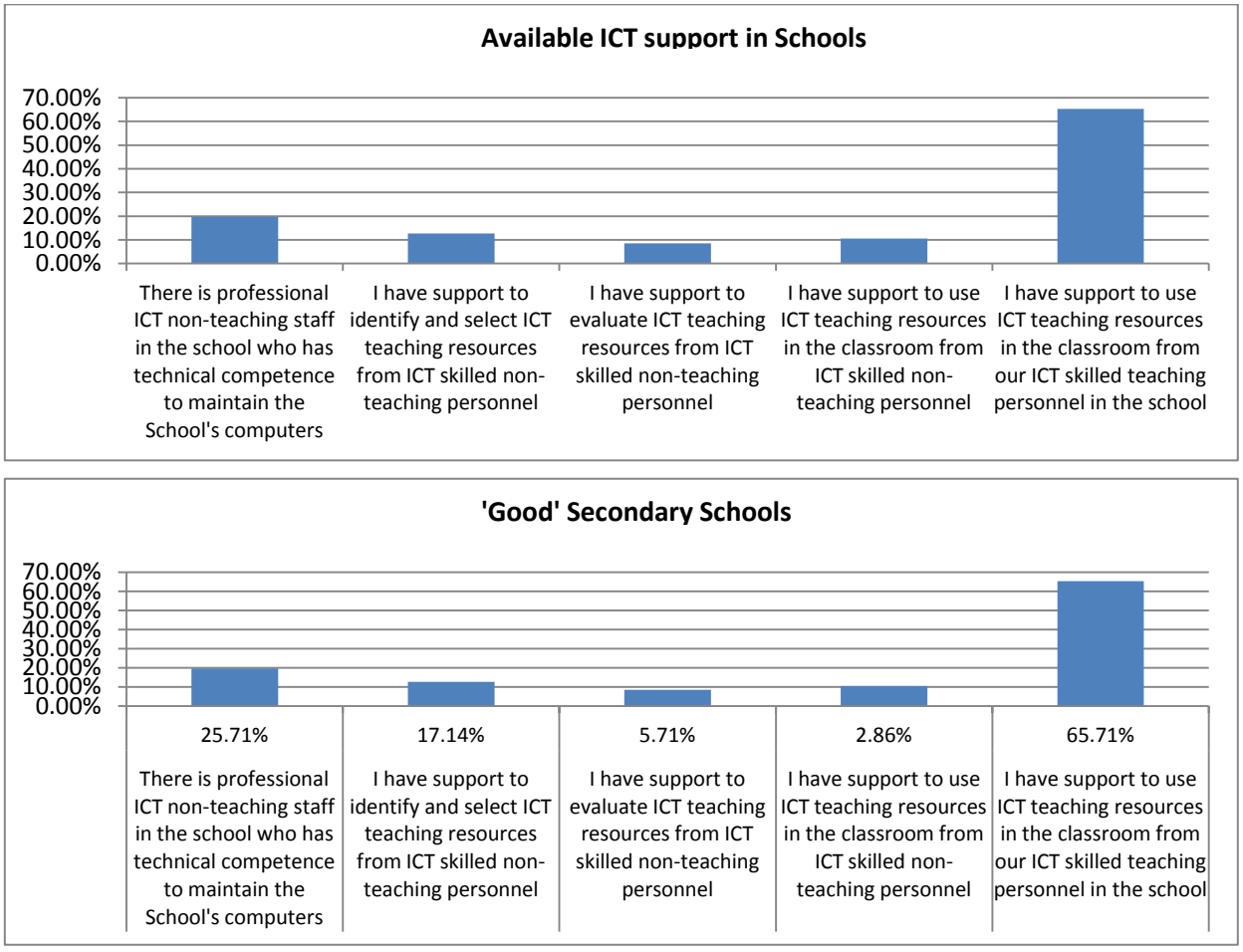
'good' school specified that they did not use ICT tools for classroom practice or administration purposes. Over half of the teachers in the 'good' school but only a quarter of teachers in the improving school respectively considered themselves 'intermediate' for administration purposes. This result may show that teachers at the 'good' school use technology for classroom and administration purposes more than do teachers at the 'improving' school. This may also confirm that teachers at the 'improving' schools are less confident than teachers at the 'good' school. For clarity, Figure 4-13 shows the teachers responses using bar charts.

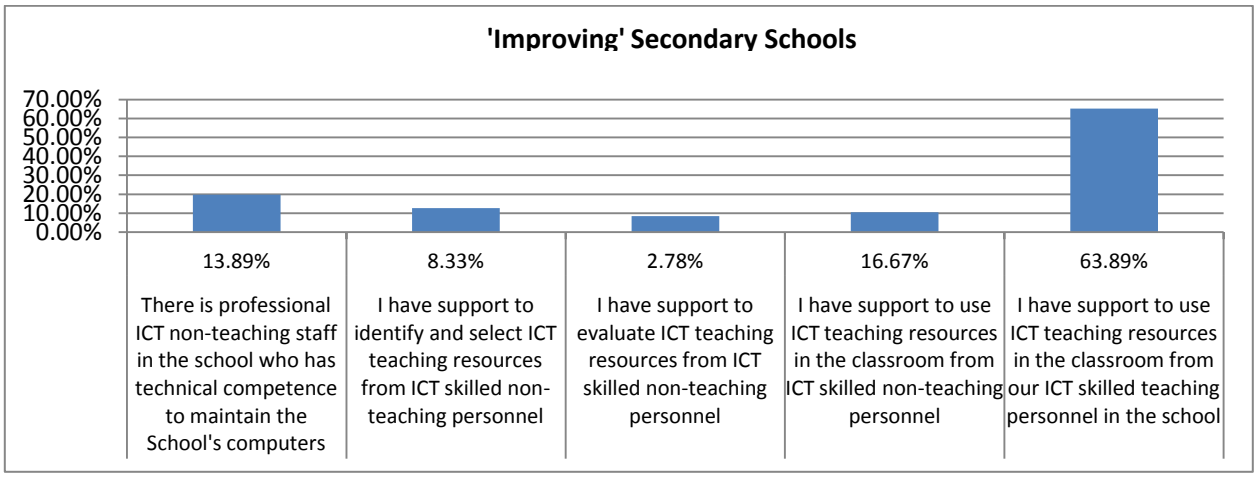
Figure 4-13 Turkish Cypriot teachers' level of ICT skills



Teachers were also asked to indicate types of ICT related support available to them in their school. Almost all teachers agreed that they had support from their ICT teaching personnel. Around 20 % of teachers indicated that there were ICT non-teaching staffs to maintain the school's computers. There was a much lower response regarding support in choosing, evaluating and using software/hardware to assist their teaching. The graphs (presented in Figure 4-14) show the findings for support in more detail, broken down by school. It can be seen that there is little difference between the 'good' and 'improving' schools.

Figure 4-14 Available ICT support in Turkish Cypriot schools (Values shown as %)





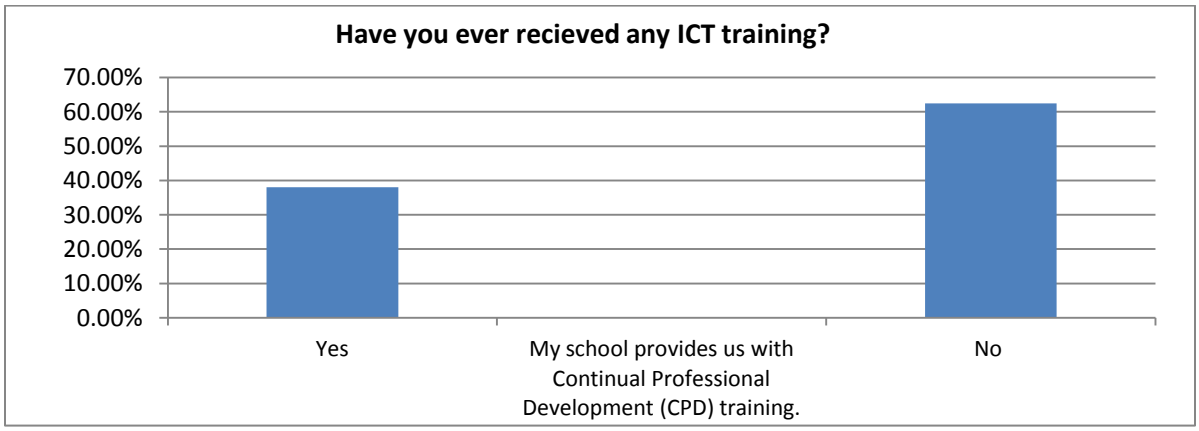
To conclude this section, teachers in North Cyprus are generally younger and more likely to be female than in English schools but there are less differences in age, gender and experience between the 'improving' and the 'good' schools. Overall the level of resource provision is narrower and percentage totals regarding availability of tools would suggest those tools which are available are less frequently or universally accessible for all teachers. There is generally less likelihood of a non-teaching ICT specialist being available to maintain computers or support classroom teachers in using these resources and levels of self-rated ICT skills are lower. This mirrors a very low reported use of ICT to support classroom teaching or using computers for professional development. Reported time spent using ICT was much lower than recorded in English schools, and levels above 90 minutes are typically usage by ICT specialist teachers.

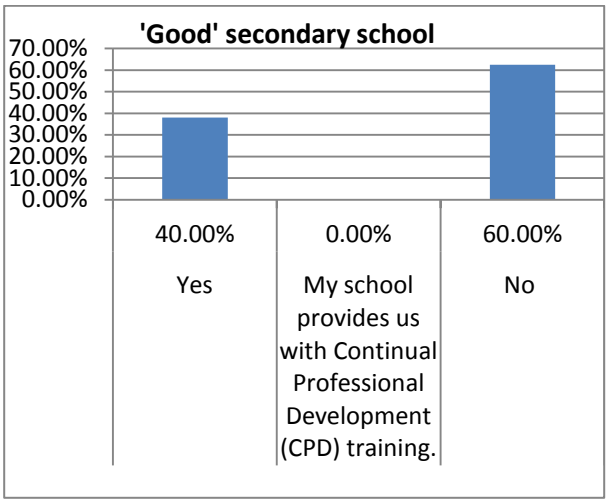
Continuing Professional Development (CPD) Training

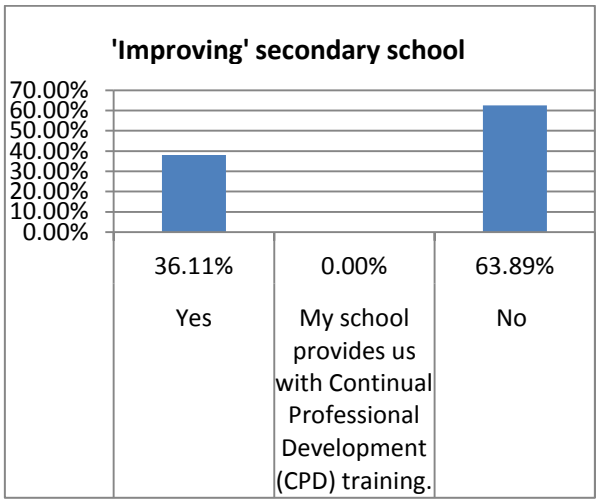
This section addresses the provision of CPD in the area of developing ICT skills and asks whether staffs are given such opportunities and the kind of opportunities they are given: teachers were asked to declare whether they have ever received any ICT training. Interestingly, the

majority of teachers (61.98%) responded that they have not received any ICT training at all, the highest proportion of teachers' ages being in the range 20-39 years. Some 38.02 % of teachers responded that they had received ICT training but that was not provided by their school. They said that they have received ICT training during their undergraduate program and nearly all of the teachers who made this response were ICT subject teachers. None of participating teachers in this study responded 'my school provides us with CPD training'. This makes it clear that the teachers do not believe schools provide any ICT training. These figures stand in striking contrast to the picture in English schools. There is little difference between the 'good' and the 'improving' schools about the training that they received.

Figure 4-15 ICT training in Turkish Cypriot schools (Values shown as %)





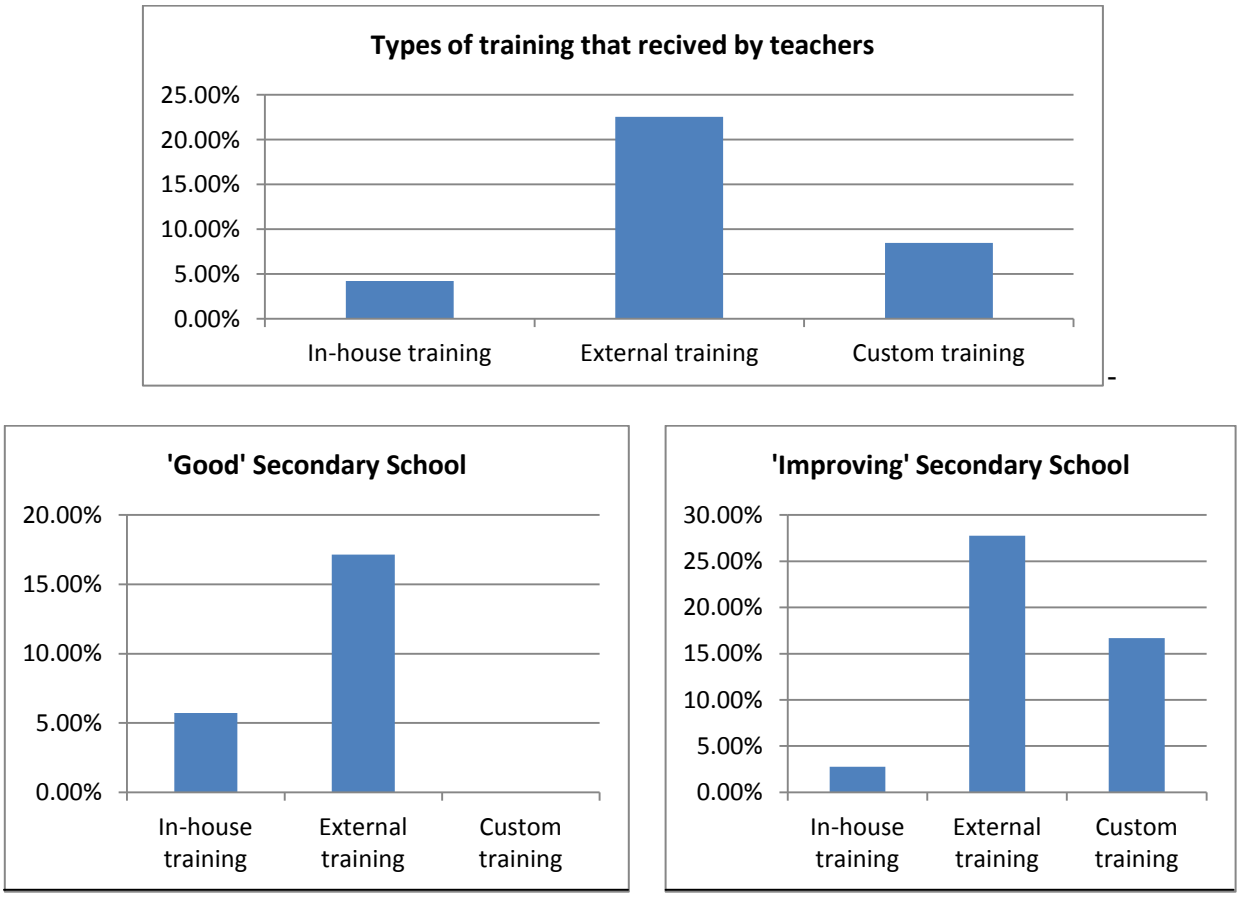


Next those teachers reporting that they had received ICT training were asked: What types of ICT related Continuing Professional Development (CPD) training have been received by Turkish Cypriot secondary school teachers? This section examines the in-house training, external training and custom training received by teachers who were asked how they would evaluated their confidence level after they had received such training, on a scale 1(low) – 5(high).

First, teachers were asked to provide the types of Continuing Professional Development (CPD) training they have had. In total 25 teachers (35.21%) out of 71 gave the response that they had not received any ICT training at all. Interestingly, three teachers (4.22%) responded that they had had 'in-house training' which means training held in the school and delivered by school staff using school equipment, and 16 teachers (22.53%) responded that they had had 'custom training' which means an outside expert consultant came to the school to deliver training for school staff using school equipment. However none of teachers ticked the box indicating that 'my school provides us with Continuing Professional Development (CPD) training'. Therefore, as a researcher I considered that teachers either did not understand what was meant by the question as

put to them or that they considered this a one-off event rather than a policy of continuous development. Six teachers (8.45%) responded that they had had 'external training: I travelled to a training venue outside my school and training was delivered by another service provider using their equipment'. Again, it may be that teachers misunderstood this – i.e. that it was a CPD opportunity being offered by the school, or perhaps that they did not consider it CPD because it was a one-off event or undertaken on their own initiative or expense.

Figure 4-16 Continuing Professional Development in Turkish Cypriot schools (Values shown as %)



Subsequently, after asking about the types of CPD training, teachers were asked to evaluate how their confidence level of using ICT tools had improved afterwards.

In-house Training: Three teachers were stated that they had had 'in-house training' with two of them evaluating their confidence level at 4 and other at 3 on the scale 1 (low) – 5 (high). These can be clearly seen from Table 4-14 below, which makes clear there is little difference between them.

Table 4-14 Turkish Cypriot teachers' confidence level after in-house training

Training type	Confidence level	'Good' secondary school Number of teachers	'Improving' secondary school Number of teachers	Total
In-house Training	1(low)	0	0	0
	2	0	0	0
	3	1	0	1
	4	1	1	2
	5 (high)	0	0	0

External Training: The majority of teachers, who had received 'external training' evaluated their confidence level at 4 (7 teachers) on the scale 1 (low) – 5 (high), four of them felt less confident and evaluated their confidence level at 2 whereas three of them were highly confident and evaluated it as 5. Only two teachers evaluated their confidence level at 3. It is notable that the majority of teachers at the 'improving' school evaluated their confidence level at 4 whereas majority of teachers at the 'good' school at 3.

Table 4-15 Turkish Cypriot teachers' confidence level after external training

Training type	Confidence level	'Good' secondary school Number of teachers	'Improving' secondary school Number of teachers	Total
External Training	1(low)	0	0	0
	2	1	3	4
	3	0	2	2
	4	3	4	7
	5 (high)	2	1	3

Custom Training: The majority of teachers, who had had 'custom training' and answered this question, evaluated their confidence level at 3 on the scale 1 (low) – 5 (high). Only two of them evaluated it at 4. However, this result only applies to the teachers at the 'improving' school, who's level of confidence improved after they had custom training, because none of the teachers at the 'good' school had received custom training. For clarity, Table 4-16 shows teachers responses.

Table 4-16 Turkish Cypriot teachers' confidence level after custom training

Training type	Confidence level	'Good' secondary school Number of teachers	'Improving' secondary school Number of teachers	Total
Custom Training	1(low)	0	0	0
	2	0	0	0
	3	0	4	4
	4	0	2	2
	5 (high)	0	0	0

Overall, the above tables showed that teachers at the 'good' school seemed to have had fewer training opportunities than teachers at the 'improving' school. However, teachers at the 'good' school seemed more confident than the teachers at the 'improving' school as the teachers at the

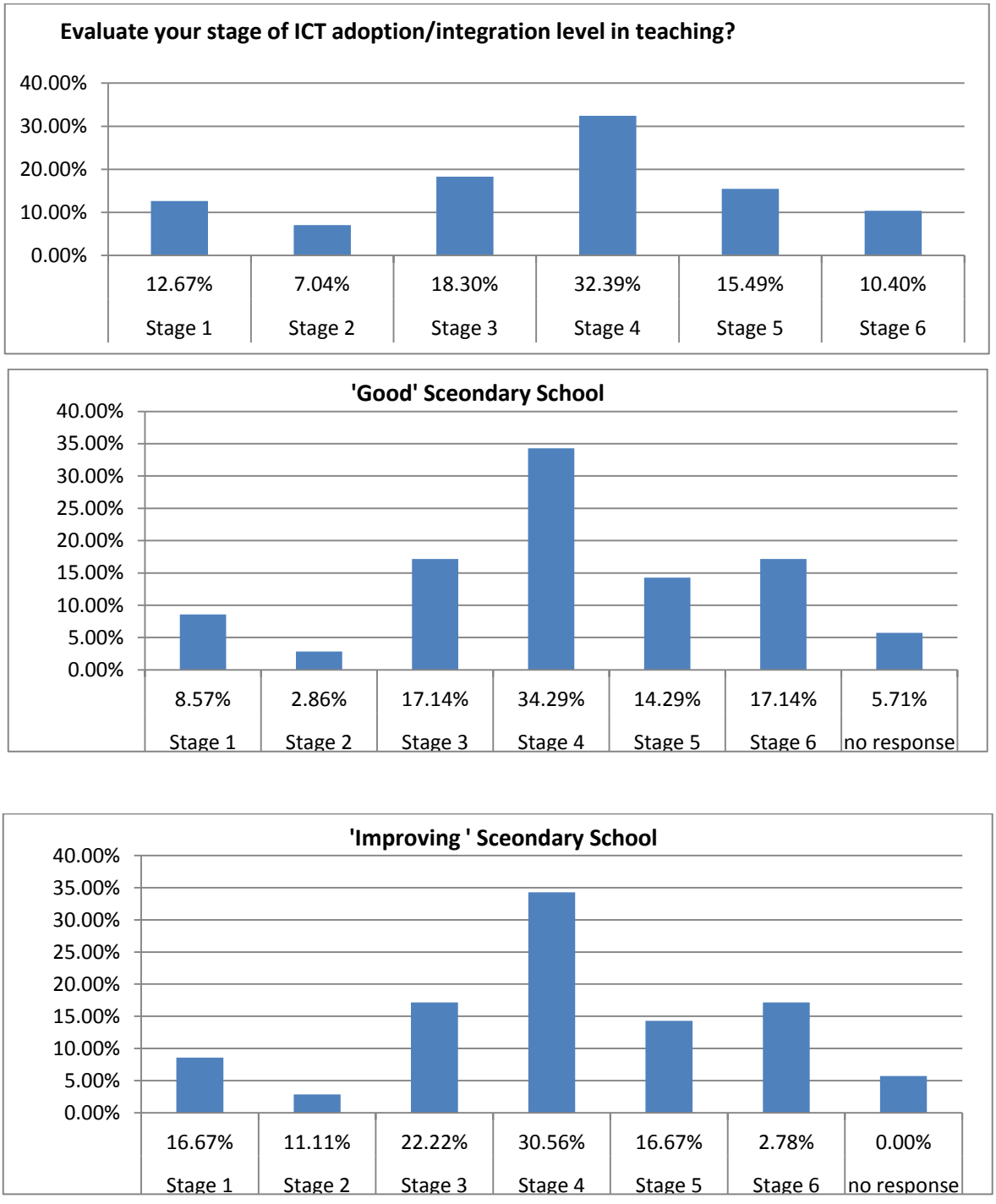
'good' school had a level of ICT use in classroom and administration tasks that is higher than for teachers at the 'improving' school. These figures stand in striking contrast to the picture in English schools where teachers have both more confidence and more training opportunities.

Teachers Stage of ICT Adoption/Integration Level

This section addresses the question: how do Turkish Cypriot teachers evaluate their stage/level of adoption/integration of ICT in their teaching? This section will examine the teachers' confidence level about ICT adoption/integration in their teaching through their self-rated stage level.

A small proportion of teachers responded they were at stage 6, the highest level of confidence in using computers, where they can creatively apply technology to classroom teaching. Slightly more teachers responded that they were at stage 5 (used a range of applications at least as instructional aides to teaching). The highest proportion of teachers, around a third, saw themselves as being at stage 4 (beginning to feel comfortable in using computers to support lessons). Almost a fifth responded that they were at stage 3 (beginning to think of tasks in which it might be useful). Only a small minority identified with stage 2 (having basic IT skills but lacking confidence to use these skills in teaching), whilst a more sizeable minority saw themselves at stage 1 (the lowest confidence level in using computers in the classroom). A small number of teachers did not answer this question.

Figure 4-17 Turkish Cypriot teachers' evaluation of their stage of ICT adoption/integration in teaching (Values shown as %)



Although the highest proportion of teachers (32.39%) stated that they were at stage 4, the majority of teachers (60.90%) responded to question 2.6 (see appendix 4) that they did not use ICT tools in their teaching. Therefore, this question may have obtained misleading responses. For this reason, when choosing teachers for interview, the teachers' answers to all questions were reviewed in order to select teachers who had answered consistently for participation in the interview process.

4.2.2. Explanation and Justification of the Chosen Selection of Good and Improving Schools

In this section, the process of selecting of the 'good' and the 'improving' schools to participate in the following phase of the research is explained using the tables and figures provided above and comparison against Ofsted criteria, which is used for its evaluation of schools in terms of ICT infrastructures/resources, curriculum and training.

This section is divided into two parts. The first part justifies the selection of the 'good' and the 'improving' schools in England and the second, the selection of 'good' and 'improving' schools in North Cyprus.

4.2.2.1. Justification of English Secondary Schools

This section explains the justification of the selected 'good' and 'improving' secondary schools in England according to the teachers' responses to the availability and accessibility of ICT resources and training questions in the questionnaire. These were compared with the Ofsted evaluation reports about the selected school in terms of the above criteria to justify the selected

case schools.

- **Justification of the Selected English 'Good' School is as Follows:**
  - In the Ofsted report, it was stated that in the good school, there 'has been heavy investment in ICT technology'. To justify this, teachers were asked 'what type of ICT do you have in your school?' and the teachers listed different kinds of hardware, software and network resources that they had in the school, which confirmed that the school has had heavy investment in ICT resources.
  - Looking at the curriculum, Ofsted reported that the 'good' school 'has had heavy investment in ICT technology, which is used very well in other subjects. All pupils can log onto the school network from home via terminal services. Staff and pupils make very good use of this facility to access their work, e-mail and school-based software'. Teachers, who completed the questionnaire, were from different subject areas and most of them used technology in their teaching for more than 90 minutes per week. In terms of network resources they mentioned that they make use of Virtual Learning Environment (VLE), which is remote access to the school network from their home. Therefore, these responses justified the curriculum issues.
  - Turning to training, Ofsted reported that 'the school has a comprehensive programme for teachers' professional development and training'. To ratify this, teachers were questioned whether they had received any ICT training and what types they had had. Nearly all of the participant teachers responded that they had received training and this training(s) was in-house training(s) meaning training held in their school and delivered by school staff using school equipment.

This school was graded as outstanding by Ofsted partly because of this availability of good ICT resources, training and good teaching in the school and they stated that 'the school is a very good school with some excellent features.'

The 'improving' school was graded as a satisfactory (improving) school by Ofsted because of the improvement of the teaching, available resources and training and curriculum, and they stated that 'Academic standards have risen from below average three years ago, to broadly in line with national averages in the 2008 examination results. This improvement is as a consequence of securely satisfactory teaching, a good curriculum, and introduction of new technologies'.

- **Justification of the Selected English 'Improving' School is as Follows:**
    - In the Ofsted report, it was stated that the 'improving' school introduced new technology and gave rewards for students and teachers who started to use different technological resources in their teaching'. To ratify this, teachers were asked 'what type of ICT do you have in your school?' and teachers listed the types of technology available.
    - Looking at the curriculum, Ofsted reported that for the 'improving' school, 'the curriculum had improved substantially since the previous inspection. New technologies were starting to be used by teachers and pupils who can log onto the school network from their home'. Teachers who completed the questionnaire, were from different subject areas and just under half of them used technology in their teaching for more than 90 minutes per week, whilst some of them used it for 15-45 or

46-90 minutes per week in their teaching. Thus, it may be said that this school is at an improving stage. In terms of network resources teachers mentioned that they made use of the Virtual Learning Environment (VLE), which is remote access to the school network from their home. Therefore, these responses justified the curriculum criteria.

- Turning to training, Ofsted reported that 'through a good training programme, nearly all teachers in the school are confident enough to use the new technology to advantage in their subject'. To ratify this, teachers were questioned about whether they have received any ICT training and what types. Most teachers responded that they had received in-house training meaning training held in their school and delivered by school staff using school equipment.

4.2.2.2. Justification of Turkish Cypriot Secondary Schools

This section presents the justification of the selected 'good' and 'improving' secondary schools in North Cyprus according to the teachers' responses to the questions about availability and accessibility of ICT resources and training in the questionnaire. As explained in detail in the previous chapter, unfortunately there is no equivalent to Ofsted reports produced for Turkish Cypriot schools. Hence, the Ofsted grading table was used to measure each school against Ofsted criteria. Therefore, teachers' responses to above mentioned questions were compared with this grading table.

- **Justification of the Selected Turkish Cypriot 'Good' School is as follows:**

  - According to the Ofsted grading table, the 'school needs to be resourced at least satisfactorily'. This is a reason why a school was selected as a 'good' school, because the

head teacher said that there were some ICT resources available for school teachers to use. To ratify this, teachers were asked 'what type of ICT do you have in your school?' and the teachers listed seven different kinds of hardware and software even when they did not have the use of any network to share ideas or practice with their colleagues. Even when there is an internet connection, not all teachers were able to access the internet.

- 'Most schools need to make at least satisfactory curriculum provision for ICT, including some balance between teaching ICT skills and its application across subjects' this is the phrase used in the Ofsted grading table referring to the curriculum. However, this 'good' school was not in a position where ICT was being applied across subjects, and ICT embedded in pupils' learning to the extent that it was a frequent and natural part of their day-to-day learning, as noted by the head teacher of that school. Most teachers did not use technology in their teaching and some of them in particular used computers or CD-players for less than 45 minutes in their teaching per week.
- Looking at training, the Ofsted grading table stated that 'schools need to improve the ICT confidence and competence level of staff'. The head teacher of school commented that there was no training in their school except that the ICT teacher could help other teachers to use technology should they wish to ask him. The, head teacher also mentioned that government policy meant they cannot hire anybody to train the teachers in ICT use.

- **Justification of the Selected Turkish Cypriot 'Improving' School is as Follows:**
  - The head teacher of the 'improving' school mentioned that there were some ICT resources available for school teachers to use, but most of the time the computer lab is closed, as students do not know how to treat computers and other available ICT resources in that room. However, she stated that the school would encourage teachers to instruct students how to treat equipment and how to use technology in their teaching. To ratify this, teachers were asked to provide details about the types of ICT resources available in their school. Teachers who completed the questionnaire responded that they had some resources, but they did not use technology more frequently because of the problem about accessibility to the computer lab. As a consequence, this meant, they did not use computers very often in their teaching, but they expected this to improve as mentioned by the head teacher.
  - This 'improving' school was also not in a position that ICT was applied across subjects and ICT was not integrated to enhance students' learning. To ratify this, teachers were asked 'how many minutes do you use computers in your teaching activities each week?' Almost all teachers said that they did not use ICT resources at all in their teaching, although some mentioned that they used technology in their teaching as a supplement. So this means that this school was still at an improving stage, as they had not started to use technology in their teaching, but their head teacher would be encouraging them to employ technology.
  - Turning to training, the head teacher of the selected 'improving' school commented that there was no training in their school but that sometimes the ICT teacher assists other

teachers to use technology. The 'improving' school head teacher also mentioned the fact that, as they are part of government, they can do nothing about the training by themselves, as government has control over them.

4.2.3. The Selection of the Teachers for the Interview

In this section, the selection of the teachers for the interview in each chosen schools is presented. Three teachers were selected from each school for the interview process, a total of twelve teachers from the four English and Turkish Cypriot secondary schools.

It would have been onerous to interview all the teachers at the four schools, and to provide an acceptable level of data, so three teachers from each secondary school were chosen, whose competence level (self-rated) was respectively high, medium and low, and who also had indicated in the questionnaire that they would be happy to participate in the interview process. The selection was based on how confident they were, how much they used ICT in the classroom, how they rated their stage of ICT use and whether they have had training. The questions used for the selection criteria were as follows:

- How many minutes do you use computers/ICTs in your teaching activities in each week?
- How would you describe your level of ICT skill in the following contexts?
    - Classroom Practice – Professional development – Personal use – Administration. Teachers rated their skills (competence) by choosing one of the following: skilled, intermediate, beginner or do not use.
- Have you ever received any ICT training?

- Read the descriptions of each of the six stages related to adoption of technology. Choose the number of the stage that best describes your level.

First of all, teachers, who agreed to be interviewed, were identified, and then their responses to the above questions were examined. From this, the teachers whose stage levels were respectively low, medium and high were chosen for this study.

More than half the teachers (18 out of 35) from the 'good' school in North Cyprus but only 6 (out of 35) teachers from the 'good' school in England responded they would like to participate in the interview process. Their responses to the other questions were checked, and from this, one low, one medium and one high stage of level ICT users were chosen from each selected secondary schools in each country for the interview. Only 6 teachers out of 36 from the 'improving' school in North Cyprus and only 3 teachers out of 15 from the 'improving' school in England said they would like to participate in the interview process and the same procedure was carried out for those teachers.

The high competence level teachers were chosen as those who use computers for more than 90 minutes in their teaching activities in each week, described his/her level of ICT skills - particularly his/her 'classroom practice' - as at intermediate level, had received training and whose stage of technology adoption was from 4 to 6.

The teachers chosen as at a medium competence level were those who used computers for 15 -45 minutes each week, described his/her level of ICT skills - particularly his/her 'classroom

practice' - as at beginner level, had received training and whose stage of technology adoption was from 3 to 4.

The teachers chosen as at a low competence level were those who used computers for less than 15 minutes each week, described his/her level of ICT skills - particularly his/her 'classroom practice' - as at beginner level, had received training and whose stage of technology adoption was from 1 to 3.

After teachers had been chosen using the above criteria, selected teachers were interviewed and the analysis of their responses is presented in the following section.

4.3. Interview Analysis: Teachers' Preferred Pedagogic Approaches

4.3.1. Introduction

This section contains an analysis of the transcripts of the interviews with teachers and ICT co-ordinators. In the case of teacher interviews, a semi-structured interview was carried out using the same base set of questions. The questions were developed from the sub-questions of the investigation:

1. How would you describe your teaching style (your naturally preferred approach)? Why do you prefer this approach?
2. Can you tell me about how you typically use ICT in your teaching and if and how ICT/technology might enhance your teaching?
3. Can you think of a class that you used ICT in last week and tell me how and why you

used it?

4. Is there any kind of technology that you would like to use in your teaching that you have not yet used? What would you like to try and why? Are there any issues or problems in trying this?

For the ICT co-ordinators interviews, again a semi-structured interview was carried, out using the same base set of questions (see Appendix 6).

Rather than using a pure grounded theory-building approach, the interview questions were derived from hypotheses arising from the literature review (presented in chapter 2). As the categorisations were first obtained using the literature review, then emergent themes were examined, and narrative analysis (Powell and Renner, 2003) was therefore more appropriate. This approach allows for the development of analytical categories in advance, and their use in informing the sampling and coding process. In this way, some initial aspects of the phenomenon could be developed by the researcher. As mentioned above, this approach still allows for the possibility that other themes will emerge from the field study; these being considered in a separate section of this chapter.

A four-step procedure, as provided by Powell and Renner (2003), was therefore used as described in section 3.4.4.2 to analyse the interviews which were presented and explained in detail in chapter three:

1. Step 1: The data was organised in the order of my interview questions, and all teachers' responses and answers were examined to identify similarities and differences.

2. Step 2: Code and descriptive label (name) were provided for each category. Both the present and emergent categories were used, starting with a list of categories established through the literature review, and extended by emergent categories from reading all the research data.

3. Step 3: After the data was categorised, the relative importance of categories was established by counting the number of times a specific theme came up and relationships between the identified categories were identified.

4. Step 4: In this step, quotations were used to identify the data that related to the identified categories and sub-categories. Briefly, this step cut and sorted all the data. The NVivo software programme was used for this analysis.

For more details about the above steps see chapter three, section 3.4.4.2 semi-structured interview.

4.3.2. Interview Findings

The following themes formed the basis for the design of the interview and its initial analysis, and were designed to gather (see appendix 6 for an example of coding):

1. Teachers' stated preferences between instructivist, constructivist or mixed approaches
2. The factors that teachers said influenced their preference (the hypotheses predicted a number of factors would be observed: individual preference, social influence, provision of resources and perception of suitability)
3. The extent to which the teachers' perceptions of their schools' preferred approach differed from their own (the hypotheses predicted that institutional influence would be a factor).

The ways in which ICT was actually used by teachers in real classes, including the range of different technologies used and the reasons for their selection (the hypotheses predict a number of factors including the topic of the lesson and the specific student group)

4. The existence of barriers to, and enablers of, the use of ICT in the classroom (the hypotheses predict a number of barriers such as available technology and training to and enablers such as enough technology tools and traning of technoogy use in the classroom)

The narrative analysis, however, also allows for the emergence of themes that were not anticipated in the initial theory; these being dealt with in a separate section of this chapter. In the text the interviewees are referred to by a three section alphanumeric code. The first section of the code determines the interviewee e.g. Teacher1. The second section of the code determines the initial letters of interviewees, and the third section of the code determines both the country and good (G) or improving (I) school e.g. 'Teacher2-SK-EG'. To maintain anonymity, school names were avoided to prevent their identification. All responses are quoted *verbatim*.

4.3.3. Preferences for Instructive, Constructive or Mixed Approaches

4.3.3.1. Teachers' Stated Preferences

The first theme concerns, teachers' own preferred styles, both in the abstract and in practice. The key interview question designed to investigate their general preferences was as follows:

- How would you describe your teaching style (your naturally preferred approach)?

Three alternative statements were suggested as possible examples of approaches and teachers were asked to describe their own preferences in relation to these statements: The first statement was intended to reflect an instructivist approach (A), where students need teachers to set clear goals and boundaries, give them access to high quality structured resources and information and give lots of practice on problems to achieve success. It was hypothesised that teachers who showed a preference for this statement might also prefer more traditional teaching methods although it was noted that it is also possible to use technologies with this approach. The second statement was intended to reflect a constructivist approach (B), where students need collaborative group activities that help them to develop critical-thinking skills, be creative, take pride in their team's work and learn to work together. A third statement reflecting a combination of both approaches was also presented (C). These are represented in Table 4-17.

Table 4-17 Teachers' preferences on teaching approaches

Preferred Pedagogic Approach (Vision A, B, C)	England % (n=6)	North Cyprus % (n=6)	Total % (n=12)
A – Instructivist Students need teachers to set clear goals and boundaries, give them access to high quality structured resources and information and lots of practice on problems to achieve success	0	2	% 16.67 (2)
B – Constructivist Students need collaborative group activities that help them to develop critical-thinking skills, be creative, take pride in their team's work and learn to work together	0	3	% 25 (3)
C – Mixed A combination of both approaches (A) and (B) is needed	6	1	% 58.33 (7)

It can be seen that most teachers (7) preferred the statement describing a combination of instructivist and constructivist approaches. It is particularly striking that all the teachers in the

English schools preferred a mixed approach, whereas all but one in North Cyprus chose one approach or the other. Based on Hofstede's model of the cultural differences between the two countries, it was predicted that teachers in North Cyprus would be more likely to choose an instructivist approach and those in England a constructivist approach. This is not reflected unambiguously in the table. Although two teachers in North Cyprus chose an instructivist approach compared with none in England, three also chose a constructivist approach compared with none in England. The picture at this level of generality is mixed and needs to be considered in the light of individual interview responses.

In the next phase of this study, teachers' preferred pedagogic approaches were double checked by applying a modified Delphi method. In other words, it was checked that lesson plans, picked and teachers' stated reasons for picking them were consistent with the style they said they preferred in response to this question.

4.3.3.2. Factors Affecting Choice of Pedagogic Approach

After being invited to state a general preference for one of the three pedagogic approaches, the teachers were asked what factors influenced their choice of pedagogy in the design and delivery of actual lessons. The following open question was used:

- Do you find it hard to decide between these visions? Why?

All of the teachers (n=12) said that it is not hard to decide between pedagogic approaches. As two teachers put it,

> *"I think when you know what you want out of the lesson, the best way to achieve those goals generally it's quite apparent."* (Teacher5-AP-EI)
>
> *"You know what will work with particular groups so it depends on their abilities*." (Teacher13-BC-CYI)

These expressions of confidence in the choice of pedagogy based on personal knowledge were typical of all the respondents. The teachers' responses to this open question examined the hypotheses developed from the literature review regarding factors expected to influence their choice of pedagogy. Where a teacher used a mixed approach they often gave distinct factors pertaining to each of the two pedagogies, while in other cases, no particular factor was identified by the interviewee, meaning that percentages in tables in this section do not sum to 100%.

Personal and Cultural Factors

It was hypothesised that cultural, personal and organisational factors would influence choice of pedagogy, and that cultural factors would differ between England and North Cyprus, along the lines predicted by Hofstede's model. In fact, when organisational factors were mentioned, it was always related to the availability of ICT resources and training; these being considered below in the section on barriers and enablers. On the other hand there was evidence that personal and cultural values did indeed influence pedagogic choices.

The application of Hofstede's model to North Cyprus anticipated that its culture would encourage a more instructivist approach, and in fact, the two teachers who preferred an instructivist

approach made it clear that this was influenced by their perceptions about their culture. The first stated, the relationship between the two but did not elaborate:

> *"…our teaching habits looks closer to vision A as our culture affect our teaching approach."* (Teacher12-HY-CYG)

The second agreed with her colleague, saying:

> *"Our teachers taught us in this way so we are still using this traditional teaching even though we know that technology is a good tool to enhance our teaching and pupils' learning."* (Teacher10-BO-CYG)

This statement reveals there is a connection between instructivist methods and culture. It also makes a clear connection between non-traditional, constructivist teaching and the use of ICT; in fact, the two issues of pedagogy and use of technology are almost conflated in this statement. It is interesting that these statements both link cultural values explicitly with an instructivist style of teaching, but no teachers cited cultural reasons for choosing either a constructivist or a mixed approach. This was as predicted by the hypothesis, although it should be noted again that it applied to only two of the six teachers from North Cyprus.

The teachers in North Cyprus who preferred a constructivist approach cited personal rather than cultural values:

> *"I think I agree most with vision B as it is important that students need collaborative group activities to learn how to work together and develop their critical-thinking skills and creativity".* (Teacher9-OC-CYI)

Another teacher commented:

> *"I think students need collaborative group activities that help them to develop critical-thinking skills, be creative, and learn to work together. So, vision B is my teaching strategy that I am trying to employ. I think students have to be started thinking critically at least in secondary education and learn how to work effectively together as a team which will be needed in their future, work life. So, vision B is a very important approach which needs to be considered by teachers."* (Teacher13-BC-CYG)

Both teachers' expressions indicate a personal belief in the development of skills such as 'critical-thinking', 'creativity' and teamwork, which are important aspects of the constructivist learning environment and valued by the teacher. Both teachers, but especially Teacher13-BC-CYI, suggested they seek to teach these skills in their lessons because they personally give value to these skills, which are important for students to learn, as they will be needed in their future working life, even if they do not necessarily teach these skills as part of their formal curriculum. Another possible reason why teachers emphasise these particular skills will, however, be discussed with emergent themes later in this chapter.

Teachers who preferred a combination of instructivist and constructivist approaches also tended to cite personal preferences or values as factors, rather than culture or tradition:

> *"I think I agree with parts of both actually because I think students need teachers as well, but students also need to be able to work together because if they can't work together then they cannot develop team working skills, I mean it's important because we are developing them as individuals as well, so when they leave school, they need to have right social skills to be able to work in a workplace."*
>
> (Teacher2-SK-EG)

> *"I suppose mine is blend because sometimes I think individual work is very important especially for maths, also I like them to work on their own, but, group work is also very beneficial, because, it can lead to a better quality of work if it's*

> *done properly plus you are getting your own peers putting input and assessing so someone who is your own age will assess the work for you or give you feedback. For me, the teachers need to get involved so there can be a lot they can get from each other before I have to do something."* (Teacher3-RB-EG)

Both teachers' comments indicate a personal belief in the development of student skills such as teamwork which are important for their future work life. Also, in both cases, the teachers' expressions seem to suggest the notion of expertise being required to support group activity. Thus, this could be the reason why these teachers preferred to apply a combination of instructivist and constructivist approaches in their teaching to help students to focus on the subject while applying a student-centred approach.

