New technologies: new schools?

Embedding ICT in primary education:

Exploring the implementation process in relation to the context and teachers' work (in Cyprus)

By

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Abstract

The thesis describes a detailed picture of how ICT is embedded in primary schools in Cyprus; a small country with a centralized educational system. A theoretical framework based on institutionalism is used to form the research questions and to explain the policy implementation process. The capacity of the system and the individuals within the system to allow or prevent implementation is revealed through this thesis.

Various data collection methods (survey, interviews, and observations) are employed to provide the empirical evidence for describing the implementation process. This study reports on the initial stages of policy implementation, focusing on the activities that take place and the role of individuals involved in these activities.

This thesis argues that the incorporation of ICT in education depends not only on the implementers but also on the wider education system. As technology changes rapidly, its institutionalization in an educational system which is hard to change becomes problematic. While technological evolution can be characterized one of the driving forces behind transforming education, by providing student-centred learning, any-where/any-time access to knowledge, and new teaching and learning methods, the education system appears to be bureaucratic and as such, it does not allow the potential of ICT tools to revolutionize education. It was found that during the first stages of implementation, only incremental changes were made, based on short-term goals and easily measurable objectives. Institutionalization however, requires long-term processes and transformational changes.

The study argues that system characteristics, and some features (e.g. principal's leadership style, champions' qualities) of individuals who are involved in implementation, have a stronger influence than factors such as the socio-economic status of the student population, or the location of the school (urban/rural). However, the findings suggest that a combination of the above factors influences implementation process, and thus a holistic approach to exploring implementation is appropriate.

Dedications

My mother tongue, what I got to learn during my childhood, the smell, the sounds, the images of my homeland, my people, the values that I was taught since I came in this world... were and will always be the foundation to build whatever came or will come afterwards. The PhD, a learning process, would not be feasible, if I didn't have that background, if I didn't always go back to those to get strength, knowledge, faith, and life examples.

ΠΗΝΕΛΟΠΗ (Μιλτιάδης Πασχαλίδης)

Μου λες κουράστηκες δεν θες να περιμένεις
είκοσι χρόνια το ίδιο φόρεμα να υφαίνεις
κι εγώ που γύρισα τον κόσμο δίχως χάρτη
άκου τι έμαθα δεμένος στο κατάρτι

Όλους τους ξέμπαρκους τους τρώει το σαράκι
μα όσοι ταξίδεψαν ζηλεύουν την Ιθάκη

Σε σένα πάντα θα γυρνώ κι αν δεν σου φτάνει
καράβι γίνε να γενώ εγώ λιμάνι
να δούμε μάτια μου στο τέλος ποιος θ' αντέξει
και ποιος καλύτερα το ρόλο του θα παίξει

Όλους τους ξέμπαρκους τους τρώει το σαράκι
μα όσοι ταξίδεψαν ζηλεύουν την Ιθάκη

Κι όσα δεν έγιναν μην τρέχεις να προλάβεις
αφού δεν μπόρεσες ποτέ να καταλάβεις
*πως **ήσουν πάντα απ΄ την αρχή μέχρι το τέλος***
εσύ η ασπίδα μου το τόξο και το βέλος

Όλους τους ξέμπαρκους τους τρώει το σαράκι
μα όσοι ταξίδεψαν ζηλεύουν την Ιθάκη

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Author's declaration

I declare that the work in this dissertation was carried out in accordance with the Regulations of the University of Bristol. The work is original, except where indicated by special reference in the text, and no part of the dissertation has been submitted for any other academic award. Any views expressed in the dissertation are those of the author.

SIGNED: ..G.Hadjithoma..... *DATE:* ...4/5/07

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List of abbreviations

ICT: Information Communication Technology
MOEC: Ministry of education and Culture (Cyprus)
EU: European Union
EC: European Commission
OECD: Organization for Economic Co-operation and Development
DfES: Department for Education and Skills
SITES M1-M2: Second Information Technology in Education Study (Module 1-2)
PI: Pedagogical Institute (Cyprus)
UNESCO: United Nations Educational, Scientific and Cultural Organization
ESC: Educational Service Committee (Cyprus)
NGfL: National Grid for Learning (England)
NLS: National Literacy Strategy (England)
POED: Pancyprial Organization of Greek Educators (Παγκύπρια Οργάνωση Ελλήνων δασκάλων)
CPA: Cyprus Pedagogical Academy
ACICES: Advisory Committee for the Introduction of Computers in elementary schools
IT: Information Technology
CDU: Curriculum Development Unit

ERC: Educational Reform Committee
s-l-b: street-level-bureaucrats (Lipsky, 1980)
BECTA: British Educational Communications and Technology Agency
IE: Interactive Education project (England, University of Bristol)
MS: Microsoft Corporation

1 CHAPTER 1 INTRODUCTION

1.1 Background of the study

International organizations acknowledge the social changes that Information Communication Technology (ICT)[1] revolution has brought and the implications these have on education:

> '*Information and communication technologies are not only having an impact now but will affect the structure of human societies even more so in the future. They are having an accelerating impact on the way we learn, live, work, consume, express and entertain ourselves*' (EC 2000, p. 17)

> '*the ubiquitous presence and utility of ICT in modern life are having a significant impact on the way we live, and even on the notion of an educated person. ...There is a widespread awareness that these developments have profound implications for education, and that schools must change ...The growth of the knowledge society and the pervasiveness of the technology represent a major challenge and a major opportunity for education.*' (OECD 2001a, p. 9)

As a result of the invasion of ICT in society, new forms of work, communication, and economic growth emerged in what is today a global society with a global market where '...a technological revolution, centred around information, has transformed the way we think, we produce, we consume, we trade, we manage, we communicate, we live, we die, we make war, and we make love. (Castells 1998, p. 1). In this context the way people learn, and what they learn, is different from what used to be. Some international discourses introduce ICT as an agent of change for education: 'perhaps the factor most identified as heralding fundamental change in the structure and organisation of schooling is the spreading impact of ICT on learning' (OECD 2001b, p. 66).

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[1] In the survey questionnaires a definition of ICT was included and this definition applies also to the use of the term throughout the thesis: '*Note: The term ICT refers to Information Communication Technology including computers, web camera, Internet, mobile phones, TV, DVD, CD, VHS etc. In some questions I refer to computers, in others I refer in general to ICT.*

The assumptions ICT bring with them are related to transforming schooling through the flexibility and variety of learning choices it provides. Loveless et al (1998) note the impact that IT has on modern notions of literacy. The concept of literacy has been changing to one that the New London Group (Cope et al 2000) calls Multiliteracy (see also Kress 2004, Jewitt 2003). Online learning resources created in a multi-dimensional space aim to involve audiovisual, textual and graphical stimuli that overrun the linearity of traditional textbooks. Inevitably, educational institutions are called to adapt to these changes; as Peter Jarvis has put it 'no educational form or institution is sacrosanct' (1999, p. 256).

As a first reaction towards this challenge, that seems to be forced on education from the external environment (society), policy-makers have attempted to introduce ICT as another addition to the existing educational structures and treated it as a tool like chalk and boards, textbooks and paper and pencil. Various authors noted the cultural and ideological assumptions for change underlying the use of ICT tools (Aviram 2000, Aviram and Talmi 2005, Conlon 2000, Hamelink 1997, Richards 2004), however, policies tended to produce descriptive rational discourses and unclear terms, regarding the embedding of ICT in education, and focused on short-term technocratic goals, such as the provision of equipment to schools. Similar stages are followed in different countries for embedding ICT (Eurydice 2001, 2004, SITES M1- M2). At a first stage, the European Union (EU) agendas, as well as documents of the Organisation for Economic Co-operation and Development (OECD), communicate the need for equipping schools with new technologies, in order to follow up the social and economic changes of the modern times. This discourse is followed in practice by equipment provision to educational institutions, and evaluations of policies based on measurable indicators. Indicators such as computer-student ratio were evident in many early documents on 'ICT in education' agendas. For example, an explicit goal of the EU action plan on e-learning refers to the 'number of pupils per computer with Internet connection (broadband/non broadband)' (EC 2002, p. 7-8). At a later stage, however, it is realized, as reflected in the most recent policy discourses, that the

introduction of ICT in education requires more than just the provision of infrastructure. Indicatively, some EU documents realize that 'investing in equipment only even to begin with is a bad policy. Access to computers without related educational policies and adequate services proved to be a waste of money' (EC 2003, p. iv).

The introduction of ICT to educational institutions proves to be difficult due to its fast evolving nature. For educators, ICT are not something novel, as unavoidably they have come across them outside school; however, they do become a problematic innovation when they are embedded in education. The influences they will have on teaching, learning and schooling in general, are yet unknown both to policy-makers and to educators who are found in the battle field, often dealing with this innovation without any sufficient empirical or cognitive guidance. As Chrysostomou, a (Cypriot) primary teacher confesses: '... even though my pupils seemed to use ICT for writing in several ways, for example, writing essays, email, SMS texts, in school practices I was only teaching writing skills that focused on writing on paper or book... not because I did not want to use ICT but because I did not know how to use it and the curriculum.... did not include any detailed policy decisions or planning for using ICT in literacy teaching' (2005, p. 3). Researchers have been studying the impact of ICT on teaching and learning during the last couple of decades, however, research findings have not yet reached the stage of becoming normative guidelines for policy-makers and practitioners. Debates are ongoing amongst those who are pro or anti technologists (techno positivists or techno sceptics), advocating either optimistic beliefs regarding the relation between ICT and society, or facing ICT tools and the web as new forms of labour and power (for example, Robertson 2003). The development of information and communication tools of educational value only recently has been taken on board by companies in the technology market such as Microsoft and Apple, which have previously focused on the development of technology as business and industrial tool. Consequently, the unfounded embedding of ICT in schools as learning tool has implications on the way that educators perceive and adopt them in

different contexts.[2] The later EU documents indicate the difficulties of identifying good practices between different countries: 'a practice that has worked well in one context, may not work well in another' (EC 2003, p. iv). Further: 'establishing a set of parameters capable of defining 'good educational ICT practice' proved to be more difficult' (EC 2003, p. iv) and thus, it is suggested, to 'provide a long-term vision, translated into large-scale objectives'. Accordingly, the attention of policy-makers during the last few years turns to long-term planning for the transformation of pedagogies and educational systems, through the integration of lifelong learning and skills. This turn of focus to the context and to the way ICT practice is developed in different countries has provided this research with a starting point, looking not only at the capacity of the implementers to introduce ICT, but also at the capacity of the system, the wider context in which ICT are embedded.

Beyond the importance of equipment provision, previous studies on this subject emphasized the role of educators in embedding ICT in teaching and learning, and presented their attitudes, skills and knowledge as influential factors on the adoption of ICT in schools (Karagiorgi 2000, Eteokleous 2004). Van Braak et al (2005), for example, developed tools for measuring teachers' attitudes[3] acknowledging, however, that teachers are influenced not only by individual factors but also by external factors related to the context in which they work in (policy planning, infrastructure, and leadership). Angeli & Valanides (2005) adopted a socio-technical perspective for analysing factors affecting the integration of ICT in primary (and secondary) education, including teachers' knowledge of ICT,

[2] An example from the Cypriot context that would highlight the uncommon nature of ICT is the following. Recently the Ministry of Education and Culture has replaced the primary school textbooks for mathematics and Greek language with new ones. This action was followed by educators' reaction, complaining about not being informed through training regarding the content of the new textbooks. The answer of the Minister of Education and Culture was that they do not need to be trained, rather as educated people they are expected to be able to teach using the new textbooks, implying that this change does not require anything beyond the educators' capabilities. A question that arises is about the possible reaction of the Minister, in case the educators complained about not being trained in how to use the new ICT tools that were embedded in schools in teaching and learning. Could the Minister reply in the same way? This question raises the issue of what changes ICT brings with it, for the role and training of the future teacher, the role of schooling and in general the impact on the notion of teaching and learning, knowledge and skills.

[3] Using, for example, innovativeness as an attitudinal component

frequency of using ICT for personal purposes, frequency of using ICT for instructional purposes in different subject matters, attitudes towards ICT, self-confidence in using ICT in teaching and learning and school climate. Some other studies extended the research to the role of students and parents in introducing ICT in education.

A preliminary research (Hadjithoma 2003), which explored ICT policy in the Cypriot context indicated that implementation has links with 'bottom-up' theoretical approaches and more specifically the theory of street-level-bureaucracy (Lipsky 1980). In addition, awareness of the way policy-making affects practice through the preliminary research (Hadjithoma 2003) led to the adoption of an institutionalist theoretical framework to enhance the study. This takes into account both the policy-making level, the capacity of the policy program, as well as the role of the implementers and the context (organizations), in producing specific outcomes. Since the role of the institution (educational system) and organizations (schools) in implementation has not been widely studied before, the subject of this study becomes significant in extending previous research.

A research objective therefore is to identify the characteristics of the Cypriot educational system and the local context (schools) in relation to the characteristics of the educators[4] - implementers, in order to understand and theorize the processes of embedding ICT in education. Tolbert and Zucker (1996) acknowledge the influence of the process on the outcomes and provide a model that describes the implementation stages, based on which another research question emerged.

Finally, the emphasis on the course of action and the way this shapes what 'ICT in education' is, led to a further research question. The study is interested in the concept of 'ICT in education' as this is produced in a specific context, under particular circumstances. The case of Cyprus is interesting on one hand because of the existing resources (previous research/literature) that enable a characterization of the educational system in relation to the embedding of ICT, as well as because a preliminary study

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[4] The term 'educators' includes both teachers and principals, whereas, other references throughout the thesis relate either to teachers or to principals.

(Hadjithoma 2003) and other studies, suggest that a concept of 'ICT in education' is already being developed amongst Cypriot teachers. More specifically, a most recent study of the European Commission on the use of computers and the Internet in schools in Europe indicates that:

> *'Over 95% of Cypriot teachers' see significant learning benefits for pupils using computers in class and say that pupils are more motivated and attentive when computers and the internet are used in class.* ***With this figure, Cyprus ranks second in Europe, and it is first at primary school level. Cypriot teachers seem to have fully internalised the use of ICT as a key element of teaching in schools'*** (EC 2006, p. 6, emphasis is mine).

The report continues; 'Teachers in Cyprus are very much in favour of ICT use in class and clearly see the benefits. Less than 1% state that there are 'no or unclear benefits in using ICT'. Again, less than 1% of the teachers not using ICT express this opinion. This compares to a European average of 16% and puts Cyprus in the top position in Europe' (EC 2006, p. 1).

Hence, previous studies, and especially the preliminary research in ICT policy with its links to theory, the institutionalist approach to implementation, and the features of the specific context framed the research questions. These questions are presented below.

1.2 General aim of the study

This study aims to explore firstly the practical aspects of the introduction of ICT to Cypriot schools, secondly to identify the implementation stages and thirdly, to indicate the influences on these. The implementation of ICT policy is viewed as a challenge posed to schools (where schools are seen as organizations within a broader institution, the educational system) and their capacity as such to allow implementation is explored in relation to the implementers' (educators) personal and professional capabilities. The results of these interactions between different factors within the institution shape the outcomes, and hence this study is also interested in exploring the meaning of 'ICT in education' as this is constructed in this milieu.

1.3 Research questions

This PhD research has its roots in a preliminary study (Hadjithoma 2003) on ICT policy-making in Cyprus to the implementation of this policy. More specifically, the research aims to answer four major questions;

Regarding the practical aspects of ICT in education:

1) How is the ICT policy in Cyprus implemented? (E.g. whether/how/when/where teachers use ICT at school and what/who supports them?)

Concerning the implementation process:

2) What are the influences on the implementation processes with regard to the
   - Policy-making discourses ('top-down')
   - Institutional context (institutionalism)
   - Educators' personal and professional capabilities (bottom - up)
3) At what stage of implementation is the integration of ICT in Cypriot primary schools? (in relation to Tolbert and Zucker (1996) implementation stages model[5])
4) What does 'ICT in education' imply in the Cypriot context? (What is the influence of the process on the outcomes?)

The relation between implementation and the resources of influence on implementation as perceived by this study can be framed in the following diagram (Figure 1)

[5] This will be presented and elaborated upon in chapter 3 (Theoretical framework)

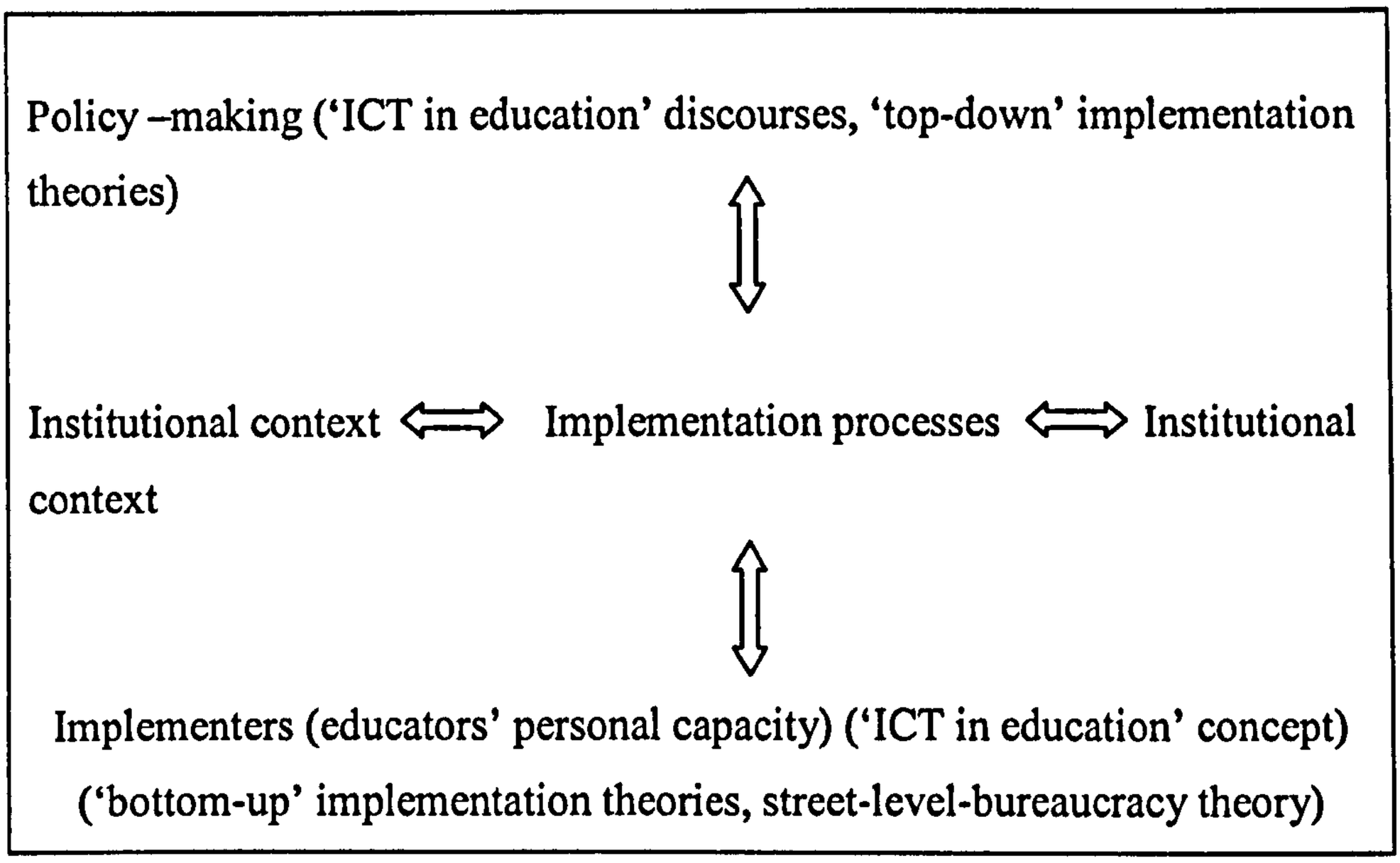

Figure 1. Implementation process

1.4 Significance of the study

Some research focused on exploring the impact of ICT tools on teaching and learning, and other studies that aimed to evaluate ICT policies, explored the factors that influence educators in adopting ICT in their classroom practices, often attributing the failure of implementation to educators. There is little evidence, however, for explaining the process followed within educational institutions until ICT, as another innovation, becomes institutionalized in the system. Looking at institutionalization processes requires adopting a holistic[6] perspective on implementation, based on the view that 'ICT in education' is a complex concept constructed at different levels (policy/implementation) and scales (international/national) and under the influence of various agents (policy-makers/teachers/unions and others). The complexity of the subject is dealt with methodologically by using various research methods, as well as multiple theories and concepts, to

[6] In Medical Sciences, holism refers to 'the treating of the whole person including mental and social factors rather than just the symptoms of a disease' (Oxford Dictionary, 1998). Similarly, in this study, individuals and organizations are treated as parts of a whole system.

interpret the findings and in this way to enhance a broad perspective on implementation.

The study expands ongoing research regarding teachers' role in integrating ICT in the classroom, and provides a fresh perspective on what influences the embedding and institutionalization of ICT. Equally important is the elaboration on the activities taking place in institutions as a response to ICT policy; this was enabled by looking at case studies; this thesis contributes to linking implementation to the context and to connecting theory and practice. This information is important for organizational researchers, as well as for policy-makers and managers or practitioners within organizations.

1.5 Overview of the thesis

Chapter 1 includes an introduction to the study, outlining the background which explains how this particular research interest emerged and providing information on the general aim and the research questions.

Chapter 2 presents the context in focus, including the structure of the educational system, and some of the major historical and cultural influences that this underwent in its development. This chapter is important as it presents why taking into consideration the context is crucial in explaining the way ICT tools are perceived and adopted in the educational system and in understanding the circumstances in which implementation takes place.

Chapter 3 outlines the main arguments and concepts of the theories used in the thesis for interpreting the findings. In this chapter it is also explained why a multitheoretical perspective is appropriate for this research task.

The second and third chapters are important in that they framed the research questions, either practical or theoretical.

Similarly, chapter 4 introduces the various research methods used, explaining why this variety of methods contributes to validating the findings. The research design is also described in this chapter; the study employs Toulmin's argumentation model[7] to structure the thesis from presenting the research methods to interpreting the findings.

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[7] This will be presented in Chapter 4 (Methodology)

The study results are presented in two chapters. Chapter 5, consists of three different parts, the first of which concerns practical aspects of the introduction of ICT in schools, the second one clarifies some of the issues that emerged through the survey, with qualitative data and the third one presents the results of the statistical correlation tests that were run, in order to identify factors related to the use of ICT by educators. These are then followed by discussion and conclusion.

Chapter 6 presents the findings regarding the implementation process. In Part 1 of this chapter the initial stages of Tolbert and Zuckers' implementation model are enriched with empirical evidence. Part 2 provides information on the role of the broader context in implementation and it includes general information on the school case studies. It also presents the conceptual tools that will be used to describe the findings from each case-study. Then in Part 3 the findings from the four schools case studies further inform the study regarding the implementation process and the influences of enclaves/communities of practice, the leadership style of the principals and the ICT Coordinators' role.

Chapter 7 summarizes major findings of the study and concludes the thesis.