The cultural and personal values reported by teachers which affected their choice of pedagogies is summarised in Table 4-18. This clearly shows the effect of personal values on the choice of pedagogy, regardless of which pedagogy was chosen as the predicted hypotheses. It can be also seen that there was more mixed evidence for cultural influence then predicted by Hofstede's model, the validity of which appears to be limited to the choice of instructivist pedagogy by two teachers in North Cyprus.

Table 4-18 Influence of cultural or personal factors on pedagogic choices in practice (Note: some interviewees identified the use of more than one pedagogic approach)

Presence of Cultural or Personal Factors in Choice of Pedagogy	England % (n=6)	North Cyprus % (n=6)	Total % (n=12)
Cultural Factors			
• Use of instructivist pedagogy	0	2	16.67% (2)
• Use of constructivist pedagogy	0	0	0% (0)
• Use of a mixed approach	0	0	0% (0)
Personal Values			
• Use of instructivist pedagogy	1	0	8.33% (1)
• Use of constructivist pedagogy	3	3	50% (6)
• Use of a mixed approach	6	1	58.33% (7)

Lesson Topic as a Factor

It was hypothesised that the topic of the lesson would be a factor in the pedagogic approach chosen, at least in cases in which content is prescribed by a curriculum and students cannot choose their own topic. In some cases teachers were aware that their practice did not always match with their general pedagogical preference as one of the teachers stated:

> *"I suppose its two things that make me decide this. I shouldn't really do it like this but sometimes the topic maybe good for group work, for example in maths, if we are doing something on statistics, something statistics-based we can do an investigation or if we are doing something with a certain number we are doing an... anything where we are doing an investigation we can come with group work, we can have a target, we can have roles to play within the group and we can go forward like that. So, it's two things really: whether the work is suitable for group work, or, whether I can find suitable task to help them understand it in group work situation."*
> (Teacher3-RB-EG)

The teacher stated that 'I shouldn't really do it like this' which indicated dissatisfaction and reflects that he thought he should try to teach all topics by applying group work method, but he

believed it was difficult to apply for some topics and tasks. The teacher suggested that being able to 'find [a] suitable task' for the topic sometimes prevented the use of a constructivist approach. This supports the hypothesis that the topic is a factor in deciding which pedagogic approach to use.

Student Group as a Factor

As hypothesised, some teachers said that group dynamics within a class can affect their choice of pedagogy. The hypothesis was formed in response to Hofstede's model but in fact, it was not cultural factors but teachers' perceptions of their students' abilities, behaviour and general social skills that were cited by teachers as influences on their pedagogic choices. Rather than wanting 'one size fits all' pedagogy, most of the teachers who identified this as a factor made reference to their experience and their specific knowledge of their students:

> *"...because you will know what will work, having this experience, the teacher knows what will work with particular groups so, I know."* (Teacher4-OB-EG)

This teacher indicated that her experience with a group helped her decide which pedagogical approach is suitable for a particular group:

> *"I would not say I have a naturally preferred approach; my approach differs depending on the actual group of teaching. Some groups need a very structured approach because they are not that sort of group therefore need more structured, more instruction, hmm more resources, more differentiation. And other groups, it can be slightly more flexible with more people settled, more group work depending on again their ability, so I would not say I had a natural preferred approach because it always varies depending on the group that I have and the abilities of the groups that are different."* (Teacher4-OB-EG)

There seems to be an assumption here that using 'a very structured approach' to classroom management is associated with a more instructivist pedagogy. In this response the teacher did not consider the possibility that the group dynamic might in fact be changed by the adoption of a different pedagogy, or that skills such as teamwork and staying on-task during an investigation might themselves need to be learned. The group's readiness to engage in more active/constructivist learning was taken as a fixed factor in the teacher's pedagogic decision-making. Another teacher gave a similar response:

> *"…the second one is to do with behaviour, certain classes I will tend maybe to do less group work because they have very poor social skills. So, they might tend to have loads of problems with each other in the group. So this means you are continuously spending more time keeping peace than learning, which is bad because they should be able to do, you know, the same group work everybody but as teachers sometimes you do think 'Look, that group perhaps this time, I will not do that task with them, I will change the task so: they are not interacting with each other because they have poor social skills" and sometimes as a teacher, I want to teach maths slowly, slowly they will get the social skills but they can't get it in one lesson, in my lesson me demanding them to do something, sometime I have to give up and say "Okay", maybe with time they will be able to do it but right now it's a problem".* (Teacher3-RB-EG)

The teacher indicated that the students who couldn't yet engage in active/constructivist learning successfully may learn to do so in the future, perhaps by its gradual introduction by the teacher: 'slowly they will get the social skills but they can't get it in one lesson'. This seems to reflect a pragmatic balance between choosing a pedagogy the teacher believes the students can currently cope with and working to develop their ability to engage with a more constructivist approach that may, in time, enhance their learning.

Table 4-19 summarises the numbers of teachers in England and North Cyprus who identified the student group as a factor in the choice of pedagogic approach. Overall, this was one third of all teachers; similar observation apply to this figure as to the 25% for whom the lesson topic was identified as a factor.

Table 4-19 also summarises the numbers of teachers in England and North Cyprus who identified the lesson topic or student group as factors in the choice of pedagogic approach. It is important to note that although the numbers are small, teachers were not prompted with any factors determined from the theoretical model presented in chapter two, rather that the identification of lesson topic or student group as a factor emerged from the analysis. This suggests that the hypothesised factors were indeed factors for at least some of the teachers interviewed.

Table 4-19 Influence of lesson topic or student group factors on pedagogic choices in practice

	England (n=6)	North Cyprus (n=6)	Total % (n=12)
Lesson topic influences choice of pedagogy	2	0	16.67% (2)
Student group influences choice of pedagogy	2	2	33.33% (4)

4.3.3.3. The Schools' Preferred Approaches

It was hypothesised that a teacher's pedagogy would be influenced by his or her perception of the school's preferred pedagogy, an aspect of what Rogers (2003) calls 'compatibility' and Venkatesh (2003) calls 'facilitating conditions'. As a follow-up to the question about their own preferences, therefore, teachers were asked the following:

- Whichever you prefer as your natural approach, which do you feel best describes the general approach of your school?

Their responses were classified with respect to the same three categories as their beliefs, that the school pedagogic culture was: instructivist (A), constructive (B) or mixed (C). These are summarised in Table 4-20.

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Table 4-20 Schools' use of pedagogy in teaching

Approach (Vision)	England (n=6)	North Cyprus (n=6)	Overall % (n=12)
A – Instructivist Students need teachers to set clear goals and boundaries, give them access to high quality structured resources and information and lots of practice on problems to achieve success	4	6	83.34 % (10)
B – Constructivist Students need collaborative group activities that help them to develop critical-thinking skills, be creative, take pride in their team's work and learn to work together	1	0	8.33% (1)
C – Mixed A combination of the two approaches	1	0	8.33% (1)

Almost all the teachers reported that their school preferred instructivist pedagogy. Only one teacher believed their school preferred a constructive approach, and one a mixed approach. As the teachers noted:

> *"It is definitely, I think definitely vision A. Because, our school wants from us to set boundaries and goals in the beginning of the term so students know what they should be doing in the classroom in the first lesson."* (Teacher13-BC-CYI)

> *"I think in terms of the way the school is and the way the students and our expectations of pupils, I would probably say A".* (Teacher2-SK-EG)

Similarly, several other teachers felt their school preferred an instructivist approach. As can be seen from the above table, only one teacher said their school's approach is constructivist, believing in particular that learning from each other is very important for his school:

> *"School approach is group definitely. They prefer group, learning from each other that sort of approach is much preferable. I think yes across the board they will prefer that where they, you know, you are discussing quite higher-order thinking problems and, you know, there is a feedback, there is peer assessment, there is teacher assessment, you know, there is a self assessment within that. Yeah, that's probably what they'd like."* (Teacher3-RB-EG)

The teacher used the word 'they' more than once and rather than 'us' when indicating school, this may suggest that the lead in this case was perhaps coming for senior management, or in any case, not from teachers. Only one teacher described their school's approach as a combination of instructivist and constructivist approaches. Furthermore, her response suggested that she was still referring to her own preferred practice as opposed to the policy or culture of the school:

> *"Both. I think both of them need to work in order to kids learn effectively and again over a years' worth of teaching. Every work of my experience both styles depending on the units that they do, depending on the topic that they do, depending on how is it delivered and how we settled up it to delivered. I think both A and B apply and I would say over an academic year of teaching and experiences of all of those in the subject."* (Teacher4-OB-EG)

It can be said that all the participating secondary schools are using an instructivist approach and encouraging their teachers to set boundaries and goals in the beginning of the school term so

students know what they should and should not do in the school and classroom. Although the general approach of all of the schools is instructivist, most teachers stated that their own teaching approach is at least a combination of both.

4.3.3.4. Comparison of Teachers' and Schools' Preferred Pedagogic Approaches

The following table shows, for each teacher, the preferred teaching approach, perception of the schools' approach, and the country in which the teacher is working. First, the general picture is presented and then England versus North Cyprus situation is discussed.

Table 4-21 Teachers preferred teaching approaches and perception of the schools' pedagogical approaches

Teacher	Preference	School Preference	Country
Teacher1-DM-E	Mixed	Instructivist	England
Teacher2-SK-E	Mixed	Instructivist	England
Teacher3-RB-E	Mixed	Constructivist	England
Teacher4-OB-E	Mixed	Mixed	England
Teacher5-AP-E	Mixed	Instructivist	England
Teacher6-RW-E	Mixed	Instructivist	England
Teacher9-OC-CY	Constructivist	Instructivist	North Cyprus
Teacher10-BO-CY	Instructivist	Instructivist	North Cyprus
Teacher11-UA-CY	Mixed	Instructivist	North Cyprus
Teacher12-HY-CY	Instructivist	Instructivist	North Cyprus
Teacher13-BC-CY	Constructivist	Instructivist	North Cyprus
Teacher14-SOz-CY	Constructivist	Instructivist	North Cyprus

In general, it is clear that almost all of the teachers believed their school to prefer an instructivist pedagogy. It is also striking that most teachers felt their own pedagogy was more or less at odds with the school's. This is summarised in the following table.

Table 4-22 Are teachers' and schools' pedagogical approaches matched?

Exact match of teacher's and school's preferred pedagogy	3 (25%)
Teacher prefers a mixed approach, school prefers either constructive or instructivist	6 (50%)
Teacher prefers constructivist and school prefers instructivist	3 (25%)

Only one in four of all teachers reported that their preferred pedagogy matched the one preferred by the school. Half of them were using, or preferred to use, a mixed pedagogy in a school that (according to their perceptions) preferred a purely instructivist one. The final quarter preferred a purely constructivist approach in the same context. This does not support the original hypothesis raised in the literature review, which predicted that teachers would tend to adopt the same pedagogy that they believe their school promotes, based on the acceptance model of Venkatesh et al. (social influence) and Rogers's Diffusion of Innovation model (observability).

When each country is examined separately, the difference between pedagogic preferences can be clearly seen. In England, all English teachers (6 or 100%) reported they preferred to employ a mixed approach and four stated that they believed their school preferred an instructivist pedagogy, one reporting their school preferred a constructivist pedagogy and one a mixed pedagogy. In North Cyprus, however, the picture is quite different: half of the teachers (3, or 50%) reported that they preferred a constructivist pedagogy, two preferred an instructivist

approach and one a mixed approach. All Turkish Cypriot teachers (6, or 100%) believed that their school preferred an instructivist approach to teaching. This also does not support the original hypothesis which initially predicted that English teachers would prefer to employ a constructivist approach while Turkish Cypriot teachers would prefer to employ an instructivist approach in their teaching.

Since this is contrary to the expectations emanating from the literature review, it is natural to ask what is happening and how it can be explained. These results appear to point to recognition of personal values on the part of the individual teacher for a choice of pedagogy, rather than the uncritical acceptance of the school's preference. The latter may be informed by the school's desire to perform well in league tables and in inspections by Ofsted. In this view constructivism may be seen as a 'noble ideal' but not a practical solution' where the school is focused on targets, and instruction may be seen as the more 'practical solution' and selected even when personal values are more in line with the noble ideal.

English teachers' adoption of a mixed approach (in conflict with an institutional preference for instructive pedagogy) could be explained as a strategic adaptation by teachers whose goals for education are not perfectly aligned with those of their school. They therefore adopt elements of constructivist approach out of their own preference, but mix them with instructivist elements expected by the school. In the case of North Cyprus, however, there seems to be a greater desire to adopt new ways of teaching (a constructivist method), that they believe will enhance their teaching and their students' learning. Where they perceive the school to be instructivistly-focused, this is often connected in the questionnaires with obstacles to technology adoption such

as poor provision of training and encouragement. Other explanations are, however, possible and further research would be required to confirm this.

It is natural to ask therefore; to what extent the teachers were able to evidence the application of their stated pedagogic preferences by reference to actual classroom practice. Examination of what they believed their pedagogic approach to be: what, in fact, were they doing in practice? - is considered in the next section.

4.3.4. Scenarios for the Use of Technology

Teachers were also asked about their way of using ICT in the classroom, to identify their approach and compare this with the teachers' responses to the first question. The reason for comparing this response with the first is to check what they said about their teaching styles and whether this matched how they applied it in the classroom. Thus, Table 4-24 in the next section shows this difference.

All the teachers interviewed were asked to describe specific lessons in which they had used ICT. In this section the classroom practices of three teachers are considered in relation to their stated preferences for pedagogic approach and their perception of their schools' preferences. The teachers selected were Teacher1-DM-EI, Teacher3-RB-EG and Teacher5-AP-EI; these were selected on the basis of the information they provided about the use of ICT in their classes, and to illustrate a variety of approaches rather than to act as a representative sample. All three were based in England where barriers to the adoption of ICT were lower (see below), so that these

teachers had more opportunities to put their pedagogic preferences into practice. All three stated a preference for a mixed pedagogy and all three believed this was different from the school's preference. Teacher1-DM-EI and Teacher5-AP-EI both identified their school's preference as instructivist, whereas Teacher3-RB-EG, who was at a different school, felt that the school's preference was constructivist. In all three cases 'a model of practice' in ICT integration could be examined in the context of a variety of pedagogic approaches.

4.3.4.1. The Practices of Three Example Teachers

All of the teachers were asked specific questions about their use of ICT in actual lessons. The following table illustrates which ICT equipment each teacher identified as something they used in their teaching. Note that this does not mean, for example, that Teacher3-RB-E did not use a VLE, but only that it was not mentioned in the interview. These specific ICT resources were mentioned in the context of questions about the use of ICT in the teacher's pedagogic practice, and teachers were not prompted about any of them. Hence these are the resources that appeared relevant to each teacher.

Table 4-23 The practices of three example teachers' use of ICT

Teacher	YouTube	Video Camera	Shared Resources	VLE	IWB	Excel
Teacher1-DM-EI	Y	Y				
Teacher3-RB-EG			Y		Y	Y
Teacher5-AP-EI		Y		Y	Y	

Teacher3-RB-E was examined first since this teacher was based at a different school from the other two.

1. Teacher3-RB-EG

Teacher3-RB-EG taught mathematics and spoke especially of the efficiency gains made possible with Microsoft Excel, a popular spreadsheet application:

> *"Yes, by pen and paper and it's very long, you know one lesson maybe you, you draw three graphs. On a computer in one lesson 20 graphs and what we can do is now discuss how these graphs are behaving So we are coming to higher-order thinking, not only to show somebody we can draw a graph but we can interpret a graph. Can we go further than the drawing and do the higher thinking about this graph?"* (Teacher3-RB-EG)

Two important points are made by this teacher. The first point is that the ICT enables more content to be packed into the lesson: with hand-drawing the students can only see a limited number of variations across the graphs, but software allows the drawing process to become immediate, which means more variations can be seen. The second point is that the lesson is able to progress beyond the mechanical skill of drawing a graph to the acquisition of more analytical skills related to interpretation and understanding which are required in the constructivist learning environment as mentioned in the literature review. In this way, ICT enables teachers spend more time on higher-order thinking skills.

This teacher teaches in classrooms that are equipped with quite large numbers of individual PCs, as he stated:

> *"No, nearly everybody, there are 25 in here and usually we have 30 pupils, so there will be some sharing."* (Teacher3-RB-EG)

Sharing a computer is clearly described as a necessity by the teacher: the fact that 'there will be some sharing' takes place because there are inadequate resources rather than for pedagogic reasons (otherwise the teacher could have all of the students work in pairs and choose not to use all of the available PCs). When students have to share, the teacher is conscious of the need to choose pairings with pedagogic aims in mind:

> *"Yes but especially with the bigger classes but most of the times most of them will have the individual and then some will share, the ones who are less weaker maybe we put them with someone who can help them and or maybe we put two weak ones together and work through it, you know. 'Cause sometimes you put strong with weak, sometimes the weak one doesn't touch it, the strong will finish it in two minutes and the other doesn't really know what's happening, but so half and half."* (Teacher3-RB-EG)

The reason for these choices appears to be predominately instructivist. Students are expected to help one another to undertake the prescribed task, there being no reference here to inquiry or discovery-based learning, although the teacher did not state explicitly that this did not take place. In fact, elsewhere the teacher described an application of Excel that could be used in a more inquiry-based way, but it was not clear whether this was used in an actual lesson:

> *"Maybe we can do a simulation in Excel where we roll a dice 100 times, you know, by pressing a button and the dice rolls a random number generating, so that would be something I might use for probability."* (Teacher3-RB-EG)

Immediately after this, on the other hand, the teacher describes his use of the Interactive White Board (IWB):

> *"...Or if we were doing some algebra, graphs, you know, It would be better to do that on, on interactive than on paper, graph paper and you can draw a graph because I can simply change the equation and you can see the graph move immediately, there is an immediate impact rather than it takes me ten minutes to draw a graph if I'm going to draw the next stage of the graph another ten minutes,*

> *whereas the press of one button and you can see the effect of something happening on a graph. It becomes more alive".* (Teacher3-RB-EG)

It is clearly seen that the technology is being used by the teacher, who is tied to the IWB at the front of the class while the students 'see' passively. This is clearly an instructivist style of teaching, even more so than the method the teacher says it has replaced, in which the students would all have time to draw the graphs for themselves rather than watching the teacher making changes on the screen at 'the press of a button'. This expresses, or perhaps even helps to construct, a large power distance in the classroom, contrary to the Hofstede's model prediction for English pedagogic culture. The ways in which technology can encourage a more teacher-centred pedagogy will be discussed as an emergent theme below.

Taking all of these examinations together it is clear that Teacher3-RB-E is using a predominately instructivist pedagogy in practice while stating a preference for a mixed pedagogy and indicating that the school's preference is constructivist. While this teacher may be using constructivist practices in other classes or in other ways, the impact of ICT described in the interview led to a more instructivist and less constructivist pedagogy. Having said that, within this pedagogic approach, it is appeared that the teacher is effectively integrating ICT into all his classes.

2. Teacher1-DM-EI

Teacher1-DM-E teaches Media and mentioned YouTube (a popular website that hosts videos) and a video camera, as pieces of ICT equipment that were used in practice, but did not mention Excel. The practical use of YouTube is not elaborated upon. A typical classroom use for

YouTube would be to show the class a video selected by the teacher; this would suggest a more instructivist approach than a constructivist one, since the mode is one of passing information from the teacher to the students. This technology could certainly, however, support active learning as well, perhaps with students finding video resources for themselves as part of a more loosely-defined task or project.

An unusual example of the use of the video camera to enhance the teacher's presentation was also given:

> *"For example, today we were doing some creative writing, so and they didn't understand the idea that I wanted them to zoom in on, on something to describe it, so I got the video camera out, hooked it up to the TV, filmed them and then zoomed in and then said, right, this is what you have got to do in writing and they got it then."* (Teacher1-DM-EI)

The teacher used the video camera in an instructivist way, as the teacher attempted to transfer information to the students so that they 'get it'. The teacher first provided a verbal explanation and when students didn't understand this, the teacher then employed the term and the technique 'zoom in' (related with the Vygotsky's ZPD) which was more familiar to the students. By doing this the teacher provided scaffolding for the concept being taught. This is consistent with the mixed pedagogy the teacher prefered to apply.

This teacher emphasised the value of ICT in the continuing professional development of teachers outside the classroom, as in weekly peer-training sessions in which:

> *"every members of staff at least a couple of times in a year will have some piece of software or some idea like an online timer or something like that and they will*

> *share that good practice with the rest of staff, so that happens every week".* (Teacher1-DM-EI)

This teacher also referred to a network drive, accessible to all of the teachers, in which lesson resources were stored and, therefore, shared. This certainly points towards a collaborative and constructivist approach to continuing professional development. When asked whether these practices supported any particular pedagogic approach, however, the teacher said,

> *"I think, either really. I guessed either. Obviously I cannot say one more than the other to be honest."* (Teacher1-DM-EI)

While these facilities may be valuable (and are clearly valued by this teacher) they were not seen to influence teaching practice towards any particular pedagogic style.

At the end of the interview this teacher indicated that the presence of ICT in the classroom (specifically, in this case, the video camera) can lead to the adoption of a more instructivist approach:

> *"If you don't have clear boundaries and goals and good classroom management then it's a lot more difficult to use the technology because I wouldn't take any technology into the classroom if they behaving in an unsafe manner or do you know what I mean. That's no point to taking into that, because they won't be able to use it. You know it get broken; it's not used properly. So, I would say possibly A is best."* (Teacher1-DM-EI)

Some issues raised by this quotation are discussed below as emergent themes.

As with Teacher3-RB-EG, Teacher1-DM-EI is integrating technology into the classroom and using it to enhance students' learning. Overall, this teacher also describes actual ICT integration

that fitted better with an instructivist rather than a constructivist pedagogy. The differences between Teacher1-DM-EI and Teacher3-RB-EG may be more attributable to their different subjects (Media Studies and Mathematics, respectively) than to differing pedagogic preferences. In a creative writing lesson there is always more scope for students to have freedom to make choices about the work they do, but this on its own does not make the lesson constructivist. There is only modest evidence here of ICT being used to scaffold learning or being provided to students as a resource for their own inquiry-based, student-led research.

3. Teacher5-AP-EI

Teacher5-AP-EI taught English. Like Teacher1-DM-E, Teacher5-AP-EI described the use of a video camera and, like Teacher3-RB-EG, referred to network resources and IWB, although in this case the resource was a VLE accessible to students as well as staff. While the VLE is clearly used as a shared resource for students and teacher, the teacher is described as directing the content and the tasks to be performed with it:

> *"In key stage 4, we are doing a media piece of course work and I have managed to put all of the tasks and sheets and resources on a Virtual Learning Environment of VLE. And I find that really useful because I can set students tasks to do which they can access not only in the classroom but they can go home and work on as well and hmmm submit it to me to mark."* (Teacher5-AP-E)

The VLE is described as assisting both the teacher and students, ensuring that the students are able to carry out the tasks assigned by the teacher effectively and correctly. The project is defined and driven by the teacher rather than by the students which is related to a generally instructivist approach (although one would expect the tasks set to allow some learner control of the activity, since media projects often have a creative element). The VLE is not being used as a way that

constructivist pedagogy would suggest wherein students and teachers can both actively collaborate, with students as far as possible taking the lead. It is, however, employed to facilitate students' abilities to study at times and in places suitable to them, with the implication that they may learn in a way that is largely independent and self-directed. Again, a characteristic blend of pedagogies is being enhanced by the integration of ICT.

The use of IWB by Teacher5-AP-EI appears to involve more student activity:

> *"And another thing I have used quite a lot is interactive whiteboard and hmm that's quite useful for let say if I put a poem on and we will discussing rhyme schemes, features in the poem. What I can ask students to do is to annotate on the board so everyone can see parts of the poem they can highlight it, they can make things flash focus on areas and what are useful then is I can print that off or I can email that to students as well so we are working collaboratively with technology."*
>
> (Teacher5-AP-EI)

Although this teacher indicates that the students are taking an active role ('they can highlight it', 'they can make things flash', 'focus on areas'), however, they are in fact, taking turns using a centralised resource at the front of the class that is controlled and moderated by the teacher. The teacher then captures a final, correct version of the work and prints or emails it. Elsewhere this teacher-led use of the IWB is more explicit:

> *"Instead of saying on paper, everyone look at line 15 and tell me about this, I can put it on the screen and I can say right let's look at this and I can point out it and everyone can see really clearly on the interactive whiteboard and I can annotate, I can draw lines off it, I can use a special, it's like a magnifying glass but it blocks out everything else apart from what I want them to look at so I can say look at this."*
>
> (Teacher5-AP-EI)

This highly structured and stepwise instruction is very similar to the use of the IWB described by Teacher3-RB-EG; that is, it is used to enhance the teacher's presentation of information to the

students rather than as a resource to be used actively by the students. The teacher recognised this fact when asked which pedagogic approach this use of the IWB tended to support:

> *"I think the way I am using technology in English typically would be for vision A. I have used it with vision B, when we have being especially creative."* (Teacher5-AP-EI)

The teacher then gave an example of a creative lesson in which he provided some basic materials (including a video camera) and set the students the task of making 'a zombie movie'. The students then spent the 'whole day' working independently 'in groups' on this project. Although the teacher set the original objective and determined in advance which materials would be available, this lesson was much more independent, active learning and gave the students considerably more freedom:

> *"They created it themselves. There was no teacher involvement, it's exactly what they want out of it and I think that's valuable learning experiences for life skill."* (Teacher5-AP-EI)

It is worth pointing out that the lesson's objectives appear to have been more to do with 'soft' skills such as teamwork, working independently, planning and so on, rather than specific technical skills such as how to use the video camera or editing software. This recalls the importance of the lesson's topic in determining the pedagogic approach that seems most appropriate to the teachers.

4.3.4.2. Summary

All three teachers discussed in detail above used ICT in a predominately instructivist manner. All were seen to employ a mixed pedagogy in practice, and all integrated ICT into their lessons in

order to support it. The teachers' stated preferences, perceptions of their schools' preferences and descriptions of practical applications of ICT may be summarised as follows:

Table 4-24 The pedagogical preference of three example teachers and their schools and the pedagogical approach they apply when they use ICT

Teacher	Teacher's Preference	School's Preference	Use in Practice
Teacher1-DM-EI	Mixed	Instructivist	Mixed
Teacher3-RB-EG	Mixed	Constructivist	Mixed
Teacher5-AP-EI	Mixed	Instructivist	Mixed

The following table summarises the approach applied by the actual uses of technology described by all twelve interviewees.

Table 4-25 Summary of teachers' use of ICT in practice

Approach (Vision)	Percentage (%), Number (n=12)
Instructivist (A)	75% (9)
Constructivist (B)	16.67% (2)
Mixed (C)	8.33% (1)

This table shows that the most of the teachers were using an instructivist approach in their teaching even though almost all report that their preferred approach is constructivist or mixed.

4.3.5. Reasons for Using the Selected Technologies

Teachers gave a number of reasons for choosing the technology they used and these are summarized in Table 4-26 in descending order of frequency. Note that some teachers gave multiple reasons.

Table 4-26 Reasons for ICT use

Reason	England (n=6)	North Cyprus (n=6)	Overall (n=12)
Increase understanding of the subject	3	6	9
Engage and increase students' interest	3	4	7
Make learning more enjoyable	2	4	6
Improve critical-thinking and problem-solving skills	3	1	4
Time-efficiency	2	1	3
Teaching how to use technology as a skill in itself	2	0	2
Help with marking	0	1	1

Increasing students understanding was the most frequently mentioned reasons that teachers chose for using ICT in their teaching:

> *"In this classroom, we used Excel program for probability which is an abstract concept and it was thought more concretely and effectively. Mathematic subjects have abstract concepts which are sometimes difficult to understand by students. So students understand these difficult concepts by using computer programs particularly Microsoft Excel software."* (Teacher12-HY-CYI)

> *"You have to get them on side to start with, then you could develop them and develop their thinking skills for example, today we were doing some creative writing, and they didn't understand the idea that I wanted them to zoom in, on something to describe it, so I got a video camera out, hooked it up to the TV, filmed them and zoomed in and then said right, this is what you have got to do in writing and they got it then?, so that kind of thing, I like to do."* (Teacher1-DM-E)

Just over half of the teachers believed that ICT can help to engage students and increase their interest in the lesson.

> *"Sometimes, I let my students to play mathematical games on the internet in the computer lab. I think different stimuli increase the students' interest in their lesson."* (Teacher12-SO-CYI)

> *"...it's getting them up and using their arms instead of just writing them using their hands to paint on the screen and things like that. I think they find it more engaging and it's more valuable".* (Teacher5-AP-EI)

Relatedly, half of the teachers reported that using ICT can make the learning more enjoyable for students.

> *"...after class I asked students what they think about this teaching style and most of them told me that it was fantastic and they learn better".* (Teacher13-BC-CYI)

> *"They quickly reached the information that we were looking for and they really like it because they found out by themselves."* (Teacher11-UA-CYG)

> *"Yes, it went well, they really like it."* (Teacher2-SK-EG)

Just under the half of the teachers believed that ICT can help to improve the critical-thinking and problem-solving skills of students:

> *"it takes me ten minutes to draw a graph, if I'm going to draw the next stage of the graph another ten minutes, whereas the press of one button and you can see the effect of something happening on a graph. It becomes more alive."* (Teacher3-RB-EG)

> *"...the use of ICT improves students' critical-thinking skills and provides working together."* (Teacher9-OC-CYG)

Only three teachers reported that the use of technology promoted the efficient use of teaching time in the classroom (also, see the discussion above of a graph-drawing lesson by Teacher3-RB-EI).

> *"Well it just saves time, you say well if you didn't quite get that, look at the video of how I did it."* (Teacher6-RW-EI)

> *"They quickly reached the information that we were looking for."* (Teacher11-UA-CYG)

The teaching of specific technology skills in preparation for employment and the facilitation of marking were given as factors by smaller numbers of teachers (n=2 and n=1 respectively). Preparation for employment was considered further as an emerging theme. The potential of ICT to reduce teachers' workloads and improve their own efficiency was hypothesised as an enabler for technology adoption and is considered in the next section.

4.3.6. Barriers to and Enablers of Technology Use

- Are there any issues or problems in trying this (using technology)? Do you see any resource / access issues in using this technology? Do you see any training needs in using this technology?

Teachers were asked these questions to find out the barriers and enablers to teachers' use of ICT in their classroom. First, the barriers and then the enablers are presented.

4.3.6.1. Barriers

The Table 4-27 below shows the barriers to teachers' use of ICT. These responses are presented in the most frequently mentioned order. The most frequently mentioned comment comes first with the least, last.

Table 4-27 Barriers to teachers' use of ICT

Barriers	Number in England (n=6)	Number in Cyprus (n=6)	Number Overall (n=12)
Unavailability of ICT training	2	6	9
Unavailability of ICT resources	3	5	8
Inaccessibility of ICT resources	2	3	5
Lack of technical support	2	2	4
School policy	1	0	1

Teachers were very clear about the factors they considered barriers to their ICT usage. As the table shows, lack of training and resources were the areas that the most of teachers pointed out. In three of the four cases, more teachers in North Cyprus reported the barrier than in England.

Unavailability of ICT Training

Unavailability of training was identified as a barrier to the adoption of ICT by more teachers than any other factor; 75% of interviewees said it was a problem, including all the teachers in North Cyprus. Surprisingly, two teachers in England reported that they had had no training at all, for example:

> *"I would like to have some training. I have not had any training on it."* (Teacher2-SK-EG)

A complete lack of training was also reported by all six respondents in North Cyprus:

> *"Also, we do not have any training for use of available technologies in our school by school or by government. This is also another problem for us. For that reason, more than half of the teachers because they do not know or they do not feel comfortable using it or learning how to use it".* (Teacher12-HY-CYI)

Only one teacher who reported problems with levels of training indicated that any training was received at all, and this appeared mostly to be informal peer learning rather than professional training provision:

> *"90% self trained, some training in University but not much on the job training. As I am one of the Maths teachers more skilled in ICT so I provide support for other Maths teachers on Maths-related software. There is definitely a problem in this area as there are insufficient funds available for training non-IT staff in their curriculum-specific software, so we rely on in-house support from colleagues."* (Teacher3-RB-EG)

This teacher's statement that '[t]here is definitely a problem' with this situation suggests that this form of peer learning alone does not suffice to raise the ICT skills of the teachers at the school to a satisfactory level.

Unavailability ICT resources

All of the teachers were asked about the types of ICT equipment they believed were available at their school. It was hypothesised that in England, which is a richer country, there would be greater provision of resources than in North Cyprus. As predicted, the use of educational technology was more common and more diverse among teachers in England, while teachers' resources in North Cyprus were more limited. Table 4-28 shows the facilities the teachers reported as available in their school, broken down by country; it appeared that teachers working in English schools had access to a far greater range of ICT resources than those working in North Cyprus.

Table 4-28 What type of ICT do you have in your school to use as a teaching tool?

Technology	England Number (n=6)	North Cyprus Number (n=6)
Camera	1	
Data Logger	1	
Microsoft excel	2	
Microsoft PowerPoint	1	
Interactive white board	2	
Internet	3	2
Laptop	2	
Projector	1	1
PSPs	2	
Publisher	1	
TV	1	
Video	3	
Virtual Learning Environment	4	
Computer	6	2
CD-Player		2
DVD		1

Although no teachers in England said they had access to a CD or DVD player, all had access to a classroom computer and these would usually offer the facility to play CDs and DVDs.

Two teachers in England reported that resources they wanted were unavailable, but these resources were acknowledged to be 'expensive' and, although useful, not essential; in one case a set of anonymous electronic voting handsets (Teacher5-AP-EI) in another a set of tablets for writing on (Teacher1-DM-EI). In both cases these are technologies that allow the IWB to be used in a more interactive way and the aspiration here may have been to move away from the instructivist way of using the IWB that was examined above.

In North Cyprus more basic ICT equipment that teachers in England did not mention any problems accessing was missing:

> *"The problem is we do not have computer and smart board technology in every classroom... I would like to present my lessons through Microsoft Excel by using computer in the classroom. However, as I said, we do not have any computesr in the classrooms."* (Teacher12-HY-CYI)

> *"The problem is that our school does not have enough computers and also we don't have computers in every classroom*." (Teacher13-BC-CYI)

Similar responses were expressed by the other teachers in North Cyprus, all but one of whom reported issues of this kind. Clearly a piece of ICT equipment can only be used if it is available to the teacher, making this a fundamental barrier to the use of more ICT in the classroom.

Inaccessibility of ICT resources

Five teachers reported that they had a problem with the lack of accessibility of ICT resources in their schools which meant the school did have some resources, but they could not always get access to them when they wanted to. Teachers said that the accessibility issue is important because if they could access more resources, then would use them more in their teaching, as two of them commented:

> *"We could use the PSPs more, we don't really use them much, I have used it once, it would be nice to be able to use them more because even if you give them to – group of students or peer students with information on them and they can use them to maybe carry out activity so you do not have to keep talking to them all the time… I had a use of it once that was a while ago. But I do not think every department in the school has one. We have just got one set in the school so it is quite difficult to get hold of them, would like to have more of them in the school."* (Teacher2-SK-EG)

> *"We have only one intelligent classroom- computer suit to use computer and internet. So, sometimes it is difficult to have your lesson in this computer suit."* (Teacher12-HY-CYI)

There is a large and obvious overlap between this issue and the previous one; for more ICT to be used in classes it must not only be owned by the school, but made available to teachers in sufficient quantities that the resource is accessible when needed. Again, if a teacher cannot access the ICT resource they wish to use then this is a fundamental barrier that effectively prevents the resource from being used.

Lack of technical support

Teachers who use ICT are aware that technological resources can develop problems that cannot quickly be resolved by the class teacher. This situation can cause a lesson to go off-track if high quality technical support is not readily available, causing stress for the teacher and disruption for the class. Hence, if a teacher is not confident that an ICT resource is reliable and well-supported they may choose not to risk using it. A number of teachers reported concerns of exactly this kind.

> *"Well we don't have IT technicians in our school so in the event of any problems or issues with the use of CDs and computer, one of my colleagues, who is not a professional teacher, help me with this."* (Teacher9-OC-CYG)

> *"Technical problems are headache; IT technicians may take some time before fixing fault.* (Teacher3-RB-EG)

All of the issues discussed in this section arise from funding priorities. As one teacher bluntly put it,

> *"On the other hand, the other reason is that we do not have good quality resources and training to use the technologies and also government and our school do not*

encourage us to use technology in our lessons so this also affects our teaching styles". (Teacher10-BO-CYG)

School Policy

In one instance, the school's policies themselves prevented the teacher from experimenting with a particular ICT resource:

> *"I would like to use mobile phones in the classrooms to be honest, but hmm you know, there are obviously issues that come alongside that, you know, pupils can, for example, teaching year 9, unit 4 they need to embed same files into their work, now if they were allowed to bring their phone into school and use it in a lesson they would have all the same files in their hand, and all I need to do is plug it in, transfer it on the computer, straight from their mobile phone instead of the twelve jump through because school policy dictates that they are not allow the mobile phone in school".* (Teacher4-OB-EG)

This barrier is unlike the others since it stems not from a lack of funding but from a school policy the purpose of which probably has little to do with pedagogy except in as much as it impacts on behavioural issues.

4.3.6.2. Enablers

The Table 4-29 below shows the factors teachers believed helped them to use ICT in their classes. Again in this table, responses are presented in frequency order.

Table 4-29 Factors enabling teachers' use of ICT

Enablers	Number in England (n=6)	Number in North Cyprus (n=6)	Overall Number (n=12)
Availability of training	4	0	4
Availability of ICT resources	2	2	4
Confidence	3	1	4
Technical support	3	0	3
Perception of usefulness	3	0	3
Access to own personal laptop	1	1	2
Belief that use of the ICT resource is easy	2	0	2
Social influence	1	0	1

Availability of Training

It is unsurprising that no teachers in North Cyprus believed this factor enabled them to use ICT in their classes, since all reported that no training whatsoever was provided. In England, the picture was more mixed, with some saying that little or no training was available (see above), but others saying that training was available:

> *"If we need it and if something new comes out they get all the staff together and they do a briefing and they train us up on new things".* (Teacher2-SK-EG)

> *"Recently, there have been courses introduced for this purpose run by* teaching *and other professional agencies which teachers may enrol on usually sponsored by the software companies."* (Teacher3-RB-EG)

This suggests that, as hypothesised, training is perceived as an enabler for ICT use when it is available; what the previous section showed is that it is often perceived as being unavailable. It is not possible to deduce from this whether suitable training was provided – some teachers who said none was provided were based at the same schools as some who said it was an enabler for them – but if training has been provided, but in an inadequate way, or at a level that was unsuitable for a

particular teacher, then this may be equivalent to no training being given at all, at least as far as the teacher's future use of ICT is concerned.

Social Influence

Teachers can develop their pedagogies by exchanging and sharing ideas within departments and schools as a community. One teacher stated that this was an enabler for technology adoption. Here a teacher refers to a use of an ICT resource in a different subject area:

> *"I have seen it in history they do that."* (Teacher2-SK-EG)

This is closely related to the informal training and CPD described in the previous section. It was further hypothesised that the influence of other teachers or institutions might encourage teachers to try out new technologies; while the teacher's quote seems to support this view, the interviews did not produce any further evidence to support this hypothesis.

Availability of ICT Resources

Since the lack of resources is a fundamental barrier to the use of ICT in schools, their presence can be seen as an enabler, albeit one at a rather basic level, since it is a necessary but not sufficient condition for educationally effective uses of ICT.

> *"The equipments are good. We have a projector, TV, sound in the room and you can show video clips if you want."* (Teacher2-SK-EG)

Only one teacher in North Cyprus felt that the provision of ICT resources was sufficient:

> *"I think currently our school has the sufficient technologies which provide me to transfer the information that I want my students to obtain."* (Teacher11-UA-CYG)

It is important to note, however, that this teacher prefers a mixed pedagogic approach and is here describing only a very basic instructivist aspect of his teaching; it is not clear from the interview whether the teacher felt that richer ICT resources would have enabled a pedagogic approach closer to the preferred one.

Confidence

A number of teachers cited their confidence in using ICT resources to which they have access, as an important enabler of their use of them:

> *"No, I experiment with any technology. I've, I've added to it a few times since I've been here, and I will keep looking out for new ideas and whatever."* (Teacher6-RW-EI)

> *"I think I am good in the use of the internet."* (Teacher11-UA-CYG)

These responses can be looked at in the light of other responses about levels of training (which 75% of respondents felt were a barrier) and of technical support. These responses may reflect the fact that some, but not all, teachers consider themselves to be 'good with technology' and enjoy experimenting with it. If they are confident with ICT in this way, then this will be an enabling factor, especially if there is a shortage of training and support. At the same time, however, many are aware that their ability to develop knowledge in this way is limited and that training would improve it were it available.

Technical Support

Technical support was mentioned by three teachers in England as another enabler factor that facilitates ICT use in their classroom.

> *"We have ICT technicians so we would just log that with the ICT technicians and they come down and sort it out. There are process is in place obviously pupils report printers not working or computers and issues with laptops on a reporting system, technicians take that down on a sorts of two daily basis, to go through to start to fix it and solve the problems. If there was an urgent request like, for example, twelve computers went down in one classroom at once, then we would send for them immediately, phone them and they will come and sort it out. Hmm you know, because obviously that impacts on the learning."* (Teacher4-OB-EG)

Given the differences between technical support in England and North Cyprus reported by teachers in the section on barriers (above), it is not surprising that no teacher in North Cyprus saw the provision of technical support as an enabler. Again, since lack of technical support was described as a barrier it can be inferred that were it to be provided it would become an enabler for these teachers.

Perception of Usefulness

Three teachers in England, but none in North Cyprus, identified the performance expectancy – the perception that a particular ICT resource will be useful – as an enabler. One mathematics teacher, referring to the use of the IWB in showing the effects of changes in a formula to the shape of a graph, said

> *"Yeah, it's really difficult to do this by pen and paper, and I think it becomes easy for them to understand in this way."* (Teacher3-RB-EG)

Another referring to the use of a VLE said

> *"And I find that really useful because I can set students tasks to do which they can access not only in the classroom but they can go home and work on it as well and hmm submit it to me to mark"* (Teacher5-AP-EI)

These comments illustrate an obvious point, which is that teachers are likely to adopt a particular ICT resource if they think it will help in their lesson. Teacher3-RB-EG refered to the instructivist value of the IWB, suggesting that it helped to make his demonstrations more immediate; this is a direct pedagogic benefit. Teacher5-AP-EI, on the other hand, emphasised the potential for the VLE to make both teaching and study more convenient. In both cases, however, the underlying use was to make learning easier for the students.

Although this factor was spontaneously mentioned by only three teachers, other teachers' descriptions of their practical teaching with ICT suggest similar motives. Teacher11-UA-CYG, for example, described the following lesson:

> *"Use the internet to obtain information about the occupations and we had a group work activity about the personality traits required for occupations in group work. So, they learned about the occupations and then, then they discussed and shared their ideas about what types of personality traits are required for these occupations.*" (Teacher11-UA-CY)

It is clear enough here that the teacher has chosen to use an ICT resource – the internet – because of its usefulness in the first, information-gathering, part of the lesson, in contrast to the use of another resource such as a library or materials presented by the teacher.

Access to Own Personal Laptop

For some teachers, access to their own laptop computer was an important enabler, since this facilitated the use of ICT in a number of ways. One obvious use was in classrooms without permanent computers, which was seen to be a particular problem in North Cyprus:

> *"All of the students can watch and listen to poetry clips from my own laptop to learn how poets read the poems so they learn how to do it."* (Teacher10-BO-CYG)

Even in a well-equipped classroom, of course, the computer can break down. Having a backup plan for this eventuality is essential and the laptop provides an easy solution:

> *"We do have laptops and we can always bring laptops in and use those if computers go down".* (Teacher4-OB-EG)

4.3.7. ICT Coordinators' Perspectives

Teachers' responses were compared with the ICT co-ordinators' responses to check whether what teachers reported about the availability of ICT resources and training was accurate. The selected secondary schools in North Cyprus, however, did not have an ICT coordinator, so an informal conversation took place instead with the head teachers. Head teachers did not give permission to record the conversation and so these are not analysed in this section.