2 CHAPTER 2 CONTEXT OF THE STUDY

2.1 Introduction

As mentioned above, the context is important for this study, in terms of understanding the implementation activities and the role of situational factors in these. Taking into consideration the context is one way of supporting the argument of this thesis that implementation is a complex process influenced by agents that are found at different levels. Being aware about the way the system works leads to having commonsensical expectations such as that implementation will be homogeneous as a result of the centralization of the system, or that policy is made at the 'top' of the system, and implementation is taking place at the 'bottom'. The study however, puts these assumptions under scrutiny.

In the following paragraphs the Cypriot educational system and broader context is presented in sufficient detail to enable the reader gain a better understanding of the situational factors related to the interpretation of the data. The first part deals with a general presentation on the Cypriot context. This includes a reference to the structure of the educational system, and a brief on historical events that defined the modern Cypriot educational context. In addition, the philosophy of the educational system is described in order to highlight its uniqueness. (This attempt is supported by a narrative provided in Appendix 1, which describes a day in the case studies schools). Finally, information on teachers' training and Cypriot teachers' profile provided in this chapter, are important in exploring educators' personal and professional capabilities. Part 2 follows with a brief introduction on the developments of ICT policy in various countries and continues then with presenting general information on the Cypriot ICT policy and the way this is formulated under the influence of specific agents, such as the European Union.

2.2 PART 1 The Cypriot educational system

2.2.1 General information on history and demographics of Cyprus

The strategic geographical position of the island of Cyprus in the crossroads of three continents, Europe, Africa and Asia, has brought the island through turbulent times in the past. The island and its inhabitants have been under foreign occupations sequentially through the years (Egyptian, Lusignan, Venetian, Ottoman rule) with the last occupation being in 1974 by Turkish military, which holds today 37% of the island (northern part). Access to Northern Cyprus, was prohibited for Greek Cypriots, until recently (2003) and under these circumstances, the study focused on the educational system and the schools in the authority of the Greek-Cypriot government. Cyprus population of 818.200 people (as estimated at the end of 2003) (Press and Information Office) consists of 646.900 (79.1%) Greek Cypriots, 87.800 (10.7%) Turkish Cypriots, and finally, 83.500 (10.2%) foreigners, who reside in Cyprus.

2.2.2 The structure of the educational system

The educational system consists of five levels[8]; pre-primary, primary, secondary, technical and vocational schools and higher education (university and private higher education institutions), of which primary and lower secondary education are compulsory for all Cypriot citizens. All levels are served by public and private institutions where enrolment to private institutions, whose main language of instruction is a foreign language (usually English) requires payment of fees, while the public compulsory education sector is provided free of charge.

The educational system is based on hierarchy, and thus the teachers in schools are supervised by the principals, as well as the inspectors, who are in turn supervised by the General Inspectors responsible for general or for subject sectors. More specifically, the Primary Education Sector is

[8] The information presented here is based on resources, such as the Ministry of Education and Culture (MOEC) website, official reports by MOEC officers and on other research studies.

structured as follows from the top of the hierarchy to the bottom (Figure 2); The Principal of Primary education[9] is responsible for the general management and operation of the primary schools. The General Inspector of Primary Education[10] is responsible for the general inspection of the schools and the staff, for the coordination of all the inspectors, and finally for organizing seminars and training workshops for the school staff. There are four 'Primary educational operators'[11] each one responsible for the local departments of the MOEC[12] and whose role is to coordinate the work of the inspectors in the schools of the educational districts they control and fulfilling other management duties. There are inspectors also appointed by the MOEC, who are supervising either general subjects, or special subjects (Music, Art, Physical Education, English, Science, Pre-Primary Education, and Housekeeping (Οικιακή Οικονομία). According to previous research (Hadjithoma 2003) an inspector for IT in education was recently appointed, who, however, was not at that time specialised in IT but in English). The IT Committee consisted of specialized in ICT in education people who undertook the responsibility of the implementation of ICT policy. In the schools, educational staff constitutes of the principal, the vice-principal(s), and the teachers.

The Principal of the school is appointed based on age and experience and undertakes responsibility for the effective and unproblematic operation of the school and for the development of activities and work, as well as supervising teachers. The Principal also has teaching duties (although for fewer school periods than the teachers) and maintains the archives and the property of the school. The vice-principal(s) assist(s) the principal in the general management of the school (he/she 'helps the principal in the smooth and effective operation of school in management and in educational sector' (MOEC), teaches in the classroom (for fewer periods than teachers) and implements activities appointed to him/her by the principal. Teachers undertake teaching responsibilities, they participate in the organization of

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[9] (Διευθυντής Δημοτικής Εκπαίδευσης)
[10] (Γενικός Επιθεωρητής Δημοτικής Εκπαίδευσης)
[11] (Πρώτοι Λειτουργοί Εκπαίδευσης)
[12] (Γραφεία Παιδείας και Πολιτισμού)

school ceremonies and other activities and implement any other responsibilities appointed to them by the principal and the vice principal(s).

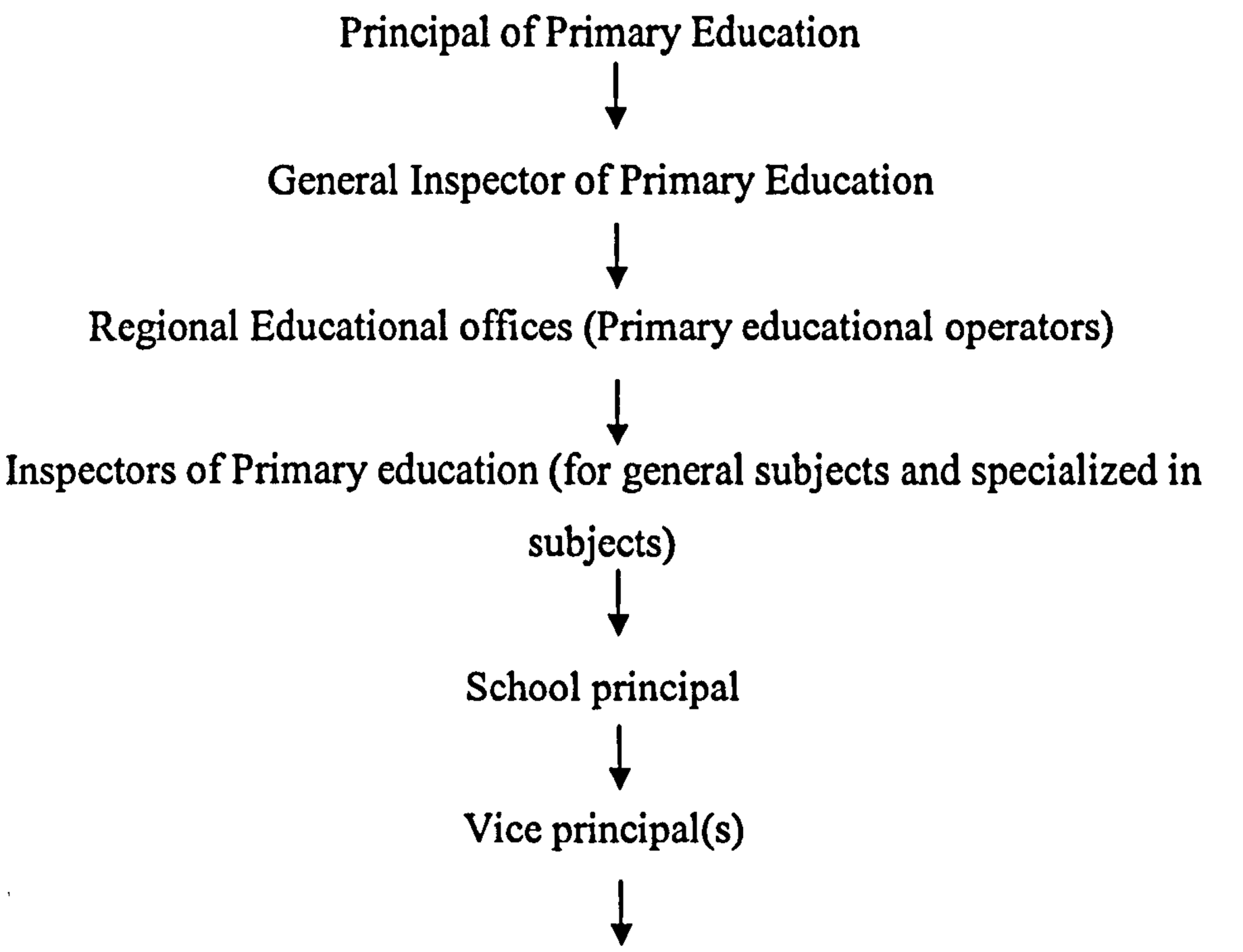

Figure 2. This figure represents the hierarchical structure of Cypriot primary education

The curriculum development, as well as other research and training activities, is a responsibility of the MOEC, and the Pedagogical Institute (PI)[13]. A new curriculum developed by the MOEC directorate, the Pedagogical Institute, and the Teachers' Union (POED) was put in practice in the academic year starting in 1992 and it is still in place. Basic ideas underlying this curriculum are; democratisation (individualization of

[13] The PI is a governmental body and comprises of a body for training teachers (regarding curriculum issues, as well as the use of technologies in education) a body for Research and Evaluation, a body for the development of Educational Material and finally a body for educational technology. It was founded in 1972, and its main aim was to provide pre-service and in-service training to candidates-educators (including training in the use of educational technology) to develop educational research, to promote the development of and support through evidence (τεκμηρίωση) educational programs. The PI is situated in Lefkosia, the capital and also has a department in Lemesos. Its activities refer to all the levels of the educational system (www.pi.ac.cy).

instruction, respect, equality of opportunities), changing of the teachers' role to one of a child's 'guide, animator, collaborator'. It also includes ideas on childrens' active participation, study of the environment (awareness and positive attitudes), integration of subjects (rather than compartmentalization of subjects), affective domain (emphasis on the values, interests and attitudes development) summative and formative assessment, the enrichment of teachers' work with educational technology and the use of technology in teachers' in-service training. This curriculum also emphasized the need for continuous development of the curriculum (there is no 'fixed' or 'stable' curriculum that will suit every school forever. Teachers are encouraged to modify and adjust it, according to their environment and the particular needs of the children) (MOEC website). Apparently, primary schooling in Cyprus, as presented by the MOEC, although hierarchical, allows flexibility to educators to implement the national curriculum. In addition, the MOEC emphasizes child-centred instruction and teachers' role as guiding. It is assumed then, that educators will also have flexibility in the implementation of ICT policy and that their role in using ICT at school will enhance child-centeredness and will reinforce their guiding role.

Having described the structure of the system, the chapter continues with presenting factors that influenced the development of the system.

2.2.3 Historical and cultural influences

History and culture are aspects that define a country's identity and therefore its education. The following briefing on these factors aims to underline the content of education provided in Cypriot schools, in order to see how ICT may fit into this content. Also, this section is a result of the view of this thesis that concepts related to education (like 'ICT in education') are constructed at different scales, nationally (through the island's history and cultural changes) and internationally (for example, through the integration of Cyprus into the European Union).

Cyprus became independent state only in 1960, after a long period under British colonialism, from 1878 to 1959. Persianis (1996) suggests that as a

British colony, Cyprus was influenced by the British system in many aspects and the educational system was not an exception. According to Persianis (1978) primary education was under the control of the British colonial administration, from 1935 to 1960 and during that time 'the British authorities encouraged child-centeredness, emphasizing mastery, rather than coverage' (in Koutselini 2000, p. 506).

A cultural influence on the educational system was that of the Cypriot Orthodox Church; 'Until independence (1960) the Church was the most powerful institution on the island, not only spiritually, but also politically, economically, socially and culturally...' (Koutselini 2000, p. 504). The relation between church and the educational system is implicitly existent nowadays given the schools' role of introducing students into the social and religious life. An indicative example is the school visits to churches where educators and students attend the mass (liturgy) on the occasion of a religious event/celebration, or visits to monasteries during school trips, in order for the students to get to know the religious traditions of Greek Orthodox Church. Religion is integrated in the curriculum of primary education and it is an example of the emphasis on humanities (see 2.2.4).

Another influence to the Cypriot educational system was Greece, which has been a source of support for education in Cyprus, providing not only textbooks to Cypriot schools and financial support to Greek Cypriots who studied in Greek universities but also lending policies. This influence was a consequence of the established Greek curriculum in the schools, which underlined the political claim of Cyprus for unification with Greece, during the years of Turkish Empire (1570-1870) and British (1878-1960) colonialism in Cyprus (Koutselini 2004). After the independence of Cyprus in 1960 and until the Turkish invasion in 1974, in the two communities in Cyprus, the Turkish and the Greek schools aimed to strengthen the ethnic identity of each group (Koutselini 2004). Nowadays, although new text books developed by the Curriculum development Unit of the Ministry of Education in Cyprus are used in all school levels, and the educational system becomes more independent from Greece, especially after the foundation of the first Public Higher Education Institution, the University of

Cyprus, in 1992, there is nonetheless a connection between the two countries that is related to the similar cultures and the use of Greek language in both places. A recent example that indicates that there is an exchange of ideas and policies between the two systems is the simultaneous development of the 'All day primary schools' in both Cyprus and Greece. At the same time, as will be explained in the next paragraph, the Cypriot state is currently in a position to introduce changes in the educational system and support them financially and pragmatically.

The continuous economic growth of the Cypriot state after 1974, with the help of other countries coming in support to the Cypriot government after the invasion of Turkish military in 1974, enabled the development of what is today a European Union member country with low rates of unemployment and poverty and which can afford to spend on the development of educational initiatives. (In 1995/6 an amount of CP 259, 2 million of which public expenditure amounted to CP 177, 8 million were spent on all levels of education, both public and private, which accounts for 13.5% of the country's budget and 4.5% of the Gross National Product) (MOEC website).

This supportive climate allows space for reflecting on the system, and for changes that aim to its transformation and modernization. Within this frame, the current Minister of Education and Culture Mr. Pefkios Georgiades within the scope of his duty as a Minister proposed to the Council of Ministers[14] to appoint a group of academics who would evaluate the Cypriot educational system and based on this evaluation would make suggestions for reform and modernization. This group was called Educational Reform Committee (ERC)[15] and consisted of seven academic members from different universities in Greece, Cyprus, the USA and the UK.[16] The result of the work of the ERC was the report submitted in 2004

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[14] (Υπουργικό Συμβούλιο)

[15] (Επιτροπή Εκπαιδευτικής Μεταρρύθμισης, ΕΕΜ)

[16] The ERC Committee members met with scientists and other people involved in the educational matters (e.g. the Teachers' Unions representatives, representatives of parents/students and political parties, the President of University of Cyprus and others), as well as doing bibliographic research using related archives and other studies (e.g. Unesco reports). The report included on one hand the theoretical and philosophical rationale underpinning the proposal for the educational reform suggested in the report, and on the

to the Ministry of Education and Culture. The report was titled 'Democratic and Humanistic Education in the Euro Cypriot state'[17] and as indicated by the title, the principles underlying the manifesto of the ERC were democracy and humanistic education, which would contribute to the development of a Just state, in the Euro Cypriot society[18]. The ERC proposal stimulated a lot of discussions presented by the local media. Despite all the efforts, some tangible changes in the educational system as suggested by the proposal have not been up till now effected. The implications of the ERC proposal on policy implementation cannot be easily tracked; however, the emphasis given to democratic and humanistic education obvious throughout the proposal could mean, at the same time that less emphasis is given to ICT integration, which would be seen as more relevant to an instrumentalist educational system, rather than a humanistic educational system. This assumption was confirmed through the interview findings with teachers and principals conducted for the purpose of this thesis, where educators emphasized the importance of socializing for students (see 2.2.4).

Another historic event that has been influential to various Cypriot policies is the integration of Cyprus in the European Union (EU) as a full member in May 2004. After the Association Agreement with the European Economic Community in 1972, Cyprus made an application to become a full member of the European Community in 1990. Accession negotiations started in 1998 and full integration for Cyprus was completed in May 2004, within the scope of the enlargement of the EU with 10 new members. Beyond some sporadic initiatives promoted by the EU that reached the schools in the form of circular letters and left to the teachers' initiative to undertake

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other hand the presentation of the issues covered by the Committee (Goals and orientation of the educational system, the structure of the school system, the curricula and others, which refer to all the levels of education from pre-primary to higher education). As stated on the website of the Ministry of Education and Culture, the dialogue on the educational reform aims to involve all the interest parties, including educators, students, and governmental officers, in a public discussion for educational reform. An online forum where civilians are encouraged to engage in the dialogue was also introduced lately (2004 - 2005) on the website designed especially to accommodate the dialogue for the educational reform.

[17] (Δημοκρατική και ανθρώπινη Παιδεία στην Ευρωκυπριακή πολιτεία)

[18] (Ευρωκυπριακή Πολιτεία/ Κράτος Δικαίου)

some of them, the impact of the integration of Cyprus in the EU on education has not been striking.[19] However, a preliminary study (Hadjithoma 2003) indicated that one of the reasons why ICT policy was initiated was the harmonization with the EU standards for ICT in education. This is also presented later in the section on the Cypriot ICT policy.

The following paragraphs refer to the characteristics of the Cypriot educational system, to enable further understanding of the context in which the implementation takes place.

2.2.4 Characteristics of the educational system

Continuing the presentation on the context, this section refers in more detail to the characteristics of the system as it currently is. These are important in understanding why ICT are viewed in a specific way, for example in relation to the humanistic approach to education. The content of teachers' training and the presentation on teachers' profile in this section provides information on the knowledge and skills (ICT and generally) that Cypriot teachers have, as well as on the status of teachers in society, in order to better understand their personal and professional capacity for implementation.

2.2.4.1 Centralization of the system

Due to the small size of the island of Cyprus, covering an area of 9251 sq. km, (and only 5910 sq. km under the Greek Cypriot authority) and with currently around 650 000 Greek Cypriot citizens who reside under the Greek Cypriot government authority, the Greek Cypriot MOEC adopted a centralized approach to managing schools. Decentralization was implemented only by giving authority to the local School Boards for

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[19] This is reflected also on the absence of Cypriot education in the European Schoolnet (website). Some examples of initiatives that have been implemented is the participation of Cypriot schools (84 currently) in the e-twinning program that is promoted by the European Union community and European school net. Other initiatives funded by the EU and promoted by the MOEC, included school exchanges between Cypriot and other European countries through the Socrates program. The influence on the integration of Cyprus in the EU, particularly on the ICT policy is presented later under the section on ICT policy.

managing minor issues of infrastructure and to the school principals for overseeing issues that concern students' and teachers' behaviour in schools (Panayides 2003). As a UNESCO report on the case of Cyprus, (2005 p. 29) describes it, the Cypriot educational system is a good combination of centralization (of management) and decentralization (some autonomy to schools). It is important to mention however, that decentralization is concentrated on minor issues, regarding the practicalities involved in the functional operation of the schools. The major administrative and managerial role is undertaken by the central government and the policies are centrally developed. The MOEC is thus responsible for formulating policy plans, which are then examined by the Planning Bureau and approved finally by the Council of Ministers. Financially, the public education sector is supported mainly by the government, either directly or by allocating financial resources to the local School Boards. Financial support covers all aspects of schooling, including provision of textbooks to teachers and students, as well as school equipment.

There are four local departments[20] which coordinate the management of the schools at a local level, in four educational districts (Lefkosia, Lemesos, Larnaca-Ammochostos, and Paphos). The School Boards are responsible for maintaining the infrastructure of the schools, in collaboration with the technical services of the MOEC. School Boards even though they are part of the MOEC, they are not involved in decision-making. The MOEC is also responsible for appointing the school staff, for all the schools in Cyprus, acting through its department of the Educational Service Committee (ESC) (www.eey.ac.cy). Depending on the demand for teaching positions in schools, the ESC selects, appoints and also promotes teachers. There are currently no exams required, in order to be appointed as a schoolteacher neither for pre-primary and primary sector which has been the subject of debates at different times.

An implication from the system being centralized concerns the influences that act upon teachers' practice in the classrooms. Kyriakides (1997) refers to these influences on teachers' practice, as external and coming from the

[20] (επαρχιακά γραφεία)

top of the hierarchy of the educational system, for example, official documents, inspectors, and parents (although parents' influence was very weak). Kyriakides (1997) identified differences between English and Cypriot teachers, in that the first were influenced a little by the government (Taylor et al 1974 in Kyriakides 1997), while the second were influenced more by the 'political factor' (inspectors and documents) rather than the 'professional' (head and colleagues) or the 'consumer' (pupils and parents) factors. In the case of the UK, it is important to note that Taylor's study does not represent the reality as it currently is in the UK, since the government has been promoting 'from top to down', national strategies, such as the National Literacy Strategy, or the National Grid for Learning and thus the system does not appear to be as decentralized as it used to be. These national strategies are addressed to all teachers, and all schools are expected to form their curricula based on these. Considering the above when comparing between the UK and Cyprus, the first can be characterized as decentralized with a tendency towards centralization, while the second can be characterized as centralized with a tendency towards decentralization.

Related to the system being mainly centralized is that the flow of information and instructions from the government to the schools is continuous and apparently overwhelming for the already multitasking role of the teachers.[21] Schools in turn are called to select initiatives appropriate to the school context and the student population. Some schools, for example, put into practice the 'ecological schools' program, (circular letter 2.10.07.3) which aims to sensitise children in environmental issues and includes organizing various activities at the eco-schools and participation of

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[21] One has to look at the circular letters that the MOEC sends to schools (on www.moec.gov.cy) to understand the multitude of activities taking place in the public primary schools, for various purposes, such as 'Road Safety' (through the educational visits of police officials to schools), the 'Week for Protecting Forests' (circular letter 2.4.01), the 'Tree Day' (during which celebrations and plantations of new trees take place in the school yards or close to the school), 'Europe Day', (circular letter 4.25.05.43) 'Global Health Day' (circular letter 4.25.05.32). There are also activities organized that take place out of school hours and students and educators are called to attend (such as the 9th Pancyprial Anti-smoking Forum, circular letter 11.2.01.6) as well as educational camps during the summer period.

educators in related seminars.[22] As a result of this 'initiative-shower' that educators face in the public schools, it would be reasonable to expect that initiatives which are not compulsory, such as the integration of computers to schools, are not taken seriously on board by educators, due to lack of time.

Bearing in mind the above information when interpreting data is an important reminder that the policies which are formulated at the MOEC are addressed to all the schools and to all the educators working in the schools, and therefore it is expected that policy implementation will appear to be similar in different educational districts and in different types (in terms of size/location) of schools. However, it is also important to be aware of the presence of various local committees, such as the IT Committee[23] (or the Committee for Social subjects, Committee for English, Nursery Schools and publications, Music, Health Education, Educational Radio and TV and others), which are involved in the coordination of the implementation of related policies locally, as well as the relative flexibility, granted to educators for implementing the curricula. This could be one of the reasons behind possible differences with regard to implementation at a local level.

2.2.4.2 Humanistic approach to education

Another characteristic of the Cypriot system is the humanistic approach to education that it perpetuates the curricula, the textbooks, and the teaching and learning practices that schools accommodate. The educational system is closely connected to society and one of its main aims is to help students socialize successfully. This is the aim, especially for Primary education, through which, students are expected to get the basic foundations for

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[22] Also, as a result of centralization in the recent years, some changes were introduced to the educational system through a top-down model, for example, the 'All day school' (circular letter, 7.11.15.7) that was implemented during the last couple of years, as a pilot program, optional for children who wish to stay longer at school after the completion of their lessons and get involved in studying and other activities they are interested in (e.g. English, music, gymnastics, computer skills are also taught in 'all day schools'). The integration of the students with special education needs in the schools, rather than the continuation of their studies in the special schools, was another change that was recently introduced to the public primary education in Cyprus, after the decision was taken at the 'top'.

[23] (Κλιμάκιο Πληροφορικής)

successful integration in the Cypriot society. Within this frame, the primary school educators undertake responsibility of teaching students about various aspects of the Cypriot society, by organizing school ceremonies on occasions of ethnic and religious events.[24]

When interpreting the data, it is important to take into consideration the humanistic approach of the Cypriot educational system, as the emphasis on humanities could be preventive to the integration of IT in the classrooms. On the opposite, in an instrumentalist system, such as in the UK, the rationale for embedding ICT in schools is rather much closer to the general goals of the educational system than in the Cypriot system.

The humanistic nature of the system also has implications on teachers' work, as teachers in primary schools are class teachers, and are responsible for teaching various subjects, from religion to gymnastics. The humanistic approach to education is also reflected in teachers' training programs which include limited subject specialization, which is more appropriate in an instrumentalist system. As it will be mentioned in the next paragraph, elementary teachers' training in the universities of Greece and Cyprus is seen as a general education of teachers rather than a specialization in subject teaching in comparison to secondary school teachers' training. Besides, the recent proposal of the Educational Reform Committee, as previously mentioned, refers to a humanistic and democratic education (Kazamias et al 2004).

2.2.5 Teachers' training

Students who would like to become teachers receive their basic training (Bachelors degree) in universities in Greece and in Cyprus. The length of the studies is currently four years. Like in most European countries, teachers are class teachers and they teach a variety of subjects (Vonk 1991).

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[24] An example would be the education and the preparation of ceremonies for the Day of the Independence of Cyprus (1st of October -1960-) the day for the commemoration of the beginning of the war against British colony (1st of April -1955-), or against the Ottoman occupations in Greece and Cyprus (25th of March -1821-). Religious events connected to the Greek Orthodox tradition also have an important place in school education, for instance, the celebrations of the Three Holly Hierarchs (Τρεις Ιεράρχες) who are celebrated as the Saints of the Letters.

Subject knowledge, as well as pedagogical, and other related theories from the fields of psychology, sociology and management, are incorporated in the program. Professional training that means training in the working field is also integrated in the curriculum.[25] The subjects related to the use of new technologies offered to teachers are the following compulsory ones; Educational Technology, Design and Technology, Introduction in the Science of IT, and the optional ones (in the cycle of Specialization); The Use of Modern Technology in Teaching Mathematics, and IT support for Natural Sciences in primary school (University of Cyprus online prospectus). This program of studies is similar to the programs that other Greek universities offer in terms of the content; it may be different however, with regard to the training in schools timetable or the way this is organized. After studying to become teachers, teachers do not have alternative professional routes to follow (Menon and Christou 2002) and therefore most of them are employed in the public educational sector.

2.2.6 The Cypriot primary school teacher profile and school climate

Karagiorgi (2000) refers to the importance that education holds as the main capital asset in Cyprus, and also to the importance of further education (higher education) for Cypriots. Indicatively, in the study of Eteokleous, 22% of the participating teachers reported having completed a masters' degree, beyond the bachelors' degree (2004, p. 42).

Various studies indicate that the selection of teaching profession is a destination for 'elite' students, in Cyprus, due to factors, such as immediate

[25] According to the prospectus of the University of Cyprus, the studies constitute of four cycles with different content, from which students have some compulsory and some optional units. The first cycle, includes units on Pedagogical Sciences and Psychology (Επιστήμες της Αγωγής και Ψυχολογία) (e.g. Sociology of Education, History of Education, Comparative Pedagogy, Philosophy of Education etc.) the second includes field training in schools, and Didactics and Methodology (Διδακτική Μεθοδολογία και Σχολική Εμπειρία) (e.g. Educational Technology, Design and Technology, Mathematics subject teaching etc.) The third cycle includes subject teaching (Μαθήματα περιεχομένου) (Teaching Physics, Physics concepts, Geography teaching, Christian Pedagogy) and the fourth includes specialization (Communicational Music, and Creative expression, Learning difficulties, Theatrical game etc.). Student teachers also attend some foreign language lessons (Μαθήματα Ξένης γλώσσας) and some other optional units from different departments of the University.

employment after studies, the short working days and long vacation periods, the high salary, and high status of teaching profession in the Cypriot society make the profession desirable and the entry exams for elementary teaching training competitive (Zembylas et al 2004, Menon et al 2002; Papanastasiou et al 1997, 1998, Karagiorgi 2000). Zembylas and Papanastasiou (2004) suggested through their study and based on previous research, that while in many countries teachers leave their profession, due to lack of job satisfaction ('lack of professional autonomy, relentlessly imposed changes, constant media criticism, reduced resources, and moderate pay'), in Cyprus teaching careers are popular. Their research showed that the context of teachers' work was important for people who chose that career:

> '*54.6 percent indicated that they entered the teaching profession because they were attracted by the hours and holidays of the profession, while 40.9 percent were attracted because of the salary. In addition, 35.7 percent of the sample indicated that both the salary and the teachers' hours and holidays were all factors that influenced their choice to follow the teaching profession. Another 51.8 percent of the respondents indicated that they thought teaching would fit well with their family commitments, while 14.8 percent indicated that there was pressure from their families to become teachers*' (Zembylas et al 2004, p. 365)

Also, the same study indicated that people who chose teaching profession because they always wanted to become teachers and had a realistic view of teaching before their studies had higher levels of job satisfaction in comparison to those who chose the profession because of pressure on behalf of their families to do so, however those (the 1st group) constituted only around 1/3 (32.3%) of their sample population (Zembylas et al 2004), which means that in Cyprus the majority of teachers, are those who select their profession based on external reasons. This in turn may affect their performance and motivation for work. This is important information for this study because lack of motivation at the work place may lead to lack of interest in undertaking implementation of initiatives, as a previous study observed (Karagiorgi 2000).

In order to complete the general picture of the Cypriot educational system described through this section, a reference should also be made to the

school climate as perceived by teachers. Pashiardis (2000) indicated that teachers considered school climate (where the term refers to 'the collective personality of the school, the overall atmosphere of the school' p. 224)[26] at their schools satisfactory, and gave the lowest rate to organization and administration (participation of staff in decision-making, principal as instructional leader) the second lowest to 'students' (students centeredness, supportive, positive climate) and the third lowest to 'collaboration' amongst four parameters (the fourth one being 'communication' meaning the sharing of information, common understanding of the goals, expectations and outcomes). The same study also indicated that women were more satisfied about their school's climate than men and the same with the more experienced teachers when compared to the less experienced teachers, although both these groups constitute minorities in schools (i.e. female 80% male 20% approx, Teachers' Trade Union-POED source).

The previous part presented a general picture of the educational system in Cyprus and outlined the implications that various aspects of the system may have on implementation. In the following section the focus shifts on ICT policies, starting with international ICT policies in order to present the general trends in terms of practical aspects in integrating ICT, (equipment, training etc) and continuing with the Cypriot ICT policy.

[26] This is how 'school climate' is also perceived by this study

2.3 Part 2 ICT policies

2.3.1 Introduction

As a result of the push that modern society and world organizations give to national governments, many countries have widely introduced ICT in schools. '...the recent and ongoing ICT evolution makes it even more compelling that educational policy-makers recognize the broadening role of technology in schools' as the SITES (2001, p. 2) study editors notice. It is thus important to be aware of the developments with regard to 'ICT in education' in other contexts in order to be able to critically look at the specific context explored.

According to the SITES-M2 study (published in Plomp et al 2003) there are countries where ICT policies have a relatively long tradition (since the 80s) while there are others in which ICT were recently introduced. In Finland for example, ICT policies were in place early; in the 1990s the Finnish strategy was already referring to a Finish Information Society. In Czech Republic, in comparison, only recently (2000) the government has approved a national policy on information technology in education, which refers to main ideas (including equipping schools with infrastructure and teachers with some mastery in working with ICT), still to be elaborated in future documents. SITES M1 and M2 studies inform this research with examples of ICT policies in other countries. Although this is not a comparative research, being aware about ICT policies in different countries makes it possible to highlight the uniqueness of the context in focus (see Appendix 2 for brief examples of ICT policies in other countries). In the section below developments on expenditure, provision and evaluation provide useful examples of other ICT policies.

2.3.2 Expenditure on ICT infrastructure and ICT Provision

In some countries millions have already been spent for providing ICT infrastructure to schools. In England, for example, the National Grid for Learning includes all the main ICT policies in England. Through the NGfL, £1.7 billions were invested in connecting all schools to the Internet by 2002.

Additional funds were provided by the National Lottery, of £230 M for existing and new teachers' training in ICT. Similarly, Malaysia funded with US$B1.2 (S$B2) the 'Masterplan for IT in education', followed by another US$B2.79 (S$B4.46) for 'The Program for Rebuilding and improving Existing schools' (PRIME)[27] (Mui et al in Plomp et al 2003, p. 500).

In terms of the level of infrastructure available in schools in European countries, according to Eurydice (2004) the level of computerization in schools is low in Belgium (Flemish community), Denmark, France, Austria, and Romania, while the highest rates of the computerization level are in Greece, Portugal and Latvia (Eurydice 2004, p. 35).

According to Eurydice (2004), there are countries where there are significant disparities between schools, as it is observed in Greece, Portugal, Bulgaria and Romania, while in the UK (England, Northern Ireland and Scotland) and in Scandinavian countries there is a 'genuinely uniform school computer environment' (Eurydice 2004, p. 36).

As regards to access to the Internet SITES informs the study that Cyprus, Bulgaria and Thailand, were the countries with the lowest percentages of access, while in Canada, China Hong Kong, Chinese Taipei, Denmark, Finland, Iceland, Lithuania, New Zealand, Norway, Singapore and Slovenia access rates were higher.

Acquisition of ICT skills, and training in the educational use of ICT is provided in all countries and in the majority of the countries, in-service education in ICT is part of a national program, which aims to improve the use of ICT by teachers, and the training is provided for teachers at all levels of education (Eurydice 2004, p. 50). However, principals, who participated in the SITES study, reported that 'teachers' lack of knowledge' was a major obstacle in the integration of ICT. Cyprus (together with Israel, Singapore, and Slovenia) was amongst the countries where 'lack of training opportunities' was not reported (SITES p.158). Cyprus was also one of the countries (New Zealand, and Singapore) where students, reported that 'a

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[27] Through this program around 290 schools are being upgraded or re-built, and include computer labs, and media resource libraries, IT learning resource rooms and pastoral care rooms and health and fitness rooms

substantial number of teachers actually regularly attended courses for updating their ICT knowledge and skills (SITES p.164).

It is important to mention here, that data were not available for the case of Cyprus, in the Eurydice 2004 study, regarding some aspects.

2.3.3 Evaluation of provision

It is observed through the literature review that national policies at the first stages of embedding ICT in the schools focus on the infrastructure (hardware and professional development). A survey conducted through Eurydice program (2001) indicated that most of EU countries followed, during the early stages of embedding ICT, a 'sequential approach' (facilities first and then objectives) rather than a 'simultaneous one' (with facilities provided while goals are being determined). In the later study, (Eurydice 2004) however, a change was observed, in the countries where it is possible to see how the budget is used; 'the expenditure on human resources accounts for the larger share in five of them: Belgium (Flemish Community) where the whole budget is used for human resources development, for professional development and expenditure on the ICT Coordinators at school level. Similarly, in Belgium (German-speaking community), Sweden, and Slovenia, a larger amount of the budget comparing to 2000, is now used for human resources rather than equipment only. On the contrary, in Ireland, Portugal, Latvia, Lithuania and Malta the biggest shares of the budget are still used for equipment and facilities, while in Greece, there is an equal share of the budget for human resources and equipment (secondary level) (Eurydice 2004).

The embedding of ICT follows a 'top-down' approach as 'in most countries, it is the Ministry or the highest decision-making authority in education matters, which takes this role' (Eurydice 2004, p. 19). However, responsibilities of purchase and maintenance of equipment in some European countries lie in the area of the local authorities/or the school, or they are shared by different authorities. In the UK, for example, schools have overall responsibility for their own budgets, while in England and Wales, schools and local authorities, the LEAs are supported by

government grants, for expenditure on ICT infrastructure, services and content (Eurydice 2004, p. 29).

2.3.4 Evaluation of ICT policies

In some countries, evaluation of the initiatives that are taking place has already been completed. In the period after the completion of the SITES Module 1 study, country reports indicate that there was recent upgrading of the computer hardware in a number of countries. In 'well-equipped' countries (e.g. Denmark, Norway) that participated in SITES-M1, the focus of the policy turned from increasing the quality and the number of computers in schools to increasing access to the Internet for students and teachers (Quale in Plomp et al 2003, p. 40).

The SITES study (2001) also provides information regarding trends in relation to the move from the Industrial Society to the Information society and from the 'traditionally important paradigm' (where school is isolated from society, teacher is initiator of instruction, in a whole class teaching, and the student is mostly passive) to the 'emerging paradigm' (the school is integrated in society, the teacher helps students find appropriate instructional path and guides student's independent learning and the student is more active) (SITES p. 6). It was supported through the SITES study that highest values on the emerging practices indicator at primary level were found in Canada, Cyprus, New Zealand and Norway, while the lowest medians on this indicator were found in China Hong Kong and Japan (SITES p. 92):

> *'A trend data analysis of SITES-M1 shows that in the years 1992-1998 most of the SITES countries had made considerable progress in equipping their schools with computer hardware and software and in providing Internet access. The information given in the country chapters in a more recent book (Plomp et al 2003) indicates that this trend is indeed continuing... Nevertheless it appears, that substantial differences still exist between the school systems of different countries regarding access to ICT equipment and to facilities such as Internet...Still it is reasonable to speculate that at least some of the present differences stem in part from the fact that the governmental policies of some countries tend to be more effective than those of*

> *others in stimulating improvement of the ICT infrastructure in schools*' (Quale in Plomp et al 2003, p. 42).

Beyond equipment provision and access, the national policies are now turning from the equipment issues to the issue of practice; how ICT can be used for improving teaching and learning:

> '*It is fair to say that the biggest challenge of ICT implementation in education is how to craft, through the achievement of new curriculum goals via new pedagogical practices in education, a new future for and with the fast-developing Information Society. Initial findings from the SITES-M2 study indicate that there are many promising examples in 'normal' schools of 'emerging pedagogy for the Information Society, a situation which suggests that many of the related policies on ICT in the curriculum are possible*' (Law and Plomp 2003, p. 28).

It is observed through the literature review on national ICT policies that almost all countries followed similar steps in integrating computers in the schools. Various initiatives were launched; however most of them addressed the existing curricula and syllabuses and brought incremental changes to the system, except from cases, such as Singapore with the 'Smart schools' project or the UK project 'Schools of the Future' that aimed to introduce new types of schools with integrated ICT tools. Cypriot ICT policy followed steps similar to most of the countries focusing firstly on equipment provision and training in basic skills, however, it is evident that these goals were achieved through various means.

In comparison to other countries (e.g. Catalonia where infrastructure and telecommunications are Internet-based and virtual teaching and learning communities are already in place (see Appendix 2)) the Cypriot policy follows traditional face-to-face training and provision of services and the development of Internet-based support for teachers was only recently launched, in the form of providing web resources and educational material. While in countries like Denmark, ICT new competencies and skills are the subject of research, in Cyprus, policy is based on international research, and very little experience and knowledge is in place regarding the role of ICT in teaching and learning in the Cypriot context (e.g. in Greek language, in Social subjects, etc.). Also the educational software used in Cypriot schools

is imported either from Greece, or translated/dubbed from other languages and may not be always appropriate to the Cypriot context, in comparison to Japan and Malaysia where funding has been provided especially for this purpose. The example of Chinese Taipei where ICT policy aimed to create computer labs in all schools is also different from the Cypriot policy, which aimed to equip schools with initially one computer per classroom. These are examples that indicate the differences in implementation from country to country. In the following section the Cypriot ICT policy is presented in detail.

2.3.5 ICT policy in Cyprus

2.3.5.1 General information

The initiation for embedding ICT in primary education by the Cypriot Ministry of Education and Culture (MOEC) took place in the early 90s. Karayiorgi (2000) describes that only in the beginning of the 90's the MOEC started considering introducing computing into primary education when a principal of Kornesios elementary school, in Lefkosia, suggested the introduction of computers in Mathematics on an experimental basis; the Pedagogical Institute (PI), as well as the Cyprus Pedagogical Academy (CPA), showed interest in this initiative and as a result, the math lessons for the students of that school were held in the PI (which was near the school) using computers on an experimental basis. The initiation for introducing ICT in schools from the 'bottom' and based on an individuals' personal interest conflicts with the assumptions related to the centralization of the educational system described above. However, the idea was taken formally at the 'top' with the development of the Advisory Committee for the Introduction of Computers in elementary schools (ACICES) in 1991. Also, a Departmental IT group was created during that period, as a part of the Department for Programs Development of the MOEC while the governmental Pedagogical Institute started offering at the end of the 90s an optional training program in computing for teachers. Some primary schools in Cyprus were then equipped with computers for piloting the integration of

new technologies in primary classrooms. This experimental stage (of planning and pilot implementation) had as Karagiorgi (2000) describes, 5 phases, from 1991 to 1995. In May 1994, the delivery of computers started for 8 schools in different educational districts. In 1994-1995, there was an increase in the number of pilot schools that were equipped (therefore all of them at that time were 24 in all educational districts). District Coordinators were appointed then, and their role was to be the point of contact between the general coordinator who was working at the CDU, and the Ministry of Education and Culture. The idea of using computers in teaching, although initiated at the 'bottom', it was pragmatically supported and developed through decision-making at the policy level and included piloting and evaluation. Before the final phase, in 1993-1994, the Curriculum Development Unit (CDU) suggested clarifying the aims for introducing computers in elementary education, and suggested the development of a 5-year plan, for the provision of equipment in schools and the training of teachers and based on this suggestion the 'Evagoras' action plan was prepared later on.

According to Karagiorgi's study (2000), the evaluation of this pilot program for the integration of computers in primary schools indicated that there was lack of appropriate software in Greek, lack of funds and technical support, as well as lack of supplementary material. Based on this evaluation, it was suggested by the individuals and the bodies involved in the program to prepare a long-term plan, to invite an expert to comment on the program and finally to create a support team for software development and technical help. As a result, 'Evagoras' was the first ICT policy document produced by a specialized group of eight people (teachers, computer programmers, graphic designers, with educational qualifications and experience in Information Technology). These were the President of the IT Departmental Committee, the General IT advisor, and some ICT Coordinators in the educational districts of Lefkosia, Lemesos, Paphos, Larnaka and Ammochostos, all appointed by the MOEC for this purpose. The document describes the action plan for the embedding of new technologies in primary education from 2000 to 2005, and refers to economic, pedagogical, and

national reasons according to which the embedding of computers in education is necessary. It was published in 1999; however, since 1999, changes have occurred which have resulted in the document showing its age. The main goals described in 'Evagoras' as a part of the action plan 2000-2005 were:

- To rewrite a new curriculum which will cover the use of Informatics in ALL the lessons of the (existing) curriculum based on the philosophy 'the computer as tool' and with an emphasis on Greek, Mathematics and Social Subjects (p. 14).
- All teachers in Cyprus should receive training with regard to skills and applications of Informatics in primary education by a recognized sector (Pedagogical Institute/ IT Committee, University or/and recognized private centres) within the pre-defined period for the implementation of the five-year program (p. 24).
- The use of Internet aiming to improve and enrich teaching and learning through acquisition of informatics and communication skills and to develop positive attitudes towards technology and support the humanistic values through contact with other people (p. 38).
- In terms of equipment provision, the aim is to install in all the schools in Cyprus computer network in order to be used by students and teachers, for using the potential that Informatics offer (p. 51).
- The purchase of software to be used by students and teachers, in a way to use all the possibilities offered today by Informatics (p. 57).

According to information by the General ICT Advisor (informal oral communication, 2004), there is an 'Evagoras II' being written, and a handbook for teachers titled 'Informatics in primary education' (2005) was distributed to schools during the academic year 2005-2006. Despite that, 'Evagoras' was the only available policy document at the time this research was taking place. Below, is a chart subtracted from 'Evagoras' presenting the constructive model system of Information Technology in primary schools (Figure 3). The figure also demonstrates the groups of people

involved in the decision-making and in the implementation (for example, ICT school Coordinators, principals and teachers) and it represents the relations and ways of communication between the different levels. Although this model is applied to a hierarchical system, the representation between policy-making and implementation appears to be flat, which is another indication conflicting with the assumptions arising from the centralized character of the system.