Most of the English teachers noted that they had training and accessibility problems in their school. Their ICT coordinators, however, said that their schools provided various types of training in the use of technology in general and of particular technologies in their subject teaching. As two ICT co-ordinators commented:

> *"For example; real smart which is the sort of VLE that we are using at the moment, ICT use that for all work from year 7 through to year 11, so before I went on*

maternity leave the year before last, all curriculum areas were timetabled by myself in how to use that and how to upload software so there was a member from each curriculum area that had individual one-to-one training from myself on how to learn, how to use the software, how to create their own units, how to use it in their particular subject areas. Same with the PSPs, there was training sessions on how to use the PSPs, you know, and how they might be benefit you and your lessons and your classes. Hmm we also as a IT department, the member of staff within the IT department, we run a continuous professional development (CPD) program which staff book into so, you know, basic skills in this piece of software, up front skills in this piece of software, learn how to do it this, learn how to do that and we give up our own time at the end of the day to provide those opportunities." (ICT-Coordinator1G)

"What do I have? On the VLE, we have one-to-one VLE teaching with teachers. I do that but I don't, I try not to say its training. Chat to them about it, you know, because it's kind of an encouragement because I think they feel they have to use it, they feel uncomfortable whereas I could rather than making them feel it's best to use it. You know what I mean, with a different kind angle of approach..." (ICT- Coordinator2I)

These views contrasted with some the teachers' statements about lack of training (see above), although not all teachers in England made such claims. One possible explanation is that the ICT coordinators see the provision of training at the level of training courses being provided and run, but individual teachers may not always have the opportunity to attend the courses, so that the truth is somewhere between the two positions.

Regarding accessibility the ICT co-ordinators said:

"Staff have to use their laptops on a daily basis every lessons to register groups, they obviously have to use it, there is projections facility in all classroom, so you know, they are expected to use it. It is very rare you to going to classroom in this school where ICT is not being used whether it is just the teacher of the front of the room or whether it be the whole group, you know, or small pockets of groups, she will notice we've got that big per day. That's where our independent learning projects go on and pupils have access to two laptops, three PSPs and two cameras to do independent project work for different curriculum areas. So, I think the infrastructure lends itself well, you know, we have complete wireless access across the school which has been upgraded recently. There are network points in rooms

where staff can plug into, should a wireless connection be too weak. You know, we provide staff with opportunities to use it. The infrastructure works well to support what is being done." (ICT-Cordinator1G)

"The infrastructure is definitely very good and it has improved in the last 12 months. Every classroom, the teachers have access to a PC, the register is done electronically in Sims, most classrooms I think most of whiteboard, yes everyone now has got interactive whiteboards, we've got projecting stream in the hall." (ICT-Cordinator2I)

This agrees well with English teachers' reports that ICT resources are generally well-provisioned and accessibility is not a major barrier. Overall, the picture painted by the teachers and ICT coordinators is compatible with the hypotheses concerning barriers to and enablers of ICT adoption that were derived from Rogers (2003) and Venkatesh (2003) in the course of the literature review.

4.3.8. Emergent Themes

The themes discussed above were all hypothesised based on the literature review and the interview was designed to investigate them. During analysis, however, a number of other themes emerged that had not been hypothesised. These are discussed in this section.

Value Placed on 'Soft' Skills

Some interviewees linked constructivist elements of their pedagogy with the development of what might be called 'soft skills'. By this is meant skills such as teamwork, critical-thinking, communication skills, appropriate behaviour and so on; such skills are not subject-specific, but are widely-applicable both inside and outside the classroom environment. Some teachers referred to their perceived importance for the future employability of the students:

> *"I think I agree with parts of both actually because I think students need teachers as well, but students also need to be able to work together because if they can't work together then they cannot develop team working skills, I mean it's important because we are developing them as individuals as well so when they leave school they need to have right social skills to be able to work in workplace. So working together is quite important. So when I teach I always have an activity which enables them to work together as a team, it might be a paired activity or group activity hmm, but it allows them to collaborate and share ideas with each other and I think that helps their learning rather than me just giving them the information."* (Teacher2-SK-EG)

> *"I think students have to start thinking critically at least in secondary education and learn how to work effectively together as a sill which will be needed in their future, work life."* (Teacher-13-BC-CYI)

Perhaps surprisingly, no teacher referred to these skills as humanistic values, but, in all cases they were linked to skills preparing students to function in the workplace. In all cases the development of these skills was linked to a more constructivist approach and often to the use of ICT to enable students to engage in more self-directed learning. This suggests that teachers who place a high value on these 'soft' skills may be more likely to adopt a constructivist approach and to use ICT resources in their teaching.

Necessity of Student Readiness

Another emergent theme was the idea that students have to be 'ready' for a constructivist approach, otherwise behavioural issues occur. This is linked directly but somewhat paradoxically with the previous theme. The constructivist elements of pedagogy were assumed to be useful in developing soft skills whereas here the possession of these skills is identified as a prerequisite for the use of constructivist approaches. This teacher seems to recognise the conflict:

> *"Certain classes I will tend to do less group work because they have very poor social skills. So, they might tend to have loads of problems with each other in the group. So they … which just means you are constantly spending more time keeping*

> *peace than learning, so I would, I might, which is bad because they should be able to do, you know, the same group work everybody but as teachers sometimes you think 'Look, that group perhaps this time I will not do that task with them, I will change the task so they are not interacting with each other because they have poor social skills."* (Teacher3-RB-EG)
>
> *"Some groups do not have the social skills to be able to talk to each other. So it's more teacher led, you know your group after first week so teacher decision depend on the group they teach."* (Teacher14-SOz-CY)

Actually the above two teachers, whose preferences were more constructivist, then explained and justified the use of instructivist methods. They and also some other teachers offered explanations for their preferences for a mixed pedagogy, that might in part reflect the pressure on teachers to cover a prescribed curriculum in a set time. This suggests that the use of instructivist elements was not necessarily a failing but may often be a tactical decision that the teacher perceived as being in the interest of the specific students in the classroom at the time. This shed further light on the choices made by the three teachers whose practical teaching was examined above.

ICT Drivers Towards Instructivist Pedagogy

A surprising theme that emerged from a few interviewees was that the use of ICT may actually drive teachers towards a more instructivist pedagogy. This was especially a problem with IWBs, OHPs, audio/visual facilities etc that have a tendency to put the focus on the teacher as an expert user of a single, centralised resource. Even if students are allowed to use the technology there is usually a limit on how many can actively do so simultaneously. Many examples are cited above, especially in three scenarios for the use of technology. Interestingly, one teacher mentioned an example of an ICT solution to this problem:

> *"A smart product that goes with the smart board and that is an interactive voting device where every student has wireless handsets, its buttons, so I can ask them*

> *questions about how comfortable you are with writing this kind of paragraph? How do you feel about today's lesson? What is the answer to this question? And they can press anonymously what they feel and what's the answer and that allows me to assess how effective my lessons are or to generating interesting games or quizzes things like that and it's just something I know everyone could use and I know there is a use because I have seen them but just have not got money."* (Teacher5-AP-EI)

This teacher specifically described applications for this technology that are designed to get the students more involved in the use of the IWB and to make the lesson less teacher-centred. The aspiration also pointed to the existence of the problem. Many teachers in both countries reported that their school's preferred pedagogy was instructivist: if this is true, it might partially explain why the school provides and authorises use of some technologies (the IWB and OHP, for example) but not others such as mobile phones (see above). This may suggest that large power distance and strong uncertainty avoidance were part of the institutional cultures of the schools in both England and in North Cyprus, whereas the teachers' individual beliefs and preferences were more diverse, providing further evidence that the cultural model derived from Hofstede was overly simplistic. The theoretical frame presented in chapter 2 could be revised in the light of this to differentiate between cultural factors at the institutional and personal levels.

ICT resources are also often expensive and, as we saw in a telling remark from Teacher2-SK-EG, this can lead to a protective approach to the technology that may prevent students from using it in their own ways:

> *"...they won't be able to use it. You know it gets broken; it's not used properly. So I would say possibly A is best."* (Teacher2-SK-E)

This relates to the 'readiness' of students for a constructivist approach and indicates the simple fact that ICT resources are often expensive pieces of school property and the preservation of these objects is given greater importance than the adoption of the teacher's preferred pedagogy in at least some cases. This factor was not anticipated in the original theory.

On the other hand, we have already seen examples of pedagogy in which ICT is not used in this way. In classrooms equipped with large numbers of computers, or in cases where students were trusted to use equipment such as video cameras without overbearing supervision, more constructivist approaches were possible (see above). Since all of these examples were drawn from relatively resource-rich English schools, and similar examples were not found in North Cyprus, it could be hypothesised that this factor is especially pertinent in cases where resources are limited, difficult to obtain or expensive. Further research would be required, however, to confirm this.

4.3.9. Conclusion

The analysis of the teachers' responses demonstrated important differences between Turkish and English teachers about the teaching approach they applied, the use of technology and available resources, training and technical support that they have in their school. Where English teachers use different types of ICT tools in their teaching, Turkish Cypriot teachers have a limited number of ICT tools available (see section 4.2.1.2). Most Turkish Cypriot teachers did not use ICT due to lack of ICT resources in their school. Also, all the Turkish Cypriot teachers stated that they had no training or technical support in their school, in contrast to most the English teachers.

Most teachers interviewed preferred a mixed pedagogy to a purely instructivist or constructivist one. Of the three whose practice was examined in detail, instructivist elements were seen to dominate, but the influence of constructivism was nonetheless apparent. The interviewees identified a number of factors that contributed to the formation of their pedagogy, including those that had been hypothesised: personal and cultural factors, school preference, the lesson topic and the particular student group. Regarding the last of these, the readiness of the students in a group for a more constructivist approach emerged as a theme for some interviewees. A large number of other barriers and enablers to technology adoption were reported, most of which were in line with the pre-study hypotheses.

Because of the strong presence of instructivist pedagogy in the practices of many teachers, it is not surprising that the use of ICT often served this end; the suitability of common ICT resources for instructivist use being an emergent theme, suggesting that the use of these resources might even encourage an instructivist approach. Cases were examined, however, in which technology was used in a more student-centred and collaborative fashion.

4.4. Modified Delphi Method Findings

4.4.1. Introduction

This section provides the findings of the modified Delphi study to obtain the perceptions of Turkish Cypriot and English secondary school teachers for the provided scenarios (lesson plans which can be found in Appendix 8), constructed using the matrix table presented in the following section. Then this chapter presents the analysis of the information collected during the process,

employing a constant comparative analysis method.

As described in chapter 3 the modified Delphi method is a non-forecasting method of consensus building (Topper, 2006), used in this case to build consensus regarding model of practice in practice, based on experienced' (secondary school teachers) views of what constitutes model of practice. Chapter 3 described in detail the modified Delphi method of research for data collection and the iterations that were used in this study to build consensus.

4.4.2. The Matrix Table

The table presented in Table 2-2 of the literature review is my analytical framework for instructivist and constructivist approaches and notes the characteristics of these approaches. Based on that, the matrix in Table 4-30 was designed as the first step towards constructing the lesson plans to use in this final phase (modified Delphi,) of the study.

As represented on the Table 4-30 at the end, the intersection of the teaching approaches and the levels of application of these approaches form six separated cells facilitating the construction of six lesson plans. The teaching approach across the top of the table consists of two teaching approaches, instructivist and constructivist. The level of application on the left side is composed of three degrees of intensity, high, medium and low. The characteristics of the levels of application for each teaching approach are described to guide the construction of the lesson plans according to the characteristics of the six different levels of teaching approaches. These can be set out in full as: high instructivist approach, medium instructivist approach, low instructivist

approach, high constructivist approach, medium constructivist approach and low constructivist approach.

The revised 'Bloom's Taxonomy', presented in the Figure 2-1 and Table 2-1 of the literature review, is used to distinguish more clearly between the six lesson plans as it is helpful for looking at learning activities concerned with pedagogical strategies to describe lesson plan components. The revised Bloom's Taxonomy consists of six levels: three lowest levels, remember, understand, apply, and three higher levels, evaluate, analyse and create which are parallel (equal). Up to level 3, remember, understand and apply are expected to be emphasised as objectives of an instructivist approach whilst the top three levels, evaluate, analyse and create, are expected to be emphasised in the objectives of a constructivist approach. If some of the top-level (critical or creative thinking: analyse/evaluate/create) are mixed with apply and understand, then this may indicate a mixed or eclectic approach, but if it is all application of knowledge and below, it is likely to be an instructivist approach and if it is all application and above, it is likely to be a constructivist approach.

The high instructivist approach is teacher-centred and the content of the lesson driven by the teachers applying strong direction, as they have high status and are considered to be the expert who provides a standard and structured experience through detailed instructional steps or actions to be taken by the students. Facts are seen as information to be recalled and verbal explanations are given by the teachers with the student role being mainly one of attentive listening. Understanding is checked by the teacher asking questions. In this system, teachers use technology as a tool in the classroom for drill and practice since repetition and practice are seen as important

for accurate recall and reliable task completion. The high instructivist approach is associated with assessment techniques such as multiple-choice tests, activities completed individually and worksheets that provide the teachers with the expected responses. Based on revised Bloom's Taxonomy, the high instructivist approach mainly emphasises the first level (remember) with some opportunity to develop and check understanding through application

A medium instructivist approach may also be a somewhat teacher-centred, but will include at least some student' involvement for deciding the steps of activities. In this approach, teachers are still considered experts who choose the topic and the main steps of activity, but students are then left to work alone to find the answer. In this approach, as for the high instructivist, teachers may provide instructional worksheets to the students but the key difference is less detailed step-by-step instructions to students. Neither do the students listen entirely passively as the teachers allow their students to find the answers by themselves or work together as a class. The emphasis is still on the demonstration of knowledge of a set curriculum and reproduction still contributes highly toward the success of students. Drill and practice may still be the main way technology is used in this teaching approach. Students may not fully demonstrate higher-order competencies such as problem-solving or original composition, but they do need to apply knowledge for themselves and organise their own learning steps to find answers as the teachers do not give detailed step-by-step instruction. Progress is monitored and assessed by teachers. Based on the revised Bloom's Taxonomy, in the medium instructivist approach, students recall, reproduce or restate learned information but in addition the students understand the meaning of information by applying knowledge in comparing and interpreting what has been learned. This includes the first level

(remember) and second level (understand) of revised Bloom's Taxonomy with at least some opportunity for application.

The low instructivist approach is a mix of teacher-centred and student-centred approaches where the teachers allow students to provide their own ideas about the topic and some aspects of the task are negotiated with students. Thus, students become more active when compared to high and medium instructivist approaches. The key difference of this approach is that instructional emphasis is on demonstrating inquiry and understanding of the topic rather than reproduction of a set body of knowledge. Technology is used to access information about the topic to be studied. Critical-thinking is important, as students need to make decisions about the topic content for the activity and to structure / organise compositions and group activities. Assessment is done by teachers but they do not prescribe all aspects of activity or a topic, rather the students can choose the topic or are free to manage aspects of the process for themselves – homework may be set to continue what they was started in the classroom. The teacher is still the only one who assesses the learner. Based on the revised Bloom's Taxonomy, the low instructivist approach includes the three lowest levels: remember, understand and apply. The students recall, reproduce or restate learned information; they demonstrate they understand the meaning of information by comparing and interpreting what has been learned and also have an opportunity to apply information in a new way or in a new context, different from the one in which it was learned.

The low constructivist approach is clearly more student-centred compared to low instructivist approach although teachers still provide guidance on the activity. The process and the topics may

have more prescribed elements than in the medium constructivist approach and may resemble a low instructivist approach. However, students are still pro-active, teachers allowing the students/whole class to discuss and choose elements of the topic or how they would like to work on it. Demonstrating understanding rather than reproduction of specific content facts is valued more highly. The quality of understanding and the quantity of knowledge demonstrate the success of the students in this teaching approach. No challenges are provided by teachers for the students to deal with, but they are encouraged to think creatively. Technology is used mainly as a tool by the students to record and access information on the computer. The teachers may also ask their students to assess each other's work. Based on revised Bloom's Taxonomy, the low constructivist approach includes all lowest three levels and also at least one of the three higher levels of revised Bloom's Taxonomy: analysis, evaluate or create as they are parallel.

The medium constructivist approach is also a student-centred approach where teachers are mainly facilitators, but sometimes also act as experts. Students are active participants and work in a group choosing aspects of the topic for their activity (though this may include some prescribed elements). The understanding of the topic is important, as the quality of understanding is a demonstration of the success of the students. Students need to think critically and use discovery or inquiry learning to complete a project brief or find the solution to a problem. Technology is used as a tool and to obtain access to information. The assessment is done by working together in teams (peer assessment) and doing research and developing products (teacher assessment). Based on revised Bloom's Taxonomy, the medium constructivist approach includes all lowest three

levels and two of the three higher levels of revised Bloom's Taxonomy: analysis and evaluate, analysis and create, or evaluate and create.

The high constructivist approach is a student-centred approach where the content of the lesson is driven by students, and where students are more in control of their own education and are not limited to acquiring knowledge only from teachers. Teachers are there as facilitators to provide necessary resources to students and to encourage students to be more engaged in the topic being studied and to choose the topic that they want to work on. Thus, students are active learners as they more actively involved in the learning process. They learn by inquiry, discovery and problem based learning, understanding the topic in greater depth as they carry out hands-on activities which promote higher-order thinking. In this approach, technology is used to communicate and access information by students. Moreover, in this approach, the students' ability to solve problems and exhibit self-directedness are very important elements. In the high constructivist approach, assessment is done using performance checklists (self-assessment), working together in teams (peer-assessment) and doing research and developing products (teacher assessment). Based on revised Bloom's Taxonomy, the high constructivist approach includes all lowest three levels, remember, understand and analysis, and all higher three levels of revised Bloom's Taxonomy: analysis, evaluate and create.

The matrix Table 4-30 below shows the characteristics of the different approaches to teaching as explained above. However, before moving to the matrix table, it is important to note that the reason to use the revised Bloom's taxonomy levels is to distinguish more clearly between the low, medium and high instructivist and constructivist lesson plans. The taxonomy systematically

classifies the processes of thinking and learning, and teachers must think about how they spend their classroom time so that they make sound/robust decisions about where to place emphasis for time spent on different types of activity. They also need to clearly align objectives with activities. Most teachers in practice work with something akin to the revised Bloom's taxonomy to determine their objectives and to match them to classroom activities and assessment methods in their lesson plans. These lesson plans also take into account student' differentiation and so designing lesson plans is sometimes difficult. A purely instructivist or constructivist approach may present practical problems. Furthermore, the categories of a revised Bloom's taxonomy run systematically from simple to complex and from concrete to abstract. As mentioned in the literature review chapter, constructivists tend to emphasise activity to support the top three levels of the taxonomy whilst instructivists may emphasise activity to support the bottom three levels. This language of hierarchy may seem to be valuing the constructivist approach over the instructivist approach and conflating level (and the ability or skills of the learner) with one or other approach. Nevertheless, it is argued that a constructivist approach can be used to teach lower level objectives and an instructivst approach to teach higher level objectives - questions of interest for this project concerning the choice of activity teachers make and why.

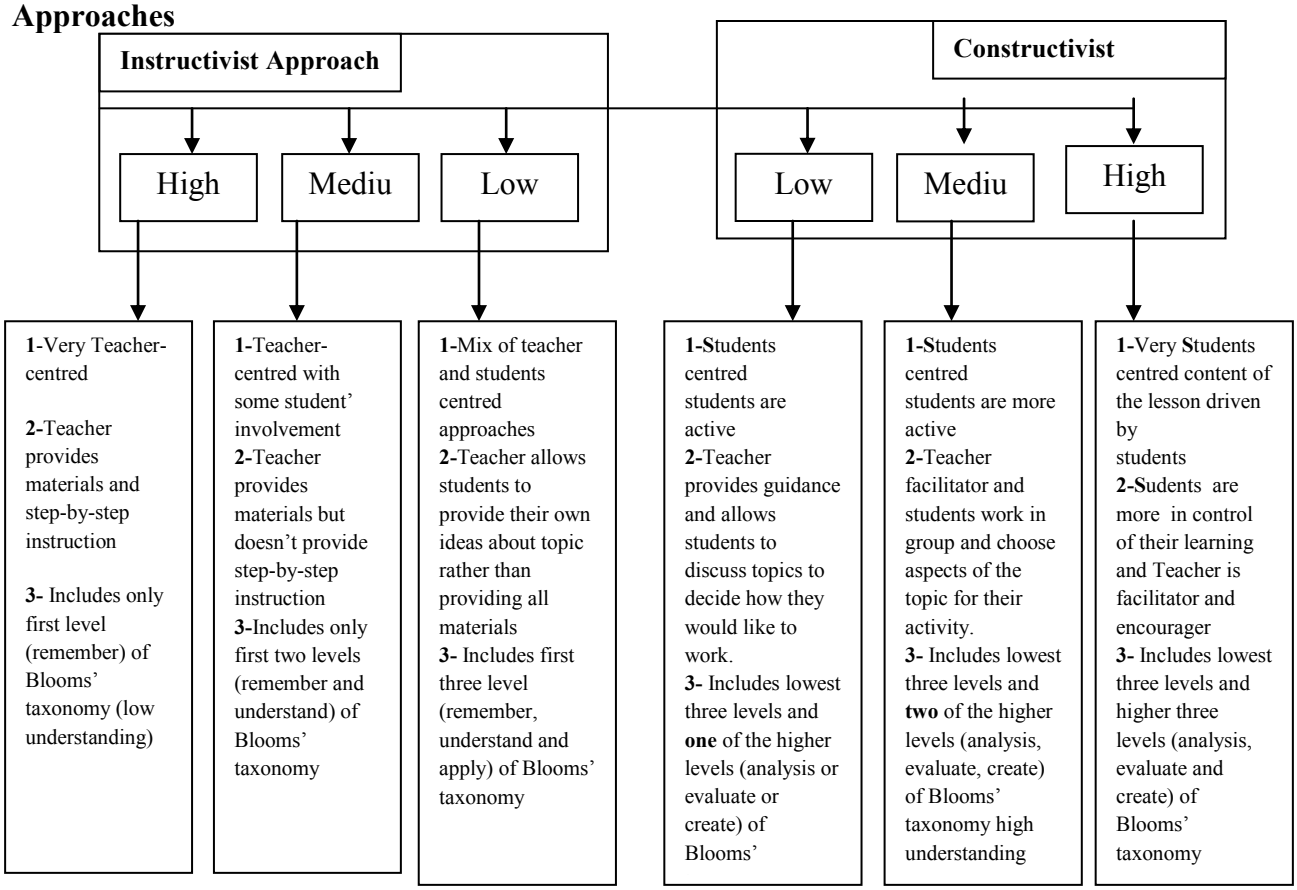
Table 4-30 Matrix table for constructing lesson plans

Level of Application	Teaching Approach	
	Instructivist approach	**Constructivist approach**
High	• The content of the lesson is driven by teacher - very teacher-centred • Teacher is the expert and gives step-by-step instruction • Teacher provides ready worksheet(s) for students to work on • Students are passive listeners and follow the steps provided by teacher • Instructional emphasis is on 'correct' knowledge and its reproduction • Students' outcome is important • Technology is used as a drill and practice • Higher-order competencies are not seen as part of the learning content • Teacher does assessment – e.g. multiple choice items, worksheets with the expected response • Includes all three lowest level of revised Bloom's Taxonomy: remember, understand and apply	• The content of the lesson is driven by students – student-centred • Teacher is there as a facilitator to provide necessary resources to students • Students decide on the topic on which they wish to work • Students are active learners as they find information by themselves and work in a group for collaboration • Instructional emphasis is on inquiry, discovery and problem based learning • Students' understanding is regarded as more important than reproducing specific facts – tasks will typically not only have one right answer • Technology is used to communicate, collaborate and access information • Problem-solving is part of learning and there are challenge(s) for students to deal with • Higher-order competencies for problem-solving and self directedness are developed • Assessment is done by teacher, self and by peer assessment • Includes all three lowest levels and top levels of revised Bloom's Taxonomy: analysis, evaluate and create
Medium	• Teacher-centred with some activities done by students • Teacher is the expert and chooses the topic for the activity but leaves students to work alone to find the answer • Teacher provides worksheet(s) but there is less step-by-step instruction • Students are not completely passive as teacher allows students to find the answers by themselves or as a class • Instructional emphasis is still on reproducing 'correct' factual responses • Knowledge rather than reasoning or originality still count most toward the	• Student-centred • Teacher is facilitator but sometimes also acts as expert • Students negotiate the topic and process for their activity • Students are active participants and work in a group and individually • Student understanding is considered important • Quality of understanding and higher level thinking skills demonstrate the success of students • Technology is used as a tool and to obtain

Level of Application (continue)	Teaching Approach	
	Instructivist approach	**Constructivist approach**
Medium (continue)	success of students • technology is used as a drill and practice • High order competencies may be rarely demonstrated as problem-solving but students need to think to find answers as teachers do not give step-by-step instruction • Teacher does assessment – norm referenced • Includes the first two lowest levels of revised Bloom's Taxonomy: remember and understand •	access to information • High order competencies such as critical-thinking and problem-solving are evidenced through assessment • Teacher and peer aspects to assessment • Includes all three lowest levels and two of the top levels of revised Bloom's Taxonomy: analysis and evaluate, or, analysis and create, or, evaluate and create
Low	• Teacher-centred mixed with student-centred, as teacher allows students to develop their own ideas and discuss these. Topics and activities have negotiated elements. • Students are generally active • Instructional emphasis is more on inquiry and understanding the topic than on acquiring a set body of facts • Quantity of knowledge as well as quality of understanding are important • Technology is used to access information and compose thoughtful responses • As students discuss or write about their own ideas they need to think creatively • Teacher does the assessment but there is some group project work as well as individual activity • Includes the first lowest level of revised Bloom's Taxonomy: remember	• Student-centred but with stronger teacher guidance on the activity • Students are still pro-active as teachers allow the students/whole class discussion and allow them to choose some aspects of the topic they would like to work on or how they would like to approach the activity • Understanding of the topics is still more important than factual knowledge alone • Quality of understanding and critical-thinking are still required for success • Technology used mainly for composition and as a tool to record information • There are fewer challenges but students are encouraged to think creatively • Teacher may be final judge but shares some aspects of assessment with students • Includes all three lowest levels and one of the higher levels of revised Bloom's Taxonomy: analysis, evaluate or create

The Figure 4-18 below shows the high, medium and low instructivist and constructivist approaches to make clear how they differ – clarification is particularly needed between low instructivist and low constructivist as they appear very similar.

Figure 4-18 Clear picture for low, medium and high instructivist and constructivist Approaches



Based on the above matrix table, six lesson plans were constructed and these can be found in appendix 8 which also includes how these lesson plans fit with the matrix table produced in this section.

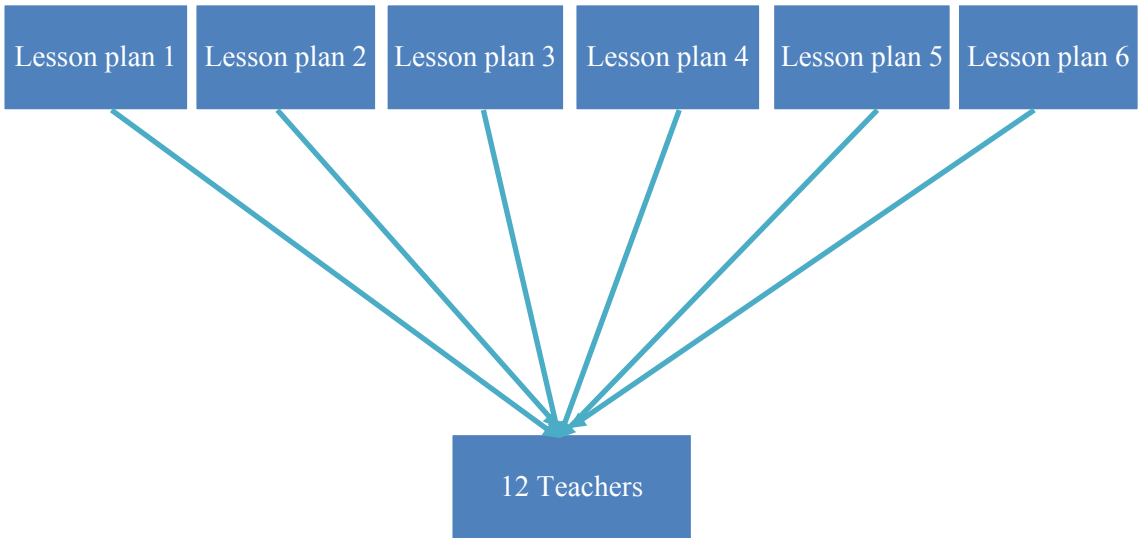
4.4.3. Round One

Invitations to the 12 teachers selected for this modified Delphi study were sent via email including an information sheet giving information about the three rounds of the modified Delphi study and a survey document that contained six different lesson plans and questions related to those lesson plans (the lesson plans can be seen in Appendix 8). All these lessons were preferred lesson plans from teachers and they embarked upon the task of how they would improve their

chosen lesson plan.

As an experienced researcher in Delphi study, Baker (2005) suggests setting time limits and sending reminder e-mails improves the response rate and keeps the research on schedule. In accordance with Baker (ibid) approach, teachers were asked to return the questionnaire by email within one week. During round one, reminder e-mails were sent one week after the initial email to those teachers who had not yet responded, to keep the study on schedule.

Figure 4-19 Round one process



Round one was constructed upon 4 open-ended questions, asking participant teachers to rank their three preferred lesson plans from the six given, their reasons for choosing them and any barriers or enablers for applying their preferred lesson plans. The purposes of round one were: (1) to identify the volunteer teachers for the second round, matching English teachers with Turkish Cypriot teachers who had similar lesson plan preferences, pairing them up for redesigning the

lesson plan; (2) to identify the plans most preferred, and the teachers' reasons for choosing or not choosing them; (3) to triangulate findings with the interview results, where teachers stated a preferred pedagogical approach for their choice of lesson plans, as the construction of each lesson plan had been based on a pedagogical approach (see see section 4.4.2.) - i.e. as a check for congruence/consistency in preferences; (4) to see if there were any cultural differences between English and Turkish Cypriot teachers about their choice of lesson plans and the reasons for their choice; and (5) to identify any barriers and enablers which teachers could face if they wanted to use the lesson plans they preferred.

All 12 teachers responded to the first round. Thus, the round one response rate was 100%. Constant comparative analysis (Glaser and Strauss, 1967) was used as a qualitative method for analysis of open questions.

The Round one analysis process began by entering all responses to each question into an Excel spreadsheet in order to easily identify the volunteer teachers and their three preferred lesson plans for subsequent pairing up. The outcome was that volunteer British and Turkish Cypriot teachers were identified and paired up, based on the similarity of their preferences. After teachers had been identified and paired up, the second round of this modified Delphi study, the constant comparative analysis (CCA) began.

CCA consists mainly of three types of coding, called open-coding, axial-coding and selective-coding, where 'the lines between each type of coding are artificial' (Strauss and Corbin, 1990, p.28). Therefore, the analysis process started with open-coding that dealt with the coding and

categorisation by closely -examining existing data with everything coded, in order to find patterns within the incidents in the data (Rodrigues, 2010). Therefore, the examined data was coded and broken down into paragraphs to identify patterns. After data had been successfully open-coded, axial coding was commenced where categories and relationships between categories emerged by grouping open-codes into categories and subcategories. It is worth noting that some open-codes themselves can become categories. Next, selective coding was carried out to determine the central category and relate it to other categories. Through this selective coding, the categories were interrelated and developed to form a model or theory. At that stage, it was necessary to step back and look at the research questions to consider what the principal information was required from the interrogation of the data. Briefly, the selection process involved choosing certain codes needed to develop the theory or explanation of the data. This analysis process was conducted using the NVivo software program for qualitative analysis. An illustration of the step by step process for the CCA process is presented below. First, the CCA process was used to identify the categories from each lesson plan (6, 5 and 4) separately and then it was used to develop a model of practice teaching based on the teacher's perceptions. Also, a comparison of the different countries allowed another model to be produced (represented as a Venn diagram), to show the differences and similarities between the two countries for preparing lesson plans.

Starting with open-coding the first teacher's interview, the first question to arise was: 'What is going on here?', 'What are the reasons for preferring this lesson plan?', 'What are the difficulties of employing this lesson plan? and 'What are the reasons for not choosing one of the other lesson plans?' In other words, 'What categories can be identified from this sentence or paragraph?'. By

answering these questions, the categories were created for the first teacher's responses (see appendix 9 for an example of coding). In the following text, the teacher first gave their reasons for choosing the preferred lesson plans and then described any difficulties in applying them. In the extract below, after analysing each segment of the teacher's response, typical codes are presented. When the different paragraphs were compared, it became clear that some of the same categories were repeated by the teacher, so they were labelled with the same code. In the succeeding segment words from the transcribed interviews appear in italic, each teacher's identification label being constructed in the following way: code words are highlighted (in colour) and the names of the codes appear at the end of each response.

The section of Teacher5-AP-E responses:

> *E (interviewer): Could you please give reasons why you chose these lesson plans?*
>
> *Teacher5-AP-EI: "This lesson plan 6 is better than the others because it makes data relevant to the students. Because the data is focused on things they know and understand – i.e., their peers, then it becomes more interesting and therefore fun to learn."*
>
> *E (interviewer): Could you give me any reasons why you did not choose the other lesson plans (scenarios)?*
>
> *Teacher5-AP-EI:" Simply, they were not as engaging for the students. Every teacher knows they will struggle if the students can't engage with the lesson and how it is relevant to them as human beings. Furthermore, they were teacher centred rather than student centred."*

Some of the codes that are attached to these paragraphs are:

"it makes data relevant to the students. Because the data is focused on things they know and understand – i.e., their peers, then it becomes more interesting and therefore fun to learn. Also, students work in a team to work together."
CODES: relevant to the students, motivation/engagement, and group work

"Every teacher knows they will struggle if the students can't engage with the lesson and how it is relevant to them as human beings."
CODES: engagement, relevant to the student

The following Table 4-31 codes were generated from the first teacher's responses:

Table 4-31 Initial Coding

Reasons for choosing lesson plan 6	**Why other plans were not chosen:**	**Difficulties in using preferred lesson plans**
• Fun to Learn • Group work • Relevant to the student • Motivation/engagement	• Students can't engage with the lesson • Teacher centred	• No difficulties

Then, in order to extend the comparative analysis to other responses by teachers from the same country, using step 2 - axial coding, other teachers' responses were selected and compared with those of the first teacher. The important categories to emerge were that technology helped students to better learn and understand topics, enabled peer-assessment, and gave a clear view whether resources (insufficient PC's) were identified as a barrier. As an example, set out below, are some segments of Teacher1-DM-EI from the same country as Teacher5-AP-EI.

Selected codes and code segments of teacher responses for Teacher1-DM-EI:

E (interviewer): Could you please give reasons why you chose these lesson plans?

Teacher1-DM-EI: "This lesson plan is a good one as it related with real life. So students learn and understand better. As activity is related with their peers and they actively use technology so it becomes more interesting and fun to learn for them and they learn and understand better. Also, peer assessment is built into this lesson plan."

CODES: related with real life, peer assessment, fun to learn, engagement

E (interviewer): Could you give me any reasons why you did not choose the other lesson plans (scenarios)?

Teacher1-DM-EI: "There is not any specific reason but the lesson plans that I chose were more student-centred and engage students more".

CODES: teacher-centred, not much engagement.

The comparison of the teachers' responses made clear what reasons had affected the particular teachers' choice of lesson plans, what the perceived difficulties were in adopting these lesson plans and the reasons the teachers gave for not choosing other lesson plans. These criteria were used to compare the responses of all the teachers who were interviewed and the results are grouped together in Table 4-32. This table presents the generated categories (patterns) from the open-codes and confirms that in practice most of the open codes became categories.

Table 4-32 Axial coding

Reasons for choosing lesson plans	**Reasons for not choosing other plans**	**Difficulties in using preferred lesson plans**
• Real life examples • Group work activities • Peer assessment • Motivation/engagement • Technology helping students to learn better	• Little engagement • Teacher centred	• Insufficient PCs

For step 3 (continuing axial coding), this only compared the Turkish Cypriot teachers' responses to those of the English teachers' previously compared as a group. Then, in step 4 (axial coding), all the teachers' responses were compared regardless of which country they were from, in order to identify the core categories for choosing lesson plans. This process used the same procedure as for steps 2 and 3 so that all teachers' responses were compared and categories were generated. As some codes did not become patterns, these did not become categories. All the categories generated by this axial coding are presented in Table 4-33.

Table 4-33 Axial coding

Reasons for choosing lesson plans	Reasons for not choosing other plans	Difficulties in using preferred lesson plans
• Real life examples • Group work activities • Peer assessment • Motivation/engagement • Technology enhancement of students learning	• Little engagement • Teacher centred • Subject matter	• Insufficient PCs • Lack of Infrastructure • Financial problems

Theories were developed in the step 5, selective coding. All categories which were generated during the axial coding and presented above in Table 4-33 were selected. As an example, the category of 'real life example' may be taken. 'Real life example' is related to the learning theory of situated learning. Consequently, this was taken as indicative of a preference for situated learning - other indicators of learning theory/pedagogic approach derived from the categories generated by axial coding, are explained in detail in the following sections.

Analysis of the information as summarised in Table 4-34 and Table 4-35 was used to define the first round purposes. The first table shows each teacher's three preferred lesson plans. This table helped: (1) to identify the teachers for the second round and was used to pair English with Turkish Cypriot teachers; (2) to determine whether teachers chose plans consistent with their expressed pedagogical approach (as stated in their interviews). The second table shows the ranked order of preferred lesson plans, and similarly for those not chosen by teachers, together with the reasons (emergent categories) for choosing the preferred lesson plans. This first Round of the modified Delphi phase also helped to identify any difficulties (i.e. barriers and enablers) for using these lesson plans in teaching. These barriers and enablers are discussed later in the section titled 'barriers and enablers', following the section presenting the findings of the first three rounds.

Table 4-34 Teachers' most preferred three less plans

Teachers	**Most preferred three lesson plans**	**Volunteer for second round**
Teacher1-DM-E	1- Lesson Plan 6- Drawing and Interpreting Bar Charts 2- Lesson Plan 5- Creative Writing and Collaboration 3- Lesson plan 4- Book summaries and Advertisement	No
Teacher2-SK-E	1- Lesson Plan 6- Drawing and Interpreting Bar Charts 2- Lesson Plan 5- Creative Writing and Collaboration 3- Lesson plan 4- Book summaries and Advertisement	No
Teacher3-RB-E	1- Lesson Plan 1- Excel (spreadsheet)- Drawing and Interpreting Bar Charts 2- Lesson plan 4- Book summaries and Advertisement 4- Lesson Plan 6- Drawing and Interpreting Bar Charts	Yes
Teacher4-OB-E	1- Lesson Plan 3 - The influence of Media- Advertisement 2- Lesson plan 2- Climate change 3- Lesson Plan 1- Excel (spreadsheet)- Drawing and Interpreting Bar Charts	No

Teachers	Most preferred three lesson plans (continue)	Volunteer for second round
Teacher5-AP-E	1- Lesson Plan 5- Creative Writing and Collaboration 2- Lesson Plan 3 - The influence of Media- Advertisement 3- Lesson Plan 6- Drawing and Interpreting Bar Charts	No
Teacher6-RW-E	1- Lesson Plan 6- Drawing and Interpreting Bar Charts 2- Lesson Plan 5- Creative Writing and Collaboration 3- Lesson Plan 1- Excel (spreadsheet)- Drawing and Interpreting Bar Charts	Yes
Teacher7-OC-CY (9)	1- Lesson Plan 5- Creative Writing and Collaboration 2- Lesson plan 4- Book summaries and Advertisement 3- Lesson plan 2- Climate change	No
Teacher8-BO-CY (10)	1- Lesson Plan 5- Creative Writing and Collaboration 2- Lesson plan 2- Climate change 3- Lesson Plan 3 - The influence of Media- Advertisement	Yes
Teacher9-UA-CY (11)	1- Lesson plan 4- Book summaries and Advertisement 2- Lesson Plan 1- Excel (spreadsheet)- Drawing and Interpreting Bar Charts 3- Lesson plan 2- Climate change	No
Teacher10-HY-CY (12)	1- Lesson Plan 6- Drawing and Interpreting Bar Charts 2- Lesson Plan 5- Creative Writing and Collaboration 3- Lesson plan 4- Book summaries and Advertisement	Yes
Teacher11-BC-CY(13)	1- Lesson plan 2- Climate change 2- Lesson Plan 3 - The influence of Media- Advertisement 3- Lesson plan 4- Book summaries and Advertisement	No
Teacher12-Soz-CY(14)	1- Lesson plan 2- Climate change 2- Lesson Plan 3 - The influence of Media- Advertisement 3- Lesson plan 4- Book summaries and Advertisement	No

Teachers were asked to select their three preferred lesson plans and to rank them in order as presented in the above table. To identify which lesson plans were most preferred, the first step was to examine teacher no. 1's lesson plans and to count how many of the other teachers chose

the same lesson plan as a first preference. Then, second and third preferred lesson plans were examined and counted in the same way. As a result of this examination it could clearly be seen that overall the most preferred lesson plan was lesson plan 6, the second most preferred lesson plan was lesson plan 5 and the third most preferred lesson plan was lesson plan 4. However, to make sure that these lesson plans were, overall, the most preferred lesson plans, chosen lesson plans were also counted without considering which was first, second or third in preference. Using this method, the same preferred lesson plans were identified, but they now emerged in reverse order, with the most preferred lesson plan becoming lesson plan 4, followed by lesson plan 5 with the third most preferred lesson plan becoming lesson plan 6. In conclusion, it can be said that the teachers agreed on the lesson plans on which they would like to build consensus. Briefly, convergence had emerged for a choice of 3 preferred lesson plans.

It was noted that although lesson plan 4 was the most preferred lesson plan of the Turkish Cypriot teachers, lesson plan 6 was the most preferred one for English teachers. Another way of looking at this is whereas the English teachers preferred the more constructivist lesson plan, Turkish Cypriot teachers preferred a less constructivist, a result that was in line with the original hypothesis as stated in the literature review chapter.

It is also clear that only four teachers, two (Teacher5-AP-EI and Teacher3-RB-EG) from England, and two (Teacher10-BO-CYG and Teacher12-HY-CYI) from North Cyprus: were willing to participate in the second round of this modified Delphi phase. Therefore, the volunteer teachers' preferred lesson plans were examined and they were paired putting one teacher from England with one from North Cyprus who had similar preferences and had selected lesson plan 5,

6 or 4 as their most preferred. Based on this, Teacher5-AP-EI and Teacher10-BO-CYG were paired to redesign lesson plan 5 (Creative Writing and Collaboration) as this had been the first preference for both teachers. Teacher3-RB-EG and Teacher12-HY-CYI were paired to redesign lesson plan 6 (Drawing and Interpreting Bar Charts). This plan had been the third preference for the English teacher although it was the first preference for the Turkish Cypriot teacher.