In terms of the view adopted by the Government concerning the way that technology may be used in the classroom, as described in the 'Evagoras' document, computers are a tool for teaching and learning. From the beginning, ICT were viewed as an additional educational tool; 'ICT is not viewed as a separate subject but as a dynamic means of teaching and learning, and of reinforcing the curriculum and the development of children's basic skills of concentrating and of processing and presenting information' (Papanastasiou et al 2003, p. 155). Teachers and students can use the computer as an educational tool, in order to find information, create material for lessons, or work in virtual learning environments, while computer skills are taught as a subject only in the afternoon school. On one hand, the introduction of ICT as cross-subject and cross-curricular educational tools is in agreement with the humanistic character of the educational system. On the other hand, the rationale for embedding ICT in primary education as seen by the 'Evagoras' authors has an instrumentalist perspective. Technology is seen thus as a mean of serving the states' territorial safety, as well as situating Cyprus in the world market:

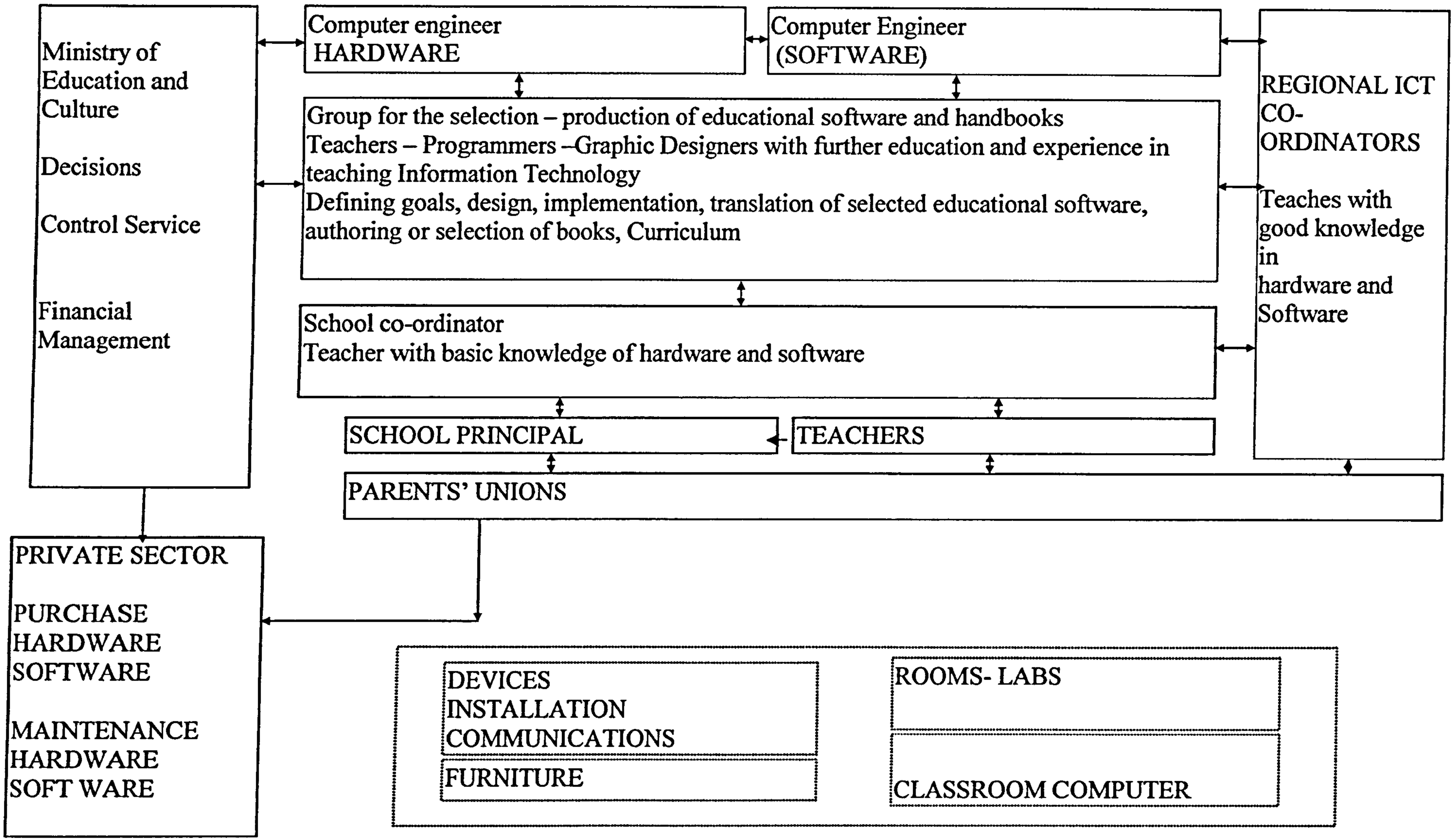
> *'The modern society demands that the states have the financial facilities which contribute to the maintenance of the state's independence and the social dignity of the citizens. Because of its small sizes (land, population, economy) Cyprus has no other choice than to become a centre for the provision of services ... Therefore since nowadays the effective services are those who adopt and use technology, it is obvious then that the people who work for the government services (that means the today's students of primary schools) should have within a decade a high level of technological foundation. At the same time, Technology enables the creation of partnerships between Cypriot companies with companies abroad, which contributes a lot to attracting*

investments in the island' (my translation) ('Evagoras' 1999, p. 8).

The pedagogical reasons referred to in 'Evagoras' also relate to an instrumentalist view of using technology for surviving in the modern society. It is stated therefore in 'Evagoras' that there is a need for updating students with the technological skills required in 'Information Era' in which 'the one who has access (to information) may survive and rule' (p. 9). It is also stated in the same document that 'preparing today's students, so that they will be able to adjust in the transformations that today's society is undergoing, we have to provide them the basic technological skills, which will ensure their successful integration' (p. 9).

Further information on ICT policy is provided below based on the preliminary study (Hadjithoma 2003) that focused on policy level.

Figure 3. Subtracted from 'Evagoras' (1999, p. 60) (my translation)



2.4 The preliminary study (Hadjithoma 2003)

The study that was used as the background of this thesis included a policy-oriented research in Information Communication Technology (ICT) Policy and Management in Cyprus Primary education. Two kinds of information sources were used to shed light on the policy-making process: firstly official documents, the written descriptions of the Government's policies/action plans for ICT, such as the 'Evagoras' document and secondly, circular letters addressed to educators in schools. An introductory discussion with the IT General Advisor was useful in mapping the initial activities taking place for embedding ICT in education. In addition, contacts with the ICT Advisors provided information both for policy-making and implementation, as ICT Advisors are the transfer point between policy and implementers in schools.

This preliminary study indicated three levels of policy-making and dealing with the management of ICT in Cyprus, and these were represented in a pyramid, as a top-down order in Figure 4. The upper level includes people who represent the Government, who make decisions by creating policy, and by producing official documents. These are the Minister of Education and Culture, the Principal of the IT Departmental Committee, and the Minister of Finance. The General IT advisor also participates in the meetings where decisions are taken. The meso level of the pyramid consists of the ICT Advisors who are responsible for transferring policy decisions to schools and who locally coordinate implementation. The ICT Advisors are teachers who had a specialization in ICT, either through Master program studies or other training and they were appointed by the MOEC through an open competition in the late 90s, as the people responsible for coordinating the embedding of ICT in primary schools. They are not more than 20 and thus they undertake coordination of implementation in around 20 schools each of them in one or two educational districts. Their work involves, as indicated through the preliminary study, informing educators of the Ministry's decisions, and guiding them on using ICT in the classroom. They are also involved in the re-design of the curriculum, and in the creation of

educational material including the evaluation of online sources for teaching and learning. Finally, teachers and principals, as well as ICT Coordinators, are included in the lower level of the pyramid, as they are those, who deal with the implementation of ICT policy in the school context. The ICT Coordinators' role differs from the one of the ICT Advisors, as the role of the former takes place within the school by helping colleagues to use computers in their teachings, as well as by solving technical problems arising. For this purpose, the ICT Coordinators were provided with four school periods out of their teaching periods, however, this happened only for a couple of years, during the early years of the 'Evagoras' implementation. Currently, as this thesis identified, ICT Coordinators are still working as such, based on their willingness to help, even though they are not paid or enabled with free periods from teaching.

The preliminary study (Hadjithoma 2003) indicated that although the policy is formulated at the Ministry level, the responsibility for implementation is held by ICT Advisors. 'Evagoras' did not define specific responsibilities and goals of the work of ICT Advisors and as a result, they were involved in various activities that meet the needs arising in the implementation field. It appeared that, the ambiguity or lack of specific goals allowed discretion to ICT Advisors in completing their work. There is thus a notion of personal agency in the implementation of ICT policy although the educational system is centralized. Based on this initial finding, as well as the fact that ICT integration is not compulsory for teachers in primary schools, this research sought to explore the circumstances in which implementation takes place, assuming that this would happen in cases where personal initiative was involved and where situational aspects were supportive.

In the following paragraphs, some of the influences on the development of ICT policy, that were observed during the preliminary study, further inform this study, based on the view that ICT policy and implementation are formulated and developed in relation to various agents.

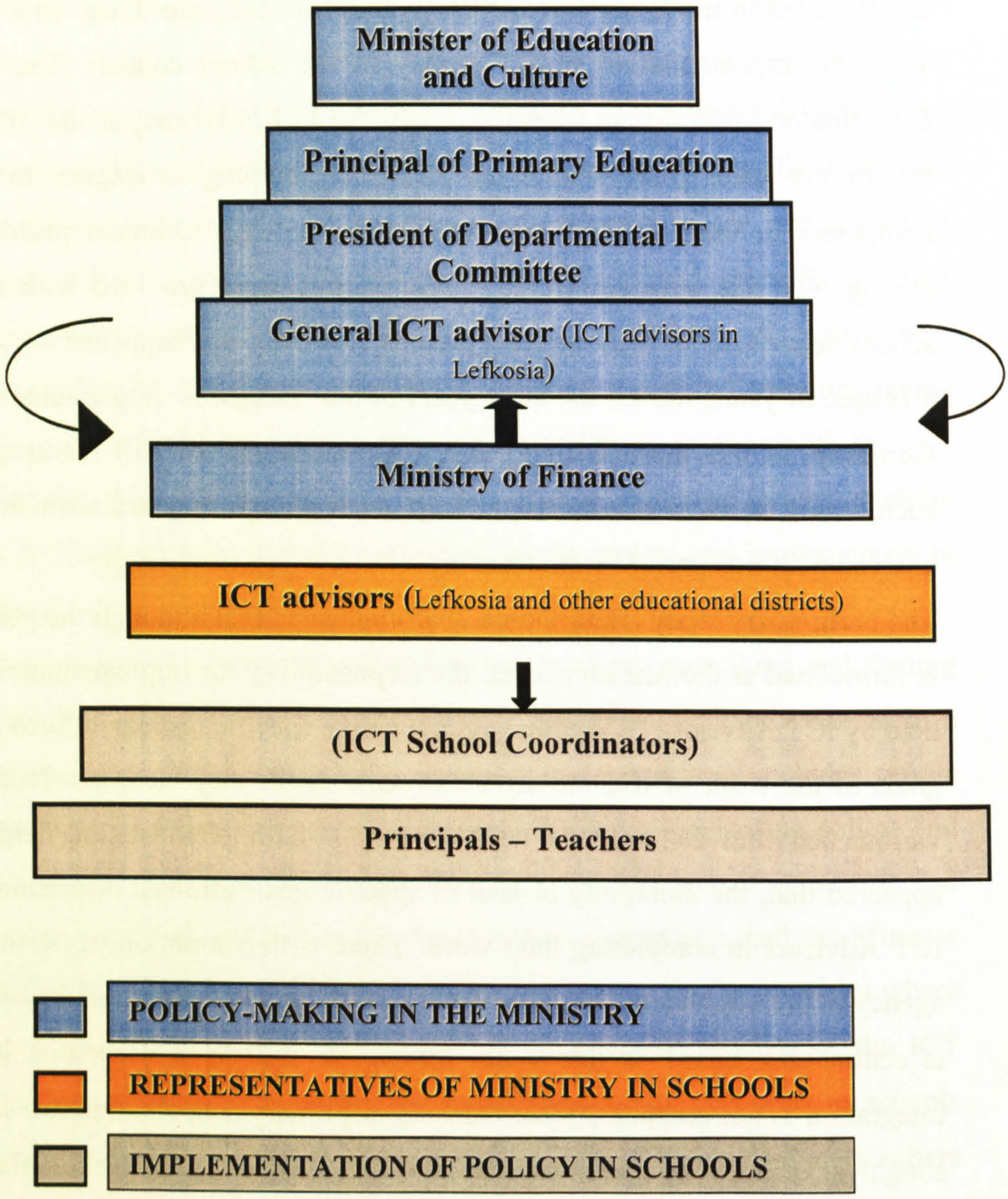


Figure 4. The pyramid of ICT policy and implementation for primary education in Cyprus (Hadjithoma 2003)

2.4.1.1 Influences on Cypriot ICT policy-making

One of the influences that were evident in the official documents ('Evagoras' and circular letters) regarding ICT policy was the harmonization of Cyprus with the European Union (EU) standards within the frame of the preparation for the full integration of the island into the EU. In light of the global changes that society is undergoing, the EU is challenged, and European leaders are concerned in maintaining stability, the economic power, security, and progress in every sector, in the European countries. The e-learning action plan is one of the initiatives of the EU, amongst others such as e-health and e-government that aim to use new technologies in order to enable services in the health sector, in the government sector and other aspects of society, to become faster, more effective, and more competitive. The EU funds projects, which enhance the goals that the European Commission sets. Since one of Europe's initiatives was the e-learning action plan[28], which included guidelines regarding the use of ICT in teaching and learning, Cyprus government also attempted to follow these guidelines and meet the benchmarking criteria. 'Evagoras' was also a response towards the challenge of the integration of Cyprus into the EU: 'Our integration into the EU requires the harmonisation of our educational system with the EU. One of the basic elements of the harmonisation, which also affects educational and economy sector, is the embedding of Information Technology in education' ('Evagoras' 1999, p. 7).

In terms of embedding ICT in education, the European Union becomes important for an additional reason, as it appears to be one of the main external sources of funding for such an initiative, while internal sources are limited for this purpose. As the General ICT Advisor (the coordinator of the IT Committee) informed this study, a large amount of funds for the embedding of ICT in education comes from the EU. More specifically, the European Union has afforded until now, 20 million euros, for the integration of ICT in schools in Cyprus, and a further amount of funds for the

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[28] The e-learning action plan 'sets out policy actions for both European Institutions and Member States to accelerate the development of the Information Society in Europe' (EC 2002, p.7).

implementation of programs such as Arion, Socrates and Grundvig (communication with ICT General Advisor by email, October 2005). Also, the program managed by the Ministry of Education and the IT General Committee, worth of 65 million pounds for the embedding of ICT in all levels of education, is funded (a low interest mortgage) by two European Banks, for the years 2002-2007 (communication with ICT General Advisor by email, October 2005).

The influence of the EU on national policy was also evident in the proposal of the Educational Reform Committee (ERC). The proposal includes a few references on the integration of ICT in education which are similar to popular European Union documents and concepts (e.g. Knowledge Society). These references indicate the importance of knowing how to use new technologies in the Europe of Knowledge[29] (p. 29). For example, a reference to ICT in the proposal comes from the European Union Agenda 2000 which identifies technological research, education and vocational training as of important role for the promotion of European integration and having a crucial meaning for the future of Europe. The proposal also identifies key competences amongst which, ICT comes first: '...and the competition in Europe according to the Union documents more and more 'depend on our ability to take advantage of the potential of ICTs for learning'' (p. 30)[30].

The influence of the European Union agenda, on the Cypriot national policy is only one example that shows the imitative trend Cypriot policy-makers

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[29] (Ευρώπη της Γνώσης)

[30] Although, the ER proposal acknowledges the need to meet the European Union agenda targets, few suggestions are made in terms of integrating ICT in education, as a result of the humanistic approach to education that underlines the proposal. The authors of the Educational Reform (ER) proposal suggested that a smaller unit within the Information Technology Committee (Κλιμάκιο Πληροφορικής) should be created in order to deal with the development and management of educational material (e.g. websites, and other software). This unit would also have the responsibility for continuously informing the ICT Advisors and the teachers regarding the available material. The report also suggests creating computer labs in all the schools equipped with modern facilities, instead of equipping every class with one computer (as the initial ICT policy aimed to do) so that children benefit more and teachers work more effectively (the authors argue). The authors suggest that a teacher who would undertake the responsibilities of the ICT coordinator in the school should be granted with a few hours of free teaching periods (a week) in order to help colleagues to integrate technology in school practice. Finally, the proposal makes the suggestion to reform the existing curricula in order to include (amongst others) the use of new technologies (p. 159).

follow. In 'Evagoras' there are also indications of the influence of other external policies to the Cypriot decision-making, such as the influence of what is happening in the schools of the United States of America in terms of ICT integration:

> '*The United States of America have set as a national goal the integration of one computer for every five students in Education, which shows the big importance given in the modern societies to the technological education of their populations'. When the most powerful country sets as an educational priority the introduction of the Computer in the education of its children, when so much importance is given in the spiritual investment even though there is inexhaustible natural and mineral wealth, which should rather be our priorities in such a small place with no natural sources at all.*' ('Evagoras' 1999, p.9)

The influence of external forces on the Cypriot policy for ICT in education was also underlined by Karagiorgi (2000) who compared between two innovations: broadcasting (television, and radio) and the introduction of computers in education in Cypriot schools. According to Karagiorgi (2000), the similarities between the two innovations, are that both initiations, and implementations followed imitation of practices; 'the educational broadcasting was introduced because of its success overseas'. Also, in both initiatives the involvement of foreign organizations (UK, US) was obvious.

As indicated in the quote above, the approach taken by the ICT policy-makers in Cyprus based on imitation and 'goal transfer' resulted to focusing on equipment provision at the early stages of ICT implementation rather than training of teachers, and investing on human resource within the schools (Hadjithoma 2003) and this in turn resulted to 'having a deserted dusty computer in the corner of the classroom; an initiative that started by charging the public with a respected amount of money, without having teachers who know how to operate these machines' (Kazamias et al 2004, p. 154), as well as unsustainable change. 'Externally imposed, short-term achievement targets are incompatible with long-term sustainability' as Hargreaves et al (2006 p. 252) suggest.

This section supports the argument of this thesis that educational policy and implementation should be looked at from a panoramic view, and thus it

highlighted various influences that contributed to the development of the Cypriot educational policy and more specifically, the ICT policy.

2.5 Conclusion to Chapter 2

Chapter 2 included information on the context in which the research was situated. It thus presented the structure of the educational system and some of the historical and cultural influences this underwent. The thesis views the system as a part of broader society and perceives it as a living organism which functions in relation to various agents of influence. For this reason, the role of international organizations, such as the European Union in forming the national ICT policy, was outlined in this chapter. This chapter also offered examples from different countries regarding the stages they followed in terms of ICT provision in educational institutions. Through these examples it was made obvious that policies tend to be similar across different contexts, however, the interpretation of policies varies in the implementation field. This thesis embarks on its mission to explore how policy is interpreted in the implementation field in the Cypriot primary schools. In this attempt, existing theories offer a contribution in framing the research questions and in interpreting the data. Chapter 3 presents the theoretical framework of the study.

3 CHAPTER 3 THEORETICAL FRAMEWORK

3.1 Introduction

The educational system is treated in this thesis as a social institution and the schools are seen as organizations within the institution. Educators in schools are perceived on one hand as individuals with unique personality but on the other hand, as members of the broader system. Therefore when talking about teachers' work, the reference is made to the characteristics that all teachers have in common, in this specific context, in terms of their role and services they provide.

In an attempt to explore the implementation processes a 'multitheoretical' approach is devised. Not only due to the complexity of the context, but also because the embedding of ICT in education is an issue consisting of a multitude of aspects (e.g. system capacity, teachers' attitudes), multiple theories are required rather than a single theory to frame and interpret the data. Theoretical pluralism (Griffiths, 1997) offers the foundation for constructing a theoretical framework useful for a comprehensive examination of the subject.

Devising theories and concepts that can explain teachers' work and the system within which they work is an important part of the study. Theories such as, street-level-bureaucracy (Lipsky, 1980) teachers' work as bricolage (Hatton 1988) and 'recipe knowledge' (Schutz in Wilson 2002) are used to explain the influence of teachers' work on implementation.

In addition, a combination of implementation approaches ('top-down,' 'bottom-up' approaches to implementation, institutionalism) are used in the analysis and interpretation of the data aiming to understand implementation.

This chapter presents these theories in brief, and these are revisited later in the Findings chapter.

3.2 Theoretical framework for exploring the implementation process

According to Ryan (1995) the implementation process came into attention after the Pressman and Wildavsky study in 1973 on a federal job-creation

program, turning attention from the design of the policy to the implementing agencies and their performance. This study was followed by others, and these were categorized by Ryan (1995) as the first generation of implementation studies, which focused on the role of implementers on the outcomes. The second generation of implementation studies developed systematic frameworks for implementation analysis; The first policy implementation approach is known as the 'top-down' approach as described by Younis and Davidson (in Ryan, 1995); 'policy is formulated at the 'top', this then being translated into instructions for those who will implement the policy at the bottom'. Top-down analysts assume a 'strong' government, which overcomes private interests for the sake of public good (Younis & Davidson 1990, Sabatier 1986 in Ryan 1995). A weakness of the 'top-down' approach that Ryan (1995) identifies is that attention is given mostly to the 'centre' while implementers and their role on developing program initiatives are underestimated. This is because, Ryan explains, the degree of implementation in the 'top-down' approach places a strong emphasis on fidelity (see Hay 2002) that implementers may show towards policy, as opposed to what is happening when a 'bottom-up' approach of implementation is observed. While 'top-down' approaches emphasizes central control, legal mandates, strong government, and capacity of policy objectives, the 'bottom-up' approaches stresses the role of decentralization, the importance of street-level bureaucrats and target groups, the capacity of the implementation actors and resources.

The 'bottom-up' approach main protagonists are Lipsky (1971) and Elmore (1979) (in Ryan 1995). Lipsky indicated the importance of the role of the implementers and street level bureaucrats in policy implementation, and Elmore described the 'bottom-up' approach as 'backward mapping', as a process that starts from the analysis of the target group behaviour, to identify the need for required change, and to define the objectives and outcomes (Elmore 1979). 'Bottom-up' approach, according to Elmore (1979 in Ryan 1995) does not assume the existence of a policy nor does it depend on compliance.

Latest implementation approaches, which use a unified model of the two abovementioned approaches are more relevant to this study; 'If 'top-down' literature can be considered to represent a macro-approach to implementation and 'bottom-up' a micro-approach, then institutional approaches provide a meso-implementation perspective' (Ryan 1995, p. 70). The institutional literature suggests that the coordination between actors, organizations, programs and policy, leads to successful implementation, thus taking into account not only the policy-making at the top but also the implementers-actors and the context (organizations). Institutionalism studies the mechanisms that maintain 'interorganizational harmony and cooperation' (Ryan 1995, p. 71). According to Steinmo (2001) institutionalists are those thinking theoretically about institutions, about their impact on behaviour and outcomes.

An institutionalist approach that informs this study is the Powel's and DiMaggio's (1991) approach, and more specifically, their concept of 'institutional isomorphism' that concerns the issue of how far does school practice developed in response to the introduction of ICT is based on coercion, mimesis or normative guidelines. Institutional isomorphic change occurs when organizations change their characteristics in order to be compatible with the environmental characteristics, as Powel and DiMaggio describe, and this, they explain, happens in three ways; firstly, 'coercive isomorphism' results from both formal and informal pressures exerted on organizations by other organizations upon which they are dependant and by cultural expectations in the society within which organizations function' (p. 67). Secondly, 'mimetic isomorphism results from standard responses to uncertainty' (p. 67) where 'uncertainty is a powerful force that encourages imitation' (p. 69). Thirdly, 'normative isomorphism is associated with professionalization' (p. 67), professionalization being 'the collective struggle of members of an occupation to define the conditions and methods of their work... and to establish a cognitive base and legitimation for their occupational autonomy' (p. 70). Coercive, mimetic and normative isomorphic changes are means of legitimizing the actions taken as a response to a change in the broader environment. The concept of

isomorphism relates to the view of this thesis, that what happens in schools (implementation) within the educational institution is connected to the surrounding environment.

Related to 'institutional isomorphism' another key theme that arises from New Institutionalism (Hay 2002) and a key hypothesis for this study is that there are difficulties in reforming, transforming, or replacing institutions due to their culture, which is based on routine and convention. Educational institutions are also based on routine and convention, something that agrees with the theories used in this study to frame teachers' work, where Lipsky's street-level-bureaucracy describes how teachers' work is routinized and Hatton's theory, on teachers' work as bricolage, explains how existing strategies that have successfully worked before are employed by teachers as a problem-solving method. In line with these concepts and in relation to implementers' role, organizational analyses suggest the following; the rational actor model assumes that people who think about the consequences of the different actions before they act (by making utility-maximizing calculations) (Coleman 1990 in Tolbert and Zucker 1996), while the institutional model assumes that people follow social norms without questioning them or reflecting on them and nor choosing them according to their personal interests (Wrong 1961 in Tolbert and Zucker 1996). The institutional actor model is related to the logic of appropriateness, as described by March and Olsen, the main idea of which is that 'humans maintain a repertoire of roles and identities, each providing rules of appropriate behavior in situations for which they are relevant' (WP 04/09, p. 4). These concepts are helpful in terms of explaining how teachers behave within their professional environment, assuming that their work is based on a repertoire of roles and identities and that they follow an institutional actor model required within the educational institutions where they work. A hypothesis arising from this is to see, if in response to the embedding of ICT in education, teachers act following a rational or an institutional actor model, and if they develop a repertoire of roles with regard to the educational use of ICT.

Zucker and Tolbert (in Clegg et al 1996) consider the above actor models as the 'two ends of a continuum' and they pose the question; 'when -under which circumstances- people behave in the one or the other way?' This is also of interest to this study, which explores the circumstances in which implementation takes place and thus examines the way people act, under specific circumstances. In order to explore this issue, an understanding of institutionalisation processes is needed. Thus Zucker was the one who first developed a 'phenomenologically based version of institutional theory'. Zucker and Tolbert (in Clegg et al 1996) described the institutionalisation process through different stages (Figure 5):

Stage 1: 'Innovation': new structures and changes are introduced as a response to new challenges imposed on organizations.

Stage 2: 'Habitualization': behaviours of actors that emerged through empirical processes as a response to particular problems that need to be solved become habitualized, formalized in policies and procedures of one or more organizations, in the sense that actors do follow them without having to do a decision-making effort. This stage is more an independent activity on behalf of an organization, however, it may be observed that organizations adopt similar innovations simultaneously, by imitating behaviours developed by other organizations, even if there is no consensus on the general utility of the innovation; rather the adoption and the change are related more to technical, economical or political factors. At this stage there are small numbers of people, who adopt structures within one or more interconnected organizations, and knowledge of such structure is limited for non-adopters, thus this structure is not thus far a subject of formal theorizing.

Stage 3: 'Objectification' is the development of social shared meanings or definitions for specific behaviours. These behaviours are not any more attributed to individuals but they have been generalized; decision-makers come to a consensus about the value of a structure, through observation of other organizations that have tested the structures. At this stage, structure becomes widely spread, takes a more normative than imitative form, (so there is not much variance in the form of the structure any more), and

adopters are heterogeneous, rather than homogeneous as they were during the habitualization stage. During this stage, objectification of a structure is a result of the effort of an organization to enhance competitiveness as Zucker observes. 'Recycling 'old social inventions' is a low-cost strategy involving investment of fewer 'social resources' than creating new organizational structure' (p. 182). This is why organizations take into consideration the outcomes of organizations that tested the structures. During this stage, champions emerge who enable the spread of the structure. Champions are the individuals 'with a material stake in the promotion of the structure' (DiMaggio 1988); champions usually emerge when there is potential for the innovation to spread. In order to manage to 'sell' the innovation 'champions' have to produce theorization of an organizational problem and provide arguments for a formal structure to be used as a solution to that problem, as well as provide examples of successful cases where the structure was used.

Stage 4: 'sedimentation' or 'theorizing' 'invests the structure with general cognitive and normative legitimacy' (p. 183) This stage implies the historical continuity of the typifications, 'it implies both width' (spreading amongst group of actors) and 'depth' dimensions (survival through generations of organizational members) (Zucker and Tolbert 1996 p.184). At this stage, typifications are treated by people as 'social givens' because these bring with them their own reality. Tolbert and Zucker (1996) argue that institutionalisation increases when objectification and sedimentation increase as well. Full institutionalisation of a structure depends on low resistance on behalf of the opposing groups, on continuous theorization and promotion of the structure by advocates and on positive correlation between the structure and the outcomes (See Table 1).

The description of institutionalization process provided by Tolbert and Zucker is used as a frame to examine the processes of ICT policy implementation in Cypriot primary schools. Based on the findings the Tolbert and Zucker model will be enhanced and enriched.

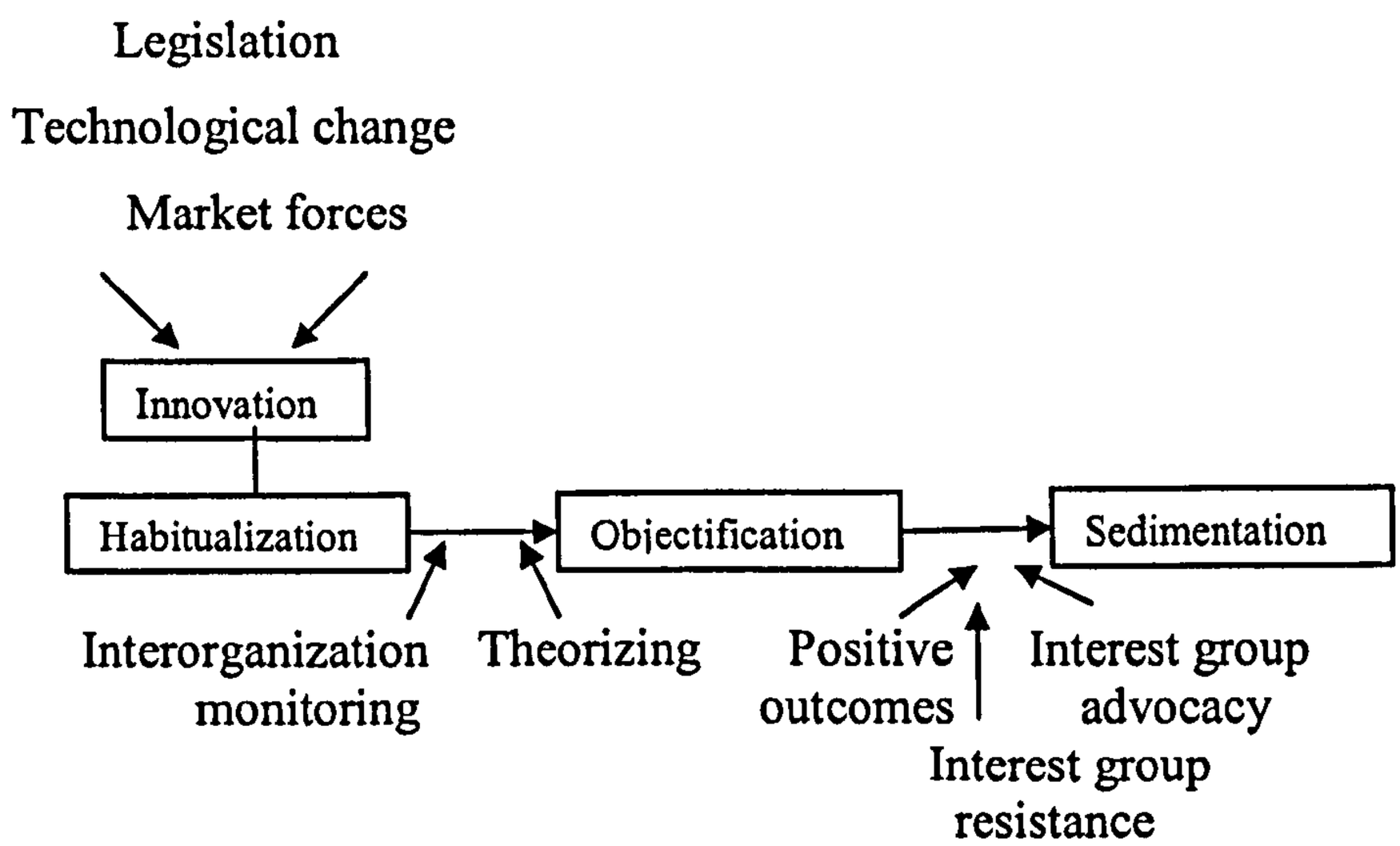

Figure 5. Component processes of institutionalization. Subtracted from Clegg et al 1996, p. 18

INSTITUTIONAL THEORY
Stages of institutionalization and comparative dimensions

Dimension	Pre-institutionalization stage	Semi institutionalization stage	Full institutionalization stage
Processes	Habitualization	Objectification	Sedimentation
Characteristics of adopters	Homogeneous	Heterogeneous	Heterogeneous
Impetus for diffusion	Imitation	Imitative/Normative	Normative
Theorization Activity	None	High	Low
Variance in Implementation	High	Moderate	Low
Structure failure rate	High	Moderate	Low

Table 1. Stages of institutionalization and comparative dimensions. Subtracted from Clegg et al 1996, p. 185

Another theoretical dimension that frames the study is provided by Bernstein's (1996) theory of 'recontextualizing fields'. According to Bernstein, the pedagogic discourse is constructed by specialists in the 'recontextualizing field' and as such, it passes through its creators' 'ideological screens'. Bernstein identifies two fields of work where

pedagogic discourse takes place; the 'official recontextualizing field' in which the state is the main producer of discourse and the 'pedagogic recontextualizing field' where the teachers and trainers of teachers, writers of textbooks, specialized media and their authors produce the discourse. Bernstein notes that these two fields may be opposed to each other. The concept of the 'recontextualizing fields' is useful for this study in examining mainly what happens in the pedagogic recontextualizing field (in the schools) when ICT policy is introduced. The relationships that emerge between the official recontextualizing field (policy documents and offered advice) and the pedagogic recontextualizing field (implementation field) may be identified too. These concepts are again used in accordance with the main argument of the thesis that an overview of policy and implementation is required for understanding the processes and the circumstances in which these take place.

Drawing on the above, this study will utilise the value of the different theoretical approaches to attempt an analysis of the implementation process. The above theoretical framework can be represented as in the following diagram (Figure 6).

POLICY

POLICY CONTENT (DESIGN, IMPLEMENTATION STRATEGIES)

Bernstein's
Theory: Official recontextualizing field
'Evagoras'

POLICY IMPLEMENTATION

Bernstein's Theory: Pedagogic recontextualizing field

'Bottom up' (Lipsky, Elmore)	**'Top-down'** (Sabatier)
High discretion for actors	Low discretion for actors
Social model of organization	Rational model of organization
(Logic of appropriateness)	Fidelity (Hay)
Situational effectiveness	

Institutionalism (Di Maggio & Powel, Steinmo, Hay)
Individuals in the institution: Educators in the schools
'Institutional isomorphism': mimetic, coercive or normative implementation? Basis of legitimation of actions
Stages of institutionalisation processes (Zucker, Tolbert)

Figure 6. Policy includes policy content and policy implementation. This is presented in the schema in relation to relevant theories.

3.3 Theoretical framework for exploring the influence of teacher's work on implementation

The theoretical framework of the study regarding teachers' work draws on theories such as Lipsky's street-level-bureaucracy theory, and Hatton's theory on teachers' work as bricolage, and uses concepts such as 'recipe knowledge' from Schutz's phenomelogocical theory. These are related to 'bottom-up' implementation approaches and are useful in providing concepts for understanding the processes taking place in schools as a response to ICT policy.

3.3.1 Street-level-bureaucracy, Lipsky (1980)

As defined by Lipsky, street-level-bureaucrats (s-l-b) are 'public service workers who interact directly with citizens in the course of their jobs, and who have substantial discretion in the execution of their work' (1980, p. 3). Teachers, welfare workers, police are prime examples of street-level bureaucrats. They are the transfer point between the state and the citizens delivering the state policy through interactions with the citizens. The main characteristic of s-l-b is that 'Their work involves the built-in contradiction that, while expected to exercise discretion in response to individual and individual cases, in practice they must process people in terms of routines, stereotypes, and other mechanisms that facilitate work tasks' (Lipsky 1980, p.140). Lipsky names a number of conditions in which people act as street-level-bureaucrats; s-l-b have high discretion in making decisions regarding the quality of services they provide, regarding the people who will receive or not these services, and their discretion increases when the rules about the services are contradictory or constantly change. The conditions of making decisions about the provision of services are restricted, however, by limited time and limited information about the case. S-l-b usually have to deal with 'large case loads' comparing to their ideal situation of providing services on individual basis. As Lipsky argues, 'the fundamental service dilemma of street-level bureaucracies is how to provide individual responses or treatment on mass basis' (p. 140).

Street level bureaucrats have to do with complex situations in which people involved are unique each time and thus they face uncertainty about the way they should provide their services. At their work they have to deal with limited resources and they experience the ambiguity of their role and their work goals in practice. In order to cope with the difficulties and uncertainty of their work conditions, they create routines and simplifications regarding their work environment and work tasks.

The preliminary study indicated that people involved in ICT policy implementation (ICT Advisors) are allowed discretion in interpreting policy goals, and as indicated they behave as street-level-bureaucrats. Therefore a

further hypothesis arose regarding teachers, who may also behave as street-level-bureaucrats, and as a result, implementation will be based on personal initiative.

Street-level-bureaucracy theory provides a framework which is useful in explaining the impact of teachers' work on the process of embedding ICT. The discretion that teachers are allowed as s-l-b can be related to implementing, and the characteristics of their work, such as limited time, limited information or ambiguity of goals, large case loads and uncertainty may explain the level of implementation that occurs in schools.

3.3.2 Hatton's theory, on teachers' work as bricolage (1988)

This theory adds on to the main theory used -that of Lipsky- providing some ideas of how teachers may exercise their discretion, in terms of using ICT as educational tools. Strauss (in Hatton 1988) defined bricoleurs, as people who are not exactly craftspeople, but professionals, although their work is constrained from a fixed pool of tools. Like bricoleurs, teachers have in their hands, tools which they use in their work. Teacher bricoleurs, Hatton argues, do not necessarily understand the project they have to accomplish but they are trying to complete it by using a fixed pool of tools/material they have in hand, thus the fixed pool of tools available to teachers is a constraint to their understanding of projects and their work. Bricoleurs try to achieve a project according to the uses of the tools they have in hand instead of aiming to understand the project and then finding the tools needed for completing the task or even acquiring new tools for this purpose. So by using the existing means, adjusting them to the situation each time, they are creative but their creativity is limited. Hatton explains that teachers employ strategies that they choose from existing strategies according to their personal judgment and their understanding of the project at the moment (ad-hocism). Therefore, as Hatton indicates, 'bricolage will have a tendency to produce narrow, incomplete, historically distorted conceptions of projects' (1988, p. 338). The way that teachers develop ICT practices based on the equipment they have in hands, can be framed through Hatton's concept of bricolage, assuming that without any specific guidance from the policy level, teachers

employ existing tools and existing strategies when using ICT in their classrooms.

3.3.3 Schutz's 'recipe knowledge'

The use of existing practices, rather than the invention of new ones by teachers -what Hatton describes as 'ad hocism'- (and a strategy of routinization of processes according to street-level-bureaucracy theory) can be related to what Schutz refers to as 'recipe knowledge', although 'recipe knowledge' connotes something even narrower than 'bricolage' because it implies the absence of understanding of ones' own activities. The theory of Schutz regarding knowledge construction is interesting for this study in relation to teacher's understanding of their work and a helpful tool for exploring teachers' contribution to implementation. Schutz describes that knowledge is constructed through people's experience in the world and it's socially distributed. 'Schutz argues that members navigate the world using a mosaic of 'recipe knowledge' where recipe knowledge is defined as below; '... there is a kind of organization by habits, rules and principles which we regularly apply with success. But the origin of our habits is almost beyond our control; the rules we apply are rules of thumb and their validity has never been verified...' (Schutz in Wilson, 2002).

'Recipe knowledge' has similar meaning with institutionalist theory's actor model, more specifically, the institutional actor model, which implies that actors follow principles without making effort for decision-making, as well as with Lipsky's theory that sees teachers' work, as one that is based on routine and convention.

Schutz describes that there are three types of people who construct knowledge in the social context. 'The man of the street' uses knowledge necessary for his survival and this is usually 'recipe knowledge' which is inconsistent and contradicted. The second type is 'the citizen who aims at being well-informed' whose knowledge is 'rigidly limited', and it is more a technical and 'taken for granted' knowledge; The third type is the 'expert' who has a clear understanding of expert knowledge related to social existence and can reflect on it instead of taking it for granted.

What Hatton describes about teachers' inability to reflect and critically and analytically think about their work, is a reminder of the types developed by Schutz, more specifically 'the person of the street' and the 'cartographer', who both do not reflect on their actions and the consequences these have in long term.

A broad assumption explored in this thesis is that teachers follow imitative practices based on their own past experiences as students, or based on their pre-service training in schools, which can be related to 'recipe knowledge'. It will be interesting thus to examine whether teachers use ICT tools according to recipe knowledge, which they copy from other sources (e.g. a repertoire for possible uses of computer developed by the ICT Advisors), and behave therefore not as 'experts' but as 'the person on the street' or 'the cartographer'.

3.4 Conclusion to chapter 3

The Cypriot educational policy could almost immediately be characterised as 'top-down' policy because of the mainly centralized character of the Cypriot educational system. However, in the case of embedding ICT in primary education, this was not a coercive policy, and consequently those responsible for transferring the policy to schools (ICT Advisors), as well as educators, appear to have discretion in implementation. Thus both 'top-down' and 'bottom-up' implementation theories apply to the case of the Cypriot ICT policy and that is why the theoretical framework used in this study employs concepts from both approaches. Institutionalist implementation approaches were also utilized based on the opinion of this study that institutions (consisting of individuals, as well as the routines and stereotypes, underlying individuals' behaviour in a specific context) influence the implementation process and outcomes.

Similarly, in order to understand teachers' work, and how this influences implementation, Lipsky's characteristics of street-level-bureaucrats (s-l-b) were devised in the preliminary research for presenting ICT Advisors' work. As mentioned earlier in the section on ICT policy in Cyprus, the work of ICT Advisors' was characterised by discretion in decision-making, which is

according to Lipsky, one of the main elements of s-l-b work. This study turns now the attention to teachers' work and explores the assumption that teachers are also street-level-bureaucrats.

Institutionalism and street-level-bureaucracy are the main theories selected based on the findings of the preliminary research (Hadjithoma 2003), however, additional concepts from other theories, (Bernstein, Hatton, Schutz) provided terms and concepts which share similar understandings with the main theories, and are thus useful in further describing and theorizing the findings.

The hypotheses arising from the theories presented above will be explored through the research questions, as data will be situated in this framework in order to support or reject the theoretical assumptions.

4 CHAPTER 4 METHODOLOGY

4.1 Introduction

This chapter starts with providing information on Toulmin's argumentation model, which is used as a frame for the research design. It continues with presenting the research questions within this frame. Then, the research methods, most relevant for answering these questions are outlined; the variety of methods provided the opportunity to look at the subject from different perspectives. Document analysis was the method appropriate for gathering information regarding the policy-making level, whilst a large-scale survey aimed to generate information to describe a general picture of when and how ICT are used, and how ICT policy is perceived by educators. The survey data were then enhanced by looking in depth at school-cases, through interviews with teachers, principals and ICT Coordinators, as well as through school/classroom observations. A diary was kept during the whole process of data collection and this also informed the study. The chapter concludes with a brief account of reflections on the research process.

4.2 Research design

This thesis employs an argumentation model to construct the research problem, the research design, and the presentation of the findings. Using Toulmin's argumentation model as a tool for designing, conducting and presenting the research was purposeful for providing logical continuation in the structure of the thesis. In this way, by using argumentation, the claims are constructed in a scientific way; 'Argumentation plays a central role in the building of explanations, models, and theories…' (Siegel 1995 in Erduran et al 2004).

Toulmin's model consists of six different parts; the first part includes a statement, or a claim, which is supported by data (evidence) and their relationship depends on a warrant, an implicit or explicit assumption. The warrant links the data with the claim. Statements that support the warrant are

called backing.[31] More specifically, in Toulmin's definition 'a claim is an assertion put forward publicly for general acceptance'. Grounds (data) are 'the specific facts relied on to support a given claim'. Backings are 'generalizations making explicit the body of experience relied on to establish the trustworthiness of the ways of arguing applied in any particular case' (in Erduran et al 2004). Toulmin's model of argumentation is represented in the following figure (Figure 7).

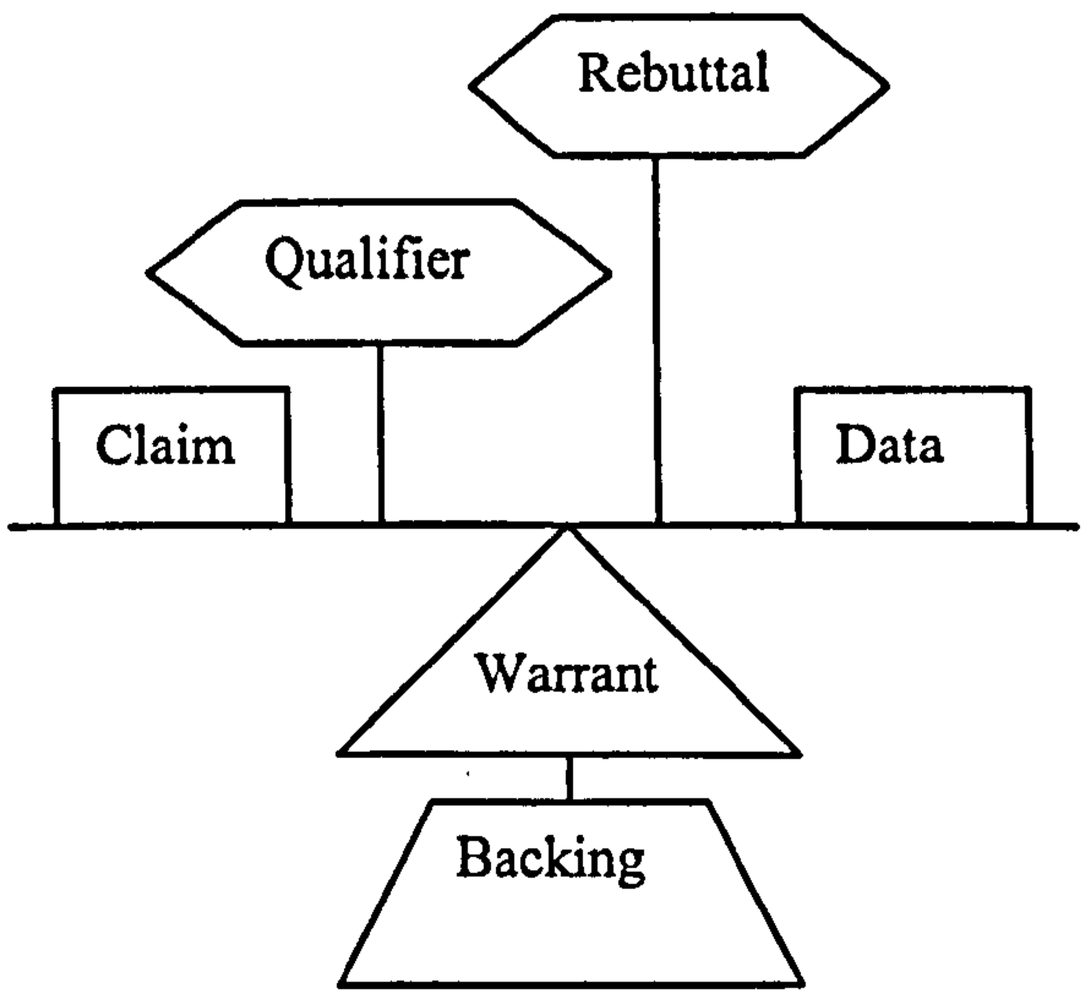

Figure 7. Toulmin's model of argumentation

This thesis was concerned on one hand with the practical aspects of embedding ICT in schools and on the other hand, with the implementation process of ICT policy for primary education. The research questions that constitute the research problem are:

[31] In addition, a rebuttal is the part of the argumentation that describes how strong the claim is, by providing exceptions of it. The presence of a rebuttal indicates higher level of argumentation, as it indicates that understanding of the claim was achieved. Rebuttals are 'the extraordinary or exceptional circumstances that might undermine the force of the supporting arguments'. Toulmin further considers the role of qualifiers as 'phrases that show what kind of degree of reliance is to be placed on the conclusions, given the arguments available to support them' (in Erduran et al 2004).