Figure 4-20 Volunteer teachers and selected lesson plan for redesign

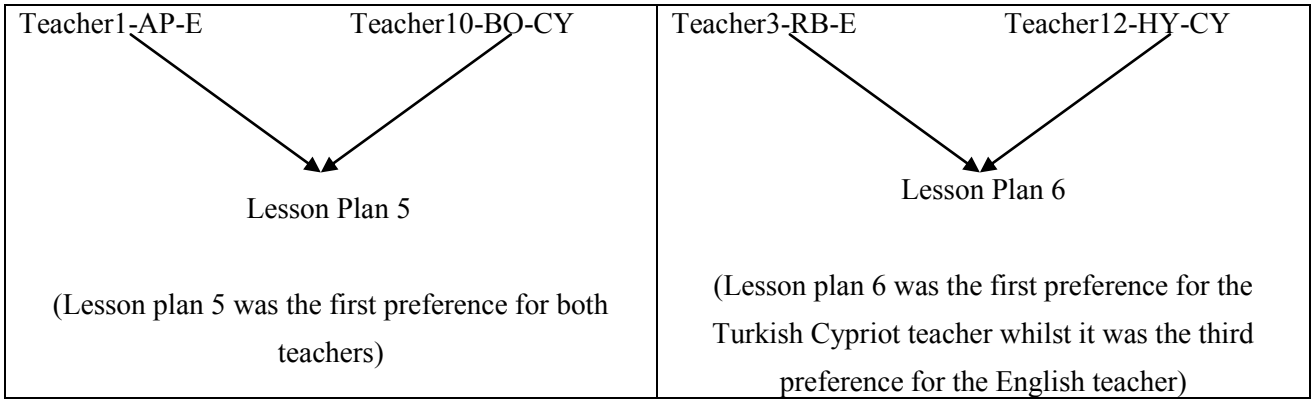


Table 4-34 also helped to show whether the teachers' preferred pedagogical approach, as stated in their interviews, matched their choice of lesson plans. All the English teachers had stated that their preferred pedagogical approach was a mixed method, a combination of instructivist and constructivist approaches. From examination of Table 4-34, it may be said that in practice most of them did, in fact, choose a mixture of instructivist and constructivist lesson plans matching the tendency displayed in their interviews. However, Teacher4-OB-EG selected lesson plans 1, 2 and 3, plans that were designed around an instructivist teaching approach. Thus, with the exception of this one teacher, all the other English teachers preferred lessons plans consistent with the pedagogic approach they had said they preferred in their interviews in round one. The three

Turkish Cypriot teachers had stated that their preferred pedagogical approach was constructivist, whereas 2 of them had stated that their preferred pedagogical approach was instructivist with the remaining one stating that her preferred pedagogical approach was mixed. When the three lesson plans, these teachers actually preferred were examined, three teachers' (Teacher7-OC-CYG, Teacher8-BO-CYG and Teacher9-UA-CYG) preferred lesson plans that consistently matched their preferred pedagogical approaches, whilst for the other three teachers' (Teacher10-HY-CYI, Teacher11-BC-CYI and Teacher12-Soz-CYI) their preferred lesson plans did not match their stated preferred pedagogical approach. Teacher10-HY-CYI had stated in her interview that her pedagogical approach was an instructivist approach, but it can clearly be seen that the preferred three lesson plans she chose were designed around a constructivist approach. Teacher11-BC-CYI and Teacher12-Soz-CYI stated in their interviews that their pedagogical approach was constructivist, but equally it can clearly be seen that their preferred three lesson plans (lesson plans 2, 3, and 4) were the more instructivist approaches.

The Table 4-35 presents the 'most preferred' and 'not preferred' three lesson plans together with the teachers' reasons (the produced categories by CCA) for why they did or did not choose particular lesson plans.

Table 4-35 The most preferred three lesson plans and lessons plans that were not chosen with reasons (categories)

Reasons for choosing the most preferred three lesson plans (in rank order)			**Reasons for not choosing other plans**	
Lesson Plan 6	1. Real life examples (4) 2. Technology enhanced learning 3. Motivation/ engagement 4. Peer review 5. Group work activity		Lesson Plan 1 Lesson Plan 3 Lesson plan 2	1. Teacher-centred 2. Little engagement and motivation for students 3. Subject relevance (teachers reported general reasons for not preferred lesson plans)
Lesson Plan 5	1. Group work activities 2. Impact on learning 3. Motivation/ engagement 4. Technology enhanced students learning 5. Subject related			
Lesson Plan 4	1. Technology enhanced learning 2. Impact on learning 3. Peer assessment 4. Student-centred 5. Group work activity 6. Improve students' critical–thinking			

Teachers provided specific reasons why they chose their three most preferred lesson plans, whereas only general reasons were provided for why they did not choose other lesson plans - i.e. without specifying whether those reasons applied to all the other plans that had not been selected.

As can clearly be seen from the above table, most of the categories reported by the teachers were the same for each lesson plan, so it followed that these form the selected categories that can be used to develop the theory concerning the perceptions of teachers in respect of model of practice lesson planning where the technology is being used. The selected categories are set out in Table 4-36.

Table 4-36 Selected categories

Reasons for choosing lesson plans	**Reasons for not choosing other plans**	**barriers/enablers in using preferred lesson plans**
1. Group work 2. Higher-order thinking 3. Technology enhanced learning 4. Real life examples 5. Engagement/motivation 6. Peer assessment 7. Discussion 8. Student-centred	1. Little engagement 2. Teacher-centred 3. Subject matter	Barriers: 1. Insufficient computers technological tools 2. Lack of Infrastructure 3. Financial problems Enablers: 4. Availability of computers/technological tools 5. Teacher pedagogical approaches

These are explained in detailed in the following sections.

4.4.3.1. Reasons for Choosing Lesson Plan 6

The teachers who preferred the lesson plan 6 gave several different reasons for choosing this lesson plan, but after scrutiny using CCA, these were categorised into one of six reasons, as presented in Table 4-36 above.

1. Real Life

Real life or familiar examples – the use of realistic/authentic problems for students to solve while learning – was the most frequently mentioned reason for choosing this lesson plan:

> *"This lesson plan is better than the others because it makes data relevant to the students. -Because the data is focused on things they know and understand."*
> (Teacher5-AP-EI)

A similar reason was given by the other four teachers. They believed that when the activity is related to the students' own life, students learn and understand better, as this allows them to integrate knowledge and practice.

This category is related to the situated learning theory as a branch of experiential learning theory. This theory normally engages students in tasks which include real world applications. According to Brown et al. (1989), a rich scenario-based activity or context needs to be provided–these being the aims that underlie this learning theory. In other words, students learn best when they 'learn by doing', through their participation in activities that not only applies knowledge but also relates to real life problems, and which as a result engages them in the learning process – perhaps through activities such as role-play or team-working. As a branch of experiential learning, this category aligns well with the constructivist approach, in which students learn by interacting with real life problems and each other.

A comparison of the English and Turkish Cypriot teachers shows that whilst the four English teachers reported that real life examples were important for improving students learning, only one Turkish Cypriot teacher similarly commented upon the use of these in their lesson plan, and no

perspective was provided setting out why it would be important to use such examples in teaching. Hofstede (2008) reported that Turkish people exhibit a tendency towards a large power distance, consequently following a teacher-centred approach that is based on the notion that the teacher is the expert who imparts all the information to the students. If this were also typical of Turkish Cypriot teachers, then they may well tend towards a more instructivist approach compared with their English equivalents. A clearer picture will emerge when all the categories are examined.

2. Technology Enhanced Learning

The use of technology to enhance students learning is also frequently mentioned by teachers. As one teacher clearly stated:

> "*Teacher uses technology as a learning tool to help students to understand better."*
> (Teacher2-SK-E)

A similar reason was also given by the other five teachers. Technology enhanced learning is one way of improving students' understanding by using/applying technology in a learning context. It can do this either directly – e.g. by providing access to alternative representations or perspectives - or by saving time on more mundane aspects of activities, thereby enabling more time to be spent on higher level goals, such as developing higher-order thinking or problem-solving and critical-thinking skills. In this lesson plan, technology is used in both these ways, as a tool to enable charts/graphs to be drawn quickly and therefore, to help students compare and contrast changes between graphs when the input values of charts/graphs are changed. This in turn helps students to see patterns and obtain more general principles from the information when presented in graphical form. Thus technology allows them to concentrate effort more on the interpretation

of charts/graphs to compare, contrast and analyse them, rather than spending most of their time on basic drawing activities.

Technology enhanced learning is also one of the teaching strategies that is used to support a constructivist learning approach, but technology remains only one of the aspects in the constructivist environment. Jonassen et al. (1999) indicates that when teachers use technologies in such learning environments, students can use them to: change data, investigate relationships and build their own personal meanings.

When comparing the English and Turkish Cypriot teachers, it was noted that whilst the five English teachers reported that technology enhanced learning improved their students' understanding; only one Turkish Cypriot teacher commented on such use of. Teachers believe that the use of technology in the math context allows students to readily see immediate changes and this helps them to understand the different charts they have drawn giving them more time to compare, contrast and analyse the charts. This is the main technology-related reason provided by teachers for choosing this plan, and as only one Turkish Cypriot teacher gave this as a reason, it may be inferred that Turkish Cypriot teachers are not really familiar with this technology. It was noted that those teachers do have infrastructure and training barriers in the use of technology as presented previously in sections on questionnaire and interview findings. This subject is discussed later in this chapter.

3. Group Work Activity

Group work activity was the third most frequently mentioned reason for choosing lesson plans:

> *"...they work as a group, which provides opportunity for students to help each other so it enhances their learning."* (Teacher6-RW-E)
>
> *"Also they will learn to act together and learn how to take a joint decision."* (Teacher11-UA-CY)

In group work, students work together for the purpose of achieving certain goals that are set by their teacher. It can enable students to learn more, as group interactions helps them to learn from each other's experiences and skills, by exchanging information. Also, group-working skills are thought to be essential for the future working life of students. These are the key benefits, as reported by teachers, that group work activity provides.

In group work, students work collaboratively in learning activities which often employ elements of peer-assessment or review and group assessment, in which each individual in the group receives the same mark for their joint product. Collaborative learning theory suggests group work can engage students in tasks upon which they work together to accomplish and achieve success, and that crucially this learning together and from each other (Davis, 1993), enhances not only the learning experience, social and communication skills, but also the depth of understanding, critical-thinking and problem-solving skills through the practice of 'dialogic' debating processes (Totten et al., 1991; Pilkington, 2001; Wegerif, 2007). Collaborative learning theory therefore aligns well with constructivist learning theories and approaches due to its emphasis on joint construction or 'meaning making' and the social-interactive processes of learning.

This category was reported as a reason for selecting lesson plans by four teachers, three of whom were from England and one from North Cyprus. Again it may be noted that only one Turkish

Cypriot teacher reported this as a reason for choosing the lesson plan. The explanation could be a cultural difference between the teachers, although that cannot be drawn as a firm conclusion at this stage. Potentially the second round of this modified Delphi study may make this clearer, as individual teacher perceptions are examined in more detail.

4. Peer Assessment

Peer assessment was the other reported reason for choosing lesson plan 6: The assessment of group projects is used as a form of peer assessment in this lesson plan.

> *"Has peer assessment built in [the lesson plan6]."* (Teacher3-RB-EG)

The teachers reported the inclusion of peer-assessment as a reason for selecting the plan, but they did not provide any explanation about why they thought this was important for them or how it helped students. However, this does not mean that they did not, in fact, have any supporting reasons for selecting this category. Peer assessment, it has been suggested, helps students to learn from each other's work and involves them more actively in the assessment process (Race et al., 2005).

In constructivist learning environments (CLE), students interact with each so helping them to make sense of their world, within the experience of collaborative and cooperative learning activities. Through these interactions, students are scaffolded by more mature or knowledgeable peers or mentors (Vygostky, 1978; Bruner, 1990), and cooperative and collaborative learning approaches often select peer assessment or review as a form of assessment that is constructively aligned with this 'cognitive apprenticeship' approach (Collins et al., 1989; Brown, 2004; van den

Berg, 2006). This type of assessment, when used in the CLE where students interact with each other to assess each other's work, requires that they understand the learning materials and resources in order to undertake the assessment. Also, students need to be involved in deciding how the assessment should be done if it is to truly align with constructivist principles and in order that they know how to assess each other's work. If these conditions hold, it is hypothesised that by using peer-assessment, deeper learning will result.

When English and Turkish Cypriot teachers were compared, whilst four English teachers reported that peer assessment was important, none of the Turkish Cypriot teacher gave this category of reason for selecting the plan. Again this may be related to a different teaching culture, as Hofstede (2008) reports that Turkish people exhibits a large-power-distance wherein teachers are used to a more teacher-centred approach, and only teachers assess student work. It may be that Turkish Cypriot teachers use a more traditional approach in their assessment process. Again, analysis of discussion in round 2 may shed further light on this issue.

5. Engagement

Teachers believed that students need to be motivated and engaged in the lesson and one of the teachers stated:

> *"As activity is related with ... real world example and they actively use technology so it becomes more engaging and motivating for them to learn*."(Teacher1-DM-EI)

Engaging and motivating students is a crucial part of learning, and in many respects it is central, as without engagement, learning will not take place or be shallow. As the above quotation illustrates, this is perceived to be part of a two-way relationship with authentic activity – i.e.

activity meaningful to the student. Such activity will relate to others which the student already knows or is familiar with, and to problems and goals which make sense to them – ones for which they can see the achievement aim, or which hold some intrinsic interest. In short, the engaged student is the one who is motivated to learn and will use their creativity, problem-solving, analysis and evaluation skills to achieve the task. Theories of engagement owe much to all the learning theory traditions, but situated learning theory is perhaps the theory that most emphasises the need for authentic, meaningful activity (Brown et al., 1989). Humanist theories also emphasise the importance of working in an environment where the student currently 'is', their interests and goals, their current level of understanding and what they are familiar with (Maslow, 1975; Rogers, 1983;Kolb, 1984; Knowles, 1988). These theories also align well with the constructivist approach (Lave and Wenger, 1991). Alternative theories for motivation and engagement which emphasise extrinsic reward are derived from behaviourist learning principles, and perhaps better aligned with a more instructivist approach (Skinner, 1975).

All of these theories of engagement have been used with technology-based teaching to motivate students in learning activities. Whilst some emphasise the instructivist approach, with the benefit of the technology claimed to be due to immediate feedback (with points or positive verbal feedback / applause as a reward), others have emphasised the rewards of social interaction and the freedom to construct or problem-solve online with or for peers and special interest groups – this use aligns more with constructivist and humanist perspectives (Kearsley and Shneiderman, 1999). The particular popularity of gaming environments for example, may be due to the fact that they combine all these elements (Mumtaz, 2001; Steinkuehler, 2004.). Whilst engagement as a reason for selecting the lesson plan was reported by three English teachers, none of the Turkish

Cypriot teachers reported engagement or motivation as a reason for choosing lesson plan 6. However, it would not be appropriate to draw the conclusion at this stage that Turkish Cypriot teachers do not seem to take motivation or engagement into consideration.

6. Higher-Order Thinking

Some teachers, albeit very few (n=2), believed that higher-order thinking was the important concept needed by students, and one of the teachers stated that:

> *"It [technology] helps teachers to focus on more interpreting, comparing, contrasting and analysing including critical-thinking and creativity where these are related with student's higher-order skills."* (Teacher3-RB-EG)

However, the higher-order thinking skills that would be promoted were not clearly identified by teachers, and instead they mentioned the creativity and critical-thinking skills of students, so these categories were categorised under higher-order thinking. For instance, Teacher12-Soz.CY stated that:

> *"This is a good lesson plan for students to formulate their creativity and I think this might be a good opportunity for them to improve their critical-thinking."* (Teacher14-Soz-CYI)

Creativity and critical-thinking are intertwined skills as students need to use their critical-thinking to produce creative products. This relationship is implicit in the above quotation.

Creativity and critical-thinking demand thinking at the peak of Bloom's Taxonomy. The top three levels of Blooms' taxonomy: analysis, synthesis and evaluation are required for both critical-thinking and creative activity. These levels are called higher-order thinking skills. These top three levels are emphasised by constructivist learning theory, as constructivist learning environments

are hypothesised to better support the development of these skills, since students apply them in their learning and teachers provide activities that enable them to do so. Real life problems/exercises, projects, scenarios or role play activities in social and interactive group work contexts are some of the most commonly suggested means of supporting the development of these higher-order thinking skills.

This category was reported by nine teachers out of twelve, with five teachers from England and 4 teachers from North Cyprus preferring the lesson plans for the reasons that they improve the student's creativity and critical-thinking skills. A consensus seemed to be emerging whereby both English and Turkish Cypriot teachers gave importance to students' creativity and critical-thinking skills in the teaching process. The extent to which teachers from both countries shared such perspectives about higher-order thinking skills will also become clearer in the second round of this modified Delphi study.

4.4.3.2. Reasons for Choosing Lesson Plan 5

Almost all of the reasons provided for the lesson plan 5 were the same as those provided for the lesson plan 6, except for 'discussion', which emerged after the teachers' responses for this lesson-plan were examined.

1. Group Work Activity

This is the first and most frequently expressed reason for selecting this lesson plan. One of the teachers stated that:

"They work in a group which help them to learn how to work in a group

which is important skill to teach them for future work life." (Teacher6-RW-EI)

Group work activity is linked with future work life by most teachers for this lesson plan, so rather than just helping them to learn how to work together to achieve good learning activity results for a particular lesson, the development of more general workplace relevant skills is also highlighted as a benefit.

More than half the teachers gave this reason, including four English and three Turkish Cypriot teachers. It seemed both countries' teachers see group-work activities as an important component of this lesson plan. However, English teachers commented on the wider benefits for future working life, whilst the Turkish Cypriot teachers only drew the narrower conclusion that students simply learn how to work in a group. This may reflect particular contextual pressures on UK teachers to prepare students for the global economy, as suggested by the recent government sponsored educational discourse in the UK reports (Brown et al., 2008). A clearer picture may emerge from analysis and arguments advanced in round 2.

2. Engagement/Motivation

This is the second most frequently mentioned reason for selecting lesson plan 5, and as one of the teachers reported:

> *"I can see that students of any age or ability will be engaged by the creative freedom they are allowed in writing parts of a story."* (Teacher5-AP-EI)

Engagement/motivation was correlated with the students' freedom to decide the content of their writing themselves, whereas engagement/motivation in the lesson plan 6 was more likely to be linked to the use of technology or group work activities. Again, this is in line with both humanist and constructivist learning theories concerning the need for meaningful or authentic learning tasks, both to engage students and also to enable them to apply higher level thinking skills.

More than half of the teachers reported this reason, including four English and two Turkish Cypriot teachers. It seemed engagement/motivation was once again a key reason for selecting this lesson plan as congruent with model of practice.

3. Technology Enhanced Learning

This reason was mentioned by only two teachers and one of them set out their thoughts particularly clearly, stating that:

> *"...use of technology helps them to correct their spelling mistakes and use different vocabulary that helps them to identify their mistakes and enhance their vocabulary."* (Teacher6-AP-EI)

As the context of the lesson plans 5 and 6 are different, the use of technology to enhance students learning is also different. In the context of lesson 5, students use technology to improve their writing and vocabulary. This means that the use of technology to enhance students learning in the different contexts/subjects needs to be thought of differently. Here it is not known exactly how these technologies are believed to impact on learning; however, the skills that are emphasized are relatively lower level skills when judged by the criteria in Bloom's taxonomy. Therefore it may be summarised that their use is more in line with an instructivist approach, although it is also

possible (as with the graph drawing application) that teachers believe that by helping students with these lower level activities, more time and attention is made free for more creative aspects of the task, and in this way the technology may also compliment a constructivist approach.

Two teachers, one English, and one Turkish Cypriot teacher, reported this reason. It may be that most teachers did not consider that technology was helping to enhance students learning in this case.

4. Discussion

Having a discussion at the beginning of the lesson is a newly emergent category from this lesson plan. It was reported by three teachers, and one of them stated:

> *"The lesson begins with a discussion about the topic of the lesson which may engage students."* (Teacher2-SK-EG)

Students' discussion in class is the one of the important distinctions of constructivist learning-environments. In this way, students are actively involved in the learning process, which is the most important aspect of constructivist learning-environment as a tool for helping students to make meaning for themselves out of their learning experiences. The value of dialogic interaction is particularly emphasised, whereby through discussion activities, students come into contact with alternative viewpoints, which has impact on students learning (Pilkington, 2001), and learn to justify their own point of view (Wegerif, 2007). In the beginning of this lesson the teacher presents a question and allows students to discuss the topic. Whilst discussion at the beginning of the lesson is a reason reported by two English teachers for selecting this plan, only one Turkish

Cypriot teacher reported this as a reason. It could be said that some English teachers consider discussion in the classroom by students as important, whereas most Turkish Cypriot teachers do not give a similar value to such discussions. This could be the one of the cultural differences between teachers, as Turkish Cypriot teachers have been thought to favour a large power distance between students and teachers. Round 2 may shed more light on this issue.

4.4.3.3. Reasons for Choosing Lesson Plan 4

Again, almost all the teacher's reasons for selecting this plan have already emerged in the previous lesson plans, with the exception of 'student-centred', which was an emergent category from this lesson plan. To avoid repetition here, the discussion of findings is limited to how these categories are expressed differently for lesson plan 4, together with any differences in response between English and Turkish Cypriot teachers.

1. Peer Assessment

Peer assessment, where students assess one another's work, is the most frequently reported reason for selecting lesson plan 4.

> *"Peer assessment is one of the good way of assess students work as they learn from each others' work."*. (Teacher1-DM-EI)

In this lesson plan, teachers were more explicit about why peer assessment was important for them, whereas they did not mention why it was important when commenting upon lesson plan 6. Although, the context of the lesson plans is different, peer assessment is used in both lesson plans to assess group work projects.

Three English teachers and only one Turkish Cypriot teacher reported peer assessment as a reason for selecting this plan. Peer assessment is distinctly favoured more by English than Turkish Cypriot Teachers. The reasons for this are discussed further following analysis of round 2.

2. Higher-Order Thinking

Higher-order thinking is another frequently reported reason for teachers selecting this plan. Higher-order thinking is defined as being the form of critical-thinking and creativity, as set out above for lesson plan 6.

> *"This is a good lesson plan for students to formulate their creativity and I think this might be a good opportunity for them to improve their critical-thinking."* (Teacher14-Soz-CYI)

Students used their creativity and critical-thinking in the preparation of a book advertisement in this lesson-plan, and technology was used as a tool to develop and record the advertisements as in lesson plan 6, with the use of technology and being a real life exercise the factors that led to the need to apply creative and critical-thinking skills, including analysis, synthesis and evaluation; these being the higher-order thinking skills identified by Bloom (Bloom, 1986)

Perhaps surprisingly, these reasons for choosing this plan were only stated by four Turkish Cypriot teachers and not by the English teachers. However this has to be interpreted in the context that English teachers tended in any case to prefer lesson plan 6 over lesson plan 4, and may have felt that the former plan exhibited these characteristics rather more than did lesson plan 4. Again, analysis and discussion in round 2 may shed further light on this.

3. Student-Centered

Student-centred is a newly emergent category from this lesson plan. It was reported by three teachers, and one of them stated that:

> *"Student has more control over their learning."* (Teacher2-SK-E)

These teachers believed that if the students are actively involved in the learning process, students learn better.

This category is related to constructivist learning theory and emphasise on student activity, students' experiences on the subject and independent learning (Gibbs, 1995). In the student-centred classroom, students must build their own learning through practical participation in the activities provided by the teacher designed to engage them in active learning.

Comparing the English and Turkish Cypriot teachers, whilst two Turkish Cypriot teachers commented that student-centre teaching is important for improving students learning, only one English teacher gave this as a reason for preference. It is surprising that only one English teacher mentioned this reason, as they normally tried to adopt student-centred teaching in their classroom, particularly as this is one of the national curriculum policies, and it is checked by Ofsted. However, this has to be also interpreted in the context that English teachers tended to prefer lesson plan 6 over lesson plan 4, and may have felt that this plan exhibited these characteristics more than lesson plan 4. Again, an analysis and discussion in round 2 may shed further light on this.

4.4.4. Summary of Round One

Overall, there are perceived inter-relationships identified in the teacher's reasons for choosing plans, between engagement, real life problems, student-centred teaching, the development of higher-order skills and the use of technology to help with lower level skills to release time for the development of higher level skills, as reported by teachers. According to teachers, model of practice would appear to combine: participation in activities that apply knowledge and relate to real life problems; use of technology to engage students in learning perhaps also through activities such as team-work; supporting the development of higher-order thinking skills-critical-thinking and problem-solving skills and involving students in working collaboratively in student-centred environments. In these ways categories are interrelated with each other in the teacher's perception of what makes a good lesson.

Overall this may evidence a general preference for a constructivist approach as indicative of model of practice and helping develop deep understanding and higher-order thinking skills. However, group work, peer-assessment and student discussion are not always identified as important in creating such an environment and may be less important characteristics for Turkish Cypriot than English teachers.

Teachers also provided reasons for not choosing other lesson plans. CCA was also used to identify the categories. These categories were presented in Table 4-35. These reasons are consistent with the above conclusion since the reasons for not selecting plans were that they were perceived to be too teacher-centred, involve students in too much passive or teacher-directed activity and therefore unlikely to engage students. These reasons are consistent with preferring a

more constructivist approach so Turkish Cypriot teachers were more likely to give such reasons, but their preferences and application are not consistent.

4.4.5. Round Two

After teachers were identified in round one, two groups were formed: (1) Teacher1-AP-E and Teacher13-BO-CY (lesson plan 5) and, (2) Teacher3-RB-E and Teacher12-HY-CY (lesson plan 6), were sent an e-mail invitation for participation in round two of the communication process, together with an attached open-ended questionnaire (see Appendix 10) to identify each teacher's requirements for adapting the lesson plan they preferred for use in their own teaching. These open-ended questionnaires were not collected and analysed, as their purpose was to help volunteer teachers in their discussion during the online communication stage. During Round two, reminder emails to keep the study on schedule were sent to those volunteer teachers who had not responded within one week of the initial communication.

After the two groups of teachers had redesigned the lesson plans, all twelve teachers were invited to participate in Round 3 to evaluate and provide their comments about the redesigned lesson plans. These comments were sent to the other 10 teachers and then the teachers who had redesigned the lesson plans themselves commented on these other teachers' comments so that consensus was built on two lessons, including how to use new technology in teaching these plans.

In Round two, CCA was used to note the emergent categories, which were related with model of practice in this round and then compared with the relationships between all the categories that

had emerged in Rounds one and two.

4.4.5.1. Emergent Categories

Following their e-mail invitation, Teacher5-AP-E and Teacher10-BO-CY and Teacher3-RB-E and Teacher12-HY-CY were asked to install Skype communication program in their computers. They agreed to meet online a few days later. However, the Turkish Cypriot teachers asked for help to install Skype into their computers which was provided via telephone conversations. From the point of view of the researcher, this was not surprising as it had also been established from questionnaire, interview and the first round of the modified Delphi method, that Turkish Cypriot teachers do not often use computers and other technological tools and they did not receive training to use them in their teaching.

The researcher acted as a translator, translating the English Teacher's comments into Turkish and the Turkish Cypriot teacher's comments into English. First, the emergent categories from lesson plan 5 were discussed, which were 'differentiation' and 'plenary', and from lesson plan 6, which followed 'Bloom's taxonomy 'and 'self-assessment'. Then, the relationships between the categories identified by the four teachers were presented, which helped towards drawing up an initial model of the teachers' perceptions of what makes a model of practice lesson.

Lesson Plan 5

Two new categories emerged from lesson plan 5 in Round two. These were: 'differentiation' and 'plenary'. They are further presented and discussed below.

1. Differentiation

Differentiation was the first new emergent category, reported by both the English teachers, but in different ways. They reported that:

> *"I set up success criteria and provide different examples to different levels of students as they do not have same learning levels... Actually, differentiation is an important aspect of teaching in English schools and teachers must consider students' learning levels as it is national curriculum policy."* (Teacher5-AP-E)

> *"By observing each student I could I get to know each student's capabilities as well as what they could do by themselves. So, I assign the each roles to students depending on their capabilities but sometimes I change this to improve their weakest part."* (Teacher3-RB-E)

Whilst only one Turkish Cypriot teacher talked about differentiation, he did not use differentiation in his class; but he thought that it was good way to enhance students' learning, noting:

> "*In North Cyprus, teachers, including me, do not consider differentiation approach. Teachers normally look for average/standard examples or explanations and provide them to students. They think that whole class and students have same level of learning. In our country, teachers have to present the subject according to national curriculum. However, personally, I think differentiation is important and good way of enhancing students' learning."* (Teacher10-BO-CY)

As Diamond (2007) states that there is scientific evidence that every student is unique and that not all students learn in the same way. The curricula objectives the students work towards are the same for all students, but the methodologies used in a classroom can be varied to take account of their differences by differentiating the content of the lesson, process or products (Tomlinson, 2001). Teachers know the abilities, interests, and prior knowledge of their students, so they take these and the curriculum objectives into account to plan what they teach, how they teach and how they assess the work. In terms of content, different materials can be used to support instructional

content by teachers and this should include the same concepts but the level of complexity must be modified to fit with the students' level (ibid). Teachers can use Bloom's taxonomy to design group work activities to teach the content of the lesson. Teachers use different teaching styles to teach students, and teachers use different assessment techniques to assess students work, depending on the students' level and understandings (ibid). Thus, in this way, each student learns better, according to their own understandings, learning styles and interests. As one English teacher stated:

> *"Without applying differentiated learning, really strong students are not being challenged and also very weak students might still be left behind."*(Teacher5-AP-E)

Differentiation is an important part of the constructivist learning environment. Teachers need to identify students learning needs and levels and based on this identification use appropriate teaching strategies and activities.

Whilst both countries' teachers see differentiation as an important component to enhance students learning, English teachers normally apply differentiation in their classroom, but Turkish Cypriot teachers do not. This reflects particular contextual pressures on English teachers to use differentiation, as this is now a national curriculum objective, as indeed English teacher stated in the quote that was provided at the beginning of this sub-section. They have to implement differentiation in their class because Ofsted inspect this aspect of teaching. However, as there is no such inspection or pressure on Turkish Cypriot teachers, they use a one-size-fits-all curriculum approach, and do not consider differentiation in their classes, even though teachers recognise that it is a worthwhile technique.

2. Plenary

Plenary is the other new category to emerge from the teachers' conversations. This category was cited by both English and Turkish Cypriot teachers, but their ways of assessing students understandings and checking whether they achieved the objectives of the lesson, were different, as they stated:

> *"After every class I do a plenary which means I measure up the students' progress and see if they reached the objectives - the targets that we mentioned at the beginning of the class. In other words I go back to the objectives and measures of success. `What I do is at the end I discuss with the students and I ask 'have we done this, have we done that' and if everyone says 'yes' this is very good for me. I think plenary should be in the lesson plan if it will be a good one."*
>
> (Teacher5-AP-E)

> *"By observing each student and their final presentation, I can understand if objectives were reached by these students."* (Teacher3-RB-E)

> *"I normally do not go back to the objectives and check if the students reach them at the end of the class, but what I do is that I collect their notebooks and check what they did and in this way I normally check whether they have learnt or not. However, I think this needs to be in the lesson plan and I need to include this in my classroom".* (Teacher10-BO-CY)

> *"What I normally do is that I write down the solution of the problem step by step on the board and ask students to look at this step... then I ask them to tell me what they did and see if they understand and learnt what they expected to learn."*
>
> (Teacher12-HY-CY)

As it can be seen, it is clear from the quotations by the teachers that model of practice for a lesson plan needs to include a plenary.

It is important to check if the objectives are being achieved by students and this method enables teachers to find out. Also, using plenary at the end of the class provides opportunities for students to review and elucidate their learning. Whilst the English teacher used plenary after every class,

Turkish Cypriot teacher did not use plenary. However, the Turkish Cypriot teacher used different ways to assess his students work as can be seen from above quote, which refers to a more traditional method of assessment. Rather than discussing with students, teachers decide only by looking at and checking their notebook.

3. Following Bloom's Taxonomy

Following Bloom's taxonomy is another new emergent category reported by English teachers. One teacher stated:

> *"We, as a teacher, need to follow Bloom's taxonomy to get students to have higher advanced thinking level as mentioned by Bloom. Thus, I follow Bloom's taxonomy when I prepare my lesson plans."* (Teacher3-RB-E)

As reported by this teacher and brought out in the literature review, Bloom's taxonomy is a way to design lesson plans giving a conceptual outline for students learning objectives and thinking skills that can be measured by classification (White, et al., 2011). Teachers use Bloom's taxonomy's cognitive domain to form questions and activities that they can use in their lessons to help students to reach a higher-order thinking level. The lowest three levels (the lower-order thinking skills) are: remember, understand, and apply, and the highest three levels (the higher-order thinking skills) are: analyse, synthesis and evaluation (Anderson and Krathwohl, 2001). Students cannot understand the topic if they do not first recall salient information and they cannot apply their knowledge if they do not understand it. Lower-order thinking skills can be taught by applying an instructivist approach but it is usually thought that higher-order thinking skills require a more constructivist approach.

On comparing the English and Turkish Cypriot teachers, whilst both English teachers talked about the Bloom's taxonomy, neither Turkish Cypriot teacher mentioned it. This does not mean that they did not follow it because most schools use a standard lesson plan template in line with Bloom's taxonomy. Thus, Turkish Cypriot teachers did not mention it but may subconsciously be using it.

4. Self-Assessment

Self-assessment is the other new emergent category, as reported by one of the Turkish Cypriot teachers. She stated that:

> *"As you know evaluation systems change from teacher to teacher as they have different experiences and cultures or different technological recourses in their schools. So, what I normally do is that I write down the solution of the problem step by step on the board and asks students to look at this step and assess their work by themselves (self-assessment). Sometimes I ask students to exchange their notebook with their friends who sit next to them for evaluation (peer assessment)."*
>
> (Teacher12-HY-CY)

In the literature, self-assessment is considered a way for the students themselves to judge the quality of work against identified evaluation criteria in order to understand their own learning process and to improve the work later in their learning (Rolheiser and Ross, 2001). When students evaluate their own work, they think about what they have learnt in that lesson and how they have learnt. Thus, they become more aware of their own learning process. As students are encouraged to take more responsibility for their own learning by self-assessment, this idea is related to a student-centred constructivist learning approach which is thought to improve their higher-order thinking skills. In an instructivist approach, teachers control the learning process and

they provide support and guidance to students to gain self-assessment skills, rather than allow students to do their own assessment.

Perhaps surprisingly, this reason was only stated by one Turkish Cypriot teacher but not by the two English teachers. However this has to be interpreted in the context that English teachers tended to prefer peer assessment over self-assessment and may have felt that these plans satisfactorily exhibited those characteristics.

4.4.5.2. Relationships between the Categories

As four teachers examined the lesson plans in detail and discussed how these could be good lesson plans which include the use of technology, relationships between the categories emerged. The student-centred category related to all the other categories and appeared to subsume the other categories under the generic label of a student-centred teaching approach. The other categories' relationships are discussed in the remainder of this section.

Engagement

Teachers stated that a reason to adopt a plan was the likelihood of encouraging student engagement, and linked properties of technology, real life examples, group work and differentiation.

Table 4-37 Linking properties of categories to engagement

Category	Properties
Technology enhance learning	• Self-correction, • Editing
Real-life exercise	• Authentic experience (real-life problems)
Group work	• Collaboration • Interactive learning process , Role play
Differentiation	• Students interest • Students level of understandings

As pointed out earlier, engagement is a key factor for students' learning and students can be engaged by the above properties of these categories as the teachers reported.

1. Technology Enhanced Learning

Whilst the teachers were discussing the lesson plans, they talked about the use of technology and specified three properties of technology that engage students. The first is self-correction that helped student to correct their mistakes by using some features of the applied technology in the classroom. Therefore, students may learn what their mistakes were and change them in their next piece of work. One of the English teachers stated:

> *"As students use MS-Word program they can use spell check and grammar correction functions of the computer to correct their mistakes."* (Teacher5-AP-E)

By correcting their spelling and grammar on the computer, students learnt their writing mistakes and would change them in their future writing. This was reported by the two teachers who redesigned lesson plan5, as their activity included writing a story using MS-Word.

The editing property is another property of technology mentioned by both English and Turkish

Cypriot teachers. A Turkish Cypriot teacher said;

> *"Students can edit their writing easily. They do not need to rewrite again as normally happens in pen-and-paper writings."* (Teacher10-BO-CY)

The editing function of the Word program enables students to edit their text at any stage of their writing, as it is easy to edit whilst composing text on the computer. However students need to be careful when they use pen-and-pencil, as to make corrections they would need to erase the part that they want to edit and then rewrite. Therefore, as students know that on the computer they can edit their text after they have finished or whenever they wish, it encourages them to concentrate on the content of their writing. In this way, teachers and students save time. This was also reported by the two teachers who redesigned the lesson plan 5, as the activity included writing a story using MS-Word program.

2. Real Life Exercises

Engagement is also linked by teachers to the property of real life exercises (authentic experiences). One of the teachers reported that:

> *"Students need to be provided with real life problems to solve so they can engage in learning. Also, as they engage, they become more interested in the lesson."* (Teacher3-RB-EG)

As real life exercises take place in authentic situations, students deal with the real life problems that relate to their daily life experience which engages them in learning because solving real life problems help them to understand why the subject they learn is relevant to their lives. Three other teachers also reported that real life examples were an important part of teaching and needed to be

included in the lesson plans.

3. Group Work

Group work is the other category to which engagement is linked: the group work collaboration, interactive learning process and role play properties as specified by teachers. For collaboration, the teachers clearly stated that:

> *"Applying group work in lessosn is good way to provide collaborative learning environment which improves students' engagement in learning."* (Teacher5-AP-E)

> *"Student engagement is an important part of the learning so if* I *apply these group work activities in this teaching, students collaborate each other while learning interactively as they discuss and decide together. Also, assigning a different role for each student is good as it keeps students engaged in their role and we can make sure that everybody produces something rather than doing nothing."* (Teacher3-RE)

As the above quotation illustrates, the collaboration property of group work engages students, because they share learning and achieve success together. For the interactive learning process, group work also gives students an opportunity to converse with each other, freely sharing their opinions and which engages them in discussion. In this way they can engage more in learning and become critical thinkers. Furthermore, teachers considered role play an important factor for engagement by, because if every student has a role to play in the group then they have responsibility within this role to finish their contribution on time. Whilst group work is applied quite frequently by English teachers, Turkish Cypriot teachers only use it rarely. Nethertheless, Turkish Cypriot teachers accepted and were aware of the importance of group work in education, one of them stating:

> *"...our students are more productive and produce good work when they work by*

> *themselves. However, when we pair them up with students who they do not like or who are not their friends then success and productivity of work are decreased. So most of the time I prefer them to work individually but as I said earlier I believe group work activity is important."* (Teacher10-BO-CYG)

English teachers apply group work in their teaching and may believe this is related to their educational policy which emphasises the importance of group work skills in students' future life; whilst it's lower use in Turkish Cypriot schools reflects the fact that they do not have such a policy

Furthermore, both English and Turkish Cypriot teachers mentioned there are barriers to applying group work in their lessons. These barriers are as follows:

- Class size: This is especially stated by Turkish Cypriot teachers and they mentioned that:

  > *"Our class are crowded and I think if class size were small, the group work activity is more effective."* (Teacher12-HY-CYI)
  >
  > *"...in small groups, teacher can assign a role for each student and everybody can engage and work in learning, but in large groups, it is difficult to observe what each student is doing to encourage them to join in with discussion."* (Teacher10-BO-CYG)

As teachers mentioned, class size can be a barrier for group work activity, as teachers need to provide a great deal of individual attention to each student and this can best be done when the class size is small and with a small number of groups.

- Classroom management: is another barrier described that applied to group work activities. Both English and Turkish Cypriot teachers reported that behavioural problems can hinder

group work activities. One of the English teacher stated:

> *"The use of this lesson plan really depends on the class that I teach and I cannot really use this lesson plan in all my classes because students in the class have to be responsible as they go out to do surveys in other classes. This is related to management issues. Thus, I can only let trusted students from each group go out to other classes to do their surveys, because sometimes some students go out for something and do not come back to class again and we do not want this."* (Teacher3RB-EG)

As it is clearly illustrated in the above quote, teachers have to consider the students' behavioural issues when they apply group work activities in the class. In addition to the behavioural problems, Turkish Cypriot teachers reported that setting up groups is also very difficult in their classes, as their students want to work with their friends and if they are put into different group, they do not produce good work, but revert to individual rather than group work.

4. Differentiation

Teachers, particularly English teachers, indicated that engagement is also linked to the properties of differentiation: individual student's interests and targets and students levels of understanding. One of the English teachers reported:

> *"I consider differentiation in my lesson so I provide different examples and targets to students depends on their interests and levels as every students have different concerns and understanding degree. When a teacher provides learning tasks to students by taking these into consideration, students get more engage in learning. Differentiation also must be considered by teachers as it is national curriculum policy."* (Teacher5-AP-EI)

As can clearly be seen from the above quotation, the properties of differentiation also engage students in learning, as English teachers try to use different teaching methods to reach out to all

their students. Thus, as they stated, they set up different targets and success criteria at the beginning of the lesson, for different levels of students. This conclusion needs to be examined in detail before concluding that English teachers use differentiation in a correct manner in their teaching, because for genuine application of differentiation in their classroom, they may need to change the activity itself according to each student's level. English teachers may apply this because it is compulsory and inspected by Ofsted. Considering differentiation, Turkish Cypriot teachers reported that it is difficult for them to provide different examples to students, so they provide a standard/average example to all, as their education system is based on all students being considered to have the same level of understanding. These teachers may not use differentiation because there is no policy for differentiation in their national guidelines.

Higher-Order Thinking

Teachers gave their reasons for higher-order thinking and linkages to properties of technology, real life, peer-assessment and self-assessment with higher-order thinking skills, as presented in Table 4-38.

Table 4-38 Linking properties of categories to higher-order thinking

Category	Properties
Technology enhance learning	• Speed up process and save time
Real-life exercise	• Authentic experience (real-life problems)
Discussion	• Discussion
Peer-assessment & Self-assessment	• Commenting on peer's work (assessment of other students' work) • Assessing own work

As pointed out previously, higher-order thinking skills: analysis, synthesis and evaluation, are important concepts for the teaching of students, and students gained these skills through the above mentioned properties of these categories.

1. Technology Enhanced Learning

Teachers reported that use of technology can enable teachers to develop students' higher-order thinking skills through its speed helping to save time on simple tasks. These properties are interlinked, as when technology speeds up the learning process of students, teachers' save time and can focus on higher-order thinking skills. In other words, the speeding up facility of technology enables teachers to speed-up their teaching of the lower-order thinking skills: knowledge, comprehension and application. One of the English teachers stated:

> *"I believe that technology helps us to speed up our teaching and students learning of lower level thinking, for example, using Excel program in math enable us to draw charts in five minutes where students learn how to draw a chart quicker when it is compared to pen-and-paper and then we save our time. Thus, we have more chance to concentrate on comparison, contrasting and higher level thinking."*
>
> (Teacher3-RB-E)

These properties of technology were reported by one English and one Turkish Cypriot teacher, when discussing and redesigning lesson plan 6, for which the subject matter was related to a math lesson. In this context, the English teacher mentioned the ability of technology to speed up those underlying elements which were simply required as basic instruction material. Although, this was also reported by the Turkish Cypriot teacher, she mentioned the barrier to use of technology in her class, stating:

> *"I also believe that higher level advanced thinking skills can be achieved much more quickly by using technology, but we do not have computers in our class and we cannot use the computer lab every time in our teaching as we have only one computer lab in the school, thus most of time I use normal whiteboard to draw graphs or charts and students use pen and paper."* (Teacher12-HY-CY)

The above quotation demonstrates that the teacher used technology in her class whenever she could book the computer lab, but as technology is not widespread and sufficiently available in schools, it represents a barrier to using technology in education.

2. Real Life Exercises

Higher-order thinking is also linked by teachers to the property of real life exercises (authentic experiences). One teacher reported:

> *"By providing students with real world problems to deal with, we can develop their critical-thinking, creativity and problem-solving skills which are very important skills to teach them."* (Teacher5-AP-E)

As real life exercises take place in authentic situations, students deal with problems they encounter in daily life helping them to develop and improve their higher-order thinking skills. Solving real world problems encourages them to think more deeply and critically. Thus, the authentic experience property of real life exercises links to higher-order thinking. This, property was also reported by the other three teachers.

3. Discussion

Higher-order thinking is also linked directly to the category of discussion. Student discussion

encourages students to develop their critical-thinking and analytic skills as well as their problem-solving skills. This was particularly reported by English teachers, as Turkish Cypriot teachers did not use discussion in their classes.

> *"Allowing students to discuss the topic of the lesson in the beginning about the topic of the lesson and to discuss while they are doing activities to produce good products encouraged them to analyse the situation and think critically."*
> (Teacher5-AP-EI)

As the above quotation illustrates, it is perceived that discussion helps develop higher-order thinking skills by allowing students to think critically and to analyse the opinions of peers' and provide their views. When students are involved in discussion, they need to think about what they know about the topic before sharing their opinions and analysing what others have said. However, to take full advantage of the discussion method the process needs to be guided by teachers. Teachers only referred to asking questions about the topic, such as what they know about it? This does not really develop students' higher-order thinking, but may improve the students' attention during the lesson.