1) *How is the ICT policy in Cyprus implemented?*
2) *What are the influences on the implementation processes with regard to the*

- *Policy-making discourses*
- *Institutional context (including characteristics of teachers' work)*
- *Educators' personal and professional capabilities*

3) *At what stage of implementation is the integration of ICT in Cypriot primary schools (in terms of the Tolbert and Zucker model)?*
4) *What is the influence of the process on the outcomes? (What does 'ICT in education' mean in this context?)*

The first question concerns the part of the research aiming to explore the practical aspects of ICT implementation, such as training, equipment provision, and the actual use of ICT at school. Thus, the best way to look at these issues is to employ a national survey which will produce results that can be generalized. Further to that however, the research questions regarding the implementation process require more in depth investigation of the situation in schools. Hence, the use of case studies appears to be the most relevant method to researching the three questions regarding the implementation process.

Assumptions arising from the literature review, the preliminary study findings and the theoretical frameworks employed by this research are used to frame the arguments in response to the research questions. The first assumption related to the integration of ICT in education, suggests that educators are constrained by the characteristics of the specific educational system in adopting ICT. Therefore using Toulmin's argumentation model resulted to the following construction regarding the first (and partially the second) research question:

<u>Practical aspects of embedding ICT in education</u>

Claim: *Teachers are street-level-bureaucrats, they have discretion in implementing ICT policy, and the characteristics of their work as s-l-b influence the level of implementation. Following this, it can be claimed that*

the educational system is bureaucratic and as such it is not capable of adopting fast changing structures, such as ICT.

Data: *Evidence needed to show that a) teachers are street-level-bureaucrats working in a bureaucratic system b) the characteristics of teachers as s-l-b influence implementation c) that the system as bureaucratic constraints implementation*

Backing: *Street-level bureaucracy theory can be used to describe the Cypriot educational system and teachers' work; teachers as s-l-b have to face time, resource, and information constraints and thus have obstacles arising from the system in adopting new structures such as ICT*

The second, third and fourth questions concern the part of the study interested in describing the implementation process, including the influences that determine the stage and level of implementation, as well as the outcomes. The theoretical framework adopted assumes that the process, as well as the outcomes, is influenced by various factors within a context. Again, using Toulmin's argumentation model the following construction was made:

<u>The implementation process</u>

Claim: *The implementation process has to be considered in relation to the context, as it is influenced by various factors at different levels. ICT tools are not yet institutionalized in the Cypriot primary education; (the process is not yet completed in terms of the theoretical model used)*

Data: *Evidence is needed to show that a) the implementation process relates to the context, b) it is influenced by various factors and c) that 'ICT in education' is a concept constructed in relation to the process*

Backing: *'Bottom-up' and 'top-down' implementation theories are relevant to examining policy and implementation. Institutionalist approaches which view organizations as micro-societies contribute to understanding the changes that organizations undergo as a response to a policy. Institutionalist theories offer a model for describing the stages of implementation*

The above constructs based on Toulmins' argumentation model, will be completed and enhanced later in the Findings chapter. Below, the design of the research with regard to the selected methods is presented in detail starting with the rationale for using both qualitative and quantitative research methods.

4.3 Rationale for using mixed research methods approach

Punch (1998) indicates that some Social Science areas tend to combine quantitative and qualitative methods and similarly, this study uses a combined method approach, with quantitative and qualitative data collection strategies applied where appropriate and complementing each other. The use of quantitative approach (in this case a survey) is appropriate for answering the first research question, to describe a general image of ICT use in primary schools. Qualitative methods (semi-structured interviews and observations), on the other hand, are more appropriate for answering the research questions related to the implementation processes and for testing the hypotheses derived from the theoretical framework of this study. The implications of using both approaches included establishing validity and reliability of the data, as the similarity of the results through the different approaches accounts for internal validity and consistency in the data collection process. Using various methods was also useful in providing the evidence for testing the above presented claims through survey and interviews with the participants, but also through field notes of the researcher. Hundreds of pages of field notes proved to be as useful as the interview transcripts and the survey data, since they offered a view on what teachers did in the classroom/school complementing what the participants said through the interviews and the survey. Gathering data from the participants' viewpoint but also from the researchers' observations on the field offered triangulation of the data.

Due to the topic of the research a survey was not considered important to do, at the initial stages of designing the research, although previous studies on

the integration of ICT in schools widely use survey (Karagiorgi 2000, Eteokleous 2004, Angeli and Valanides 2005). Later however, a large-scale survey was included in the methods as a preparatory stage before conducting case studies. The analysis of the survey data played a main role in giving preliminary answers to the research questions and providing quantitative data on the subject, for example, the number of teachers who use computers at school or the number of teachers who have received training in ICT. In addition, the survey enabled the gathering of information that would provide a general description of how, when and where ICT are used in primary schools in Cyprus and also on how the educators experience ICT policy. Secondly, the data collected through the survey enabled stratifying the sample, in order to select schools for the case studies. Therefore factors such as the level of use of ICT in each school in relation to the level of resources as described by the teachers of that school were used in categorizing the participating schools. The number of teachers who were willing to participate in interviews and allowed for observations in their classrooms was also taken into consideration for creating the school categories (see Figures 8-11). Finally, other factors, such as average socio-economic status of the student population in the school and the location of the school (urban/rural, educational district), information given by the school principals in the survey questionnaires played a secondary role in selecting schools. By selecting schools with different characteristics in terms of use of ICT or ICT resource level, their location and socio-economic status, it was possible to identify some situational factors that influence implementation. The sampling procedures are further explained below. The analysis of the questionnaires also served in shaping/modifying the interview guide and in identifying points of references for the school/classroom observations.

Case studies were employed in order to gain deeper understanding of the organizational context, through comparing individual schools, but also because process was in focus and not events. Another reason for using case studies is that the study was interested in testing theoretical hypotheses and also in achieving theoretical generalization (Yin 1994). Case studies included interviews with educators to provide the study with more detailed

information on the themes of the survey and to elaborate on the context where ICT implementation takes place. Classroom observations in the selected schools enabled the study to look at specific examples of use of ICT by educators and to describe the structure of the classroom where ICT are embedded. School observations were useful in identifying characteristics of the schools, in terms of the school climate (relationships between staff and principal) and school culture (e.g. tradition of the school in ICT, operation of the school as an 'all day' school etc.). By using both interviews and observations for selecting and comparing data the study achieved better understanding of both the activities and the perceptions of the participants, on the subject in focus.

> '*Through observations I, as a researcher, am allowed access to understand the participants' actions, however, this is a subjective understanding, because it is the way I make meaning of what I observe. Through interviewing, however, I give the participants' the opportunity to explain their actions, to put them into a context, and to narrate how they are making meaning of their own actions*' (Seidman 1998, p. 4).

4.4 Reliability, validity and ethicality of the research

During the period of time devoted to data collection, a systematic approach of tracking and reporting the procedures was followed adding reliability to the findings. Also, in terms of reliability, it is important to mention that the findings verify the results of previous studies on issues of ICT integration in schools (Karagiorgi 2000, Eteokleous 2004, Sergiou 2005). The ability to generalize the survey results to the whole teacher population indicates external validity of the results. However, beyond generalizing the findings to a bigger population this research was meant to be a theory verification study aiming to test theoretical hypotheses (deriving from institutionalist implementation theory and street-level-bureaucracy theory) and thus qualitative approaches enabled this. Punch suggests that theory is 'a set of propositions which together describe and explain the phenomenon being studied' (2000, p.37), and in this case, the aim was to test if propositions of the theories employed, explain the phenomenon of implementation with

regard to the integration of ICT in schools. In addition, the findings were used to enrich these theories or modify them. As previously explained in Chapter 2, the thesis used as background a preliminary research, which provided links to theory (street-level-bureaucracy, Lipsky, 1980). The PhD in turn, put these theoretical links under further scrutiny. As such, the whole research process can be characterized as abductive as the relation between data and theory is cyclical and thus continuous. In this way, the various methods that were used intertwined during the research process.

Gaining authorization to access the public schools was a precondition for this study and this was achieved through a letter sent to the Ministry of Education and Culture (more specifically to the General Principal of Primary Education) explaining the aims of the research and the ways data would be collected and used. The MOEC granted the permission for conducting the study and access the schools where principals and teachers agree to participate. Also, the letter stated that the content of the questions that will be used in the questionnaires and the interviews has to be especially selected, so that the work of the teachers, the school environment and the families of the students are not disturbed. The permission was also granted on the basis that observations will be conducted in a scientific way and the interviews during a time other than the teaching time. It was also noted that it is necessary to use the results anonymously and to use the information gathered confidentially. The MOEC also suggested that the evidence will be used for the purpose of the research only and that the results will be available to the Department of Primary Education to be used accordingly (Appendix 3).

Coming from the same context where this research study was situated, being a teacher in schools similar to those used in this study, I firstly became aware of the characteristics of the educational system, such as the centralization of the system, and secondly, noticed the first attempts to embed new technologies in schools. Being 'one of them' as a participating principal described, enabled access in the schools and networking with the educators. It was thus not required to spend a long time in the field for achieving understanding of the context; rather my acclimatization was

immediate and this was positive in terms of the timing for gathering the data. At the same time, having work experience enabled me to build on this experience for understanding teachers' work and its influence on the implementation processes. My personal knowledge of the context and the educational system supports the evidence gathered and the interpretation of the findings.

Within this framework, the mixed method approach, presented above is supplemented through the use of relevant to the subject information from the UK. The importance of the use of the UK case is described below.

4.5 The use of the UK case

The claims made by this study are justified by the data provided and linked together by the warrant, backed up by the theories used, as well as the comparison with another context (the UK case). Although the research presented in this thesis took place in Cyprus, the fact that the program of studies was offered by a UK University, enabled using the UK case in various ways and at different phases of the research process. The purpose of using this case was to complement the data gathered in Cyprus and to highlight possible unique characteristics of the Cypriot system identified through comparison with the UK system. The researcher became aware of the UK ICT policy through sources, such as British Educational Communications and Technology Agency (BECTA) (http://www.becta.org.uk/), the online National Grid for Learning (website closed on 13/4/06), and research studies including Impact2 and the Interactive Education project, at the University of Bristol. Academic members of the University of Bristol (including the supervisor of this thesis) contributed to one or the other study, enabling sharing information and results with this study.

Therefore in the design of the research, some of the Interactive Education project questionnaire content was replicated.[32] Also, during the analysis the

[32] More specifically, the survey questions from section C and D (the last two questions) were replicated from the IE questionnaire, as they were considered important questions in terms of identifying teachers' beliefs and attitudes towards ICT.

Interactive Education project findings were used for illuminating results from the research in Cyprus. Although the IE project was limited to participation of schools in Bristol and South Gloucester region, this region is populated by more than 600 000 of residents[33], which approximately equals to the Greek Cypriot population of Cyprus.

The IE project considered schools with different ICT level in terms of equipment and with teachers at different stages of integrating ICT in their teaching and learning, something that was of interest to this study too.

Below, the sampling procedures followed by this research study are described in sufficient detail to enable the reader to understand the steps leading to data collection.

4.6 Sampling procedures

The sampling procedures for each of the research stages are presented in this section. The survey was designed as tool that would gather general information. As mentioned above, the survey was also the first step into selecting the schools for the case studies. Then, the interviews and observations took place in the selected case-studies schools.

4.6.1 Sampling for the survey

A list of all public primary schools in Cyprus provided by the Ministry of Education and Culture was used to select the sample for the survey. The list is classified by educational district (Lefkosia, Lemesos, Larnaka, Paphos, Ammochostos) and rural/urban schools for each district are included in separate sections.[34]

20% of all the schools were selected for participation. From the 348 public primary schools, 69 schools were chosen for participation through systematic random selection from the list. An approximate number of

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[33](http://www.southglos.gov.uk/)(http://www.bris.ac.uk/prospectus/postgraduate/2006/intro/20)

[34] A comparison between the list used (for the school year 2003 - 2004) and the list for the school year 2004 – 2005 (which coincides with the year when the survey took place, although it was released after the survey took place) indicated a decrease in the number of schools (from 348 to 344), however; this did not generate any problems in the sampling.

schools (15-21%) was selected from each rural and each urban area of each district, by numbering all the 348 schools and taking every 5th school on the list.

Another list with the number of teachers who work in each primary school in Cyprus provided by the Ministry of Education and Culture proved to be useful; as it appeared that there are schools with 3 teachers and some others with 25 teachers. Knowing the number of teachers in each of the sample school saved money, effort, and it was also more practical for the principals who did not have to deal with extra questionnaires. The list with the number of teachers at each school, used for identifying the number of teachers at each school, was the one for the academic year 2003-2004, since the one for the year 2004-2005, when the survey was conducted, was not by then ready. The changes to the latest list were only minor.

4.6.2 Sampling for the case studies

The first step for selecting schools to participate in the case studies was to analyse the survey data, in order to obtain patterns and ideas on differences in implementation between schools. A widely referred to factor and explored by previous research as one of the factors that influence integration of ICT is the lack of access to ICT resources (Williams et al 2000). For this reason, the factor 'use of ICT by educators at school' in relation to the factor 'level of ICT resources at school', was used to categorize the participating schools. The category 'High use of ICT at school' included schools were more than 50% of the participating teachers stated using ICT at school daily/weekly and the category 'High ICT level resources', included the schools where more than 50% of the participants described the ICT resource level at their school as 'high' or 'very high' (selecting between 'low' 'very low' 'high' 'very high'). Figure 8 shows the combination of the data for both above variables for all participating schools; the percentage of teachers who indicated that they use computer at school daily/weekly, and the percentage of teachers who consider the level of ICT resource at their school as 'High' or 'Very high'. Looking on the horizontal line of 50%, the schools were both graph bars (representing 'use of ICT' and 'ICT level') were equal

or higher to this line, were selected to represent this category in the final selection of schools for the case studies. In the same way, the other three categories were as follows; 'Low use of ICT'-'Low ICT resource level' (Figure 9), 'High use of ICT'-'Low ICT resource level' (Figure 10) and 'Low use of ICT-High resource level' (Figure 11). The schools where fewer than four educators were willing to participate in interviews or observations were excluded from participation in the case studies. The willingness of principals regarding participation of their school into the study was also considered at this stage. In addition, principals' questionnaires indicated the socio-economic status of their schools' student population as 'low' 'medium' or 'high'.

Then schools selected from the above categories, were categorised into urban and rural, under each of the four educational districts (the fifth district, Ammochostos is considered a rural district). It was intended to get four schools from the four different categories, however, this was not possible as the third category 'Low ICT use' – 'Low ICT resource level' included only two schools, where principals reported (in the survey) not willing to allow the school to participate in further study. The fourth category included schools two of which were willing to participate in further study, however, due to priority in selecting schools with different characteristics in terms of various criteria, a school from this category was not selected. Based on all the criteria mentioned above four schools were selected and approached in order to participate in the study (Table 2).[35]

[35] Schools in urban Lefkosia appeared to be much busier than other schools in different districts, and thus, less willing to participate in the research. The first school selected and approached in urban Lefkosia rejected participation, because of previous or other current projects the teachers were involved in. Similarly, the second school approached in urban Lefkosia, although agreed in participating, it was also busy with various activities, at that moment. The fact that urban Lefkosia schools are usually busier in terms of procedures and events going on is confirmed by other research studies (e.g. Eteokleous, 2004). Also, as expected, schools where more teachers used ICT often (daily/weekly) and where the ICT resource level was high, had more volunteers for participation, and thus the first category 'High ICT use' – 'High ICT resource level' was the most populated.

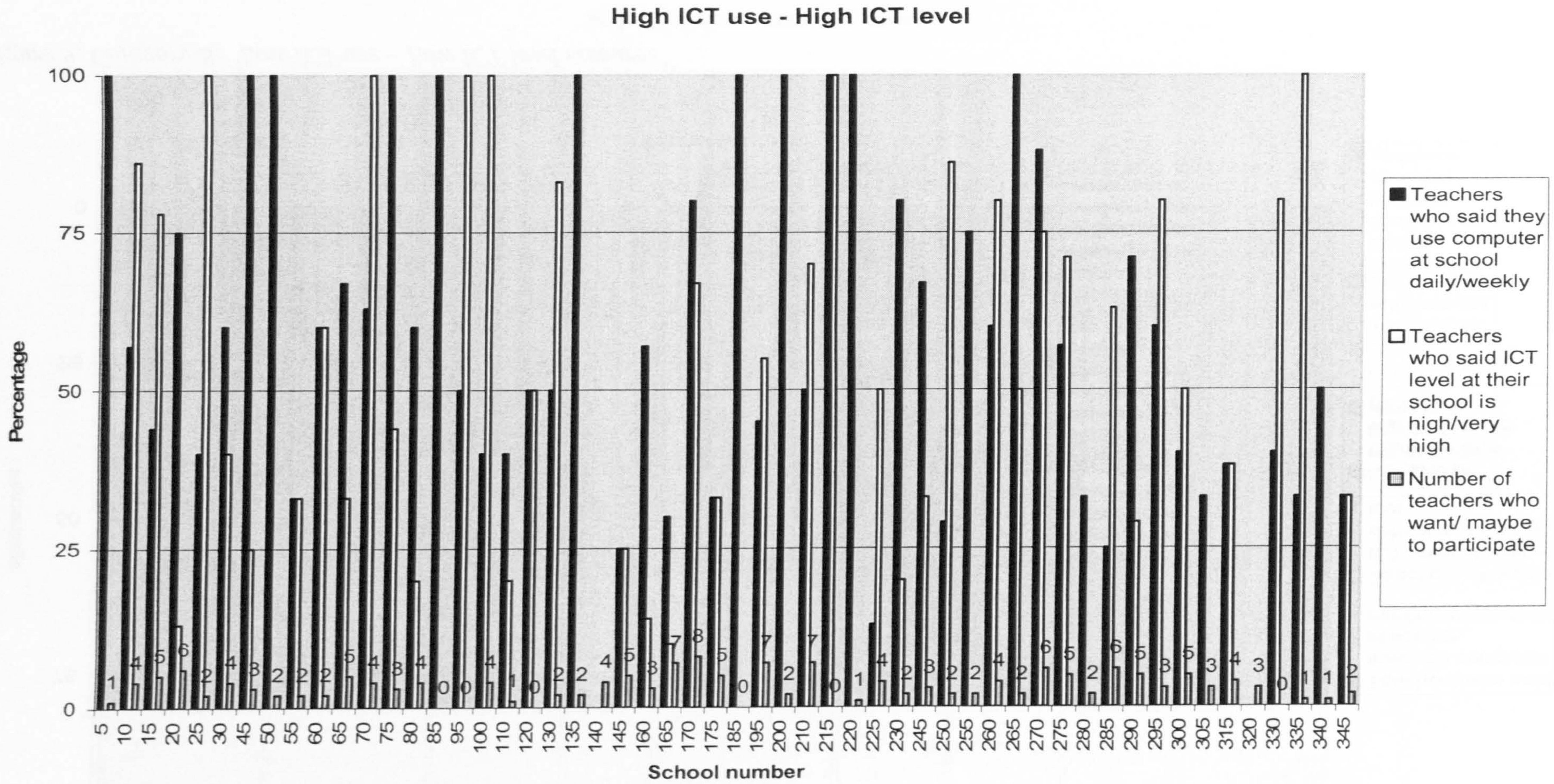

Figure 8. Category A: 'High ICT use – High ICT level resource'

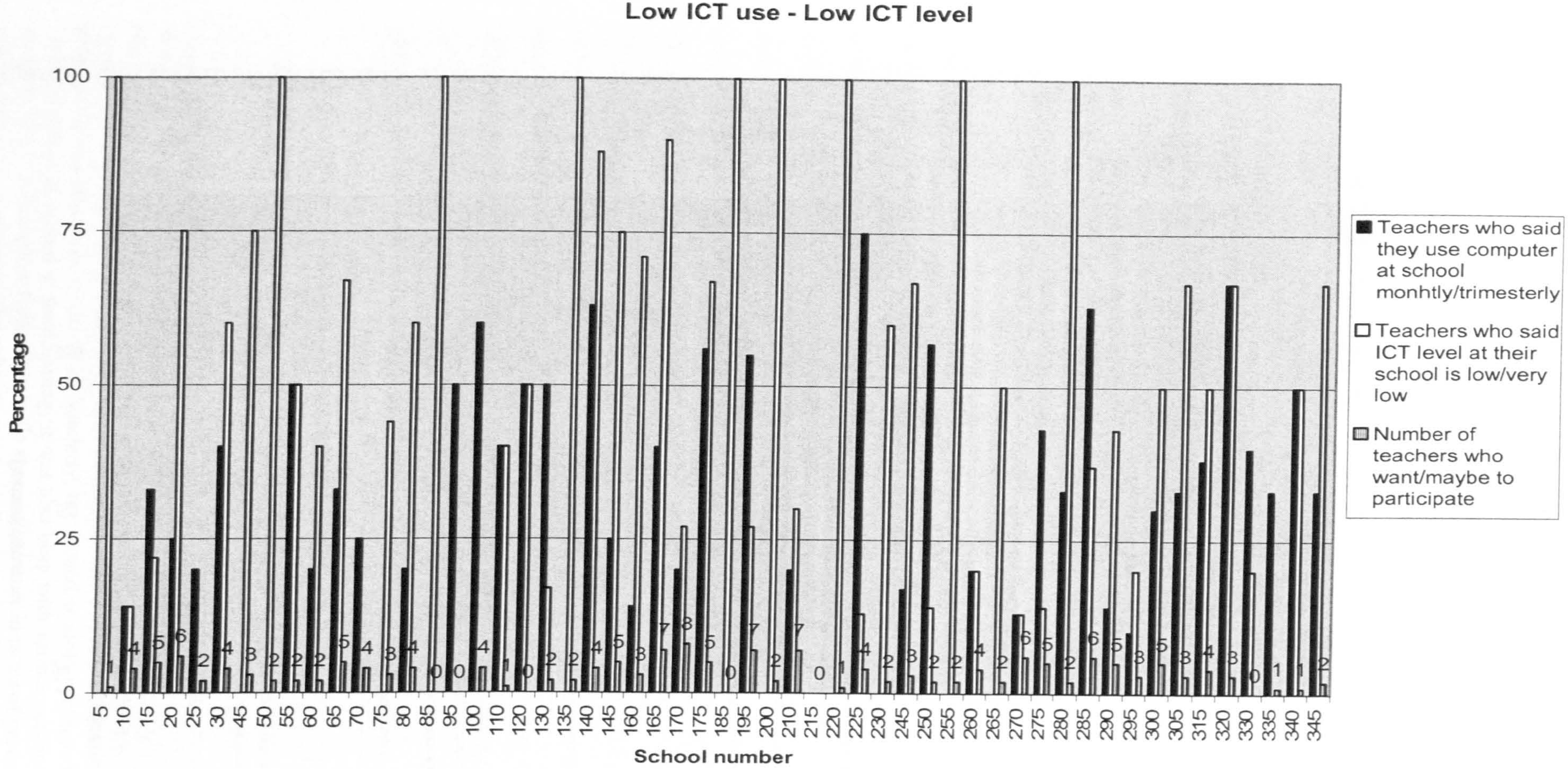

Figure 9. Category B: 'Low ICT use – Low ICT level resource'