4. Peer-Assessment and Self-Assessment

The other category to which higher-order thinking was linked was peer-assessment and self-assessment. This was observed by two English and one Turkish Cypriot teacher respectively. As peer-assessment and self-assessment are interrelated and develop the higher-order thinking skills of students, their relationships with higher-order thinking are combined. Teachers specifically commented that peer-assessment helps students to develop higher-order thinking skills and also helps students to analyse and evaluate their own work. Self-assessment develops higher-order

thinking skills for students as was suggested by one of the teachers:

> *"I quite like peer-assessment, because it helps me to develop students' critiques upon other students' works which helps them to learn to think critically and evaluate other works by applying their knowledge. Also, they can see their mistakes and correct them next time in their own work."* (Teacher3-RB-EG)

As the above quotation illustrates, commenting on their peers' work is a property of peer-assessment believed to help improve students' higher-order thinking skills, as students' evaluation skills are practiced. When students judge and evaluate another student's work, they also obtain insight into their own learning and mistakes, which is related to the important skill of reflection and self-assessment. Brown et al. (1994) concurred that students acquired the skills of evaluation and judgment through peer-assessment at the same time as learning to understand and recognise their own mistakes. Whilst peer-assessment is applied fairly often by English teachers, Turkish Cypriot teachers rarely use it, preferring to use self-assessment. Although, Turkish Cypriot teachers accepted and were aware of the importance of peer-assessment for students learning, they stated that traditional marking or sometimes self-assessment, works better than peer-assessment in their schools.

4.4.5.3. Differences and Similarities between Teachers

It can be seen that there are both differences and similarities between English and Turkish Cypriot teachers. These differences and similarities are discussed in the following paragraphs.

Whilst both English teachers agreed that group work is more important for students future work prospects, one emphasised behavioural management difficulties in group work and the other did

not, stressing instead how strong students helped weak students in the group work activity. Turkish Cypriot teachers, on the other hand, also agreed that group work was valuable but stressed behavioural management difficulties in the group work activities, and in addition the friendship factor where students wanted to join with their friends and when they couldn't, they produced low quality work.

For differentiation, whilst both English teachers agreed that it is a vital part of education, particularly as new national curriculum objectives include it, one stressed the importance of providing different targets and success criteria at the beginning of the lesson for each different group of students, whereas the other English teacher preferred to apply group work activity to assign different roles to students according to their interests and ability. However, Turkish Cypriot teachers did not consider differentiation at all, even though they recognised it could be an important teaching method. They particularly stressed the principle of the whole body of students being at the same level, as this emphasised in their educational policy. As a result they provided standard teaching to all students, as would be expected from the idea of one-size-fit-all curriculum.

Whilst English teachers mentioned Bloom's taxonomy for lesson plans, Turkish Cypriot teachers, on the other hand, did not mention it at all.

The plenary is the other concept upon which both English and Turkish Cypriot teachers agreed. However there were contradictions in their preferred ways of assessing objectives. Whilst one of the English teachers asked questions at the end of the class about what the students had learned,

the other teacher observed each student during the class and used the plenary in their final presentation to confirm what the group as a whole had learnt. On the other hand, although Turkish Cypriot teachers reported that they used plenary after each class, their application of it differed in how it was used for checking whether objectives of the lesson had been achieved by the students. One collected students' notebooks to check if their answers were correct, a very traditional way of assessing student work. This strategy is also applied by one of the English teachers as well as plenary and peer assessment, whilst the other teachers used self-assessment. So, the teachers' perspectives in applying the plenary differ even within the same country.

Furthermore, whilst English teachers agreed that peer-assessment is an important part of the assessment process, one stressing that the students should assess their peers work by asking questions and the other emphasising group assessment where each individual student assesses their peers group-work presentations. Although, both Turkish Cypriot teachers thought that peer-assessment could be valuable, they did not use peer-assessment in their class.

Another common factor for English teachers was the Ofsted inspection of their teaching, as all English schools have curriculum objectives set for their lessons in accordance with national curriculum policy which, inter alia, mentions use of group work, differentiation and use of technology. However, Turkish Cypriot teachers are not inspected by a government body, and they plan their own teaching freely without such pressures. Briefly, within the UK, there is great deal more pressure to prepare students for the future work place, but probably less pressure from government in the Turkish Cypriot educational culture to prepare students specifically for future work place employment.

Therefore, it is possible that these differences impact on the canonical lesson plan or template for lesson planning - with particular emphasis placed on certain elements of the lesson, perhaps because they are an expected component – one that inspectors will look for – or that English teachers believe inspectors will require to be graded outstanding.

When all emergent categories arising from Rounds one and two were examined, it may be said that these categories form part of the constructivist learning environment. The question then arises whether it might be said that the emergent categories, especially technology-enhanced learning, group work or peer-assessment, align with a constructivist or instructivist approach? Whether indeed, these aspects are necessarily constructivist or whether they are just those which inspectors have selected as required from English teachers.

For technology use, both pairs of teachers referred to the ability of technology to carry out simple tasks speedily, so that the technology gave students the opportunity to spend more time thinking critically. Therefore, it could be argued that technology enabled constructivism in their teaching, but not because what they doing with technology is actually, in itself, constructivism.

Looking at group work activities, both pairs of teachers had strongly restricted activities the students might actually do, such as leaving the classroom. They mentioned class management issues for group work because of worries about discipline, with the consequence to some extent that it stopped being a truly constructivist lesson.

As the aim of this study is to build a theory of model of practice, not to dwell on constructivist approaches, it may be that not all the core categories for deciding whether a lesson plan is model

of practice will be in line with a constructivist approach.

4.4.6. Summary of Round Two

In Round 2, the emergent categories, which had emerged whilst teachers discussed lesson plans 5 and 6 (to redesign them to make them model of practice lesson plans), were presented. Next, the relationships between the categories were given, and at the end, the differences between English and Turkish Cypriot teachers identified.

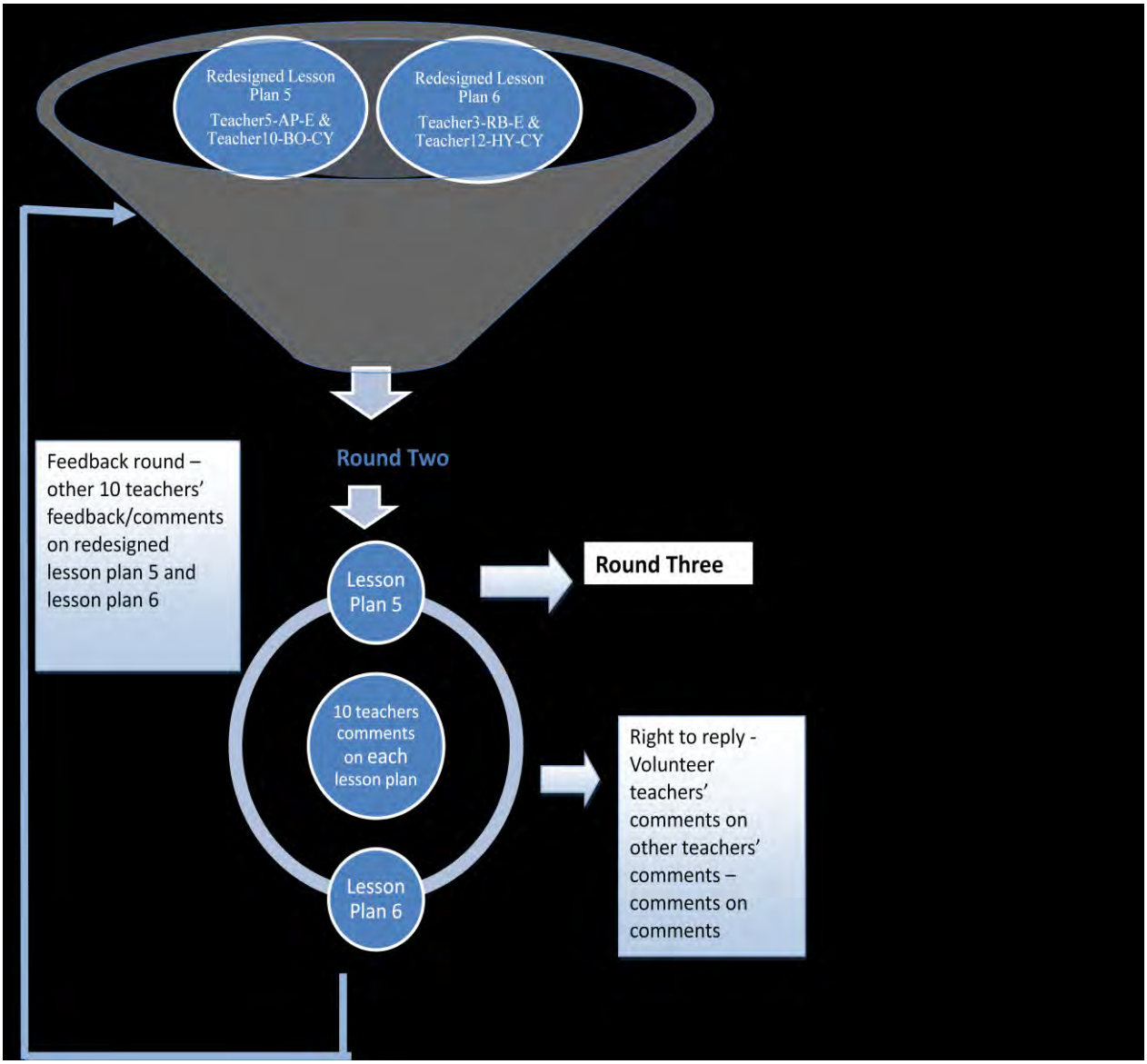
Round 2 of this modified Delphi phase entailed coming to a consensus concerning the model of practice uses of technologies in the classroom that can be adopted in the two different countries secondary schools (those which have similar characteristics with the four schools investigated). With the information gathered from Round 2, two redesigned lesson plans were fed back for their comments to the other teachers in Round 3, working towards achieving an overall consensus on these lesson plans.

4.4.7. Round Three

Round three was the final round of the modified Delphi phase for producing a model of practice. This round took forward the redesigned lesson plans from Round two. All 12 teachers who were involved at the start of the project were invited by email to participate in the final survey, and all completed the open-ended survey questions by 17 December 2011. Since 2 pairs of teachers had redesigned 2 of the lesson plans, the 10 teachers who hadn't been involved were asked to examine and evaluate the redesigned lesson plans. Each of these 10 teachers provided their

constructive critical comments as well as sharing the features they liked about these lesson plans. (The redesigned lesson plans can be seen in Appendix 12). The following Figure 4-21 illustrates the Round three processes.

Figure 4-21 Round three processes



Responses are presented below under the same headings. Finally, the 4 teachers, who had volunteered for Round two, commented on these other teachers' comments, thereby constituting a final response.

4.4.7.1. Teachers Comments for Lesson Plans

10 teachers examined the revised lesson plans 5 and 6 and provided their comments by answering the open-ended questionnaire they had received by e-mail (see Appendix 12). They were asked three questions: the first asked which aspects within the lesson plans they particularly liked; the second asked them to provide their critiques of the lesson plans; and the last asked for any other comments they would like to add. CCA was again used to analyse the Round three data. First, the teachers' critiques were analysed using CCA, and three sub-categories, related to the peer-assessment, group work and use of technology categories, emerged. Second, the features teachers liked about the lesson plans were analysed by CCA, with a single core category of what needs to be included in a good plan, and one other core category, emerged.

The Critical Comments of Other Teachers

Participant teachers gave a number of critiques of the lesson plans, as presented in Table 4-39 in descending order of frequency.

Table 4-39 Critical comments of other teachers about the redesigned lesson plans

Category	England & North Cyprus (n=10)
Evaluation criteria	**4**
Work simultaneously (Every students needs to work simultaneously in the group)	4
Peer-assessment Criteria (a list to identify what students will assess) -	3
Students familiarity with the technology	2

Evaluation criteria was the only new category to emerge from the teachers critiques, as other categories related to the categories that had emerged in round one and two, were: working simultaneously, peer-assessment criteria and students familiarity with the technology which relate respectively to group work, peer-assessment and technology enhanced learning categories. These categories are discussed below.

1. Evaluation Criteria

One of the critical comments mentioned by teachers was evaluation criteria. This need was pointed out by four teachers and two of whom put it particularly clearly, reporting:

> *"Are there any evaluation criteria developed how to measure students progress as they have different roles within a group? And how their homework will be evaluated"?* (Teacher4-OB-EG)

> *"How are the students' homework and group work evaluated by the teacher as there are not any teachers identified criteria?"* (Teacher5-AP-EI)

The teachers requested criteria to be established for the teachers' evaluation of the students' homework and group work products. They clearly stated that criteria are a very important part of the lesson plans as, if students know how they will be evaluated, then can formulate their

homework or presentation on these criteria. Therefore, teachers need to develop clear criteria for evaluation and to let the students know these criteria. Teachers would then use these clearly understood evaluation criteria to check whether the learning objectives had been met. By identifying the evaluation criteria teachers decide what is important for students to learn so this is largely an instructivist approach (Mergel, 1998).

When comparing English and Turkish Cypriot teachers, whilst the four English teachers reported that teachers needed to identify clear criteria which are important for students to know, none of the Turkish Cypriot teachers did so. This may be because Turkish Cypriot teachers do not provide evaluation criteria to students when they evaluate their students work.

2. Working Simultaneously in the Group

The other critical comment reported by teachers was that 'while one of the group members was working, what would other group members do?' Four teachers reported this category which is related to the principles of group work activity. One of the teachers stated:

> *"I especially worry about the roles of the group members leading to students with no work to do... Do these roles allow the group to all be working simultaneously? Will some be sat doing nothing for 5 mins or more? We all know this leads to boredom."* (Teacher5-AP-EI)

Teachers believed that students need to work simultaneously so they do not get bored and everybody should engage with some work to avoid behavioural problems.

Whilst four English teachers stated that working simultaneously in group work is important, none

of the Turkish Cypriot teachers referred to this. This may be related to the different teaching culture. As mentioned earlier, Turkish Cypriot teachers rarely use group work activities so that may be why they did not provide any such critique in their evaluation.

3. Peer-Assessment Criteria

A request for criteria - a list to identify what students will assess – was the other critical comment made by teachers, attracting two comments. For example:

> *"What exactly are they looking for? Get them to list on their whiteboards ways it could be improved and how."* (Teacher4-OB-E)

Similarly, the other two teachers stated that teachers need to identify criteria for peer assessment as this was lacking. Teachers thought that when using peer assessment, there should be identified assessment criteria that enabled students to assess their peers. Peer assessment/review is a very important aspect of constructivist lesson plans and teachers need to discuss these criteria and their meaning with their students at the beginning of the lesson for them to assess their peers using these criteria at the end of the lesson. Therefore, teachers should write down the criteria for peer assessment on the board, so that in their peer-assessment, students could look at their fellow student's work and say what needed to be improved. Alternatively, teachers could provide a worksheet at the end of which all assessment criteria for peer-assessment would be given. The criteria for peer assessment would either be discussed with students, or teachers would need to provide them at the beginning of the lesson plan for any subject. However, it is important to note that when a teacher provides the worksheet for peer assessment criteria, this would no longer fit with the notion of the constructivist learning environment where students should at least discuss

the assessment criteria with teachers' guidance and support – only then could the assessment method be truly aligned with the constructivist learning environment (Race, 1993).

Whilst three English teachers stated that criteria need to be identified for peer-assessment, none of the Turkish Cypriot teachers referred to this as they do not often use peer-assessment in their teaching.

4. Students' Familiarity with Technology

Another question raised concerning this lesson plan was 'do students know how to use technology?'

> *"How many of them will know how to use the technology? Would there need to be some skills taught?"* (Teacher4-OB-E)

This teacher thought that using technology in lessons is good, but that the most important thing teachers need to take account of is that students are familiar with the technology or computer program that the teachers use in their teaching. This is because if students do not know how to use it, then using technology will not enhance their learning, conversely it would actually hinder it. Only two English teachers reported this category. As this study only involved a small number of teachers, the critiques of these two teachers about the lesson plans were taken into account, as it was considered an important aspect for the good lesson plan. None of the Turkish Cypriot teachers mentioned this category as they rarely used technology and it generally not being used by students, so this may be why instead they discussed barriers to technology use in their classroom, as are presented under the barriers and enablers heading in this section.

4.4.7.2. The Features the Other Teachers Liked

Participant teachers gave a number of features they liked about the lesson plans, but only two are presented in Table 4-40 below, as other features that were liked were the same as for the emergent categories that emerged from Rounds one and two, such as peer-assessment and group work activities.

Table 4-40 The features the other teachers liked about the redesigned lesson plans

Liked Features	England & North Cyprus (n=10)
Different subject working side by side	2
Web resources	4

1. Different Subjects Working Side by Side

Teachers reported that 'Different subjects working side by side' is a good aspect of these lessons, and as one of the English Teacher stated:

> *"It is positive to see Numeracy and ICT working side by side."* (Teacher5-AP-EI)

> *"What I also like about lesson plan 6 is that teachers ask ICT teacher to allow students to enter their data that they collected into Excel programme in ICT lesson time as we do not have more than one computer lab in our school and do not have computers in our classrooms."* (Teacher11-UA-CYG)

As teachers mentioned, when individual subject teachers and ICT teachers work together, they should not waste time entering their data during their subject classes' time, particularly allowing math teachers to have more time for discussing and interpreting their data rather than simply drawing graphs.

Two English and five Turkish Cypriot teachers pointed out this category. It was referred to by all the participating Turkish Cypriot teachers and this may be related to the inaccessibility of computers in their schools. According to these teachers, it also allowed students to make the link between different subjects.

2. Web Resources

Web resources are the other feature reported as being liked by two English and two Turkish Cypriot teachers. One of the Turkish Cypriot teachers reported:

> *"[what] I particularly like about this lesson plan is that the students undertake search on the internet in the computer lab by themselves."* (Teacher11-UA-CYG)

Teachers who liked the internet search feature in the activities, thought that searching on the internet was important because students try to discover things independently, actively learning by themselves in a self-directed way, which involves the higher-order thinking skills in Bloom's taxonomy and it is an important aspect of the constructivist learning environment. The internet is considered to be like a world-wide library (Paris, 2002) as it contains massive amount of information accessible by students about topics they looking for. This is the reason why teachers need to guide their students by making available a list of appropriate Web Sites to select appropriate information, in order to guard students from poor quality Web Sites . In addition, teachers need to discuss with their students why selected Web Site(s) are considered good/safe to use.

Both English and Turkish Cypriot teachers agreed that use of internet can be a good tool for

effective teaching and learning.

4.4.7.3. Volunteer Teachers' Comments on Other Teachers' Comments

The teachers' critical comments and the features they liked were sent to those teachers who had volunteered for Round 2. They made their comments on the other teachers' critiques, but only on the negative ones. For this reason, teachers' comments on the critiques are presented under the same headings as in the 'critical comments of teachers' section.

1. Evaluation Criteria

In response to this critique, volunteer teachers gave an explanation of how they were going to evaluate their students work. This is presented in Table 4-41 below.

Table 4-41 Volunteered teachers comments on evaluation criteria critique

Critique	Teachers' comments on critique
Evaluation criteria	• "*While students write their story we will be walking around the classroom so we can make sure that everybody is contributing to the story. As they write in order that we can identify who has written what in the text. We can understand the students learning from their written text. It is difficult to assess the changes they make using the thesaurus but it is for them to learn rather than for assessment." (Teacher5-AP-E & Teacher10-BO-CY)* • *"Students will assess by data they present. If everybody has done their job (role) well then presentation will be good. In other words if data presented well, then it means data collected well, well prepared charts, etc. Yes this is a problem in teamwork as has everybody done some work? We think presentation is the way of assessment as you can isolate by presentation, because you can target individuals as you know who did what." (Teacher3-RB-E & Teacher12-HY-CY)*

It seems that the volunteer teachers agreed to include evaluation criteria for evaluating their students, to let them know how they will be evaluated, to help them improve. They did not mention the evaluation criteria in earlier rounds but it can be clearly seen from the teacher's

comments that they all had evaluation criteria to assess their students' performance and homework.

2. Working Simultaneously in the Group

In response to this critique, volunteer teachers clarified what students would do whilst other student were working on other tasks. This presented in Table 4-42 below.

Table 4-42 Volunteer teachers comments on working simultaneously in the group critique

Critique	Teachers' comments on critique
Working simultaneously in the group	• *"This is an important point. Also we need to be careful as sometimes one student can write all the story, thus it needs controlling. In terms of this criticism, we would say that while one student is adding to the text, other students are thinking and try to figure out what they are going to write when their turn comes." (Teacher5-AP-E and Teacher10-BO-CY)* • *"Once data collected other group members start to do their bit and students who went out for data collection prepare frequency table for other student who will prepare a chart and help them. Once data is there, everybody will have to do something. Teacher has to plan what they are going to do. Working simultaneously where one student prepares presentation then charts come from other student etc. so everybody works at the same time to prepare it for the end of the lesson..."Once they have the data, all group members work simultaneously. We did not mention this in the lesson plan in detail but normally what we do is, while other group members are waiting for data we can sometimes ask them 'what preparation can we do while data comes back to class?' Or rest of class go through the task in detail and we can ask 'can you go on the computer and start working?' such as draw chart, how you are going to present presentation. We can do a mind map in the class." (Teacher3-RB-E and Teacher12-HY-CY)*

As it can be clearly understood, teachers commented that working simultaneously is important in group work activities and every teacher has his/her plan to keep all students busy, in their own role. This means that they agreed with the other teachers that every student needed to work simultaneously in the group. Their practice was to ask some questions and to produce a mind-

map with students are setting out what each group member would do during the group work activity. They believed that students needed to be observed continuously during their group work to keep them concentrating on their work.

3. Peer-Assessment Criteria

The critique of the peer-assessment criteria was answered by volunteer teachers as presented in Table 4-43 below.

Table 4-43 Volunteer teachers comments on peer-assessment criteria critique

Critique	Teachers comments on critiques
Peer-assessment Criteria	• *"We did not mention about this and these teachers are right but actually we have ready an assessment sheet about the creative writing." (Teacher5-AP-E and Teacher10-BO-CY)* • *"We did not point out the criteria for peer-assessment while redesigning lesson plan but it does not mean that we do not have criteria. Of course, every teacher has their own criteria technique so we can say that ready assessment sheet includes criteria." (Teacher5-RB-E and Teacher12-HY-CY)*

Volunteer teachers agreed with the other teachers' critiques – students needed criteria for peer-assessment for students to know how they would assess their peers' work, helping them to improve their higher-order thinking skills and think critically. They reported however that they had a ready assessment sheet for students to use in their peer-assessment which demonstrates that teachers do not use peer-assessment in a constructivist way. In the constructivist learning environment, the peer-assessment criteria needs to be discussed with the students and decided by students with the teachers' guidance and support.

4. Students' Familiarity with the Technology

The last critique made by teachers was the students' familiarity with the technology. Volunteer teachers' responses to that critique are presented in Table 4-44 below.

Table 4-44 Volunteer teachers comments on students' familiarity with the technology criteria critique

Critique	Teachers' comments on Students' familiarity with the technology critique
Students familiarity with the technology	• *"We assume that they had learnt the use of Thesaurus and spell check options in Office in the previous lesson and for the internet search key search words would be provided." (Teacher5-AB-E and Teacher10-BO-CY)* • *"We assume that students have prior knowledge about drawing charts and graphs so we designed this lesson plan. Actually, this is related with IT lessons but if they require assistance we will be there to help them. But as we said we assumed that they have knowledge about how to draw charts. For this, what we can do is; in the objectives, we can indicate that: all students should be able to draw chart, collect data and do presentation, some students do certain analysis. So I can do differentiation." (Teacher3-RB-E and Teacher12-HY-CY)*

Responding to this critique, the volunteered teachers stated that their lesson was not for teaching technology per se, as students had IT classes where they learn basic IT skills. They assumed, therefore, that students knew how to use certain programmes, however, they would help their students if necessary.

4.4.8. The Researcher Evaluation of Lesson Plans Processes of Consensus Building Through Commenting

The consensus building process proved to be a beneficial technique to both researchers and teachers. It is not a normal decision-making process, thus, its value is not based solely on whether or not agreement was reached. In this study, the modified Delphi method worked well because

teachers were not only asked to reach agreement but also to justify their reasoning, so as to understand the relationships between the categories they suggested were important to good lesson planning. This helped to build a theoretical model of the process (see Chapter 5).

For the participant teachers, who were from two different countries, the consensus building method was a new experience, and the reviews and comments they made after each round were useful to build consensus between teachers. The process was focused fittingly on producing a model of practice. Although the teachers came from different schools and cultures, and Turkish Cypriot teachers did not use some categories in their lessons, there was a high degree of consensus on the structure of the good lesson plan format, where it not only included technology, but inter alia it included real life examples, group work and engagement. As a result of all three rounds, two models were created / formed: firstly, what model of practice of lesson plans needs to include, and secondly, the elucidation about background educational and cultural environments in England and North Cyprus.

The modified Delphi method was successfully employed in this study to identify teachers opinions about the essential features of model of practice. As a researcher, I believe that this modified Delphi process (see Chapter 5 section 5.3) was not only valuable for building the theory, but it was also able to generate relevant recommendations for practice. Therefore, this modified Delphi study can contribute to directly both practice and theory where the theory built by design and by the practitioners (teachers) will have the list of categories concerning what needs to be included for model of practice generated by experienced teachers, and which they could use in their own classrooms. More importantly, the key point about Delphi is its

participatory nature. It is a participatory action research technique, meaning that it has the benefit of increasing engagement and ownership of the process of change. A lot of the time, busy teachers will not engage with change because they are simply told to do something by management without understanding the rationale for change (International Institute for Educational Planning, 2000). Delphi is a process by which people work through the reasons why they might want to do something in a particular way. They come into contact with different views about how things should be done and having argued through to a consensus they start to feel those ideas are their own ideas. Briefly, being told to change practice is not as effective as engaging in a process of figuring out what to change and why. Thus teachers having gone through to this process will be more receptive to change.

4.4.9. The Modified Delphi Data Analysis Conclusion

Throughout the three rounds of this modified Delphi phase, the Delphi participants, who were the secondary school teachers, were asked to share their experiences, opinions and comments regarding how prepare model of practice for lessons, including the use of technology. Round 1 provided data about the teachers' preferences about the pedagogical approaches that they applied in their teaching as well as an explanation of how they use ICT in their actual practice. From this data, it seemed both countries teachers applied a broadly instructivist approach in their teaching with Turkish Cypriot teachers applying virtually a purely instructivist approach. English teachers applied a dominantly instructivist approach but used elements of constructivist approaches. This was also confirmed by the last two rounds of this modified Delphi study, when in Round two, paired teachers had further discussion about the lesson plans they had redesigned. All three

rounds helped to identify what teachers perceived to be model of practice.

Overall, it does not mean that Turkish Cypriot teachers did not wish to apply a constructivist approach, on the contrary they would have liked to apply such an approach but they felt they needed greater recourses and appropriate training and support from their school and government. Similarly, English teachers often used an instructivist approach in their classrooms. They were trying to provide quality education and also taking into consideration the national curriculum and inspection issues which were perceived by English teachers as a barrier to being more flexible/constructivist in their teaching.

The following Table 4-45 illustrates the categories emerging from the literature review/theory and which came from the data/research findings itself:

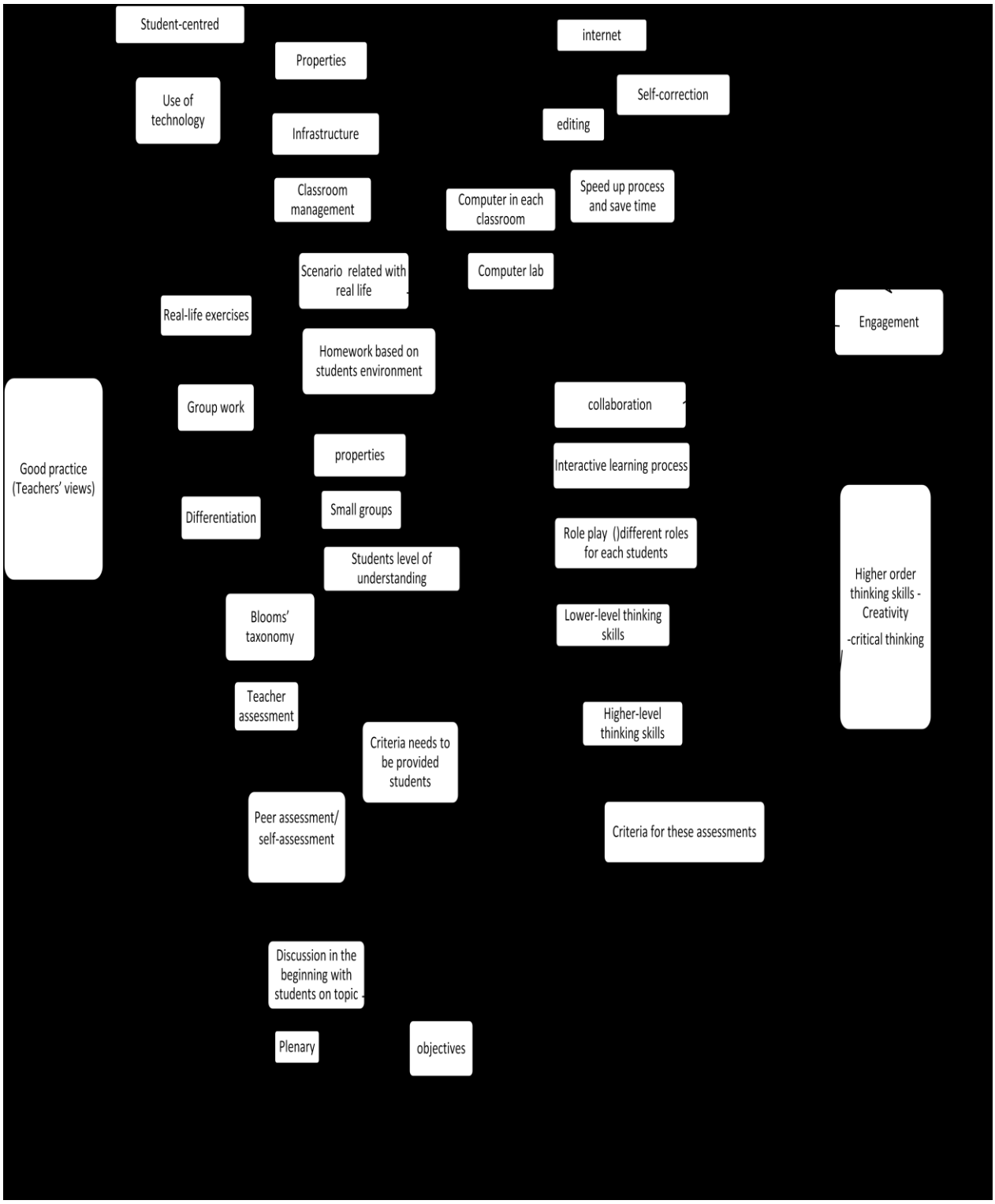
Table 4-45 Summary of the identified categories

Phase of the study	Category	
	From Theory	**From Data (emergent categories)**
Interview	• Teachers' pedagogical preference ➢ Instructive ➢ Constructivist ➢ Mixed • Factors affecting teachers choice of pedagogic approach ➢ Personal and cultural ➢ Lesson topic ➢ Student group ➢ The schools' preferred approaches • Reasons for using the selected technologies ➢ Increase understanding of the subject ➢ Engage and increase students' interest ➢ Make learning more enjoyable ➢ Improve critical-thinking and problem-solving skills ➢ Time-efficiency ➢ Teaching how to use technology as a skill in itself • Barriers to and enablers of technology use ➢ Barriers •Unavailability of ICT training •Unavailability of ICT resources •Inaccessibility of ICT resources •Lack of technical support •School policy ➢ Enablers • Availability of training • Availability of ICT resources • Confidence • Technical support • Perception of usefulness • Access to own personal laptop	• Value placed on 'Soft' skills •Necessity of student readiness •ICT Drivers towards instructivist pedagogy

Phase of the study (Continue)	**Category**	
	From Theory	**From Data (emergent categories)**
	▪ Belief that use of the ICT resource is easy ▪ Social influence	
Modified Delphi Method		
Round One		• Real Life examples • Technology enhanced learning • Group work activity • Peer assessment • Engagement • Higher-order thinking • Discussion • Student-centre
Round Two		• Differentiation • Plenary • Follow Bloom's categories • Self-assessment
Round Three		• Evaluation criteria • Work simultaneously • Peer-assessment criteria • Students familiarity with the technology

As a result of this consensus building on model of practice and collected data from interview, the model presented in Figure 4-22 was constructed.

Figure 4-22 A summary of key features identified by teachers as being model of practice



As a result of the modified Delphi technique, model of practice was constructed by building a

consensus between participating English and Turkish Cypriot teachers. This model includes the elements needed for practice and has potential to engage students in lessons and improve their higher-ordering thinking skills, important skills for students. According to the above discussion, it can clearly be seen that the identified elements included in good lesson plans, align with the constructivist approach, but as mentioned earlier, teachers do not use all these elements in a constructivist way, also including instructivist approaches. First, the lesson needs to be designed by taking student-centred learning into account where the students have a greater say in the classroom, being involved discussion, as model of practice requires. The higher levels of Blooms taxonomy need to be included in the lesson activities that help to develop students' higher level thinking skills. Here, it helps teachers to differentiate their lesson according to their students' range of abilities and characteristics, which are also elements of model of practice. Other characteristics, such as group size, affect the design of the activities teachers need to take into account to decide which activities are suitable for their class and to help all students engage with activities. Group work and use of technology were agreed as important elements of lesson activities and these are skills that students need to gain for their future work life. It is also good practice to check students understanding at the end of every lesson plan. Furthermore, model of practice needs to involve peer-assessment and self-assessment alongside the teacher's assessment.

The above perspective, which also presented in Figure 4.22, suggests a practical method of lesson planning required for model of practice.

4.4.10. Chapter Summary

This chapter has documented and analysed the detailed research findings from the two countries teachers: England and North Cyprus. Findings highlighted differences in access to resources between good and improving schools and between Turkish Cypriot and English schools. Access to reliable technology and basic ICT training are identified issues for Turkish Cypriot teachers whilst effective integration of ICT in teaching is identified as a key issue for English teachers. Turkish Cypriot and English teachers differed in their pedagogical approaches but instructivist teaching methods continue to be a major component of teaching in both Turkish Cypriot and English schools. The Delphi method proved a useful process to encourage mutual engagement toward shared goals, exploring different contexts of use and building consensus on model of practice. The consensus building activity suggested some parameters for a model of practice, generated useful lesson plans and proved a potentially useful method for encouraging a sense of joint ownership for professional development in this area.

In the next chapter the findings will be discussed.

CHAPTER 5

DISCUSSION AND CONCLUSION

5.1. Introduction

Having presented a brief overview of the study findings in the previous chapter, the purpose of this chapter is to discuss and interpret those findings with reference to the context of the original research questions underpinning the fieldwork conducted for the study. This chapter begins by addressing the research questions of the study and goes on to discuss the implications that arise for theory and practice, including pedagogical approaches, use of ICT and pedagogical approaches, and barriers to and enablers of technology use. Then, discussion about the strengths and limitation of the study, its recommendations and the prospect for further research are presented. The chapter ends by drawing observations from the study findings, including a final summary and a conclusion for this study.

The results presented in chapter four lead to a number of conclusions. Although the sample from which data was obtained is small, as a researcher I am of the opinion that the results nonetheless provides meaningful findings and insights that could be useful to applicable schools in England and North Cyprus.

For clarity, the presentation of the main findings and discussion are referenced to the main themes of the research: teachers' pedagogical beliefs, the barriers and enablers of technology use and what features or characteristics of a model of practice that combines teachers' views with

learning theory should be included in a well thought out and effective lesson.

5.2. Addressing the Research Questions

In this section, the research questions set out at the start of the study are addressed.

5.2.1. What are the Pedagogical Practices Adopted by Teachers in the Respective Secondary Schools?

a. What pedagogical approaches are applied by English and Turkish Cypriot secondary school teachers?

Data to answer this question came from the interview results and the modified Delphi study as presented in Chapter four. The results of the interviews showed that English teachers preferred a combination of instructivist and constructivist pedagogy to one that is purely instructivist or purely constructivist. However, when their use of technology in practice was examined in detail, elements from the instructivist approach were seen to dominate. Nonetheless the influence of constructivism remained apparent. The pedagogical approaches to teaching adopted by Turkish Cypriot teachers are more diverse, as some preferred to apply an instructivist approach, some a constructivist approach and some applied a combination of each of these pedagogies in their teaching. However, from interviews during which Turkish Cypriot teachers' use of technology was examined in detail, it emerged that it is likely that those teachers apply a largely element of instructivist pedagogy in their teaching.

The pedagogical approaches applied by English and Turkish Cypriot teachers in their teaching were verified using a modified Delphi study. In the modified Delphi study, English teachers

selected three lesson plans from a given set of six, which included examples of both instructivist and constructivist plans. Their choices were analysed to determine whether the interviewee's stated preferences matched their choices. However, when their explanations for their choices and their discussions about the changes were examined in detail, it could be seen both approaches applied with the instructivist approach tending to dominate, but elements of the constructivist approach also being used. Turkish Cypriot teachers preferred to employ the instructivist approach to teaching and this also matched their choices and the explanations of their choices as revealed in the modified Delphi study.

b. Why and how have teachers been integrating ICT into their lessons to enhance teaching and learning within their classrooms?

ICT is used by English teachers as a tool to support their current teaching practice, such as through presentation using Interactive whiteboard (IWB) to engage students in the lesson and to speed up their teaching of basic skills. This allows the teachers more time to teach higher-order thinking skills. In this way technology is used indirectly to create a more constructivist learning environment rather than being used to enhance the students learning at the higher end of Bloom's taxonomy, or at least not directly. However, Turkish Cypriot teachers do not really use ICT in such a way as they mostly lack sufficient technological infrastructure and training to use such technologies as are available in their teaching to be able to enhance student learning.

5.2.2. Under What Circumstance are Information and Communicaion Technologies (ICTs) Currently Being Used in Secondary Schools?

a. What do English and Turkish Cypriot teachers perceive to be barriers to effective use of ICT in teaching?

Lack of training and of resources were the two areas that most English and Turkish Cypriot teachers pointed out. The inaccessibility of ICT resources, the lack of technical support and unsupportive school policy were other barriers mentioned by teachers. However, more teachers reported these barriers as being a problem in North Cyprus than in England.

b. What do English and Turkish Cypriot teachers perceive to be enablers of effective use of ICT in teaching?

The ready availability of ICT resources, together with greater self-confidence and access to their own personal laptop, were pointed out by both English and Turkish Cypriot teachers as enablers of the use of technology in teaching. In addition, English teachers also indicated that the availability of training, technical support, their positive perception of its usefulness, the belief that use of ICT resource is trouble-free and social influence were the factors that they believed helped them to use ICT in their classes.

c. Are there any differences between English and Turkish Cypriot teachers in terms of the teaching approach they applied, the use of technology and the available resources and training?

The analysis of the teachers' responses revealed significant differences between English and Turkish Cypriot teachers in terms of the teaching approach they applied, the use of technology

and the available resources and training that they have in their school. Whereas English teachers apply a predominantly instructivist approach withsome constructivist learning elements, Turkish Cypriot teachers still continue to use an instructivist approach in their teaching, as reported in Chapter 4. Furthermore, English teachers have a range of types of ICT tools that they can use in their teaching, whilst Turkish Cypriot teachers have only a limited number of ICT tools in their schools for them to use in their teaching (see the interview analysis section 4.3.1.1 in Chapter 4). As a consequence most Turkish Cypriot teachers do not use ICT due to the lack of ICT resources in their school. Also, it was stated by all of the Turkish Cypriot teachers that they have had no training or technical support provided by their school, in sharp contrast to the experience of most of the English teachers.

5.2.3. What can Turkish Cypriot Teachers Learn from the Experience of Teachers in England and Vice Versa?

a. Are teachers in the two countries able to arrive at a consensus regarding model of practice in integrating ICT in lesson?

Teachers in the two countries did arrive at a consensus regarding model of practice for integrating ICT into their lessons. This has brought me to the point where I can make the claim that both English and Turkish Cypriot teachers desire a balance between the instructionism and constructionism approaches and it's not the case that they simply want ICT tools to be used in a constructivist manner all the time. They think some tools are appropriate for instructivist practice, and this they value. From the collected data, it can be also determined that the reason they are reluctant to integrate ICT into their lessons is that they think it is difficult because of classroom management issues and feel some technologies are too complicated to integrate into lessons.

b. Are there any contextual differences which teachers believe require a different approach to integrating ICT in lessons in the two countries?

Contextual differences emerged from the study requiring different approaches to integrating ICT in lessons for the two countries. In North Cyprus, teachers very often do not have sufficient resources and computer labs which is the cause of many of the contextual differences. Turkish Cypriot teachers overcome this problem in various ways and rather than using ICT in their classroom as English teachers who have computers and other technological tools readily available, do, they suggested working jointly with ICT teachers to provide an opportunity for their students to make use of technologies in their ICT lessons. By doing this, teachers freed up more time to discuss and evaluate the topic being discussed in the lessons. Moreover, Turkish Cypriot teachers preferred to utilise computers and the internet themselves bringing materials into the classrooms for students to work on.

5.3. Implications for Theory and Practice

Important implications have emerged from the data collected by this study. These relate on the one hand to how instructivist and constructivist pedagogical approaches are defined in the current literature and by participant teachers in this study, and on the other hand, to the differences that emerged between pedagogical beliefs and actual practice of the English and Turkish Cypriot teachers.

5.3.1. Pedagogical Approaches

There are two pedagogical approaches referred to in the literature that are generally applied in

education: instructivist and constructivist. Sometimes teachers blend these approaches to take advantage of both (Ally 2004; Connole et al., 2004; Mayes and de Freitas, 2004). The choice of approaches applied in the lesson depends on the teachers' own preferences and the underlying factors that influence those preferences. These are recognised in the literature and it is stated that teachers know how, when and under which circumstance to apply appropriate pedagogy (Viadero, 1997; Howe and Berry, 2000; BECTA, 2004, Ally 2004; Connole et al., 2004; Mayes and de Freitas, 2004).

The interviews and modified Delphi findings of this study, revealed the English and Turkish Cypriot teachers' stated preferred pedagogical approaches and their actual working practices. Furthermore, these results showed a difference between the English teachers and Turkish Cypriot teachers' views on pedagogical approaches. The study also provided insight into the factors affecting their pedagogical choice.

Based on Table 2-2 in the literature review, UNESCO (2004), the policy perspective defines the instructivist approach as teacher-centred, with teachers as 'tellers' and students as 'listeners'. In this approach, memorisation by rote is the main method of learning, with technology only used as a drill and practice tool. Similarly, but in a slightly different way, the instructivist approach is defined by academics (such as Reevees, 1999; Brown et al., 1986; Kolb, 1984; Knowles; 1998; Lave and Wenger, 1991, Roger, 1983; Merriam and Caffarell, 1999; and others that mentioned in the Chapter 2 literature review) as a process of passing knowledge from the teacher to students (one way communication), where the lesson is directed by the teacher. Under this definition, materials are provided to students and those students obtain knowledge from their teachers as

they transfer information in accordance with their own experiences and conceptions. Further, it was identified that information provided by teachers is not contextualised / situated, i.e. associated with an authentic or workplace context and that the approach lacks flexibility. In this method, students learn by memorising what their teachers tell them with technology used for drill and practice, with the additional attribute of acting as a tool to facilitate other activities and to engage and motivate students i.e. as an extrinsic reward. It is only the teachers who carry out the grading of students work as they alone are considered to be the experts.

As mentioned above, the policy and the academic view of the instructivist approach are a little different. As a result of my understanding and synthesis, both identify it as a teacher directed form of education – the main difference being that academics (such as Reevees, 1999; Brown et al., 1986; Kolb, 1984; Knowles; 1998; Lave and Wenger, 1991, Roger, 1983; Merriam and Caffarell, 1999; and others that mentioned in the Chapter 2 literature review) also brought in the use of tools to support more constructive activity.