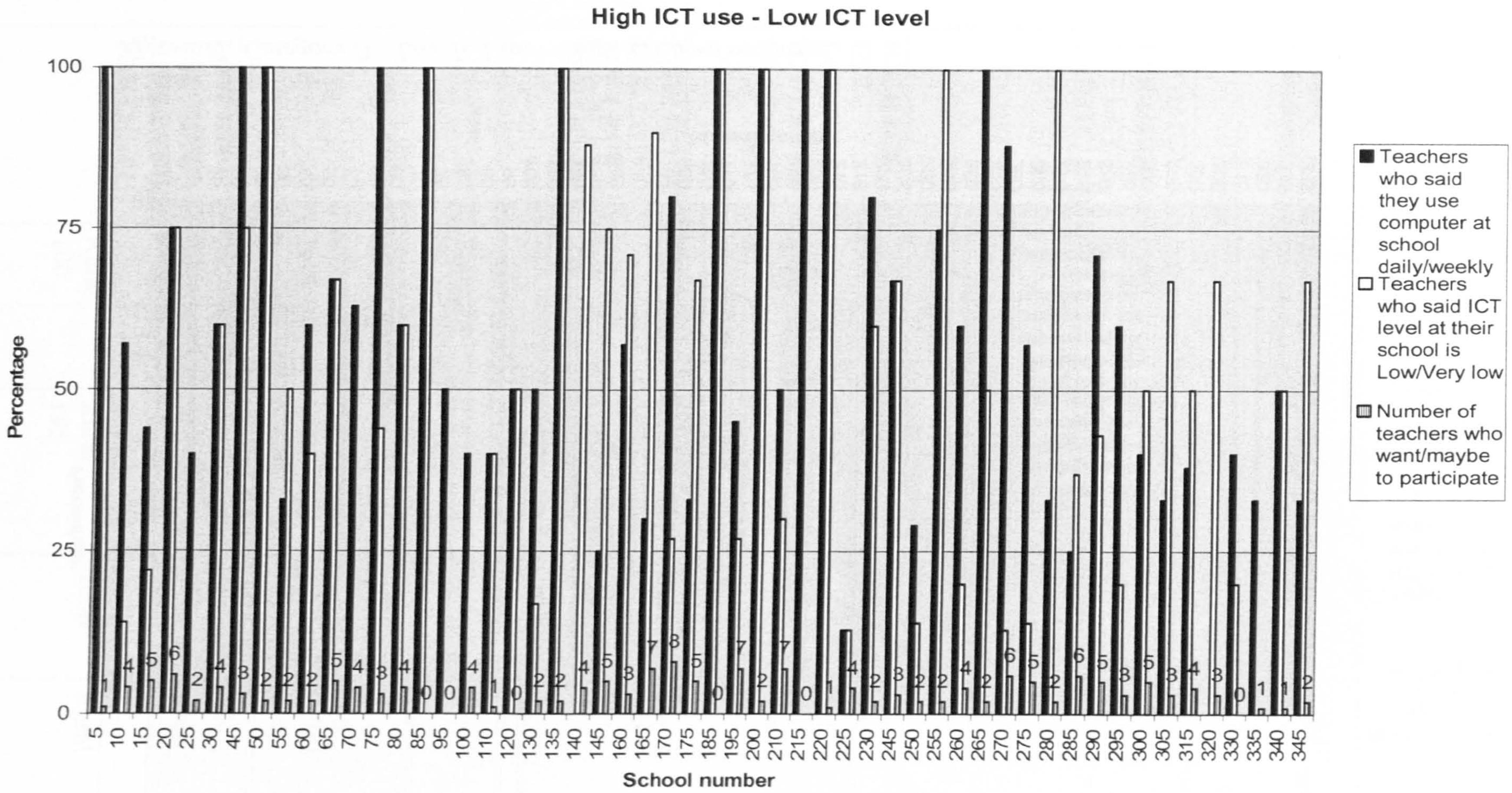

Figure 10. Category C: 'High ICT use – Low ICT level resource'

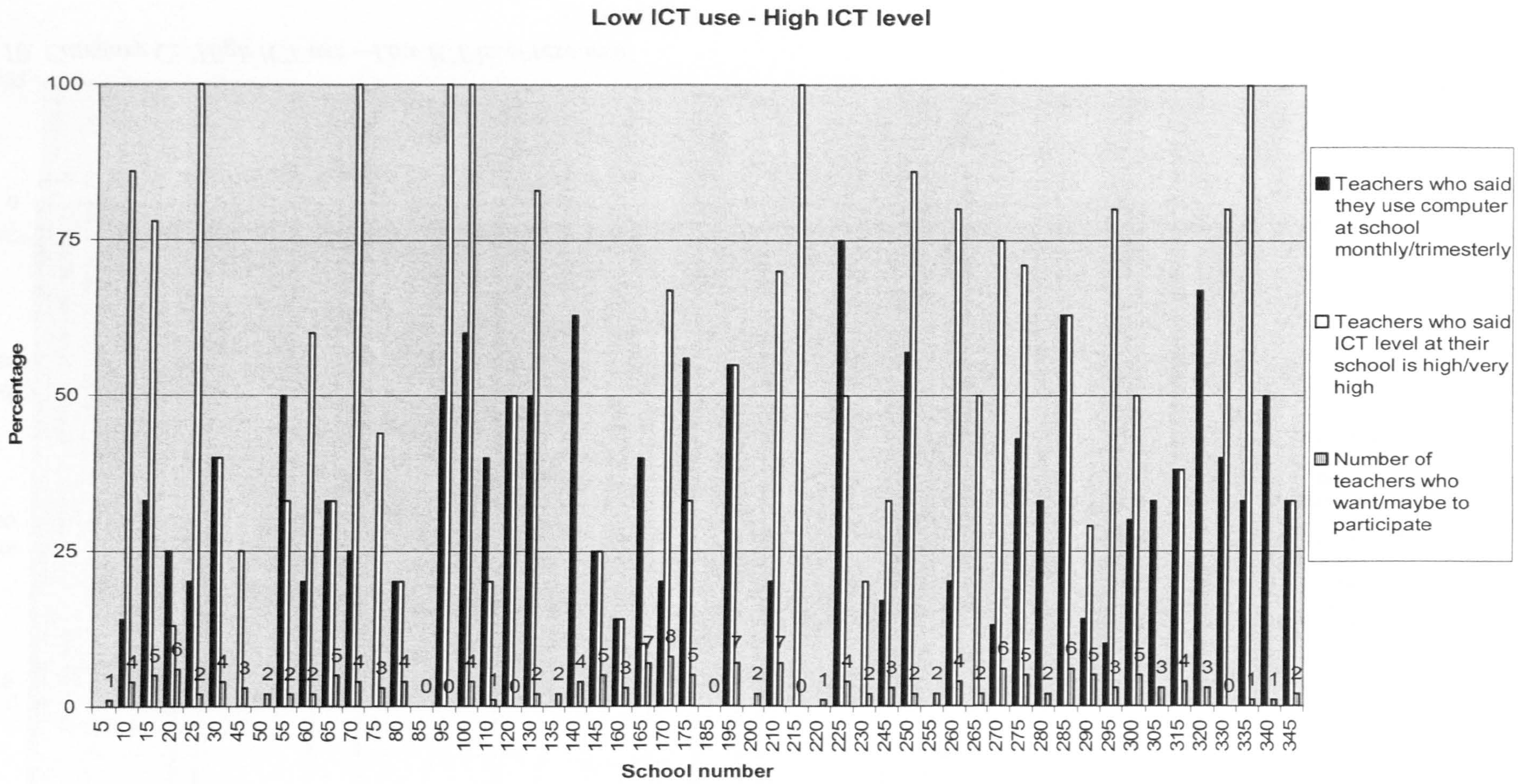

Figure 11. Category D: 'Low ICT use – High ICT level resource'

Table 2. Selection of schools for the case studies. The school numbers in bold are the ones selected finally

Factors considered	**Education District (ED) 1**	**ED 2**	**ED 3**	**ED4**	**ED5** (Considered as Rural area)
HIGH ICT USE-HIGH ICT LEVEL, PARTIC. (4+)	Urban **(10),** 15	Urban **170**	Urban	Urban	
	Rural 100, 70	Rural 210 (principal not willing to participate)	Rural	Rural 270 275 **260**	
HICH ICT USE-LOW/V.LOW ICT LEVEL PARTIC. (4+)	Urban **(20),** 30	Urban	Urban	Urban	
	Rural **65,** 80	Rural	Rural	Rural	
LOW ICT USE-LOW ICT LEVEL, PARTIC. (4+)	Urban	Urban 140 (principal. not willing to participate), 175(principal. not willing to participate)	Urban	Urban	
	Rural	Rural	Rural	Rural	
LOW ICT USE-HIGH ICT LEVEL, PARTIC. (4+)	Urban	Urban	Urban	Urban 225	285
	Rural 100	Rural 195	Rural	Rural	

4.7 The research instruments

4.7.1 The survey questionnaires

The survey included two types of questionnaires; one was addressed to principals of the schools and the other to teachers, and these were accompanied by a letter explaining the aims, the research methods and the conditions of participation (Appendix 4). In the design of the questionnaire, some questions were replicated from the Interactive Education project (IE) (University of Bristol) questionnaire. The reason for using IE questions was explained earlier in the thesis (see 'The use of the UK case'). The questionnaires included closed questions, classified in pre-defined categories, as well as open questions, for the analysis of which a coding system was devised, namely, all answers were written in a word document and then copied under specific categories, which were assigned a number.

The teachers' questionnaire was structured into 6 themes; 'Personal information', 'Experience in ICT', 'Views about ICT', 'Use of ICT in the classroom', 'ICT policy and implementation' and finally, 'Participation in the Research (interviews and observations)'. The questionnaire included an introduction outlining the aims of the study, and was stating that information will be used confidentially and anonymously. A note on a definition of ICT was also provided at the beginning of the questionnaire (Appendix 5).

In the Findings chapter, data regarding demographics and experience in ICT are grouped together to provide an image of the teachers – implementers. Data regarding teachers' views and attitudes towards ICT integration in education are grouped together to answer to the research question regarding the influences on the use of ICT at school, as a part of the implementation. These were also related to the data gathered through the questions regarding use of ICT, for comparing the use of ICT at home and at school. These questions were useful in identifying the influence of teachers' use of ICT outside school and the use of ICT at school.

The principals' questionnaire drew upon five themes as follows; 'Personal Information', 'Information about the school', 'Experience in ICT', 'Views

about ICT', and 'Participation in the Research'. This questionnaire also included an introductory comment providing the general aims of the study, stating that the information gathered would be used confidentially and anonymously, and that the research has the approval and the support of the Ministry of Education and Culture. A definition of ICT was given in the principals' questionnaire too (Appendix 5).

Much of the information offered by the principals was used to describe a general picture of the schools that participated in the study. Questions similar to those in the teachers' questionnaires were compared with the data collected from teachers.

The questionnaires were first designed in English, and then translated into Greek, (the language of the participants and the researcher)

4.7.2 The interview guides

The guide for the interviews with both principals and teachers were initially written in English and then translated into Greek. It included questions similar to the survey questionnaire aiming to elaborate on the same themes. This enabled to clarify the issues that emerged during the survey analysis, as well as to initiate discussion with the educators that would test the theoretical assumptions of the study. The interview guides can be found in Appendix 6.

4.8 Piloting the instruments

4.8.1 Piloting the survey questionnaire

The purpose of piloting the questionnaires was mainly to test the clarity of the questions and the practicality of the questionnaire layout. One of the schools was in urban area and the other in a rural area, both in Lefkosia (the capital). The urban school, because of having a big student population, had two principals, each of whom was responsible for three-year groups. The pilot questionnaires were given to the principal responsible for the three higher year groups, assuming that teachers working with older students would use ICT more than those working with younger students, something

that was positively confirmed later during the case studies. In the rural school, the principal of the school was away with sick leave; however, the assistant principal distributed the questionnaires to the teachers. A meeting was arranged in order to collect the questionnaires in person.

Both school principal and assistant principal indicated that they received a bigger number of questionnaires than required. As they explained, teachers who teach a specialized subject, for instance, English or Art are appointed to teach in various schools (if not in a school big in size), similarly to the Special Education teachers, or psychologists and linguists who work full time, covering different schools, according to the needs of each school. This was useful to know later when preparing the questionnaires for the schools that would participate in the survey.

Since the number of pilot questionnaires received was small, an initial analysis was carried out by hand for the questionnaires from the urban school. The analysis of the pilot questionnaires resulted to changing the wording of some questions or replacing some of them, as well as adding new questions. For instance, a question on teachers' specialization was included in order to identify, if a teacher teaches a specific unit, or has his/her own class; something that could possibly make a difference in the use of ICT in the classroom, being aware that computers are installed in classrooms but not in the Art lab, for example. In some cases, closed questions to which teachers answered verbally rather than selecting one of the provided answers were changed into open questions, by adding a line for completion. A 'Why not' question, was inserted near questions that needed further clarification.

The layout was modified by ordering the titles of each section in the questionnaire, and by separating the questions with bullets (as suggested by one of the teachers interviewed during the pilot phase). Instructions were made more obvious by using capital letters. Care was taken, so that the questions were not separated in different pages, something that caused the teachers (during the pilot) to complete verbally the correct answer just to find out on the next page that the answer was already provided. All the questions were finally included into two pages, (two-sided) rather than five

pages, in order to facilitate the preparation, as well as the completion of the questionnaire.

The final questionnaire incorporated similar to the pilot questionnaire elements, such as the introductory text (reduced in terms of the amount of details provided about the research), however, some other elements were removed; for instance, instructions of how to complete the answers (ticking box, or filling in, or circling) were proved unnecessary as each one of the teachers found their own way of filling in the questionnaire.

Finally, changes were made on the letter that was addressed to the principal, explaining that taking account of the perceptions of the teachers who do not use ICT was as important as doing research with teachers who are ICT users.

The pilot questionnaires were not used in the survey analysis as the questionnaire was modified after the pilot.

4.8.2 Pilot interviews

The pilot took place in Bristol, with Greek-Cypriot teachers-students (attending Master programs at the University) in order to achieve familiarity with teachers' answers and modify the interview guide accordingly. Some pilot interviews were conducted in the schools that participated in the pilot survey study. At the rural school, three teachers volunteered to participate in interviews, the one being the special education teacher, who permanently works in this school (instead of visiting other schools). The interview took place in the special education room providing an opportunity to observe the setting in this specialized classroom. During the pilot, many of the questionnaires in both schools were sealed in the envelope provided; however, the reasons for that are not known; although it can be assumed that this happened for the purpose of maintaining confidentiality.

Piloting the interview guide resulted to adding more questions regarding the reasons that teachers have for not using ICT. This was based on the decision that the interviews should not address only to teachers who do use computers but also to include those who do not use ICT, although it

appeared that those who volunteered to participate were those who do use ICT at school, whilst teachers who do not use ICT were not willing to participate. The process followed during interview transcription was to listen to the interviews, and, at the same time, as transcribing to translate them from Greek to English.

4.9 Data collection procedures

4.9.1 Survey

Initially, the modified survey questionnaires were printed with a different number for each school (in order to use it later as a code to identify them), however, this proved to be time-consuming, and instead, on the stamped envelope provided for returning the questionnaires, a note was made of the school number and name. By keeping the questionnaires in the envelopes in which they were returned, it was possible to identify the school, and later on, each questionnaire was assigned the school number and a questionnaire number. It was important to keep track of the school identity, in order to select later four schools for the case studies, however, for ethical purposes the list with the schools, which was numbered for the sampling procedures was kept safely secret. The questionnaires were sent together with the letter of approval of the study by the MOEC, as well as a letter addressed to the principals. In addition, for each of the 69 schools, a big stamped envelope, with my home address and the number and the name of the school was provided for principals to use them to return the completed questionnaires. Also, smaller envelopes were included in the envelopes with the questionnaires, to give teachers the option to enclose the questionnaires in the envelopes before returning them to the principals, in order to maintain confidentiality.

In terms of sending the questionnaires an option was to send the questionnaires to the schools using the MOEC internal post. It was assumed that in this way, the questionnaires would attract the attention of the educators, and this would also save money on stamps, rather than sending them by post. On the other hand, however, it was hypothesised that this

might have an influence on the reaction of the principals/teachers, towards the study, positively or negatively, if this was related to the Ministry. Therefore it was preferred to use the external post in order to be independent from the MOEC.

The staff was given a period of two weeks to answer and return the questionnaires to the principal, who would then return them by post. By the end of the third week, (allowing an extra week for the delivery of the questionnaires through the post), the principals of the schools who did not reply so far were reminded through phone. Later on, the principals of the schools who did not reply were briefly interviewed over the phone, in order to identify the reasons related to non-participation. In this way, by reporting on the reasons of non-participation of a part of the sample, and by referring to the possible differences between those who responded and those who did not, it was ensured that the analysis of the results would draw on a representative sample. One of the schools had not received the questionnaires, and therefore these were sent again, while a telephone number provided in the list for a school, was connected instead to a home, therefore no contact with the school was achieved.

In general, principals of schools, who did not reply, provided reasons such as, that the teachers are busy and receive a lot of questionnaires to complete from other research studies, or that they were preparing for the Christmas school performance, and that they would deal with the questionnaires after Christmas holidays. The remaining schools, which did not reply by the beginning of January, were again contacted after Christmas and New Year holidays for one last time to be reminded about returning the questionnaires. The selection of questionnaires was completed in January 2006, thus it lasted four months. The involvement of my family members was important in enabling the preparation, the posting and collection of the questionnaires.

4.9.2 Case studies

In February 2005 the principals of the four schools were informed through phone that their school was selected for participation in interviews and

school/classroom observations (case studies). When they confirmed their agreement for participation they were sent by post a letter outlining the role of the researcher and the participants' role in the study, explaining the processes that would be followed during interviews and classroom observations, and informing them about the ethicalities involved in the study (confidentiality, anonymity). This letter can be found in Appendix 7.

The initial visits to each school (in February 2005) took place during staff meetings, (the three of them) or during breaks (one of them). The educators were briefly introduced to the study and were asked to register their interest for participation. A matrix was pre-prepared to fill in with names of potential participants and dates more convenient for them (in March/April/May when I would be visiting Cyprus for the data collection), as well as their preference, as to what they would be most interested to participate in (interview or classroom observation or both). During the first visits to schools, at least four names for participation from each school were gathered however, just before the subsequent visit, for the beginning of data collection, one of the schools withdrew, providing as an excuse that teachers were busy and had other evaluation committees visiting the school during that period. Therefore during the next visits to schools, another school with similar characteristics (Urban – ED1–high socio-economic level of student population) was approached. Due to this school being also busy with inspection by various committees, as well as preparing for a school celebration (for the National days of the 25th of March and 1st of April), the data collection was achieved through short visits to the school. Detailed information about the visits to schools, were kept in a diary, including thoughts and first impressions on the school climate, the architectural structure of the school and the relationships between the staff members and the principal. While interview transcriptions present an emic perspective, that is, the participants' accounts of events and activities (see Morse and Richards 2002); observations notes represent the researchers' perspective and understanding of events and the context. Furthermore, the observations were extended to describe the characteristics of the school, which the researcher did not discuss with the participants; for example, the

relationships between the principal and the staff. These observation field notes were used thus in a more cautious way, as the themes arising could not be compared with the survey and interview data. It would be useful to revisit the case studies in order to discuss the observations of the researcher with the participants, although not feasible within the timelines and purpose of the present research.

4.10 Analysis of the data

The survey data were entered into SPSS and descriptive statistics were produced first, while cross tabulations and Chi Square tests were used to indicate significant relationships between variables. Some questions that enabled the participants to select more than one answers were separated into different variables. For example, for the question 'Who were the trainers?' each of the answers provided 'University, Pedagogical Institute, ICT Advisors, High-school teachers, Private institute', when inputted into SPSS, constituted a different variable (training received by University / training received by Pedagogical Institute and so on). The graphs produced to categorize schools based on the variables 'Use of computer at school' in relation to 'ICT resource level', as well as other school-based graphs, were created in Excel.

The variable 'use of computer at school' and its association with variables such as, 'use of computer at home' 'confidence in using ICT' and others were tested in order to answer to the sub question 'which factors influence teachers' computer (ICT) use at school', and the results are presented in the Findings Chapter.

The survey questionnaire and the interview guide included similar questions, and the sections of both the interview guide and the survey questionnaires were divided into themes, based on the interview guide previously used during the preliminary study for interviewing the ICT Advisors. Thus some themes were already pre-decided, for the PhD study, and revisited, throughout the process, from 2003 (masters study) to 2006 (PhD study). The transcriptions were made in Office Word and this made it

easier for coding under the categories that were related to the themes. Where more elaboration was needed, a new word document was created, and under the title of the theme e.g. 'Views of the teachers about ICT' chunks of texts were cut from the transcription document and pasted in the new document. The findings presented in Chapter 5 combine data from the survey, the interviews and the observations. The one technique complements and supplements the other.

The transcriptions were read and reread and during the analysis some themes emerged, however, some main ideas were written down, during the process of data collection. Striking events or activities were noted during the data collection process and were observed whenever the field was revisited. For example, the image of the identity of Cypriot teachers that emerged at the beginning of the study was reinforced during the data collection process, and similarly, the way teachers view ICT in education, and the characteristics of their work were themes that re-emerged at every visit to the schools. Therefore when transcriptions were made, some ideas were already in place about the themes arising, and the transcripts were used for providing the evidence (e.g. indicative quotes) to support the description of the themes.

The descriptions produced over the duration of the visits to the case study schools (observation notes) were analysed similarly to the interview transcriptions; chunks of text were cut from the descriptions and pasted under thematic categories.

This thesis however did not aim solely to describe the situation in Cypriot schools, but also to theorize some of the findings, in relation to the implementation processes. Beyond the analysis of the data, the interpretation included theory testing and theorization of the findings. The existing theories used in this study were enhanced and enriched, based on the findings. For example, the activities currently undergoing in the Cypriot schools, were related to the stages of implementation, and responses that influence implementation were used for enriching the model of the implementation stages (Tolbert and Zucker-See Theoretical Framework, Chapter 3).

The themes presented in this thesis, for example, the way teachers perceive their role, or the way they view ICT in education, seemed to arise continuously throughout different contexts (schools). This agrees with what Corbin and Strauss notice; 'It is by theoretical sampling that representativeness and consistency are achieved. In grounded theory representativeness of concepts not of persons is crucial' (1990, p. 7).