On the other hand from a policy point of view, the constructivist approach is defined by UNESCO (2004) as a student-centred and interactive approach where the teachers' role is to guide and mediate whilst the students' role is to inquire and investigate, consequently discovering information for themselves by using different sources including those accessed through technology. Students used the inquiry based learning method to achieve a deeper understanding. Academics (such as Reeves, 1999; Brown et al., 1986; Kolb, 1984; Knowles; 1998; Lave and Wenger, 1991, Roger, 1983; Merriam and Caffarell, 1999; and others that mentioned in the Chapter 2 literature review) define the constructivist approach as student-led, driven by the 'need

to know'. In this definition, the role of the teacher is to facilitate and coordinate everything that the students need and them provide them with guidance. The role of the student is to actively engage with learning, by investigating and discovering for themselves, and from this to construct their own understanding. They use technology for collecting information, communicating and collaborating with others. Students also use problem-based and project-based methods to learn when their understanding is successful, and they are actively and collaboratively involved in the learning and decision process. Academics list: differentiation, group work, peer-assessment, self-assessments, and experiential learning i.e. real life situations and plenary as very important elements of constructivist teaching theory. Both the policy and academic view of constructivist teaching focus on active learning, but they are different in some ways, the policy view being somewhat shallower, whilst the academics view delves deeper into the thought process with the focus on profound understanding.

In the study for this thesis, teachers did not expound directly about theoretical aspects, but concentrated on the approaches and activities that they generally applied in their teaching. However, in this report, I took the step of associating their methods and activities with instructivist or constructivist theory respectively. In the interviews, the teachers were asked to state their pedagogical preference and describe the activities they carry out in their classrooms, and in the modified Delphi rounds they joined together to design lesson plans which enabled me to identify their pedagogical approaches through an examination of their preferences and activities.

Based on this, the perceptions about the instructivist approach of the teachers who participated in

this study, provided definitions of instructivist pedagogy that were in line with the thinking that students need to be controlled by the teacher to keep them focused on the subject. Even though only two Turkish Cypriot teachers said that they applied instructivist pedagogy in their teaching (see Table 4-17), examination of their practice showed that all participating Turkish Cypriot teachers seemed likely to conform to an instructivist definition. For example, one of the teachers stated that he brought his own laptop to use in his classroom, declaring that:

> *"All of the students can watch and listen to poetry clips from my own laptop to learn how poets read the poems so that they themselves learn how to do it." (Teacher10-BO-CYG)*

The example shows that this teacher used laptop (technology) in his classroom, which is positive, but he used it in a purely instructivist way with students taking a passive role. However, English teachers tried to balance instructivist and constructivist approaches, giving more responsibility to students whilst still keeping their students 'on the rails'. As one English teacher stated:

> *"I think students need teachers as well but students also need to be able to work together because if they can't work together then they cannot develop team working skills, I mean it's important because we are developing them as individuals as well so when they leave school they need to have right social skills to be able to work in a workplace." (Teacher2-SK-EG)*

In addition as mentioned in the previous chapter, they sometimes use technology as an extrinsic reward. Therefore, English teachers agreed in principle with the instructivist approach, students needing some degree of control to keep them focussed, but they believe that elements of constructivist teaching, such as the collaborative group working activities, needed to be taken into account whilst designing the lesson plan to improve students understanding and to prepare them for the workplace.

Looking more broadly, it can be seen that all the teachers' perceptions were in agreement with a constructivist view to some extent, but when their practices are examined, it seems that to some degree they may have misunderstood the entirety of the constructivist approach with its emphasis on deeper learning and understanding. Learning by rote is still learning, but it is not learning by understanding. Many teachers use computers in their teaching, but not to enhance students learning or to enable students to do research by themselves (inquiry based learning) for group work activities in their teaching. In such classes, students did not generally discuss tasks together in order to prepare good work. Another example demonstrating teachers' misunderstanding, is when teachers provided their feedback and comments about the designed lesson plans in the third round of the modified Delphi method, some of them asked why teachers could not provide students with a ready worksheet eliminating the need to go to the other class and conduct a survey to generate data. This provokes the question that if this is how they think, how will teachers be persuaded apply a more student-centred approach? The tentative conclusion is that teachers do not really understand the rationale behind constructivist pedagogies. Moreover, teachers who designed lesson plans responded to one teachers' query about 'how peer-assessment criteria are determined' by saying that most of the time, students have ready a peer-assessment sheet that they can use. If students are not involved in the decision making process establishing peer-assessment criteria, or at least have the opportunity to discuss their meaning, then it is difficult to discern where in this process is the application of the constructivist approach? These are just some of the examples where teachers may have misunderstood the spirit of the constructivist approach. Whilst teachers claimed they applied a constructivist method in their teaching, or applied constructivist method together with the instructivist approach, their practice and comments suggest that they do not, in fact, apply constructivist approach in its pure form.

Thus the instructivist approach still dominates in their teaching. .

At first glance, it seems Turkish Cypriot teachers apply a variety of pedagogical approaches, as each of them preferred a different approach to teaching, but when their actual practices were examined, as mentioned previously, the evidence suggested they apply an instructivist pedagogy, although the intention was to apply more constructivist approaches. This was also acknowledged by Isman et al. (2007) when they looked at how technology was actually being used by Turkish Cypriot secondary school science teachers. The English teacher's used a more constructivist approaches in their teaching when compared to Turkish Cypriot teachers, but again actual practice showed that the application of the instructivist approach dominates. This conflicts with the Hosftede's cultural dimensions, who depicted English teachers as being small-power-distance with weak uncertainty avoidance (Hofstede, 2009), whereas the findings of this study demonstrated that English teachers are not small-power-distance with weak uncertainty avoidance, but neither are they simply large-power-distance with strong uncertainty avoidance as are Turkish Cypriot teachers. They are between these extremes, because whilst they desire control over their students to keep them focused on the subject, they also provided opportunities to their students for discussion about the activities and gave them criteria to assess their own and each others' work through the application of self-assessment and peer-assessment techniques.

Sometimes it is difficult to apply constructivist theory in practice as researchers have developed models which do not in fact assist teachers to apply it in practice. From the literature review and this current study, I can say that there is a difference between the ideal of constructivist theory and the application of its principles in practice. This is because teachers are pragmatic

professionals, mainly concerned with what works in practice and under what circumstances (factors that affect the preference of teaching approach), as also discussed in this section, and only after this are they concerned with why this works (theory side). Briefly, teachers quickly get down to practice, and their lesson planning may evidence an activity-based approach linking objectives to methods without necessarily basing this on deep theory but rather on expectations about what a canonical lesson should be, not omitting to mention the need to conform to the requirements of audit. English teachers referred to these inspections by Ofsted (see chapter 3 for details), to check that schools provide good education and that teachers teach students appropriate skills as set out by the education department of government. This inevitably leads to the predominance of constructivist teaching with the adjunct of the use of technology, group work, peer-assessment, plenary, differentiation and overall support for student-centred teaching. Therefore, as a researcher I argue that this may be the reason English teachers apply elements of constructivist pedagogy, as driven by the need to be graded 'outstanding'. Therefore, I think the impact of Ofsted is that it short cuts the teachers' thinking about theory who simply do it in the way that Ofsted desires. However, as a qualified secondary teacher myself, I am of the view that whether teachers use constructivist, student-centred approaches or instructivist, teacher-centred, approaches, they need first to analyse their students and only then design their lessons. This is also confirmed by some English teachers, who take the view that differentiation is the most important aspect of their learning design.

Blooms' taxonomy is a middle ground between instructivist and constructivist teaching theory as it can be used to build both instructivist and constructivist's lesson plans (see section 5.4.2. and appendix 8). If the teachers in this study do have a theory of approach, it is probably Blooms'

taxonomy, with English teachers predominantly stating that they take Blooms' taxonomy into account when designing lesson plans (section 4.4 under the sub-heading 'Blooms' taxonomy').

Further factors influenced the teachers' use of pedagogical approaches when designing their lesson plans. The three principal factors were the organisational environment (Davidson and Tesh, 1997; Shafritz & Ott, 2001; Hennessy and Deaney, 2004), cultural beliefs and personal beliefs (Hofstede, 1986; Dimmock and Walker, 2005; Leo et al., 2005; Lin and Peng, 2005; Erumban and de Jong, 2006; Singh, 2006; Anderson and Maninger, 2007; Way and Webb, 2007; Hofstede, 2008). When teachers referred to organisational factors in their interviews, this related to ICT resources and training being a barrier to the use of technology. This was confirmed for the North Cyprus situation, however as mentioned earlier English teachers in the modified Delphi study, stated that inspections from Ofsted, meant that their head teachers checked their teaching and wished them to apply the criteria by which they are judged by Ofsted inspectors. This means that for schools in England, inspections have an influential effect on teachers' pedagogical preference.

The prevailing culture is also a factor influencing teachers' pedagogical choice. Teachers preferring the instructivist approach, indicated that culture is the factor that influenced them to use this approach and, as expected, these were all Turkish Cypriot, following the application of Hostede's model to North Cyprus, that predicted its culture would encourage this more instructivist approach. However, teachers who stated a constructivist or combination of both approaches, did not mention cultural influences on their pedagogical preference, but said their preferences were influenced by their personal beliefs about teaching and students learning. These

teachers believed that critical thinking, creativity, group work and use of technology are important skills for students to gain at school. Turkish Cypriot teachers related this to improving students' understandings of the lesson whereas English teachers also related it to preparing them for their future work life as can be seen in section 4.3.2. and 4.4.3.

In summary, these were the broad factors that influenced teachers preferred pedagogical approaches; however, there are other issues important to teachers, such as the topic of the lesson, the size of the classroom, the student group and management issues. Teachers, particularly English teachers, believed that the topic of the lesson sometimes prevented them from applying a more constructivist approach such as group work activities in their classroom, because finding suitable tasks for the topic was too difficult. Teachers' perceptions of their students' abilities, behaviour and general social skills were also identified as factors that influenced their pedagogic choices. This means that constitution of the student group is an important factor they take into account when applying teaching approaches, because where particular students have greater behavioural problems and lack the ability and social skills to work in a group for example, then the teachers adopted 'a very structured approach' to classroom management, as is normally associated with an instructivist pedagogy. However, as a researcher, I believe that the teachers may not be giving sufficient consideration to the possibility that the group dynamic might, in fact, be changed by the adoption of a different pedagogy, or that skills such as teamwork and staying on-task during an investigation, might themselves need be developed. The tendency was to take the group's readiness and ability to engage in more active learning as a fixed factor in the teacher's pedagogic decision-making. The teachers understood that students cannot acquire such skills in a single day, so they chose a pedagogy that they believed was within the students current

ability, and worked toward developing their ability so they could in time enhance their learning by engaging them in a more constructivist approach. For example, teachers believe that collaborative group work is important for students, but it is not practised within the curriculum, as they need to cover a wide range of content in their teaching within a restricted amount of time.

It can therefore be seen that the instructivist approach continues to be applied by teachers in both countries.

Before I began this study, I had expected that English teachers would already have moved from instructivist teaching to more constructivist forms and that the constructivist approach would dominate their teaching, as much research has been carried out in England promoting a constructivist teaching approach for teachers (my hypothesis can be found in Chapter 2 in section 2.3). However, interestingly and contrary to my expectation, I found that instructivist pedagogy is still dominant in those English schools in this study.

As a summary, the following Venn Diagrams based on Table 2-2 in the literature review, were constructed to make the England and North Cyprus situations clear, taking into account the principles of instructivist and constructivist theory and delineating their differences and similarities. Figure 5-1 clearly shows that English teachers use a mixed approach and Figure 5-2 equally shows that Turkish Cypriot teachers use an instructivist approach in their teaching, the left side of the Venn diagrams representing instructivist and the right side constructivist teaching theory. The intersection of these diagrams shows the respective England and North Cyprus situations. Figure 5-3 is a Venn diagram setting out the differences and similarities between the

English and Turkish Cypriot teachers.

Figure 5-1 English teachers' pedagogical approach

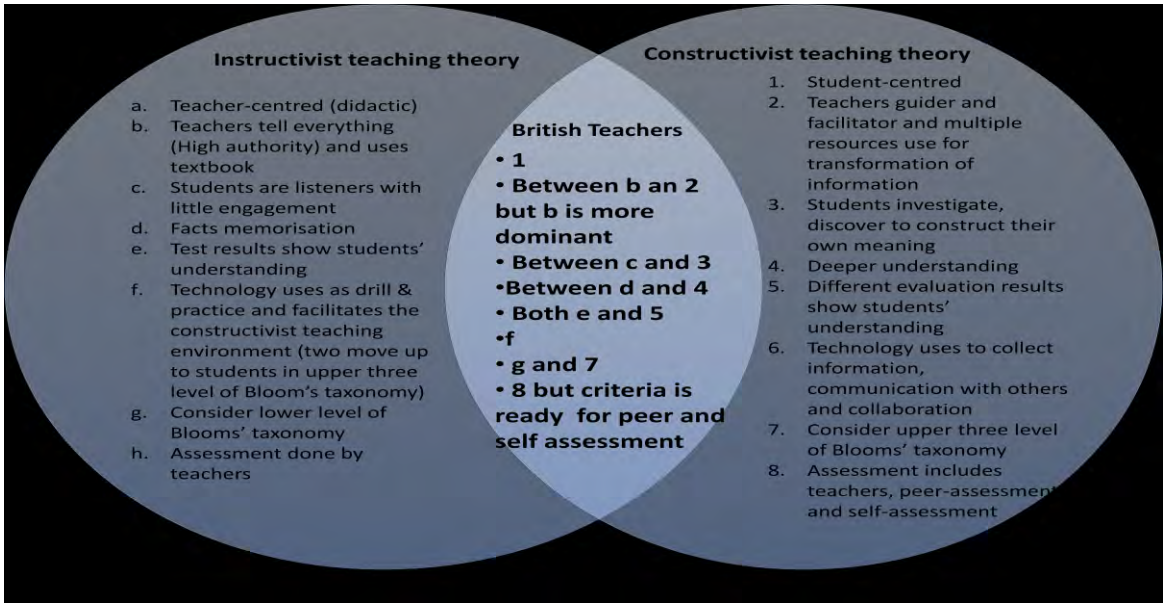


Figure 5-2 Turkish Cypriot teachers' pedagogical approach

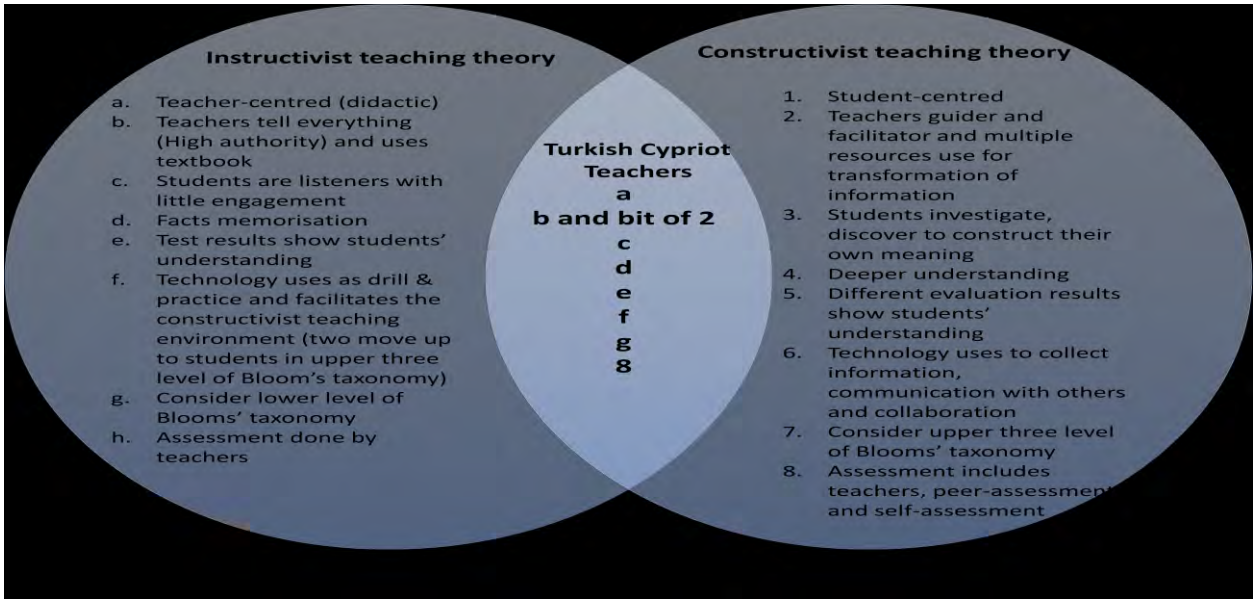
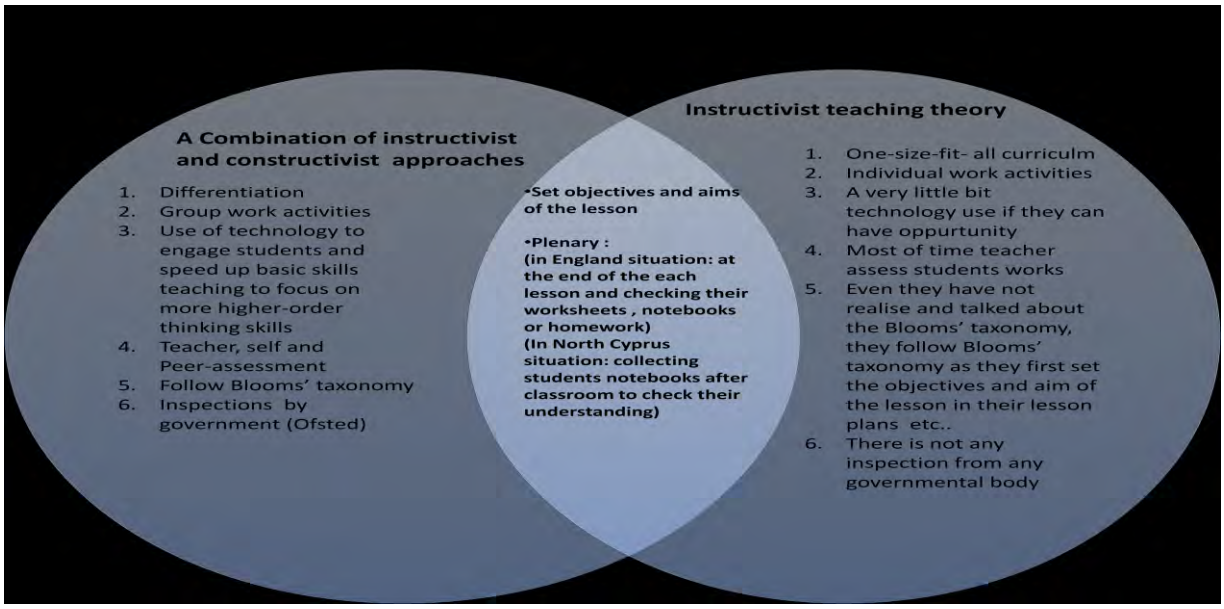


Figure 5-3 Differences and similarities between English and Turkish Cypriot teachers



According to Hofstede's (2008) cultural model (see chapter 2), it was expected that England would be a small-power-distance, weak uncertainty avoidance, individualistic and masculine culture. However, my research results do not really align with Hofstede's small-power-distance and weak uncertainty avoidance for English culture, because teachers in a small-power-distance and weak uncertainty avoidance culture would facilitate student-centred education, have less control over the students learning and allow more discussion in the classroom.

However, as can be seen from Figures 5-1 and 5-3 above, English teachers in fact use both student-centred and teacher-centred approaches, with teacher-centred approaches dominating even though they adopt differentiation, group working and the use of technologies in their teaching, effects which may be result from the Ofsted inspection regime. Ofsted expects teachers to include these elements in their lessons, leading to discussion, but with little students'

engagement and teachers retaining strong control over the students learning. On the other hand, according to Hofstede's cultural model, North Cyprus is a large-power-distances with strong uncertainty avoidance, collectivist and feminine characteristics, this being confirmed by the research results showing teachers have greater control over the students and teaching, providing all the required information, and not seeming to apply differentiation when engaging in group work activity, considering the whole class to be at much the same level.

The effective way forward is to blend the essential elements of the instructivist and constructivist teaching approaches. This stems from the belief that teachers are professionals, and that model of practice comes from their teaching experience as much as it can come from theory. In short, theorists should look more closely at teachers' practices when they develop models, and equally teachers need to know what the theory is, understand the theories sufficiently deeply to eliminate misunderstandings and misinterpretation and to have good models through which to apply theory appropriately in their teaching.

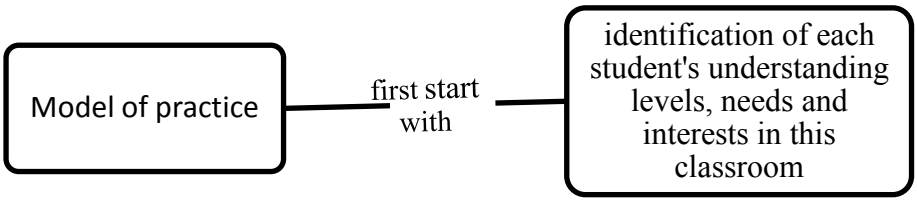
Effective pedagogy requires that theories need to be founded on teaching experience, as that 'works in practice' and teachers need to know how model of practices can be enhanced through theories. Therefore, the teaching of theories needs to be reconstituted, so that teachers can better adapt them into their daily teaching practice. For this reason researchers need to start with an understanding of the factors that teachers take into consideration in their classrooms, enabling theories to be reconstituted. In addition to this, teachers should keep abreast with the development of theories, including associated activities and strategies, so as to obtain ownership of good practical theory within their own teaching.

I therefore constructed my own model based on what teachers believed about good practice, blending it with what the theories said about the practice of good teaching. I presented a conceptual model to act as a framework to assist teachers in England and North Cyprus in their designing lessons. This model of practice includes elements of both the instructivist and constructivist approaches. Figures 5-4 and 5-5 show this new model of practice derived from my own synthesis of what the teachers and theories said.

The model of practice I constructed includes steps that teachers would need to follow. For the first step, they need to identify each student's level of understanding, their needs and interests together with their behaviour and social skills, as a prerequisite to designing lessons. Following that, teachers can group students of the same level in groups, enabling them to differentiate their teaching strategies, activities and assessment methods.

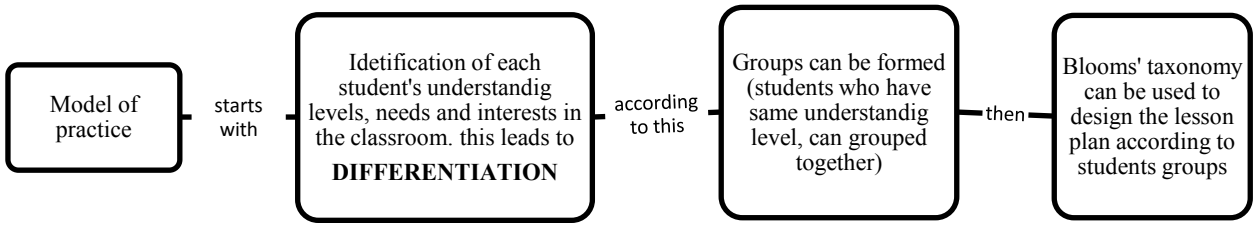
According to the theory of learning, students need to be differentiated according to their needs, attainment and understanding levels (Tomlinson, 2001; Heacox, 2002) as each student is different and not all of them learn in the same way (Diamond, 2007). Differentiation became a national curriculum strategy, as the participating English teachers stated, thus every teacher in England needs to take differentiation into consideration. This is the reason why some teachers mentioned differentiation as a first step for a model of practice. It is therefore appropriate to take differentiation as a first step in the model of practice that combines teachers' views with learning theory.

Figure 5-4 The first step for a model of practice that combines teachers' views with learning theory



For the second step, the Blooms' taxonomy follows on from the initial differentiation step as the teachers referred to their use of Blooms' taxonomy to design lesson activities as informed by their students' levels of understanding and needs. Some teachers do not use differentiation strategy as a first step in their lesson design, instead using Blooms' taxonomy to categorise learning objectives according to the levels of thinking required in different classroom activities and which can be assessed by classification (White et al., 2011). Therefore, this step comes from the teachers themselves and is also supported by reference in the theory of learning. Figure 5-5 shows this second step:

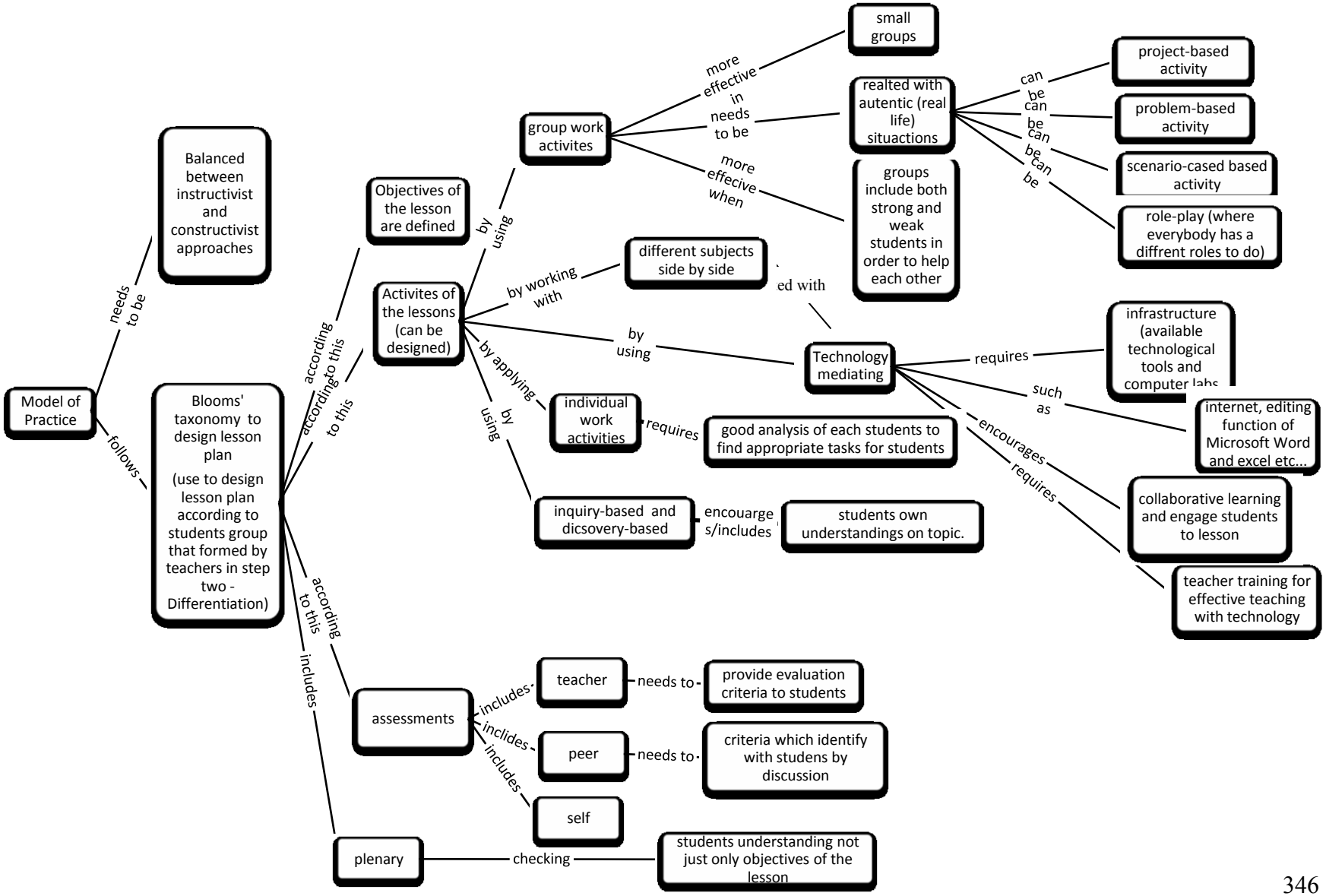
Figure 5-5 The second step for a model of practice that combines teachers' views with learning theory



After teachers have identified and grouped the students and decided how to construct their lesson using Blooms' taxonomy, then they can design their lesson plan by applying the principles of

both instructivist and constructivist approaches, entirely consistent with the conviction that good teachers can identify the best route for the groups of students they are teaching. From this can be identified the circumstances in which teacher-centred learning is best and those in which student-centred approach is best, always bearing in mind that it does not have to be entirely either/or. Different types of knowledge and learning processes need different teaching approaches (Ally, 2004; Conole et al., 2004; Mayes and de Freitas, 2004). Therefore, a balance is needed between instructivist and constructivist teaching approaches and the teachers need to decide and give attention to this when beginning the process of setting up their lesson plans, as their point of view is that students cannot direct their own learning by themselves and they require a firm structure upon which they can construct decisions on how, why and what they will learn. Moreover, teachers stated that they normally preferred to use a variety of approaches in their teaching according to their class size, students' ability levels and behaviour. Therefore, in the third step of model of practice, as presented in Figure 5-6 below, differentiation and Blooms' taxonomy can be placed in same box as they relate to each other just as teachers first identify students' needs, interest and their understanding levels and then design their lesson plan. Also, at the same level, another box has been added which is labelled as the balance between instructivist and constructivist approaches. Consequently, this model of practice includes objectives of the lesson, activities within the lesson, assessment and plenary, all being the steps that are used by teachers when they design lesson plans (an example of this can be seen in appendix 8). In this third step, different subjects work side by side, and the conclusion that group work activities are more effective when groups include both strong and weak students in order to help each other, emerged from the collected data (teachers' responses) with further insights arising from both the theory of learning and from the teachers practice.

Figure 5-6 The third step = model of practice that combines teachers' views with learning theory



My constructed model which includes both what teachers said based on their actual practices and what theorists say is presented above in Figure 5-6.

5.3.2. Use of ICT and Pedagogical Approaches

The first stage (the questionnaire) findings of this study paints a distinct picture of English teachers having greater ICT resources and training, leading to them being more confident to use ICT in their teaching (see Table 4-5 for available resources in English schools, see Figure 4-7 for training that received by English teachers and see Tables 4-6, 4-7 and 4-8 and Figure 4-9 for English teachers' confidence level and their stage of ICT integration). Turkish Cypriot teachers do not have sufficient technology and training, but their confidence level is high as they choose their own confidence level (see Table 4-12 for available resources in Turkish Cypriot schools, Figure 4-15 for training that received by Turkish Cypriot teachers and see the Table 4-13, 4-14 and 4-15 and Figure 4-17 about Turkish Cypriot teachers' confidence level and their stage of ICT integration). However, the interview and modified Delphi study findings showed that they are not really as confident as they appear when it comes to the practicality of using technology in their teaching.

Even before I commenced this study, I had expected to find that the Turkish Cypriot teachers used less ICT in their teaching because of the lack of their technological training and less resources in Turkish Cypriot schools, as was indeed confirmed, being 83% (5 out of 6) of Turkish Cypriot teachers. However, interestingly, one of the Turkish Cypriot teachers stated that he uses his laptop to overcome this barrier (see section 5.3.6). It shows that now teachers try to find ways (one of them actually stated this) to use computers in their classes, which means that teachers are becoming getting more aware of the effect of the

computer/technology on student learning.

ICT has started to be used widely in education, but the effective use of ICT in education implies changes to teachers' pedagogic practices as indicated by Viadero (1997), Nichol and Watson (2003), BECTA (2004), Olinzock, and Okojie-Boulder (2005) and Knezek (2008). However, the findings of the interviews and modified Delphi study revealed that teachers continue to use the traditional, instructivist approach when they employ technology in the belief that students need to be instructed while technology is applied in the classroom as a means of keeping them focused on the subject. Olinzock, and Okojie-Boulder (2005) also acknowledge that a review of basic teaching principles may be necessary, but that teachers have not yet developed pedagogical principles that can appropriately guide their use of technology. A study by Hermans et al. (2008) found from the empirical research those teachers whose beliefs are more instructivist/traditional will apply a more teacher-centred approach and make little use of technology, whereas teachers whose beliefs are more constructivist are likely to apply a more student-centred approach and make greater use of technology. As the results presented in Chapter 4 revealed, my results are in line with this finding, in that teachers who believe that a constructivist approach is important, did use technology more in their teaching. However, these teachers also stated that when they use technology in their teaching the purpose of using that technology is to enable them to build a more constructivist learning environment, which in turn means technology is actually used in an instructivist way. This way of using technology accords with Gibson (1979)'s affordance theory, wherein teachers use technologies to support their current teaching practice or to enhance students learning, and where the term affordance relates to perceived opportunities, interactions and possibilities. As a researcher, my perspective is that even low end use of

technology works well and it is helpful. As an example, an excel spreadsheet was referred to by one of the teachers to show students how graphs changed shape when equations are changed, enabling the students to see more variations. In t his way, students also acquire greater analytical skills such as interpretation and understanding rather than merely the mechanical skill of drawing a graph, skills that are needed in the constructivist learning environment as referred to in the literature review.

Fosnot (1996), Strehle et al. (2001) and Bellefeuille (2006) claimed that when the teachers use technology in their classrooms, particularly when integrating technology into the teaching of other subjects, it is constructivist pedagogy that is applied by teachers. However, most of the participating English teachers and some of the participating Turkish Cypriot teachers indicated that the use of the instructivist approach is well suited to their needs when using technology in their teaching. Although, students are allowed to use ICT during the lesson, the teachers reports of how they actually used technology in their classrooms, showed it was normally quite limited, with teachers continuing to have more control over their students' learning, as shown by the many examples cited in chapter 4, especially under the section 4.3.4. (three scenarios for the use of technology). In particular, one of the English teachers described the use of a voting device application, designed to get the students more involved in the use of the IWB and to make the lesson less teacher-centred.

Before beginning this research, I thought that there would be a substantial gap between the way English and Turkish Cypriot teachers' used ICT to enhance students learning, and that students in English schools would have greater freedom in their use of ICT. However, this study has revealed that even though English teachers have more resources and training than

Turkish Cypriot teachers, they use ICT in an instructivist way and they also retain control over their students, so that they can use ICT in a directed way.

5.3.3. Barriers to and Enablers of Technology Use

Schools teachers find there are barriers to and enablers of technology use, and technology readiness can itself be a barriers or enabler of its use (Parasuraman and Colby, 2001). The infrastructure issues pertain to the actual school, whereas the use of technology in teaching, related to the teachers' readiness or acceptance of the use of technology (Seng and Choo, 2008).

5.3.3.1. Barriers to technology use

As UNESCO (2004) stated, technology can be effectively integrated into lessons if schools have sufficient ICT resources. This study was consistent with this view, as the lack of availability of resources was a major barrier cited by teachers. In practice, English teachers have more resources when compared to North Cyprus, and all English schools have access to basic ICT tools such as at least one computer and IWB in the classroom. In comparison, Turkish Cypriot schools have only a single computer lab and this lab is normally used by specialist IT teachers. These schools do not have a computer in the general classrooms for other teachers to use in their lessons. Therefore, as expected, the use of technology is more common and more diverse among teachers in England, technological resources being more limited in North Cyprus. This was also acknowledge by Williams et al. (2000) and Pelgrum (2001) nearly a decade ago and they stated that there are not enough computers in schools, which is a key problem for the integration of ICT in education. In this study, the paucity of ICT resources and of training are also the barriers most often indicated by teachers

(Venkatesh et al., 2003;Rogers, 2003). Whilst none of the Turkish Cypriot teachers had any bespoke training, and only a limited number of resources (see Table 4-13), as even basic ICT equipment were often missing, English teachers have more resources (see Table 4-13), England being a richer country. Although there means a greater provision of resources than in North Cyprus and teachers have some training, they still pointed out that this was not sufficient to help them to use technology fully in their subject teaching. It means that, whereas as expected Turkish Cypriot teachers have an underlying resources and training problem, English teachers have substantial barriers through not having sufficient and appropriate training in their schools. The training they have is less than professional, but is more often peer-support which they perceive as less than adequate to promote the ICT skills of the teachers, especially in their own subject teaching. Clearly ICT tools can only be used if they are available to the teacher and if teachers have appropriate training to use them (Venkatesh et al., 2003; Rogers, 2003).

Turkish Cypriot teachers have only a single computer lab in their schools and accessibility emerges as a barrier to their use of computers. This is different to the situation in England where there is more than one computer lab and ICT, Maths and English teachers in particular have the use of their own dedicated computer labs. English teachers can access all the required basic ICT equipment within their school, however, they still have accessibility problems for some expensive ICT tools such as PSPs, voting devices and mobile phones. If teachers had greater accessibility to resources, it would encourage greater use of technology in their classroom, backed of course, with appropriate training to use it effectively.

Technological tools can develop malfunctions that cannot quickly be resolved by a teacher in

the classroom and which can cause a lesson to go off-track if technical support is not readily available, causing stress for the teacher and disruption for the class (Venkatesh et al., 2003; Rogers, 2003). If a teacher lacks confidence in using technology and there is insufficient technical support, then they may choose not to risk using it. Therefore, availability of resources, and of training and technical support, are the key issues for technology integration in the classroom.

School policy also emerged as a barrier as stated by one of the English teachers, with the use of mobile phones being banned in the school, for the possible reason that there could be behavioural issues for the students.

5.3.3.2. Enablers of technology use

There are factors that enable teachers to use technology in their classroom. Teachers identified issues that enable them to use technology in their teaching. The availability of ICT resources, teachers' confidence and access to own personal laptop were the enablers identified by teachers in both countries. In addition to these, English teachers only pointed out other enablers that encouraged them to use technology in their teaching. These were: availability of training, technical support, the perception of usefulness, and the belief that use of ICT resources is a trouble-free and socially enhancing influence. The availability of ICT resources and training and technical support were also identified as enablers. Clearly, only where technological resources and training are available, teachers will be able to use them.

Venkatesh et al. (2003) and Rogers (2003) acknowledge that provision of necessary support and training has positive effects on the teachers' use of technological tools in their teaching.

This study also confirmed that teachers believed that they can use the technology if they have sufficient resources, training and support. The above researchers also claimed that the teachers' beliefs about the ease of use of ICT in teaching and learning have a positive effect on its adoption, as indeed was pointed out by the participant teachers of this study, that if the use of ICT tools is easy and they know how to use them then they would consider adopting technology in their teaching. Social influence (Venkatesh et al., 2003) and observability (Rogers, 2003) are taken to mean the effective use of technology by other teachers and the ICT policy of the school or government which can also influence the teachers' integration of technology. This was also confirmed by current study in response to examination of the effective use of technology by peers or through encouraging ICT policy of school in influencing teachers' adoption of technology.

5.3.4. Professional Learning

The consensus building process (modified Delphi method) proved a useful method for providing a supportive environment to promote professional learning opportunities and the implementation of new practice in the classroom. The use of the modified Delphi method was reported as increasing the teachers' sense of engagement and ownership of the process of change. Teachers reported that having been involved in arguing through to a consensus, they started to feel that these ideas were their own. In contrast they felt that being told to change practice was not nearly as effective as engaging in a process of working out what to change and why. For example, teachers in the English schools perceived inspection (by Ofsted) as a barrier to being more flexible in their teaching because they felt they had to include all the laid down inspection criteria in their teaching to ensure compliance with Ofsted criteria.

This process proved to be a beneficial technique for teachers, particularly as they came into contact with different views from different cultures about how things can be done. By coming together with other cultures/counties, teachers were given a good opportunity to process new understanding, learning, and skills and to be able to see alternative visions. Therefore, through collaborative inquiry by using the modified Delphi method, teachers explored new ideas, new ways of teaching and could re-examine current practice using processes that allowed them to gain a growing respect emerging from the fresh experience about what could be brought in to improve their own practice and, of course, to enhance student learning. The participating teachers stated that they really liked this process of consensus building and use of the Skype communication programme to come together with other countries' teachers to jointly design lesson plans. As one of the teachers stated:

> *"I found this consensus building process very useful...[this process] helped us to see different way of teaching and different views on designing the same lesson and also understand how one lesson can be done without using specific technology in the classroom...."* (Teacher3-RB-EG)

Teachers, particularly Turkish Cypriot teachers, mentioned that this process was very helpful for them to change their practice by understanding and learning from the stories of the successful use of technology in teaching. As one of Turkish Cypriot teacher stated:

> *"... Having this consensus building process and using Skype to come together with English teachers, who... are more experienced than us, helped me to see how to use particular programme [Microsoft Excel] in my teaching effectively so I think this kind of study to bringing the teachers in different cultures or even same*

country together to discuss lesson plans is very helpful and I really liked the idea. ” (Teacher12-HY-CYI)

These quotations indicate that teachers found this modified Delphi method process of value, and thought it is was very helpful for improving their teaching style and understanding new ways of teaching. As a researcher in the field of Education, I believe that whilst actively engaging teachers in professional learning of this type will increase their professional knowledge and enhance their students learning. It is acknowledged that this kind of process, involving teachers in different cultures sharing experiences and helping one another, may not necessarily be sustained once the project is completed. However, it is worth mentioning here that one of the Turkish Cypriot teachers informed me by email that he is still communicating with the English teacher (with whom were paired up in same group). He stated that he asked the English teacher, who he considered as having more experience than himself, about the specific use of technology in his classroom and received comments on his draft lesson plans in order to make the use of technology more effective in his classroom to enhance students learning. . Subsequently I contacted the English teacher about the email I received from the Turkish Cypriot teacher and he told me that he was very happy to help as much as he could. He also suggested that I should conduct another study to bring more experienced teachers in the same subject areas together to discuss teaching methods when using different types of technological tools in teaching, in order to develop new ways of using technology in their practice.

Overall, the success of this consensus building process was demonstrated by the positive feedback from teachers and the way they learned from each other and suggests new and

exciting avenues for future research in this area in order to bring teachers from different countries together to discuss good practice in their respective contexts.

5.4. Strengths and Limitation of the Study

5.4.1. Strengths

No comparative study on pedagogical practices of teachers and ICT use has been carried out to compare North Cyprus with any other countries, and only a few studies, particularly about ICT use in science teaching, have been carried out in North Cyprus. This study therefore contributes to this emerging body of work. The main strength of the study is that it is the first local study that provides findings from well designed and implemented research on teachers' pedagogical practices, their ICT use and perceptions towards this usage, as well as providing a model of practice in teaching, through the technique of pairing them up with English teachers to discuss good teaching practice. The study has also yielded up-to-date information on teachers' perceptions about the use of ICT in the classroom and their pedagogical beliefs, as well as identifying those factors that enable and hinder this use, all of which add to the currently limited literature on the subject of ICT use in Turkish Cypriot schools and which extends the literature on ICT use in English schools. This information will inform current perceptions of secondary schools teachers, and could have a number of implications for the professional development of teachers.

One hundred and twenty-one teachers in total, from two English and two Turkish Cypriot secondary schools, participated in this study's questionnaire, together with two ICT co-ordinators from English secondary schools (there not being any ICT co-ordinator in the North Cyprus selected schools). Then, twelve teachers and two ICT co-ordinators were interviewed,

which is considered an adequate sample size to create confidence in the reliability of the results (Patton, 1990). Moreover, since I personally have been part of the culture of North Cyprus and have also lived in England, this formed another strength of the study since I was fully aware and could comprehensively understand the interaction between research participants and their environments and interpret them within the context in which they occurred.

Another strength of the study is its design, a potentially unique or at least innovative feature, as few studies (such as Ballesteros, 2009; Romano, 2010) have consider adopting a participatory approach using the Delphi method to build a consensus on model of practice. Modified Delphi method was applied in the last phase of this study, which involved getting the peers (teachers) together to discuss the lesson plans for model of practice. There were contrasts between each other and disagreement in some parts, as can be seen from section 4.4.5. in Chapter 4. Furthermore the other strength of the study, is the use of triangulation is of the various data collection instruments, i.e. questionnaires, semi-structured interviews and modified Delphi method. These developmental phases of research enabled themes to emerge from the data and also for a degree of verification of the importance of the themes as they are seen across all three phases of the research. Moreover, although this study was dependent mostly on UK based literature, in both the review of related research and interpretation of findings, it confirmed that similar patterns of ICT usage, perceptions, and enabling and hindering factors exist in Turkish Cypriot schools as they do in other countries, although there are also some important differences.

5.4.2. Limitations

The study was conducted by a postgraduate student, who had limited time and resources

compared to those that a full time researcher might enjoy. Data was collected for this study through the use of questionnaires, semi-structured interviews and modified Delphi model. Had additional time and resources been available to extend the study to other secondary schools, it would have been possible to obtain in-depth information to augment the current results and to ascertain whether the study's results were generalisable or were specific to the teacher's way of working at the four participating schools. However, given the constraints of time and resources available for the study, it was considered essential to select no more than two secondary schools in each country rather than drawing a sample from a greater number of schools in each country, because such a strategy would have necessitated more travel and involved greater expenditure of time and money, neither of which are available for a small study such as this. In addition, the study could usefully have been expanded to cover the students' perspective and their vision of the use of ICT and pedagogy their teachers apply, and to examine the differences between the teachers and students' views. Moreover, a comparison between teachers and students' visions might have assisted in delineating the preferred future scenario which policy makers should consider when formulating policies in order to achieve such scenario.

5.5. Recommendations

In view of the findings derived from this study and the conclusions arising from them, the following recommendations for practice are presented. Arising from the research work, it is clear that there are also potentially some policy implications that could be regarded as recommendations for policy makers. However, as this was not the focus of my study, I have not produced any recommendations for the policy makers.

5.5.1. Pedagogical Approaches and Use of ICT in Education

The way the teachers apply the pedagogy is more instructivist than constructivist and they should appreciate that using elements of the constructivist approach such as technology, plenary or group work activities in their teaching, does not in itself mean that they are providing more student-centred constructivist teaching. To make the teaching more student-centred and constructivist to enhance students learning, a number of changes and issues need to be taken into account by teachers as well as by schools and government body, through Ofsted, that is responsible for education.

At a basic level, if teachers wish to enhance their students learning by applying constructivist approaches, they need to understand what constructivist learning really is and what is included in it. The model presented in Figure 5-6 can shed light on what a good lesson plan contains and what needs to be included. However, teachers should try/apply this teaching theory into their practice/lessons so that they can understand and apply the constructivist approach properly. They can then create student-centred classroom environments and achieve effective students learning. The key point is that they need to involve their students in every stage of their teaching activities, discussing and deciding the best approach with them. Therefore, teachers can blend the instructivist approach with their current pedagogy, the constructivist element being used to design effective lesson plans, as the study result showed that model of practice needs to include both approaches.

Teachers cannot do this individually because there are curriculum and infrastructure issues, such as the availability of a computer lab, of a computer for teachers to use in the classroom, resources issues, and the number of computers in the lab or classrooms. First and foremost, it

must primarily be the responsibility and function of government and its education department to provide the encouragement and support that enables teachers to apply a more student-centred constructivist learning approach, and whilst setting the guidelines of a national curriculum it also should show its recognition of the need to allow requisite flexibility for teachers to achieve best practice. Schools can encourage their teachers to use peer-support, where more experienced teachers, who apply more constructivist theory along with the instructivist approach, blending both approaches and integrating ICTs effectively in their teaching, can help them to design an effective lesson plan, which includes use of technology, and improve their understanding of how to use both approaches. Furthermore, government can provide money to schools to provide professional training to their teachers to learn how to use technologies effectively in their teaching to enhance their students learning.

Within the suggested issues outlined above, teachers should consider how they should differentiate their own teaching methods in the light of the obvious differences in their students' needs, attainment level and understanding.

5.5.2. Recommendation for the Teachers

This study showed that selected Turkish Cypriot, and particularly English, schools provide a wide range of technological resources to teachers for use in their teaching, and also that English schools provide considerable training to their teachers in use of technology. However, having a wide range of technology and basic training are not, in themselves, enough to ensure the effective use of technology in the classroom, as this study revealed that teachers need to have a better understanding of how to actually make full use of this technology to facilitate learning and student-centred instruction.

To gain this understanding and knowledge, teachers need to be provided with opportunities to observe a variety of examples and models. Having access to such a variety of examples and models can help build knowledge of what meaningful technology integration looks like, and through observation of successful methods used by other teachers, can also build confidence in the observers, who tend to believe 'if this teacher can do it, then I can too'. The more examples teachers observe, the more likely it is they will gain both the knowledge and confidence that they need when attempting similar uses of technology in their own classroom. One way to accomplish this is through sharing their success stories. This could be facilitated through: an item in staff meetings; arranging professional develoment sessions for teachers who teach the same subject to discuss their experiences, virtual means (e.g. asynchronous discussion boards) so that teachers can share their success stories about how they used technology in their teaching during a defined period of time with other teachers being able to access the discussions at a later date.

English teachers have access to a wide range of technological resources and training, but what appears to be missing, is quantifiable research-based knowledge about how the technology itself works in particular subjects and, how it interacts with pedagogical knowledge to support and enhance students' learning. Based on the literature review, Hew and Brush (2007) concluded that effective continuing professional development (CPD) for technology integration requires a focus on content that includes; technology knowledge and skills, technology-supported pedagogy knowledge and skills (by which is meant the ability to see a clear connection between the technology being used and the subject content being taught_. The key is then to combine this with technology-related classroom management knowledge and skills, as many teachers taking part in this study stated that the management issues in use

of technology in their classroom effects their adaptation to using the resource. This is the reason CPD programs need to focus on helping teachers understand how students learn specific content, and how specific instructional practices and tools can support the learning process.

In the context of the Turkish Cypriot teachers, they have access to some basic ICT resources, but what is missing is specific knowledge about the actual workings of the technology, as many of them stated that they did not know how to use specific technology that they had available, leading to the clear conclusion that they need some, or perhaps quite a lot of training to understand how technology interacts with pedagogical knowledge and thereby enhancing students' learning.

5.6. Further Research

Research studies often generate issues of future interest to researchers. Resulting from the present study, future studies can build on its findings to enrich existing knowledge in the area of ICT, exploring the fresh ideas for further research that have emerged. It is clear from this and other research, that the use of ICT in education is developing rapidly. Research in this area needs to be expanded. A study using observational techniques combined with other methods, such as interviews, could provide deeper insights into teachers' usage of ICT in teaching, as well as obtaining first-hand information regarding factors, enabling and hindering their usage and evaluating the extent of their influence on teachers' ICT use. Moreover, I personally believe in the importance of interviewing policy makers, to investigate their views on the current status of ICT use in schools and procedures and initiatives they are taking to promote supporting factors and reduce the effect of hindrances. Comparing their visions of

the future of education with those of teachers would reveal interesting comparisons and assist in bridging the gap between current policies and preferable futures.

This study was conducted in two England and two Turkish Cypriot secondary schools and I believe that more research is needed, particularly in North Cyprus, as that country has only just started to use ICT. There are thirteen further secondary schools in North Cyprus that should be studied. When conducting a study like the present one, many secondary schools from England and North Cyprus could be included to confirm findings and provide a fuller picture of teachers' current ICT use, perceptions, views and model of practice.

Furthermore, this study was involved only the teachers in secondary school so it could usefully have been expanded to cover the students' perspective and their vision of the use of ICT and pedagogy that their teachers apply, and to examine the differences between teachers and students' views.

Moreover, responses by teachers set out in Table 4-17 chapter four, demonstrated that most teachers preferred to apply a combination of instructivist and constructivist approaches or simply use constructivist approaches, whilst the schools in which they worked actually preferred their teachers to apply instructivist approaches. This was revealing, because when these teachers responses were obtained and examined in detailed in the modified Delphi study, it seemed that schools in England wished their teachers to apply more constructivist approaches in their teaching because those schools are evaluated and inspected by Ofsted. Therefore, there needs to be further research on this aspect to establish whether English schools genuinely want their teachers to follow a stricter instructivist approach, particularly as

this is contrary to Hofstede's cultural model of England as a small-power distance and weak uncertainty country.

Moreover, research can be carried out using similar consensus building methods to those employed in this study, which may in turn be assimilated into a form of CPD that encourages teachers to integrate technologies, The approach would be that a group of teachers in the same school are brought together to work through a process in which the steps of that process are decided by the teachers themselves e.g. which technology to use, and which activity to support with which topic.

Teachers who are involved in this way may be more likely to change practice and to continue to apply this practice in their teaching, because they will have decided for themselves how to work through the process. For such further research, the constructed model of practice from my study can be provided to teachers for use in their teaching as a blueprint model for designing their own lesson plans. As a result of this, I (or other researchers, who would like to do research on CPD in this way) can test my model of practice, using, as it does, a combination of teachers' views with learning theory. If teachers do not wish to use my model of practice, then they can use their own way of teaching and utilise their own model as emerging through discussion with other participants, particularly those teachers experienced in their subject and the use of ICT. After such research, these teachers would be able to share their accounts of the successful use of technologies in their classroom with other teachers and in turn help them to use the specific technologies in their own teaching.

The researcher would be heartened to believe that this study will encourage other researchers

to conduct follow-up research in the field of ICT in education. Teacher ICT usage is still in its early stages of implementation in North Cyprus and further research should therefore be supported and welcomed.

5.7. Conclusion

Although English and Turkish Cypriot teachers have access to different levels of available ICT resources, the training and the pedagogical approaches as understood from the literature review and my own collected data, show that successful learning does not depend on a single teaching strategy, or device/tool. Teachers need first to analyse and identify their students understanding levels, their needs and their interests, then design lesson plans so that they can provide differentiated learning that enables students to better understand the topic. Understanding teachers practice as conducted in the classroom, as well as theoretical knowledge, is important to produce a theory of model of practice in teaching.

This study is important for the field as no comparative study on pedagogical practices of teachers and ICT use has been carried out to compare North Cyprus with any other country, and only a few studies, particularly concentrating on ICT use in science teaching, have been carried out in secondary schools in North Cyprus. Furthermore, this study is important because it is the first study that used a particular innovative approach i.e. modified Delphi method in the field of the study. This consensus building activity suggested some parameters for a model of practice, generated useful lesson plans and proved a potentially useful method for encouraging a sense of joint ownership for professional development in this area; in other words the participatory approach has the benefit of increasing the change in teachers' practice as mentioned by the participant teachers themselves. Being told to change practice is not as

effective as engaging in a process of figuring out what to change and why. Therefore, this study contributed to knowledge.

There is still much work to be done in providing teachers with truly usable concepts and frameworks especially in curriculum and instruction. I believe researchers need to continue to try out different teaching theories to see how they can develop robust learning and identify technologies that can be effectively used in teaching and learning, in ways which positively influence learning.

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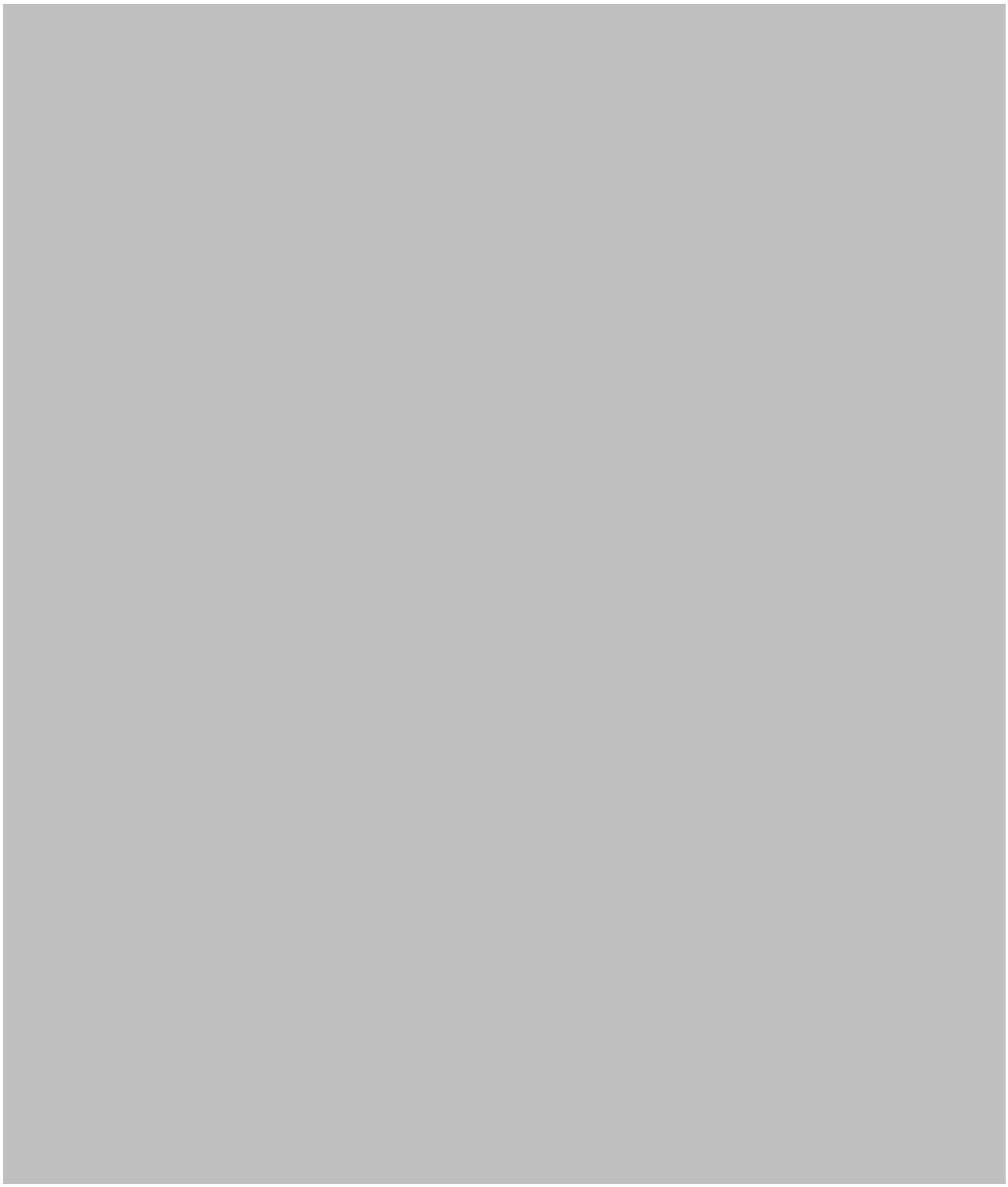
APPENDIX

Appendix 1.
The grade profile (Ofsted grading table)



Appendix 2.
The common evaluation framework criteria

Strand 1. Leadership and vision

1a. A shared vision recognises the potential of ICT to achieve the school's aims and aspirations.

1b. A sustainable strategy incorporates staffing, ICT resources and curriculum planning to meet the vision.

1c. Implementation of the strategy is managed, coordinated and monitored across the school.

1d. The vision and strategy are informed by an evaluation of implementation and of developments in technology and practice in the wider world.

Strand 2. Curriculum

2a. The planned ICT curriculum is broad and balanced.

2b. The school reviews and updates its whole curriculum in the light of developments in technology and professional practice.

2c. Pupil's actual ICT experiences are coherent, balanced and consistent across year groups and progressive over time.

Strand 3. Teaching and learning

3a. Teaching is enriched and enhanced through informed use of ICT.

3b. Teachers' expectations of pupils' use of ICT for learning are informed by knowledge of their ICT capability and patterns of access to ICT.

3c. ICT extends the quality and range of opportunities for pupils' learning.

3d. Teachers identify and evaluate the gains in teaching and learning through using ICT.

Strand 4. Assessment

4a. Where ICT is being used, interactions support pupils' learning.

4b. Formative assessment evidence and data are used in planning teaching and learning.

4c. Systems and processes are in place to ensure the consistency and reliability of summative assessment across the school/team.

Strand 5. Continuing professional development

5a. School and individual needs have been identified and addressed.

5b. The quality of support and training promotes effective use of available resources.

5c. The impact on practice is monitored and evaluated and the results used to inform future development.

Strand 6. Resources

6a. The design of teaching and learning environments enables ICT to be used effectively and in line with strategic needs.

6b. The availability and deployment of ICT resources reflects the strategic needs.

6c. Support systems and their organisation ensure that ICT resources optimise staff and pupils' use.

Strand 7. Standards

7a. Pupils' attainment in ICT capability is high with reference to all schools nationally.

7b. Pupils' attainment in ICT capability is high with reference to the school's own context.

7c. Pupils make good progress in ICT capability.

7d. Use of ICT has a beneficial impact on: attitudes, behaviour, motivation, attendance.

7e. ICT has had a positive impact on pupils' standards in other subjects.

Appendix 3.
Old questionnaire

THE UNIVERSITY OF BIRMINGHAM

A study of availability, accessibility and training of Information and Communication Technologies (ICTs)

Dear Teachers,

The survey aims to investigate the ICT resources, its location/accessibility, state of repair and availability of technical support and basic training that you had.

The questionnaires will be confidential and your contribution will be anonymous, so that no individual can be identified.

Most questions can be quickly completed by marking a cross or tick through the box. Please try to answer all questions.

Thank you for your contribution.

Section 1. Personal Information

1.1 Name of the School _____

1.2 Are you:

☐ Male ☐ Female

1.3 Which age group intervals are you in?

☐ 2 0-29 ☐ 30-39 ☐ 40-49 ☐ 50+

1.4 Which year groups are you teaching?

☐ Year 7 ☐ Year 8 ☐ Year 9

1.5 How long have you been using a computer technologies as teaching tools?
_____ years.

Section 2. Availability and accessibility of Information and Communication Technologies (ICT)

2.1 What type of ICT do you have in your school to use as a teaching tool?

☐ Hardware (e.g. PCs, laptops and notebooks, overhead projectors, electronic whiteboards, voting device, mobile phones and peripherals for them such as cameras, printers and, scanners)

☐ Software (e.g. word processing, spreadsheet, database systems, drill and practice, simulation, educational games)

☐ Networks (e.g. intranet, internet browser/search engine, Virtual learning environment (VLE))

Please specify;

2.2 Do you believe there are enough computers/ICT in your school (i.e. per students)?

☐ Yes ☐ No

2.3 Are these computers/ICT well-maintained and/or run well in your opinion?

☐ Yes ☐ No

2.4 Is there a dedicated ICT support non-teaching person in your school?

☐ Yes ☐ No

2.5 Where do you generally use ICT resources (hardware-software-networks) for teaching? (please tick that all apply**)**

☐ Classroom ☐ Computer Lab

☐ Library ☐ Home ☐ Other (please state)_____

2.6 How many minutes do you use computers/ICT in your classroom for teaching activities in each week?

☐ 0 minutes per week ☐ Less than 15 minutes per week

☐ 15-45 minutes per week ☐ 46-90 minutes per week

☐ More than 90 minutes per week specify hours per day_____

2.7 How would you describe your level of ICT skill in the following contexts?

	Skilled	**Intermediate**	**Beginner**
Classroom practice			
Professional development			
Personal use			
Administration			

2.8 What type of ICT related support do you have in your school? (Please tick that all apply)

☐ There is professional ICT non-teaching staff in the school who has technical competence to maintain the School's computers.

☐ I have support to identify and select ICT teaching resources from ICT skilled non-teaching personnel.

☐ I have support to evaluate ICT teaching resources from ICT skilled non-eaching personnel.

☐ I have support to use ICT teaching resources in the classroom from ICT skilled non-teaching personnel.

☐ I have support to use ICT teaching resources in the classroom from our ICT skilled teaching personnel in the school.

2.9 Have you ever received any ICT training?

☐ Yes

☐ My school provides us with Continual Professional Development (CPD) training.

☐ No (go to question 3.5)

2.10 Please state, how many hours technology-related professional development you have completed————— .

3. This section refers to your Continual Professional Development (CPD) training. If you have not had any CPD training please go to 3.5

3.1 What types of CPD training have you had? (Please tick all that apply)

☐ In-house training: training held in my school and delivered by school staff using school equipment.

☐ External training: I travelled to a training venue outside my school and training was delivered by another service provider using their equipment.

☐ Custom training: an outside expert consultant came to my school to deliver training for school staff using school equipment.

3.2 The following question relates to in-house training if you have had no in-house training leave this question blank and go to 3.3

Overall, on a scale of 1-5, how effective was your in-house training in helping you become a confident user of your school's computing equipment?

1(low confidence)_____5(high confidence)

☐ 1 ☐ 2 ☐ 3 ☐ 4 ☐ 5

3.3 The following question relates to external training if you have had no external training leave this question blank and go to 3.4

Overall, on a scale of 1-5, how effective was your external training in helping you become a confident user of technology in your subject teaching?

1(low confidence)_____5(high confidence)

☐ 1 ☐ 2 ☐ 3 ☐ 4 ☐ 5

3.4 The following question relates to custom training. If you have had no customised training leave this question blank and go to 3.5

Overall, on a scale of 1-5, how effective was your custom training in helping you become a confident user of technology in your subject teaching?

1(low confidence)_____5(high confidence)

☐ 1 ☐ 2 ☐ 3 ☐ 4 ☐ 5

3.5 Please read the descriptions of each of the six stages related to adoption of technology. Choose the number of the stage that best describes your level.

☐	**Stage 1: Awareness** I am aware that technology exists but have not used it for teaching. I am not confident about using computers in the classroom.
☐	**Stage 2: Learning the process** I have basic computing skills but have difficulty or lack confidence in using technology for teaching.
☐	**Stage 3: Understanding and application of the process** I am beginning to understand the process of using technology for teaching and can think of specific tasks in which it might be useful.

☐	**Stage 4: Familiarity and confidence** I am gaining a sense of confidence in using computers for teaching and am starting to feel comfortable in using the computer in lessons for specific tasks.
☐	**Stage 5: Adaptation to other contexts** I think about the computer as a tool to help me in teaching when planning lessons and have used a range of applications as instructional aids.
☐	**Stage 6: Creative application to new contexts** I can apply what I know about technology in the classroom. Therefore, I am able to use it as an instructional tool and integrate it quite confidently into the curriculum including adapting examples to meet the needs of new learning situations.

4. Other Comments

4.1 Do you have any further comments?

Your help and time in completing this questionnaire is much appreciated.

Would you like to participate in an interview, if your school will be selected as a case school?

☐ **Yes**

☐ **No**

Appendix 4.
Questionnaire after piloting

THE UNIVERSITY OF BIRMINGHAM

A study of availability, accessibility and training of Information and Communication Technologies (ICTs)

Dear Teacher,

My name is Ebru Heyberi and I am studying at the University of Birmingham as a PhD student. The reason I would like to collaborate with your school in conducting this study is that your school has been recommended as having a good overall reputation which includes use and integration of ICT resources within subject teaching. This is a student project and it is no way associated with any of the government or other auditing, evaluation or school inspection processes.

This survey aims to investigate Information and Communication Technology (ICT) resources and their use in your school and includes questions related to their location/accessibility, state of repair and the availability of technical support and basic training. The purpose of it is to examine teachers' perceptions of the thoroughness and relevance of the ICT training they received and their confidence in deploying these technologies in classroom situation. I am not evaluating your professional skills.

The questionnaires will be confidential and all contribution will be anonymous, so that no individual can be identified.

Most questions can be answered quickly by crossing or ticking through a box. Please try to answer all questions.

If you wish to see the anonymised results of this study, please provide an e-mail or postal contact address at the end of the questionnaire. **Thank you for your contribution.**

Note: For the purpose of this questionnaire I interpret ICT to mean: Any computer based and communication technologies networked and/or stand alone, including both hardware and software, which can be used as teaching, learning and information resources.

Section 1. Personal Information

1.1 Name of the School _____

1.2 Are you:

☐ Male ☐ Female

1.3 Which age group intervals are you in?

☐ 20-29 ☐ 30-39 ☐ 40-49 ☐ 50+

1.4 Which year groups are you teaching? (Please tick all that apply)

☐ Year 7 ☐ Year 8 ☐ Year 9

1.5 Which subjects do you teach?_____

1.6 How many years teaching experience do you have?_____

1.7 How long have you been using computer technologies as teaching tools?

_____ years.

Section 2. Availability and accessibility of Information and Communication Technologies (ICT)

2.1 What type of ICT do you have in your school to use as a teaching tool?

☐ Hardware (e.g. PCs, laptops and notebooks, overhead projectors, electronic whiteboards, voting device, mobile phones and peripherals for them such as cameras, printers and, scanners)

Please specify;

☐ Software (e.g. word processing, spreadsheet, database systems, drill and practice, simulation, educational games)

Please specify;

☐ Networks (e.g. intranet, internet browser/search engine, Virtual learning environment (VLE))

Please specify;

2.2 Do you believe there are enough computers/ICTs in your school (i.e. per students)?

☐ Yes ☐ No ☐ Not sure

2.3 Are these computers/ICTs well-maintained and/or run well in your opinion?

☐ Yes ☐ No ☐ Not sure

2.4 Is there a dedicated ICT support non-teaching person in your school?

☐ Yes ☐ No

2.5 Where do you generally use ICT resources (hardware-software-networks) for teaching? (Please tick that all apply**)**

☐ Classroom ☐ Computer Suite ☐ Other (please state)_____

2.6 How many minutes do you use computers/ICTs in your teaching activities in each week?

☐ 0 minutes per week ☐ Less than 15 minutes per week

☐ 15-45 minutes per week ☐ 46-90 minutes per week

☐ More than 90 minutes per week specify hours per day_____

2.7 How would you describe your level of ICT skill in the following contexts?

	Skilled	Intermediate	Beginner	Do not use
Classroom practice				
Professional development				
Personal use				
Administration				

2.8 What type of ICT related support do you have in your school? (Please tick that all apply)

- ☐ There is professional ICT non-teaching staff in the school who has technical competence to maintain the School's computers.
- ☐ I have support to identify and select ICT teaching resources from ICT skilled non-teaching personnel.
- ☐ I have support to evaluate ICT teaching resources from ICT skilled non-teaching personnel.
- ☐ I have support to use ICT teaching resources in the classroom from ICT skilled non-teaching personnel.
- ☐ I have support to use ICT teaching resources in the classroom from our ICT skilled teaching personnel in the school.

2.9 Have you ever received any ICT training?

- ☐ Yes
- ☐ My school provides us with Continual Professional Development (CPD) training.
- ☐ No (go to question 3.5)

2.10 Please state, how many hours technology-related professional development you have completed_____ .

3. This section refers to your Continual Professional Development (CPD) training. If you have not had any CPD training please go to 3.5

3.1 What types of CPD training have you had? (Please tick all that apply)

☐ In-house training: training held in my school and delivered by school staff using school equipment.

☐ External training: I travelled to a training venue outside my school and training was delivered by another service provider using their equipment.

☐ Custom training: an outside expert consultant came to my school to deliver training for school staff using school equipment.

3.2 The following question relates to in-house training if you have had no in-house training leave this question blank and go to 3.3

Overall, on a scale of 1-5, could you please evaluate your confidence level after you have received **in-house training**?

1(low confidence) _____5 (high confidence)

☐ 1 ☐ 2 ☐ 3 ☐ 4 ☐ 5

3.3 The following question relates to external training if you have had no external training leave this question blank and go to 3.4

Overall, on a scale of 1-5, could you please evaluate your confidence level after you have received **external training**?

1(low confidence)_____5(high confidence)

☐ 1 ☐ 2 ☐ 3 ☐ 4 ☐ 5

3.4 The following question relates to custom training. If you have had no customised training leave this question blank and go to 3.5

Overall, on a scale of 1-5, could you please evaluate your confidence level after you have received **custom training**?

1(low confidence)_____5(high confidence)

☐ 1 ☐ 2 ☐ 3 ☐ 4 ☐ 5

3.5 Please read the descriptions of each of the six stages related to adoption of technology. Choose the number of the stage that best describes your level.

☐	**Stage 1: Awareness** I am aware that technology exists but have not used it for teaching. I am not confident about using computers in the classroom.
☐	**Stage 2: Learning the process** I have basic computing skills but have difficulty or lack confidence in using technology for teaching.
☐	**Stage 3: Understanding and application of the process** I am beginning to understand the process of using technology for teaching and can think of specific tasks in which it might be useful.
☐	**Stage 4: Familiarity and confidence** I am gaining a sense of confidence in using computers for teaching and am starting to feel comfortable in using the computer in lessons for specific tasks.
☐	**Stage 5: Adaptation to other contexts** I think about the computer as a tool to help me in teaching when planning lessons and have used a range of applications as instructional aids.
☐	**Stage 6: Creative application to new contexts** I can apply what I know about technology in the classroom. Therefore, I am able to use it as an instructional tool and integrate it quite confidently into the curriculum including adapting examples to meet the needs of new learning situations.

4. Other Comments

4.1 Do you have any further comments?

If you wish to see the anonymised results of this study, please provide your email or postal contact address:

_____

_____

_____

Your help and time in completing this questionnaire is much appreciated.

Would you like to participate in an interview, if your school will be selected as a case school?

☐ **Yes**

☐ **No**

Appendix 5.
Information sheet with consent form

UNIVERSITY OF BIRMINGHAM

Informed Consent Form for Teachers

This informed consent form is for teachers, senior teachers and ICT co-ordinators who work for secondary schools in Birmingham or Northern Cyprus and who I am inviting to participate in a research study, entitled "Technology Enhanced Learning: a case study of UK and Cyprus".

This informed Consent Form has two parts:

- **Information Sheet** (to give you the background to the study)
- **Consent form** (if you choose to participate)

You will be given a copy of the full Informed Consent Form

Part I: Information Sheet

Introduction

My name is Ebru Heyberi and I am studying at the University of Birmingham as a PhD student. I am doing research on the perceptions of teachers, senior teachers and ICT co-ordinators about technology enhanced learning.

I am going to give you some information about my research and invite you to take part in it.. Before you decide whether or not to take part, it is important that you have the background to the research and what it will involve for you. Please take time to read the following information carefully. If you have questions, please do not hesitate to ask me.

What is the aims of the research?

The aim of the study is to investigate the views and perceptions of teachers, senior teachers and ICT co-ordinators about what technologies are being used to enhance student learning and how and why these technologies are being used. Furthermore, this study aims to investigate differences between Cypriot teachers and British teachers in the kinds of technology used and how they are used and to explore what Cypriot teachers can learn form the UK experience and vice versa.

Why have I been invited to participate?

You are being invited to take part in this research because I feel that your experiences and perspectives, as a teacher are very important. This is a student project, it is independent and it is no way associated with any of evaluation or school inspection process.

Do I have to take part?

No; your participation in this research is entirely voluntary. If you do decide to take part you will be given this information sheet to keep and be asked to sign a consent form. If you decide to take part you are still free to withdraw at any time and without giving a reason.

What will happen to me if I take part?

This research will involve your participation in a questionnaire that will take about 15 minutes to complete. If you do not wish to answer any of the questions included in the questionnaire, you may miss them out and move on to the next question. You will fill out a questionnaire which will be provided by me and collected a week later.

If your school is selected to be a part of the research study as a result of the questionnaire, then this research will involve your participation in an interview and a focus group; interview will take about 40 or less minutes and a focus group discussion will take 1 hour and 30 minutes. If you do not wish to answer any of the questions included in the interview, you may want to miss them and I will move on to the next question. If you decide to take part you are still free to withdraw at any time from stage 2 of the study without giving a reason.

What are the possible risks of taking part?

There are no risks to you taking part in the study.

What are the possible benefits of taking parts?

There will be no direct benefit to you, but your participation is likely to help me find out more about the use of technology for enhancing students' learning in secondary schools and give recommendations to Cypriot teachers on good practice when using and integrating technology in subject teaching.

Will what I say in this study be kept confidential?

The information recorded is confidential. I will not be sharing personal information about you to anyone outside of this research project. The information that I collect from this research study will be kept private. Any information about you will have a pseudonym instead of your name. No one other than my supervisors Dr. Christine Corcoran and Dr. Rachel Pilkington and I will have access to your information.

What should I do if I want to take part?

You just need to sign the consent form.

What will happen to the results of the research study?

The knowledge that I get from this research will be shared with you and your school before it is made widely available to the public. If participants want to have a summary of the research, they can get it from their school.

Who is funding the research?

This research is funded and organised by myself.

Who to Contact

If you have any questions, you may contact with me or any of my supervisors by provided e-mail addresses in the below:

[redacted]

[redacted]

This proposal has been reviewed and approved by the Ethical Review Committee of the University of Birmingham.

Thank you for taking your time to read the information sheet.

Part II. Certificate of Consent

I have been invited to participate in research about technology enhanced learning.

I have read the foregoing information. I have had the opportunity to ask questions about it and any questions I have been asked have been answered to my satisfaction. I consent voluntarily to be a participant in this study.

Name: _____

Signature: _____

Date: _____

Day/month/year

Statement by the researcher taking consent

The potential participant has read the information sheet, and the participant understands the following:
1. Understands the information sheet for this study and has had the opportunity to ask questions.
2. Understands her/his participation is voluntary and can withdraw at any time without giving reason.
3. She/he agrees to take part in this research study.
I confirm that the participant was given an opportunity to ask questions about the study, and all the questions asked by the participant have been answered to the best of my ability. I also confirm that the consent has been given freely and voluntarily.
A copy of this Informed Consent Form has been provided to the participant.
Name: _____

Signature: _____

Date: _____

Day/month/year

Would you like to participate in an interview and focus group discussion if your school will be selected as a case school?

☐ **Yes**

☐ **No**

Appendix 6.
Interview schedule for teachers and an example of interview coding

Interview Schedule for Teachers

UNIVERSITY OF BIRMINGHAM

Interview Schedule

Thank you very much for agreeing to participate in this interview. My name is Ebru Heyberi and I am studying at the University of Birmingham as a PhD student. The reason I would like to work with your school in conducting this study is that your school has been recommended as having a good reputation including the use and integration of ICT resources within subject teaching. This is a university PhD study and is no way associated with any of the government or other auditing, evaluation or school inspection processes.

This study will be conducted in two English and two Northern Cyprus secondary schools. The main aims of this study are to examine the types of technologies that enhance student learning and to gain insight into whether sharing solutions across cultures might benefit the professional development and practice of participating teaching staff. One positive outcome of this study might be a mutual understanding of the cultures of the four participating schools.

The purpose of this interview is threefold: (a) to examine how and why ICTs are being used; (b) to document your pedagogical beliefs in relation to the use of ICT to enhance learning; (d) what (if any) barriers to the use ICTs there might be.

The interviews will be confidential and all contribution will be anonymous, so that no individual can be identified.

Participating in this interview may not be of direct benefit to you, but your participation is likely to help me find out more about the use of technology for enhancing students' learning in the secondary schools of Northern Cyprus. I also hope that at the end of this research, you and other teachers who have participated will have benefitted from sharing your experiences of using ICT in teaching and learning. It is hoped that this exercise will therefore be of mutual benefit.

Questions

1. How would you describe your teaching style (your naturally preferred approach)? Why do you prefer this approach?

   For example which of these statements do you agree with most (A) OR (B), elements of both or neither?

   (A) "Students need teachers to set clear goals and boundaries, give them access to high quality structured resources and information and lots of practice on problems to achieve success" OR

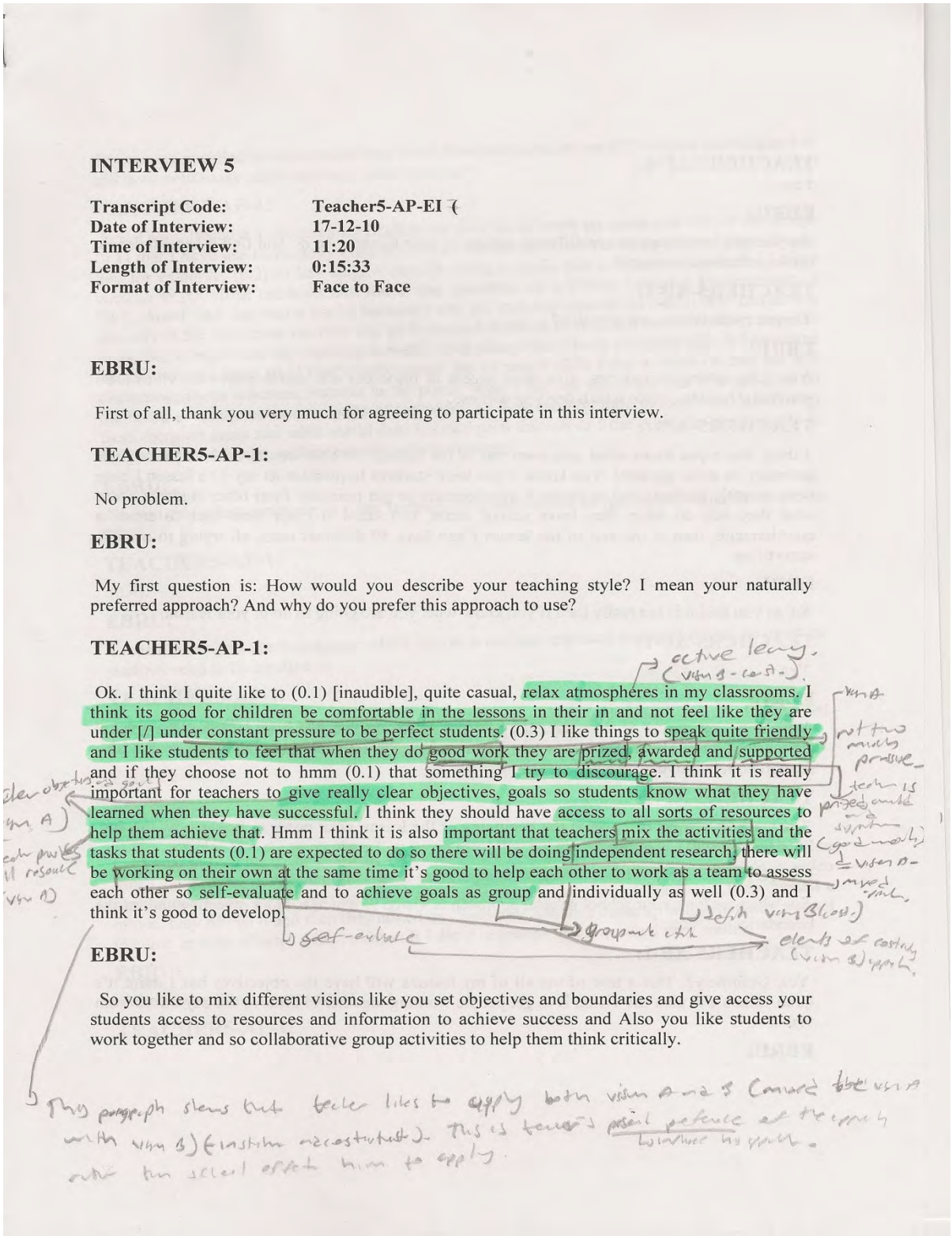
   (B) "Students need collaborative group activities that help them to develop critical-thinking skills, be creative, take pride in their team's work and learn to work together".

2. Can you tell me about how you typically use ICT in your teaching and if and how ICT/technology might enhance your teaching?

3. Can you think of a class that you used ICT in last week and tell me how and why you used it?

4. Is there any kind of technology that you would like to use in your teaching that you have not yet used? What would you like to try and why? Are there any issues or problems in trying this?

An Example of interview coding



INTERVIEW 5

Transcript Code:	**Teacher5-AP-EI -(**
Date of Interview:	**17-12-10**
Time of Interview:	**11:20**
Length of Interview:	**0:15:33**
Format of Interview:	**Face to Face**

EBRU:

First of all, thank you very much for agreeing to participate in this interview.

TEACHER5-AP-1:

No problem.

EBRU:

My first question is: How would you describe your teaching style? I mean your naturally preferred approach? And why do you prefer this approach to use?

TEACHER5-AP-1:

Ok. I think I quite like to (0.1) [inaudible], quite casual, relax atmospheres in my classrooms. I think its good for children be comfortable in the lessons in their in and not feel like they are under [/] under constant pressure to be perfect students. (0.3) I like things to speak quite friendly and I like students to feel that when they do good work they are prized, awarded and supported and if they choose not to hmm (0.1) that something I try to discourage. I think it is really important for teachers to give really clear objectives, goals so students know what they have learned when they have successful. I think they should have access to all sorts of resources to help them achieve that. Hmm I think it is also important that teachers mix the activities and the tasks that students (0.1) are expected to do so there will be doing independent research, there will be working on their own at the same time it's good to help each other to work as a team to assess each other so self-evaluate and to achieve goals as group and individually as well (0.3) and I think it's good to develop.

EBRU:

So you like to mix different visions like you set objectives and boundaries and give access your students access to resources and information to achieve success and Also you like students to work together and so collaborative group activities to help them think critically.

TEACHER5-AP-1:
Yes.

EBRU:

As you said you trying to use different visions in your teaching so do you find it hard to decide between these two visions?

TEACHER5-AP-1:

Do you mean when I am planning?

EBRU:

Yes. Like setting boundaries, give them access to resources and collaborative activities….do you find it hard to decide which one you will use?

TEACHER5-AP-1:

I think when you know what you want out of the lesson, the best way to achieve those goals generally its quite apparent. You know if you want students to produce let say (.) a lesson I have done recently students had to create a questionnaire to get opinions from other students about what they will do when they leave school. hmm, you know if I got them each to create a questionnaire, then at the end of the lesson I had have 40 different ones, all trying to achieve same thing.

EBRU:

So, as you said it is not really hard if you know what you are going to do in your lesson.

TEACHER5-AP-1:

Yes.

EBRU:

Whichever you prefer as your natural approach, which do you feel best describes the general approach of your school? Do your school wants teachers to set goals and boundaries or they also support collaborative working?

TEACHER5-AP-1:

The teachers always (0.2) set at the beginning of the lesson what needs to be done by the end. So, a teacher will say in this lesson we will learn or we will evaluate or we will achieve..

EBRU:

So, when we look your school general approach is vision A which is more objective and set the boundaries…

TEACHER5-AP-1:

Yes, Definitely?. That's true of me all of my lessons will have the objectives but I think it's quite valuable to also use vision B to get people working together to achieve the objectives from vision A.

EBRU:

My second question is: Can you tell me about how you typically use ICT in your teaching and if and how technology might enhance your teaching?

TEACHER5-AP-1:

Yes, Okay. Because I am teaching English we do a lot of work on paper and one of the things (0.1) that I have use technology quite a lot to do reduce the amount of paper that I have to use. Say for example, (0.2) in key stage 4 we are doing a media piece of course work and I have manage to put all of the tasks and sheets and resources on a Virtual Learning Environment of VLE. And I find that really useful because I can set students tasks to do which they can access not only in the classroom but they can go home and work on as well and hmm submit it to me to mark. So, it helps with my marking as well?. And other thing I have use quite a lot is interactive whiteboard and hmm (0.1) that's quite useful for let say if (0.2) I put a poem on and we will discussing rhyme schemes, features in the poem. What I can ask students to do is to annotate on the board so everyone can see parts of the poem, (.) they can highlight it, they can make things flash focus on areas and what useful then is I can print that off or I can email that to students as well so we are working collaboratively with technology.

EBRU:

Do you think that computer or other technology is best suited to supporting vision A or vision B?

TEACHER5-AP-1:

(0.4).

EBRU:

I mean, when you use technology which vision is the best approach to use? Like set boundaries, students need to be creative or…

TEACHER5-AP-1:

I think, the way? I am using technology in English typically would be for vision A. I have used with it with vision B, (.) when we being especially creative. Can I give you an example?

EBRU:

Yes, Please.

TEACHER5-AP-1:

Last year at the end of the summer, I took an entire year group and gave them an opportunity to film (.) a zombie movie and all I gave them was some paper and planning materials, a video camera and some fake blood and (0.1) they spent whole day using technology, they created a movie, they filmed it and then they edited on computers and they came up with what they wanted to come up with which I think is vision B I did it in groups which worked very well.

EBRU:

Why do you think it went well?

TEACHER5-AP-1:

I think is because mostly? (0.2) they created it themselves. There was no teacher involvement, its exactly what they want out of it and I think that's valuable learning experiences? for life skill.

EBRU:

Can you think of a class that you used ICT in last week and tell me how and why you used it?

TEACHER5-AP-1:

I have spoken about this one a little bit already with the year 11 literature class where we have to analyse poetry quite a lot. It is very useful (0.1) for me instead of saying on paper, everyone look at line 15 and tell me about this, I can put it on the screen and I can say right lets look at this and I can point out it and everyone can see really clearly on the interactive whiteboard and I can annotate, I can draw a lines off it, I can use a special, it's like a magnifying glass but it block out everything else apart from what I want them to look at so I can say look at this (0.2) sentence here I would like you to discuss this in groups and write down what you think and things like that. I can highlight parts of a play script which I have also done with the same class and print those off, and things like that. it is also quite good ((coughs)) (0.3) to get students up and do it as well so if I could say will go back to the poem lesson which is something I have done, hmm (.) Jim and Jane, hmm (.)I would have asked you to try and find the rhyme scheme of the poem, can you come up on to the board and write down on the poem for everyone to see and things like that. So, it's a get them up and using their arms to instead of just writing them using their hands to paint on the screen and things like that. I think they find more engaging and it's more valuable.

EBRU:

So, you mean they are interested in your lesson more.

TEACHER5-AP-1:

It's more kinetic static appeal, kids up and moving instead of sat down all day which I think is good.

EBRU:

Were there any issues or problems in using the technology?

TEACHER5-AP-1:

I know for some teachers, they find it very hard to get into. (.) Our school spends a lot of money putting them into every classroom and I would say there are about half of the teachers either because they do not know or they not feel comfortable using it or learning how to or they have not been given training how to use it or its faulty and we cannot afford to repair it. I said about half of the teachers are not using that equipment well.

EBRU:

So you have a maintenance problem if some ICT tool get break down.

TEACHER5-AP-1:

Yes.

EBRU:

Is there any kind of technology that you would like to use in your teaching that you have not yet used? What would you like to try and why?

TEACHER5-AP-1:

There are two very expensive things that I really like to try. One of them (.) is the smart product that goes with the smart board and that is interactive voting device where every students has wireless handsets, its buttons so I can ask them questions how comfortable are you with writing this kinds of paragraph? How you feel about today's lesson? What is the answer to this question? And they can press anonymously what they feel and what the answer and that's allows me to assess how effective my lessons are or to generating interesting games or quizzes things like that and it's just something that I know everyone could use and I know there is a use because I have seen them but just have not got money. Another one is a visualiser which I find really really useful in English which is similar to a projector and I can (0.2) take child's work as an exemplary or someone has done something really well, I can put it on the visualiser then everyone in the room can see it on the board. (0.2) And what I can do with that I can also mark or I can highlight areas which is really good, or what students should stay away from or something like that which I think is really useful. I can also take pictures of students' works as well so I can keep them.

EBRU:

If you will have these technology in your school, do you see any training needs in using this technology?

TEACHER5-AP-1:

Hmm:, personally, I am quite good with technology, so I do not think so and I do not think it would be necessary to buy training for other staff to use these devices I know that we are quite good working together so I can personally show people how to use them. (0.3) And also with the interactive whiteboard every term or whenever someone would like to I can show them how to use it, because I know how to use it quite well.

EBRU:

Is there any training for teachers in your school how to integrate technology into their subject teaching or is there only training about how to use it technically?

TEACHER5-AP-1:

Hmm. We had (0.1) one, (.) two training evenings whether it has been an hour to train us to use Virtual Learning environment of VLE but I do not think staff found it very valuable. What I think is more useful is very small, (.) one or two people asking someone that knows how to use something and then training in that way.

EBRU:

So, do you mean in this way teachers learn better how to use technology in their own subject teaching?

TEACHER5-AP-1:

Yes. Something that teacher actually wanted to learn about. But the problem is some teachers they doing well without the technology, they do not feel they need to (0.1) train in technology. They do not need it.

EBRU:

So, as I understood, some teachers think they do not need any training in technology because they are good in their teaching without it.

TEACHER5-AP-1:

Yes, exactly.

EBRU:

These are the all questions that I would like to ask you today. Thanks again.

TEACHER5-AP-1:

Ok. No problem.

Appendix 7.
The interview schedule of ICT co-ordinators

Interview Schedule for the ICT co-ordinators

UNIVERSITY OF BIRMINGHAM

Thank you very much for agreeing to participate in this interview. My name is Ebru Heyberi and I am studying at the University of Birmingham as a PhD student. This is a student project and it is no way associated with any of the government or other auditing evaluation or school inspection processes.

This study will be conducted in your school and in other school in the West Midlands area. Also, this same study will be carried out in the two secondary schools in Northern Cyprus. The main aims of this study are to examine the types of technologies that enhance student learning and to gain insight into whether sharing solutions across cultures might benefit the professional development and practice of participating teaching staff.

The purpose of this interview is to examine what types of technology do your school has? How such technologies are normally are being used by teachers? And what types of support and trainings do your school provide?

1. What does the school have in terms of ICT and how is it being used by teachers?

    a. Do teachers have computers in the classroom and what resources can they access from them?
    b. Is there a computer room and if so what resources can be accessed there?
    c. Is there a Virtual Learning Environment or intranet for teaching and learning?
    d. Are there any other web-based or networked computer resources the school uses or subscribes to and how do teachers access these?

2. Is there timetabling of computers or other ICT resources? If there is, how is this managed?

(Or follow up with cross-curriculum question if subject based arrangement- do you make sure that the timetable for the computer rooms or other ICT tools allows time for cross-curricular work as well as ICT skills development work?

3. Do you think the computing infrastructure meets the learning and teaching needs of the school?

4. In your opinion, does ICT bring added value to learning and teaching?

5. Do you have a role in supporting teachers in integrating technology with their subject-teaching, if so describe how you support them?

6. Is there any training that you or the school provides to teachers to help them integrate ICT in the curriculum?
    a. If not, are there any other sources of training/staff development that you are aware of or that you direct them to?

Appendix 8

Lesson plans and their fitness with the matrix table

Lesson Plan 1: Hgh Instructivist Approach

Lesson plan 1 is constructed based on the intersection of the instructivist teaching approach and the high level of application of the matrix table.

Table 1. Lesson Plan 1

Lesson Title	Excel (spreadsheet)- Drawing and Interpreting Bar Charts
Subject	ICT
Age	Year 7
Resources	Projector Computers running a spreadsheet application (preferably one per student) Worksheets

Lesson Description

Introduction

1. State purpose and list objectives.
2. Teacher asks students what they know about bar charts and writes responses on the board
3. Show students real-life examples of bar charts from web sites, advertisements.

Objectives

1. Students will **learn** how to draw a bar chart **step-by-step** and how to reproduce it.
2. Students **learn** and **show** how to read a bar chart based on teachers explanations.

Activities

1. Teacher gives a step-by-step demonstration of how to draw a bar chart using the projector.
2. Teacher provides a worksheet containing survey information. Each student enters this data into a spreadsheet
3. Each student uses the spreadsheet to produce a bar chart of the data
4. Teacher explains how bar charts can be read
5. Students fill in a worksheet answering questions about the chart they have created.

Evaluation

1. Teacher asks individual students to give examples of their answers to the class and provides formative feedback.
2. A summative test is given in the following lesson in which each student answers questions about a graph provided on a worksheet.

The following table shows how the intersection of the instructivist teaching approach and the high levels of application fit with this lesson plan.

Table 2. Lesson Plan 1 and its fit with the matrix

Lesson Plan 1 activities	**Content driven by teacher**	**Teacher-centred**	**Teacher provides work-sheet**	**Students are passive listener**	**Outcome is important**	**Assessment is done by teachers**	**Revised Bloom's Taxonomy: Remember**
1. Teacher gives a step-by-step demonstration of how to draw a bar chart using projector.	√	√		√			
2. Teacher provides a worksheet containing survey information. Each student enters this data into a spreadsheet. 3. Each student uses the spreadsheet to produce a bar chart of the data.	√	√	√	√			√
4. Teacher explains how bar charts can be read.		√		√			
5. Students fill in a worksheet answering, questions about the chart they have created.			√	√			√
6. Teacher asks individual students to give examples of their answers to the class and provides formative feedback. 7. A summative test will be given in the following lesson in which each student answers questions about a graph provided on a worksheet.						√	

Lesson Plan 2: Medium Instructivist Approach

Lesson plan 2 is constructed based on the intersection of the instructivist teaching approach and the medium level of application of the matrix table.

Table 3. Lesson Plan 2

Lesson Title	Climate change
Subject	Geography
Age	Year 7 and 8
Resources	Interactive Whiteboard (IWB) Power point office program Worksheets

Lesson Description

Introduction:

1. State purpose and list objectives.
2. Teacher asks students how much they know about the different types of climate and what they know about it

Objectives:

1. Students will **understand** what climate change is and learn about its different descriptions.
2. Students will **learn** and **understand** how to draw a bar graph and how to compare and interpret data.

Activities:

1. Teacher presents and explains to students what climate change is and what it means by using power point presentation software.
2. Teacher divides students into groups and allows some time to discuss what they understand about climate change and ask them to write down their thoughts.
Teacher gives some time to students working individually using internet to find out about climate change and learn how it is described by different sources such as car manufactures, environmental supporters.
3. Teacher gives a presentation about the countries that have been affected by climate change and asks students to choose two countries and show these countries on the map. Teacher asks a number of volunteers to come up to the IWB and show these countries on the map.
4. Teacher provides the rainfall levels of three areas over the last two years and ask students to draw a bar graph to compare these levels of rainfall
5. Teacher asks students to search to find out rainfall levels of their own area over the last few years and to draw a bar graph to compare these levels of rainfall

Evaluation:

For homework, students are given a worksheet that includes rainfall levels in different countries for last few years and are asked to draw a bar chart to show differences and to interpret and compare them. Teacher will collect the worksheet of the next class for evaluation.

The following table shows how the intersection of instructivist teaching approach and the medium levels of application fit with this lesson plan.

Table 0. Lesson Plan 2 and its fit with the matrix

Lesson Plan 2 activities	**Teacher-centred**	**Teacher expert but also let students find answers**	**Teacher provides work-sheet without step-by-step instruction**	**Students are not completely passive**	**Outcome – quantity of knowledge is important**	**Assessment is done by teachers**	**Revised Bloom's Taxonomy: Remember And Understand**
1. Teacher presents and explains what climate change is and what it means to students by using power point presentation software	√	√					
2. Teacher divides students into groups and gives some time to discuss what they understand about climate change and ask them to write it down.		√		√			√
3. Teacher gives a presentation about the countries that have been affected by climate change and ask students to choose two countries and show these countries on the map. Teacher asks a number of volunteers to come up to the IWB and show these countries on the map	√	√		√			√

Lesson Plan 2 activities (continue)	**Teacher-centred**	**Teacher expert but also let students find answers**	**Teacher provides work-sheet without step-by-step instruction**	**Students are not completely passive**	**Outcome – quantity of knowledge is important**	**Assessment is done by teachers**	**Revised Bloom's Taxonomy:** **Remember And Understand**
4. Teacher provides the rainfall levels of three areas over the last two years and ask students to draw a bar graph to compare these levels of rainfall		√		√			√
5. For homework, students are given a worksheet that includes different countries rainfall levels over the last few years and are asked to draw a bar chart to show differences and interpret and compare them. Teacher will collect worksheets to evaluate for next class.			√			√	√

Lesson Plan 3: Low Instructivist Approach

Lesson plan 3 is constructed based on the intersection of the instructivist teaching approach and the low level of application of the matrix table.

Table 5. Lesson Plan 3

Lesson Title	The influence of Media- Advertisement
Subject	Citizenship and English& Media
Age	Year 8 and 9
Resources	Interactive Whiteboard (IWB) Video camera connected to a TV (or computer)

Lesson Description

Introduction:

1. State purpose and list objectives.
2. Teacher asks students to share their ideas about the types of advertisement Media that they know about and writes the responses on the IWB.

Objectives:

1. Students will **learn** about the different types of advertisement.
2. Students will **understand** how advertisements influence them.
3. Students will **apply** the knowledge learned to write an advert.

Activities:

1. Teacher gives students some time to research the types of Media that are used in advertisements on the internet and write them down.
2. Teacher put agree and disagree signs on the wall and ask students to place themselves under agree or disagree signs (after the teacher has read out the statement).
3. Teacher reads out a statement to students such as 'I tried to look like someone I have seen in an advertisement' or 'I am never influenced by advertisements'. Then the teacher gives students some time to think and then to take their place under the 'agree' or 'disagree' sign. After they have taken their position, the teacher asks some further questions to each student such as 'why they took this position' etc.
4. After this warm up activity, the teacher divides the students into 3 or 4 groups (depending on group size) and asks them to identify 3 or 4 advertisements they have recently seen on TV and to write a report to explain what was the main message of these advertisements and how the advertisements influenced the students.
5. Each group reads out their report aloud to their classmates.

Evaluation:

For homework, students continue to work in groups and produce an advert using their chosen media type and product. Teacher tells students to bring their homework to the next class and present what they have produced. Teacher asks other students to assess each others' homework. The teacher and students make assessment.

The following table shows how the intersection of the instructivist teaching approach and the low level of application fit with this lesson plan..

Table 6. Lesson Plan 3 and its fit with the matrix

Lesson Plan 3 activities	**Teacher -centred mixed with student-centred**	**Students are active**	**Instructional emphasis is understanding of the topic.**	**Quantity of knowledge as well as quality of understanding demonstrates students success.**	**Mainly application of knowledge**	**Technology use - assess information**	**Teacher and peer assessment**	**Revised Bloom's Taxonomy:** **-Remember Understand Apply**
1. Teacher asks students to share their ideas about the types of advertisement Medias that they know and writes the responses on the IWB	√	√						√
2. Teacher gives students some time to search types of Medias used in advertisements on the internet and write them down.		√		√		√		√
3. Teacher puts agree and disagree signs on the wall and asks students to place themselves under agree or disagree signs after he reads the sentence		√						
4. Teacher reads some sentences to students such as 'I tried to look like someone I have seen in an advertisement' and 'I am never influenced by advertisements'. Then the teacher gives students some time to think and take their place under 'agree' or 'disagree' sign. After they have taken their position, the teacher ask s some other questions to each student such as 'why they took this position' etc.		√	√		√			√

Lesson Plan 3 activities (continue)	**Teacher -centred mixed with student-centred**	**Students are active**	**Instructional emphasis is understanding of the topic.**	**Quantity of knowledge as well as quality of understanding demonstrates students success.**	**Mainly application of knowledge**	**Technology use - assess information**	**Teacher and peer assessment**	**Revised Bloom's Taxonomy: -Remember Understand Apply**
5. After this warm up activity, the teacher divides the students into 3 or 4 groups (depending on group		√	√	√				√
size) and asks them to identify 3 or 4 advertisements that they have recently seen on TV and to write a report to explain what was the main message of these advertisements and how the advertisements influence the student.								
6.Each group reads their report aloud to their classmates.		√					√	√
7. For homework, students continue to work in groups and produce an advert on their chosen media type and product. Teacher tells students to bring their homework to the next class and present what they have produced. Teacher asks other students to evaluates and write a critique on each others' homework and the evaluation made by teachers.		√			√		√	√

Lesson Plan 4: High Constructivist Approach

Lesson plan 4 is constructed based on the intersection of the constructivist teaching approach and the high level of application of the matrix table.

Table 7. Lesson Plan 4

Lesson Title	Book summaries and Advertisement
Subject	ICT and Media
Age	Year 8 and 9
Resources	Interactive Whiteboard (IWB) Computers Books

Lesson Description

Introduction

1. State purpose and list objectives.
2. Ask students if they all have read the book that they had selected in groups of 4-5 (as arranged in a previous lesson).

Objectives:

1. Students will **learn** and **examine** how to use a video camera,
2. Students will **learn** how to make or **create** an advertisement.
3. Students will **evaluate** their peers' advertisement videos.

Activities

1.Working in their groups, students act out (or at least read out loud, taking different roles) a scene that they regard as important or dramatic from their book.
2. Using this as a starting-point, each group designs and records a three-minute advertisement for their book.
3. Their ads are presented in turn to the whole class.
4. Students are asked to choose which of the books they would like to read next.

Evaluation:

Students read the book they chose and then re-watch the advertisement. They then write a report that discusses whether the book was fairly represented and which aspects of the book they themselves would have included. Teacher, self and peer assessments are used for evaluation.

The following table shows how the intersection of the constructivist teaching approach and the high level of application fit with this lesson plan.

Table 8. Lesson Plan 4 and its fit with the matrix

Lesson Plan 4 activities	The content is driven by student: student-centred	Teacher is facilitator	Students are active learners	Inquiry, discovery and problem based learning	Understanding is important and this demonstrates the students success	Technology is used to communicate, collaborate and access information	Higher-order competencies – problem-solving and self-directness	Assessment is done by teachers, self and peer	Revised Bloom's Taxonomy: -remember understand and apply - Analysis, evaluate and create
1. Ask students if they all have read the book that they had selected in groups of 4-5	√								
2. Working in their groups, students act out (or at least read aloud, taking different roles) a scene that they regard as important or dramatic from their book.	√	√	√		√		√		√
3. Using this as a starting-point, each group designs and record a three-minutes advertisement for their book.			√			√	√		√
4. Their ads are presented in turn to the whole class.			√						√
5.Students are asked to choose which of the books they would like to read next.		√	√						

Lesson Plan 4 activities (continue)	**The content is driven by student: student-centred**	**Teacher is facilitator**	**Students are active learners**	**Inquiry, discovery and problem based learning**	**Understanding is important and this demonstrates the students success**	**Technology is used to communicate, collaborate and access information**	**Higher-order competencies – problem-solving and self-directness**	**Assessment is done by teachers, self and peer**	**Revised Bloom's Taxonomy: -remember understand and apply - Analysis, evaluate and create**
6. Students read the book they chose and then re-watch the advertisement. They then write a book report that discusses whether the book was fairly represented and which aspects of the book they would have included.			√		√				√
7. Assessment is done by teacher, self and peer assessment								√	

Lesson Plan 5: Medium Constructivist Approach

Lesson plan 5 is constructed based on the intersection of the constructivist teaching approach and the medium level of application of the matrix table.

Table 9. Lesson Plan 5

Lesson Title	Creative Writing and Collaboration
Subject	English
Age	Year 8 and 9
Resources	Interactive Whiteboard (IWB), Computers, and VLE (not essential)

Lesson Description

Introduction:

1. State purpose and list objectives.
2. Teacher chairs a discussion on creative approaches to writing a story. Students record their ideas on the IWB.

Objectives

1. Students will learn how to write creatively.
2. Students will learn how to work as a group and collaborate to **produce** good creative writing.

Activities:

1. Take students to computer lab; allow students to work alone or in pairs as they prefer.
2. Ask students to open the word processor software.
3. Ask students to start to write a beginning of a tale in five minutes. (during this activity, teacher walks around the classroom and helps students who need assistance)
4. After five minutes, ask students to exchange their computers with classmates, who sit next to them, and to read what has been written so far and continue writing the story for another five minutes.
5. Repeat this step as often as there is time. On the last repetition, indicate that the stories must now be finished with a proper ending.
6. Students then swap seats one more time and take turns to read out the story in front of them loud to the class.
7. The students vote for which story they like the best.
8. The winning story is displayed on the wall of the classroom or in another suitable place.

Evaluation:

For homework, each student receives one of the stories by email and is asked to improve it by making changes to the language and storytelling, fixing inconsistencies etc. The results are put on the Virtual Learning Environment, if one is available, for others to look at.

The following table shows how the intersection of the constructivist teaching approach and the medium level of application fits with this lesson plan.

Table 10. Lesson Plan 5 and its fit with the matrix

Lesson Plan 5 activities	Student-centred	Teacher is facilitator but sometimes could be expert	Students choose the topic for an activity	Students are active participant and work in a group	Student understanding is important	Quality of understanding is demonstrated success of students	Technology use as a tool and access to information	Critical-thinking, problem-solving and discovery learning are developed	Teacher and peer assess-ments	Revised Bloom's Taxonomy Remember Understand Apply Analysis, and Create
1. Teacher chairs a discussion on creative approaches to writing a story. Students record their ideas on the IWB.	√	√	√	√						
2. Take students to computer lab; allow students to work alone or in pairs as they prefer. Ask students to open the word processor software.		√		√						
3. Ask students to start to write a beginning of a tale in five minutes. (during this activity, teacher walks around the classroom and helps students who need help)		√	√	√				√		√

Lesson Plan 5 activities **(continue)**	**Student-centred**	**Teacher is facilitator but sometimes could be expert**	**Students choose the topic for an activity**	**Students are active participant and work in a group**	**Student understanding is important**	**Quality of understanding is demonstrated success of students**	**Technology use as a tool and access to information**	**Critical-thinking, problem-solving and discovery learning are developed**	**Teacher and peer assess-ments**	**Revised Bloom's Taxonomy** **Remember Understand Apply Analysis, and Create**
4. After five minutes, ask students to change their computers with friends who sit next to them, and read what has been written so far and continue it for another five minutes. Repeat this step as often as there is time. On the last repetition, indicate that the stories must now be finished off with a proper ending. Students then swap seats one more time and take turns to read the story in front of them aloud to the class.		√	√	√				√		√

Lesson Plan 5 activities **(continue)**	**Student-centred**	**Teacher is facilitator but sometimes could be expert**	**Students choose the topic for an activity**	**Students are active participant and work in a group**	**Student understanding is important**	**Quality of understanding is demonstrated success of students**	**Technology use as a tool and access to information**	**Critical-thinking, problem-solving and discovery learning are developed**	**Teacher and peer assess-ments**	**Revised Bloom's Taxonomy** **Remember Understand Apply Analysis, and Create**
5. The students vote on which story they like the best. The winning story is displayed on the wall of the classroom or in another suitable place.				√					√	
6. For homework, each student receives one of the stories by email and is asked to improve it by making changes to the language and storytelling, fixing inconsistencies etc. The results are put on the Virtual Learning Environment, if one is available, for others to look at.			√	√					√	√

Lesson Plan 6: Low Constructivist Approach

Lesson plan 6 is constructed based on the intersection of the constructivist teaching approach and the low level of application of the matrix table.

Table 11. Lesson Plan 6

Lesson Title	Drawing and Interpreting Bar Charts
Subject	Mathematics
Age	Year 7
Resources	Interactive Whiteboard (IWB) Computers running a spreadsheet application (preferably one per student) Worksheets

Lesson Description

Introduction

1. State purpose and list objectives.
2. Teacher asks students what they know about bar charts and writes responses on the whiteboard

Objectives

1. Students **learn** how to draw a bar chart,
2. Students **understand** and learn how to interpret a bar chart,
3. Students **practice** e working in the group.

Activities

1. The whole class discusses and chooses a suitable subject on which to conduct a poll of students, such as 'favourite sports'. The teacher provides guidance as needed.
2. Divide students into three groups
3. The groups survey the students in three nearby classrooms (this will be agreed in advance by the teacher with the teachers of those classes).
4. Each group returns to the classroom and creates a spreadsheet and a bar chart representing their data.
5. Give some guidance to students on how they can interpret the chart by asking them questions, then let each group produce queries to analyses and interpret their graph.
6. Each group produces a one-page report including their bar chart and some discussion of what it represents. If possible these can be displayed somewhere so that the students who were polled can see them.

Evaluation

Working in pairs, students choose one real world topic such as the population of different cities in England. They describe how they would represent the information as a bar chart and one example of a feature they would expect to see (for example, London would have the highest bar).

Plenary: All groups feed back to the class with the examples they have come up with

The following table shows how the intersection of the constructivist teaching approach and the low level of application fit with this lesson plan.

Table 12. Lesson Plan 6 and its fit with the matrix

Lesson Plan 6 activities	**Student centred with teacher guidance on the activity**	**Students are active learner**	**Understanding of topic is important**	**Quality of understanding as well as quantity of knowledge is demonstrated success**	**Technology is used as a tool to record and access information**	**Encourage students to think creatively**	**Teacher does assessment.**	**Revised Bloom's Taxonomy Remember, Understand Apply and Analysis,**
1. The whole class discusses and chooses a suitable subject in which to conduct a poll of students, such as 'favourite sports'. The teacher provides guidance as needed. Divide students into three groups	√	√						√
2. The groups survey the students in three nearby classrooms (this will be agreed in advance by the teacher with the teachers of those classes).	√	√						
3. Each group returns to the classroom and creates a spreadsheet and a bar chart representing their data.		√		√	√			
4. Give some guidance to students on how they can interpret the chart by asking them questions, then let each group produce queries to analyses and interpret their graph.	√		√			√		√
5. Each group produces a one-page report including their bar chart and some discussion of what it represents. If possible these can be displayed somewhere for the students who were polled to see.		√				√		

Lesson Plan 6 activities	**Student centred with teacher guidance on the activity**	**Students are active learner**	**Understanding of topic is important**	**Quality of understanding as well as quantity of knowledge is demonstrated success**	**Technology is used as a tool to record and access information**	**Encourage students to think creatively**	**Teacher does assessment.**	**Revised Bloom's Taxonomy Remember, Understand Apply and Analysis,**
6. Working in pairs, students choose one real world problem such as population of different cities in England. They describe how they would represent the information as a bar chart and one example of a feature they would expect to see (for example, London would have the largest slice). Plenary: All groups feed back to the class with the examples they have come up with	√	√	√			√	√	√

Appendix9.
General and round one information sheet and an example of round one coding

Technology Enhanced Learning: Case study of England and North Cyprus

Information Sheet for the last phase of the study

Dear Teachers,

Thank you again for agreeing to participate in this study. You were a participant in the survey about your school and also kindly agreed to participate as a selected teacher in the interview phase of the study which was about your pedagogical beliefs and use of ICT in the classroom. This is the third and last phase of this study. This last phase involves three rounds. This information sheet is prepared to inform you about these three rounds.

Based on your views and the views of others interviewed we have developed some alternative generic scenarios for using ICT based on the different perspectives of teachers in this study. In the first round, the researcher will send by email these scenarios (lesson plans) that use ICT with some questions. The aim is to try to reach a consensus around good practice use of ICT for teaching. Each teacher will examine these lesson plans and choose their three preferred plans – ideally, these should be ones that you would like to adapt for use in your own classroom and I will collect your ranked choices and reasons for selecting your three preferred plans. However, it is unlikely that a consensus on these reasons for choosing plans..

Following this first round and based on your selection of plans teachers, who would like to volunteer, will be paired with another teacher (one teacher from England and one teacher from North Cyprus) who has similar preferences. Then, together they will redesign their preferred lesson plan so that it will work in both countries. These modified lesson plans will be shared with all the other twelve participating teachers to get their comments. In the third and final round, teachers will make any changes to their lesson plans taking the other teachers comments into account. After that, the plans will be shared again for final discussion and comment. At this point, the aim is that consensus upon what will work in England and North Cyprus and seems to the group to be in line with good practice should be emerging and in the process we will all learn something from each other.

I understand that this is a significant time commitment. Your participation and opinions would be very important to my study. You can withdraw from the study at any time. After the first round is completed, you will be informed in more detail about the second round. Once the all three rounds are complete I am happy to provide you with a detailed report of the findings and you will remain anonymous throughout the presentation of my study results. I would like you to answer the

following questions and **send it to me back no later than 10th October 2011** as I have a time table to finalise these three rounds. **Please do not forget to send it back to me on-time, thanks for your help in advance.**

I would be happy to discuss the study further. I can be reached at the following mobile number or email address;

Sincerely,

[redacted]

[redacted]

Round One

Dear Teacher,

You can find six different lesson plans below (for lesson plans see appendix 8). After examining each lesson plans, please answer the questions that are provided at the end.

Questions

1. Could you please choose your most preferred three lesson plans?

First most preferred Lesson plan:	
Second most preferred Lesson plan:	
Third most preferred Lesson plan:	

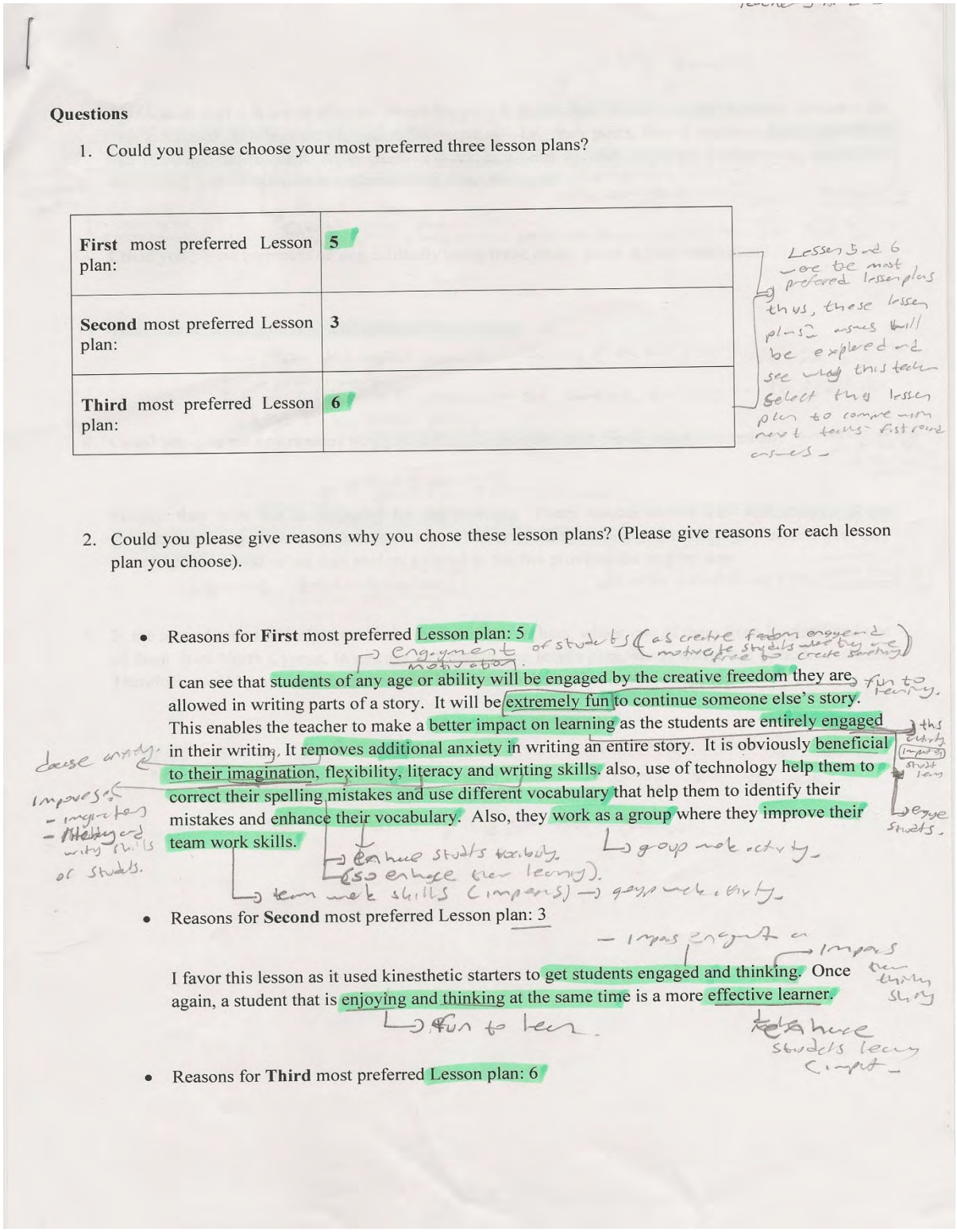
2. Could you please give reasons why you chose these lesson plans? (Please give reasons for each lesson plan you choose).

    - Reasons for **First** most preferred Lesson plan:
    - Reasons for **Second** most preferred Lesson plan:
    - Reasons for **Third** most preferred Lesson plan:

3. Could you please comment on any difficulty using these lesson plans in your classroom?
4. Could you give me any reasons why you did not choose the other lesson plans (scenarios)?
5. In the second round of Delphi method, I will pair up teachers, where one of them from England and one of them from North Cyprus, to discuss and design one lesson plan which will work in both countries. Therefore, would you like to be participating in this second round? Please tick appropriate box

    ☐ Yes
    ☐ No

An Example of round one coding



Questions

1. Could you please choose your most preferred three lesson plans?

First most preferred Lesson plan:	**5**
Second most preferred Lesson plan:	**3**
Third most preferred Lesson plan:	**6**

2. Could you please give reasons why you chose these lesson plans? (Please give reasons for each lesson plan you choose).

- Reasons for **First** most preferred Lesson plan: 5

I can see that students of any age or ability will be engaged by the creative freedom they are allowed in writing parts of a story. It will be extremely fun to continue someone else's story. This enables the teacher to make a better impact on learning as the students are entirely engaged in their writing. It removes additional anxiety in writing an entire story. It is obviously beneficial to their imagination, flexibility, literacy and writing skills. also, use of technology help them to correct their spelling mistakes and use different vocabulary that help them to identify their mistakes and enhance their vocabulary. Also, they work as a group where they improve their team work skills.

- Reasons for **Second** most preferred Lesson plan: 3

I favor this lesson as it used kinesthetic starters to get students engaged and thinking. Once again, a student that is enjoying and thinking at the same time is a more effective learner.

- Reasons for **Third** most preferred Lesson plan: 6

This lesson plan 6 is better than the others because it makes data relevant to the students. Because the data is focused on things they know and understand – i.e., their peers, then it becomes more interesting and therefore fun to learn. Also, students work in a team to work together. Furthermore, use of the technology improves students understanding about the topic.

3. Could you please comment on any difficulty using these lesson plans in your classroom?

There would be no problem running these lesson plans

4. Could you give me any reasons why you did not choose the other lesson plans (scenarios)?

Simply, they were not as engaging for the students. Every teacher knows they will struggle if the students can't engage with the lesson and how it is relevant to them as human beings. Furthermore, they were teacher centred rather than student centred as teacher provides the step by step .

5. In the second round of Delphi method, I will pair up teachers, where one of them from England and one of them from North Cyprus, to discuss and design one lesson plan which will work in both countries. Therefore, would you like to be participate in this second round? Please tick appropriate box

Yes
No

Appendix10.
Round Two: Information Sheet for all participated teachers

Dear Teachers,

We paired up some volunteer teachers now from first round for round 2. Two teachers from England and two teachers from North Cyprus would like to be volunteers. Therefore, one teacher from England is paired up with one teacher from North Cyprus, so we formed two groups:

1. Teacher1-AP-E and Teacher13-BO-CY paired up to redesign the lesson plan 5 that you examined in the first round of this last phase.

2. Teacher3-RB-E and Teacher9-Bc-CY paired up to redesign the lesson plan 3 that you examined in the first round of this last phase.

Each group redesign the lesson plan so it will work in both countries taking their individual requirements into account and concerning how they can use ICT effectively in the classroom in different countries and situation. Their designed lesson plans will be shared with you and then you will be coming back in round 3 to discuss what they have done.

I would happy to answer any questions that you may have. I can be reached at the following mobile number or email address;

Sincerely,

Ebru Heyberi

Appendix11.
Round Two: Information Sheet for volunteered teachers

Dear Volunteer Teachers,

Thank you for your interest in volunteering this second round to redesign the lesson plan with your colleague that you will pair up with. The idea is that each pair of teacher together redesign or adapt the lesson plan as you wish so it works in both countries taking your individual requirements into account concerning how you can use ICT effectively in the classroom. These concerns might for example be technical in relation to the equipment available; or practical in relation to the layout of your classroom environment, or there may be pedagogical e.g. your teaching method, the level of your students or your/your students familiarity with equipment. Furthermore, you might to change it because you might think it is difficult for your students' level and etc.

You will use Skype communication program for joint discussion concerning what each of your requirements might be, what and why you may need to change or adapt in the lesson plan: . In this way it is hoped that we may generate some new innovative ideas and better understand any constraints in implementing them in each situation/environment. The individual requirements and adapted designs will be shared with the other teachers in round 3 where we can all comment in and discuss the plans and any common principles emerging. Before you discuss with your partner/ pair, please have a think and have go answer the questions in the below as this will help you to redesign the lesson plan that you chose. I would be happy to answer any question you may have. I can be reached at the following mobile number or email address;

Sincerely, Ebru Heyberi

Round 2: Question

1. Could you please identify your requirements in order to use and adapt this preferred lesson plan in your teaching? How are you going to change this lesson plan to fit it with your current class teaching?

   The following sub-question may help you answer this question:

   - Do you have the technology that was mentioned in your preferred lesson plan? Or, what would you use instead of using the technology that mentioned in your preferred lesson plan?

   - What knowledge and skills are desired for the students to learn? Or what are students expected to understand, know and do? Does it fir with curriculum?

   - Are these activities interesting and engaging for your students on this topic? If not, what activities would be interesting and engaging for your students?

   - How do you normally assess your students work? Does the evaluation and assessment method in the preferred lesson plan work in your class?

   - Do you have familiarity with technology? or Do you have any training? Or do your students have familiarity with mentioned technology in your preferred lesson plan?

Appendix12.
Round Three: The open-ended questionnaire for participated teachers on redesigned lesson plans

Dear Teachers,

Thank you for your participation again in this third and last round of the study. As I mentioned in the first round, in the second round, volunteer teachers were paired up. Each group redesigned the lesson plan so it will work in both countries taking their individual requirements into account and concerning how they can use ICT effectively in the classroom in different countries and situation.

In this third round, the idea is that each participated teacher will examine the redesigned two lesson plans and will give his/her comments and suggestions about the lesson plans.

The redesigned lesson plans: 5 and 6 are presented in the below. Could you please examine them and put your comments on each lesson plan and answer the questions that follow after each lesson plan?

Lesson plan 5

After English and Turkish Cypriot teachers' discussion, Lesson plan 5 is changed as follows:

Lesson Plan 5	
Lesson Title	Creative Writing and Collaboration
Subject	English
Age	Year 8 and 9
Resources	Interactive Whiteboard (IWB)/normal Whiteboard Computers VLE (not essential)

Lesson Description

Introduction:

1. State purpose and list objectives.
2. Teacher chairs a discussion on creative approaches to writing a story. Ideas can be recorded on the IWB, saved and then printed by the teacher for use as a handout / stuck in books. If IWB is not available then ideas can be written on the normal whiteboard.
3. Teacher shows creative writing example(s) to students. Examples can be annotated on IWB or teacher give example(s) to students as a handout.
4. Teacher says to students 'you know you have done a good lesson if you have used full stop, capital letters, good words and good vocabulary in your written'.
5. Teacher also asks students to use MS-Word thesaurus option to improve descriptive writing, and spell check option to improve spelling mistakes.(if computer not available then students can check it after school)

Purpose

Improve students' imaginations, and writing skills.

Objectives

1. Students will learn how to write creatively.
2. Students will learn how to work as a group and collaborate to **produce** a good creative writing.
3. Students will learn how to use their imagination in writing.

Activities:

1. Take students to computer lab (if computer lab is not available or empty, use paper in the classroom); divide students in four groups. Then, let them to use internet to search different genres

Lesson Plan 5 – continue

1. of fictional texts (science-fiction, romance etc.) for creative writing (if there is not, teacher can ask students to search different genres of fictional texts for creative writing one week before this lesson).
2. Ask students to open the word processor software (if computer lab is not available, ask students to use A4 paper).
3. Ask one student in each group to start to write a beginning of a tale in five minutes and check spelling at the end and note what his/her spelling mistake (during this activity, teacher walks around the classroom and helps students who need help)
4. After five minutes, ask students to change their computers (/papers) with one of the other group members. Then, ask these students to read what has been written so far and continue it for another five minutes.
5. Repeat this step as all group members take place. On the last repetition, indicate that the stories must now be finished off with a proper ending.
6. Students then swap seats (/papers) one more time and take turns to read the story in front of them aloud to the class.
7. The students vote on which groups' story they like the best.
8. The winning story is displayed on the wall of the classroom or in another suitable place.

Evaluation:

Teacher collects the written stories at the end of the class to evaluate them and give feedback to students about their writing.

Homework: each student receives/gets one of the stories and is asked to improve it by making changes to the language and storytelling, fixing inconsistencies etc. The results are put on the Virtual Learning Environment, if one is available, or on the note board in the class for others to look at.

1. What do you particularly like about this lesson plan 5?

2. As we are trying to build consensus on best practice of use of ICT effectively in teaching, what would you like to change in this lesson plan 5? and Why?

3. Do you have any more comments about the lesson plan 5?

Lesson Plan 6:

After English and Turkish Cypriot teachers' discussion, Lesson plan 5 is changed as follows:

Lesson Plan 6	
Lesson Title	Drawing and Interpreting Bar Charts
Subject	Mathematics
Age	Year 7
Resources	Interactive Whiteboard (IWB)/normal Whiteboard Computers running a spreadsheet application Worksheets

Lesson Description

Introduction

1. State purpose and list objectives.

2. Teacher asks students what they know about bar charts and writes up responses on the whiteboard.

3. Teacher then provides the meaning of words such as bar, graphics etc.

Objectives

4. Students understand and learn how to interpret a bar chart,
5. Students' learn how to think critically during interpreting, comparing and contrasting the data sets.
6. Students learn how to draw a bar chart,
7. Students practice working in the group,

Activities

1. The whole class discusses and chooses a suitable subject in which to conduct a poll of students, such as 'favourite sports'. The teacher provides guidance as needed.

2. Divide students into Five groups (approximately 6 students in each group and each group have different level of students such as a student who have ability to motivate other students, a student who is good in math, and a student who is not good in math etc.)

3. Ask each group to assign one person for data collection who will do survey in other class, one person for organising and co-ordinating the group, two person for inputting data, one people for reporting data and one person for presenting data to class. (the assigned roles can change for other class activities so each student can take different roles)

4. One student in each group surveys the students in five nearby classrooms and from different year groups (year 7 ,8 and 9) (each group member will go to different classroom and this will be agreed in

Lesson Plan 6- Continue

advance by the teacher with the teachers of those classes).

5. Each group returns to the classroom and student who assigned to data input role creates a spreadsheet and a bar chart representing their data. (if computer lab is not available then teacher use pen and paper or if there is a limited time then the teacher can ask ICT teacher to let students enter their data into excel in ICT class).

6. Give some guidance to students on how they can interpret the chart by asking them questions, then let each group produce queries to analyses and interpret their graph.

7. Report writer of each group produces a one-page report including their bar chart and some discussion of what it represents. (If possible these can be displayed somewhere for the students who were polled to see).

8. After each group finish interpretation of their data and presented it, then then compare and contrast their data set or bar chart against the other data sets, which collected by other groups from different class and different year groups, or bar charts which made by other groups (this improves students critical thinking as they need to think, compare and contrast the different data sets). Also, students compare different year groups' (7, 8, and 9) 'favourite sports' and look whether their choice is changed according to their age (or year group).

Evaluation

After all activities are done, teacher evaluates the each group work according to their presentation.

Homework: Teacher provides two options for students to choose from:

1. Working in pairs, students choose one real world problem such as the population of different cities in England. They describe how they would represent the information as a bar chart and one example of a feature they would expect to see (for example, London would have the largest slice). All groups feed back to the class with the examples they have come up with.

Students (individually) choose a problem or topic around their family, such as weekly or monthly family expenses, to prepare a graphic then they can hang this graphic in a place where every family member can see it and student explains how this can be interpreted to his/her family. While explaining it to their family they will record this by using phone or normal video camera and prepare a report that includes their work and experiences. Also, students will present and share their recordings (a small part) and experiences with their classmates and teacher

1. What do you particularly like about this lesson plan 6?

2. As we are trying to build consensus on best practice of use of ICT effectively in teaching, what would you like to change in this lesson plan 6? and Why?

3. Do you have any more comments about the lesson plan 6?

Appendix13.

Publications, presentations and awards

Publications

Tenekeci-Heyberi, E. (2011) Preliminary Study for Technology Enhanced Learning: Comparative Study of England and Northern Cyprus. **The Turkish Online Journal of Educational Technology (TOJET),** 10 (4): 300-310.

Presentations

Technology Enhanced Learning: Comparative Case study of England and North Cyprus. International Educational Technology Conference, Istanbul, Turkey, May 2011.

Evaluating Benefits of Integrated Educational Technology: Case Studies of Secondary Schools in the UK and Northern Cyprus, University of Birmingham, July 2009.

Awards

2010: Grand recipient from the European Union for PhD study (for one year)

2009: School of Education Bursary Awards, University of Birmingham

2000: Scholarship recipient for two semester from Eastern Mediterranean University

1999-2001: Scholarship recipient from T.R.N.C. Minister of Education