Since the thesis took into consideration various data collected through different research methods, analysis with regard to different levels was enabled. Policy-making and the influences on this were regarded as the macro-level and were interrelated with the micro-level, the implementation; this highlighted the importance of having a holistic view on the subject. Similarly, according to Corbin & Strauss:

> '*The analysis of a setting must not be restricted to the conditions that bear immediately on the phenomenon of central interest. Broader conditions affecting the phenomenon may include economic conditions, cultural values, political trends, social movements, and so on. ...It is not appropriate simply to list them or refer to them as a background for "better understanding" of what one is studying. It is the researcher's responsibility to show specific linkages between conditions, actions*' (1990, p.11).

Therefore the influences on policy and implementation were interpreted and related to the findings with regard to embedding of ICT in primary schools; 'Macro social conditions must not simply be listed as background material but linked directly to the phenomena under study through their effect on action/ interaction and, through these, to consequences' (Corbin and Strauss 1990, p. 19). Although the thesis did not aim to use grounded theory, it, however, indicated (similarly to grounded theory) the links between the context and its influences on the actions/interactions of people involved in policy and implementation and the consequences on the outcomes of implementation; 'A grounded theory is generalizable insofar as it specifies conditions that are linked through action/interaction with definite consequences' (Corbin and Strauss 1990, p. 15).

Another important aspect of this study is that the collection of data was continuous through time (although restricted to the time limitations of PhD studies). Therefore while the first data (interviews with ICT Advisors and

document analysis) were collected for the preliminary study during 2003, more data were collected during the years 2004-2006, at different times, and at different levels (policy-making or implementation context). (A detailed timetable of the processes can be found in Appendix 8). Through the analysis of the initial interviews with the ICT Advisors, there were indications of some theoretical concepts (street-level-bureaucrats) and thus through further data analysis at a later stage (during PhD) these theoretical concepts were tested and confirmed. This is important as Corbin and Strauss (1990, p. 13) state; 'If one does not alternately collect and analyze data, there will be gaps in the theory, because analysis does direct what one focuses upon during interviews and observations.'

4.11 Evaluation of the research process and reflections

4.11.1 The survey process

The PhD research employed first a survey, in order to describe the ICT policy implementation in Cypriot schools. The questionnaire was similar to the interview guide employed for the interviews with ICT regional Advisors for the preliminary study (Hadjithoma 2003). It therefore explored similar issues, the ICT policy as viewed by teachers, their training, their attitudes towards ICT and their views about ICT in teaching and learning. The process of piloting the questionnaire proved to be insufficient in terms of identifying problems with analysis of the data that emerged later. The pilot study was limited to two schools and questionnaires were delivered and collected by hand, while the actual survey questionnaires were sent by post and gathered also by post using pre-stamped envelopes. Piloting the questionnaires indicated problems with the layout but did not identify problems of the way the questions were posed. Consequently, the input of the survey data in the statistical package of SPSS proved to be difficult as, for each question, various variables were constructed since the participants could choose more than one answers. This resulted into having a big number of dummy variables. The analysis of the questionnaires would probably have been easier and faster, if the questions were based on Likert

scales that would allow teachers choose one answer only for each question. However, allowing educators to choose as many answers as applicable to them, the survey was able to gather more representative information without restricting educators' choice. Another function of the survey was that it was used as a basis for categorizing the participating schools and selecting some of them for case studies.

The survey was conducted at the end of October, and by December almost all the completed questionnaires were returned. Using post to collect the questionnaires left the initiative for participation to educators, without further interference of the researcher and thus the rate of response (from individual educators) was not very high (35.8%). However, through phone calls some pressure was exercised to the principals, to encourage teachers to complete the questionnaires and return them. The main reason that principals gave for not distributing or collecting back and sending the questionnaires, was that the period was busy for teachers, as the schools were preparing for the Christmas school performances. Some of the principals, who were contacted, also mentioned that teachers are busy enough with completing questionnaires from many other studies that overwhelm schools. Some principals reported that if the questionnaire was not compulsory, (assuming that means a questionnaire from the Ministry or from the Pedagogical Institute), then they would not, as they mentioned, bother the teachers with that. There were one or two cases where the principals seemed to have not received the questionnaires and therefore the survey package was posted to these schools one more time.

A way of motivating educators to participate would be to give some material stimuli, for example, offering a present such as a web camera, or a printer for a school through a draw, although this could prove a costly method. Also sending the questionnaires some time earlier would avoid clashing with the important for the schools preparation for the Christmas performances although this would delay the PhD procedures (data collection, data analysis, and writing-up).

4.11.2 Case studies

When the analysis of the survey questionnaires was complete, four schools were selected (based on the criteria that emerged from the survey analysis) to participate in the case studies. Although it was evident from the survey, that schools in the capital, Lefkosia, are busier than schools in other educational districts two of the schools selected were in Lefkosia, one in rural and another one in urban area. It was then not surprising that, the urban school that was initially selected withdrew from the study, due to reasons similar to those mentioned earlier.

Issues raised during the data collection through the case studies, were issues of acceptance of the researcher by the educators within the school. Feelings of being an outsider and an intruder in educators' busy lives on behalf of the researcher and possible feelings of having an outsider who may act as a judge for their work, on teachers' behalf were noted in the researcher's diary. Also, feelings of nostalgia for the work within the school, and, at the same time, the feeling of belonging to the community of teachers in Cyprus were present for me throughout the process, and this was obvious, for example, when sharing views on teaching and learning with other teachers in the case studies-schools. Memories from working experience in the schools were following the research process at all times. This, on one hand was positive as it would enable the understanding of the context in which, the research was taking place, on the other hand, however, it was overwhelming and sometimes a reason for being carried away from the main aim of the research. After all, being a teacher while doing research with teacher participants enabled shared development of understandings between the researcher and the participants.

Doing field research also required detachment from the events that are going on where the research takes place, as this can be emotionally overwhelming at times. Visiting different schools at the same period of time may prove to be difficult in terms of adjusting to the environment of each school.

Dressing codes was also an issue that emerged in the context of this research in one of the schools where the principal was, at the same time, a priest, and this required specific way of dressing on behalf of the researcher, to show respect to the priest – principal, although teachers in that school did not seem to adjust their appearance to the fact that the principal was a priest.

In terms of gathering the data, being concentrated was important during the process of the interviews, as some participants obviously felt better talking in an informal context rather than being recorded. In such circumstances, taking notes that would be useful later in the analysis required focusing on the task.

Keeping track of the learning process also proved to be very important for this research. The 'Diary of my PhD studies' includes information not only about the PhD process but also about events that happened during these three years, and may have influenced the direction that my studies took from time to time. Not only keeping a diary, but writing down the immediate response to field observations was very useful in gathering information that would later be used in the analysis and interpretation of the findings.

The next chapter presents the findings in two parts, the first one consists of presentation of the empirical evidence in relation to the first research question and the second part elaborates on the implementation process and the mechanisms that influence this process.

This study aimed to describe what happens in the schools when ICT are embedded, through the implementation stages model. Building on the background information regarding the way ICT policy-making was initiated (Chapter 2) it shed light on activities that take place in schools, during the first two stages, of the introduction of the innovation and 'habitualization'. At the initial stages, there is variance in terms of the adoption of the new structure (ICT), and the level of implementation depends on individuals such as the ICT Advisors, the ICT Coordinators and the principals. The discretion left for individuals is based on a 'logic of appropriateness' which results to interpreting the notion of 'ICT in education' in various ways.

Therefore it was important to highlight at the beginning of the chapter, the context in which ICT were introduced, so that the reader understands how the optional and general character of ICT policy was interpreted in relation to the humanistic and socializing approach to education that underlines teachers' practice in Cypriot schools. The centralization of the system and, at the same time, the discretion of the educators as street-level-bureaucrats to interpret the policy, were important factors that shaped the responses observed in the schools and the different characteristics of the institutions also influenced the circumstances in which implementation took place. The responses of individuals (educators) and the organizations (schools) towards the introduction of computers (ICT) in their work environment were shaped by the characteristics of the context. The constructions of what 'ICT in education' means are then transferred to policy-makers through the ICT Advisors and become normalized. There is thus an interaction between policy-making level and implementation field, which results to some theorizing of ICT which is an activity leading to the next implementation stage (objectification). Describing the implementation stages using a theoretical model should not be assumed as an attempt to put the implementation process in a formula, as this proves to be a complex process influenced by interacting agents and the characteristics of the context in which it takes place. However, it does illuminate the role of these agents and the circumstances that enable or prohibit implementation. As implementation is a long-term process, the study cannot yet describe any of the next stages of implementation. What it does however, is that it provides information on situational factors that influence implementation. Looking at four schools as case studies enabled the research to shed light on these factors. The survey data, as well as the observation notes and the interviews, were all sources of information that enabled characterizing the school case studies. Some of these factors, such as those related to communities of practice, or the leadership style of the principals were based on observations during the data collection process in the field, and were not expected, at the beginning of the study to emerge. Therefore while the broad theoretical framework employed by the study helped explain the

implementation stages and teachers' behaviour as bricoleurs, further theoretical concepts were used later to describe the activities arising in the implementation field. The conceptual tools used are offered as criteria for evaluating the implementation process and the outcomes. The degree to which ICT was habitualized in each school depended on the school climate ('introvert'/'extravert'), the principal's leadership style, the presence of an enclave or a school wide community, and the support of an ICT Coordinator or an ICT regional advisor.

The findings presented above are further discussed below, and the chapter is followed by a general conclusion in Chapter 7.

5 CHAPTER 5 FINDINGS

5.1 Introduction

The research findings are presented in two separate chapters (5 & 6).

The first part of Chapter 5 attempts to answer the first research question 'How is ICT policy implemented in Cypriot primary schools'; it thus describes a generalized picture of how ICT are integrated in schools based on the survey. Findings regarding the level of ICT resources, the training of educators in ICT and their experience in using computers and other new technologies, the use of computer at school, awareness of ICT policy and other such issues are presented through statistical evidence and then supported with qualitative data (interview quotes and observation notes) in Part 2. This chapter also refers to influences on the implementation process (second research question) relating to factors that affect teachers' use of ICT at school (Part 3). These factors are categorized into personal, professional/organizational, and institutional. The information presented in Chapter 5 also relates to the (fourth) research question regarding the concept of 'ICT in education' as this is constructed in the Cypriot schools. One of the aims of the study was to test theoretical assumptions therefore at the end of the first part of the chapter the evidence is discussed in relation to Lipsky's street-level-bureaucracy, Hatton's bricolage and Schutz's recipe knowledge (that were presented in Chapter 3).

Part 1 of Chapter 6 elaborates on the implementation process (third research question) and extends and modifies the theoretical framework related to this part of the study. As an answer to the second research question this chapter also presents the influence of the broader context on the implementation process and on outcomes (Part 2). The study turned to existing literature and theories to discover conceptual tools that would enable a description of the new themes arising and these tools are described in Part 3. Chapter 6 then continues with presenting the findings that came into light while in the implementation field and that were beyond the pre-decided themes that the research attempted to explore; the role of the school climate, the principals' leadership style, the enclaves or communities of practice, and the ICT

coordinators as champions (Part 4). The chapter concludes with discussion and implications for policy-makers and practitioners.

Following Toulmin's argumentation model (in Erduran et al 2004) to structure the findings chapters, the claim of the study regarding the integration of ICT in primary education which states that teachers are street-level-bureaucrats working in a bureaucratic educational system that is not capable of adopting fast changing structures (ICT), is supported through the data. Similarly, the claim of the study regarding the implementation process that this should be examined in relation to the context and that it is influenced by various factors at different levels, is supported by the findings and interpreted through the theoretical framework.

5.2 Situating the evidence within the theoretical framework

Before proceeding further, the reader is reminded of the theoretical assumptions of the study; these are briefly related to the evidence that will be presented in detail, later, in this chapter.

A basic part of this research was to 'test' the theoretical claims deriving from theories such as Lipsky's street-level-bureaucracy, Bernstein's pedagogic and official recontextualisation, Hatton's bricolage and Schutz's recipe knowledge (that were presented in Chapter 3). As described in the methodology chapter (Chapter 4) the preliminary study (Hadjithoma 2003) pointed out some of the links between the specific policy, the Cypriot ICT policy and street-level-bureaucracy (Lipsky 1980). This turned the attention to the implementation field and more specifically to teachers and their role in implementation. To start with, the assumption that teachers are street-level-bureaucrats was tested by juxtaposing the teachers' characteristics as presented by Lipsky (1980) to the characteristics of the Cypriot teachers as presented through the interviews and observations. The findings that will be described later in this chapter create a general picture which confirms these theoretical assumptions. Teachers, as street-level-bureaucrats have discretion in decision-making, in terms of implementation (to use or not the computer in their classroom, and in terms of how to use it). They have to deal with workloads on a mass basis within limited time. They also face

difficulties in devoting time to preparing material (although many of them use the computer at home for preparation of school work) due to limited resources, especially with regard to using ICT in cross-curricular subjects.

One of the main barriers for teachers to using ICT in their classrooms as reported during interviews appears to be the lack of time, which, in turn, is related to other problems of the bureaucratic educational system, the control of teachers' practice by the overloaded curriculum, the evaluation of their work by inspectors who exert pressure on content completion and the lack of resources which means time-consuming preparations by teachers. Lack of materials, and the optional integration of computers in the curriculum, lack of available technical help, as well as lack of training, in how to integrate the computer (e.g. 'the one computer') in the classroom (which is related to the policy of the MOEC and the training provision to teachers), are also important barriers to teachers' adoption of ICT in school practice. Similar factors that contributed to unsuccessful integration of ICT into lessons were reported by IE (technical failure factors that de-motivated teachers and students, difficulty for booking the computer lab, and teachers' lack of confidence with the equipment and software) (Sutherland et al 2004). Although there were also school specific characteristics (the financial situation of students in relation to computer access at home and consequently to their computer skills, student population with learning and other difficulties) that prohibited teachers from employing ICT in their teachings on a regular basis, as will be presented later, there were other constraints that should be related to the broader educational system rather than to smaller units (schools or individuals). By embedding ICT as another innovation for the schools, without first dealing with the circumstances that prohibit teachers from adopting the innovation, the government's attempt to fully embed ICT in schools falls into vacuum.

A BECTA (British Educational Communications and Technology Agency) report on a small-scale survey regarding the barriers to the uptake of ICT by teachers (June 2004) presents the teachers' lack of confidence and teacher anxiety as some of the barriers. In the case of Cyprus, one cannot attribute the phenomenon to educators' lack of confidence. Suffice it to say, (as the

survey results demonstrate that) 51% of the teachers reported feeling confident or very confident in using ICT and 39.7% that they are developing confidence. Therefore, one would expect that educators would start using ICT at school more often and in a way to transform their practices; however, this is not happening so far. Also, lack of time for training was another barrier identified by BECTA. Lack of time for training is a problem that has been tackled by the MOEC (and the Pedagogical Institute) by providing teachers in-service training, or by offering material motives (e.g. a small grant) for those participating in the after school hours training. Even though the training currently provided does not seem to correspond to the needs of targeted educators, it provides basic skills to educators, which is a pre-requisite for starting using ICT at school and thus cannot fully explain the lack of daily and transformative use of ICT by educators.

Rather than solely attributing this to the attitudes of educators towards ICT, the evidence that will be presented in this chapter suggests that the characteristics of teachers' work and the constraints that the bureaucratic system presents to implementation are also crucial to any explanation of the phenomenon of the incremental adoption (in contrast to institutional adoption) of ICT by educators. The study provides evidence indicating that the vast majority of the teachers have positive attitudes towards the embedding of ICT in education. A recent European study comes to support this finding, stating that; 'Teachers in Cyprus are very much in favour of ICT use in class and clearly see the benefits. Less than 1% state that there are 'no or unclear benefits in using ICT'. Again, less than 1% of the teachers not using ICT express this opinion. This compares to a European average of 16% and puts Cyprus in the top position in Europe' (EC 2006, p. 1) (see also Chapter 1).

This is not to say that personal factors, such as teachers' attitudes, or skills, are disregarded as being factors that influence ICT adoption by educators. However, this thesis comes to argue that, even if teachers' will and positive attitudes, are present that does not mean that ICT will be fully integrated and institutionalized in the educational system. Consequently, this thesis

suggests that factors that may explain the failure of educators to adopt ICT in their daily practice related mostly to educators-implementers in previous research (Angeli and Valanides 2005, Karagiorgi 2000, Eteokleous 2005) might be interpreted in a different way. For example, Karagiorgi's (2000) study following the example of other international studies placed emphasis on actors' (implementers') attitudes as an influential factor on implementation. On the contrary, this thesis shifts the locus from the individual implementers to the broader system, the context and the institutional factors that may influence implementation. It is undeniable though, that professional factors can more easily be addressed, rather than the broader system changes required (e.g. the change of the curriculum). The latter require long term transformative changes, while the professional needs of the educators can be tackled through provision of training and material/resources.

Another interesting finding that emerges from situating the evidence within the theoretical frame, is that the content of the recently published by the MOEC teachers handbook 'Informatics in Primary education' which constitutes the 'official recontextualizing field' according to Bernstein's theory, emerged through the interactions between teachers and ICT Advisors who constitute the 'pedagogic recontextualizing field'. This handbook for teachers was written by a group of ICT Advisors under the supervision of the General ICT Advisor, and was distributed to schools as a helpful guide to teachers' use of ICT in the classroom[36]. It includes a section on the philosophy behind the use of Information Technology in Primary Education; 'In Primary Education, Information Technology is not viewed as a separate subject, but it is embedded as a powerful learning and communication tool' (p. 9, translation is mine). In this document, it is also stated that 'the children use the computer with the help of the educator, as a 'cognitive-research tool' and they learn through osmosis[37]' (p. 15). The handbook also describes ways of using the computer in primary school according to three models; firstly the model of the one computer in the

[36] This document was published amongst other subject handbooks, which guide teachers' practice.

[37] Greek term: οσμωτικά

classroom, secondly the model of the one computer in the classroom and, at the same time, the presence of a computer lab and finally, the model of the 'all-day school', through which the computer is used by the children as a subject.

In addition, the handbook provides various examples of using the computer (as a simulator, as a supportive tool for children with special needs, as a research, communication and exchange of information tool, etc.) and describes ideas for using programs like MS Word, and MS Power Point in specific subjects (Mathematics, Language etc.) in the last part of the handbook.[38] Some of these usages were developed by ICT Advisors, others by ICT Coordinators or teachers, and became then officially adopted by policy-makers. What Bernstein's theory argues, that pedagogic discourses passes through its creators' 'ideological screens' is confirmed here by the findings which indicate that ICT Advisors' and educators' views are influencing the ways that ICT is integrated into classrooms, as a result of the discretion that educators (including ICT Advisors) have in making decisions regarding their practices.

The ICT Advisors and ICT Coordinators' role that was defined locally within the implementation field rather than prescribed officially by policy-makers, is also portrayed in this handbook. Although ICT coordinators emerged as a form of street-level-bureaucracy, towards the needs arising from the embedding of ICT in schools, their role currently becomes formalized in the handbook, which defines them formally as IT managers. The individuals however who undertook this role were found to be more leaders, rather than just IT managers, in some schools case studies. Therefore, the role of ICT coordinators is further discussed in the next

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[38] Roles of different actors, such as the ICT school coordinator, the principal and the teacher with regard to the use of ICT in schools are also described for the first time in an official document. Important to mention, is that the aspects of the role attributed to ICT Advisors and ICT Coordinators, by this policy document are in agreement with the findings presented in this chapter, and illustrates that in the case of Cyprus, the role of specific actors who are involved in implementation was defined locally in a 'bottom-up' process characterized by interaction between top and bottom. Initially, the policy-makers appointed the facilitators defining only in a general manner their role in implementation. Their presence and activities contributed to crystallize their role, which later (5 years after) is being described in an official document (handbook for teachers) that reflects the MOEC policy.

chapter, with regard to them being 'champions' or managers within the schools.

While Bernstein notices that the two above recontextualizing fields may be opposed to each other, this does not seem to be the case for the Cypriot ICT policy and implementation. Rather there seems to be a productive interaction between these fields which contributes to evidence-based formulation and development of policy.

Schutz's concept of 'recipe knowledge' could be used here to describe the product of this interaction between policy-making and implementation, as finalized in the teachers' handbook. The practices regarding use of ICT described in the handbook could become routinized processes. Recipe knowledge connotes, however, a lack of understanding of one's own activities; in this case though, the practices arise from the same implementers and thus are understood by them, even if implementers act as 'The man of the street'. This term describes the behavior of a person who uses knowledge necessary for his survival in this case, the use of existing knowledge as a response to the policy.

Another concept from the theoretical framework used in this study, that can be used to interpret the findings is the one of 'bricolage' which Hatton (1988) introduced. The way that ICT were introduced in the Cypriot educational system restricted educators, in that the MOEC offered them a fixed pool of tools (e.g. one computer in the classroom) which produced specific practices, within the limitations or the possibilities of these tools. Furthermore, Hatton's theory can be used to explain, why the use of ICT by teachers, is currently based on incremental change of their practice, relevant to the suggestion that teachers employ strategies that they choose from existing strategies according to their personal judgment and their understanding of the project at the moment ('logic of appropriateness'). Thus, the use of ICT is added on the existing practices and structures and according to teachers' understanding of the benefit of using ICT (to maintain students' interest and motivation). This could lead however, as Hatton argues 'to produce narrow, incomplete, historically distorted conceptions of projects' (1988, p. 338). In this case, the use of ICT could

remain only incremental, and thus it may not become normalized and institutionalized, instead it will continue to be a tool left to educators' understandings and discretion.

The findings are presented below in the following order for answering the research questions addressed in this chapter; firstly (Part 1) presenting a general image of ICT policy implementation in Cypriot primary schools through the survey data, secondly (part 2), supporting this with qualitative data from the interviews and observations, and thirdly (Part 3), describing the statistically significant factors that seem to influence educators in using ICT at school.

5.3 Part 1: A general picture of ICT integration in primary education in Cyprus

Having as background the preliminary study (Hadjithoma 2003) which described the policy-making process and the people who are involved in this process, this PhD study focused on the implementation process. Survey was a method suitable for producing generalizable results regarding practical aspects of implementation. The survey data would also give the foundation on which to base the selection of schools for further study. The response rate to the survey questionnaires was 76.8% of the sample schools (53/69) and 35.8% of individual teacher questionnaires (312/871). The teacher population that responded to the survey represents an approximate 10% of all the teachers who worked in public Greek-Cypriot primary schools during 2003-2004.

5.3.1 Demographics of the participating schools according to principals

The principals' survey questionnaire aimed to gather statistical information regarding the participating schools. The mean for the 'number of teachers in this school' was 13.26. The largest population of the participating schools belonged either to the small size group (e.g. schools with 3 teachers 15.1%) or the big size schools (e.g. with 18 teachers 11.3%). Medium sized schools (with 12 teachers) constituted the 9.4% of the sample.[39]

Regarding the number of students the mean was 186.15.[40] Principals were asked to estimate the percentage of their school's students who may have computer at home, and the highest proportion (20.8%) gave a 50% as an answer, while 13.2% of them gave a 20% (of students who may have computer at home). 11.3% of the principals provided a 60% as an answer, and 9.4% of them said 70% of the students were likely to have computer at home.

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[39] There is no indication if the principals were including in the numbers they provided the visitor-teachers such as the music teacher, or the English language teacher, who are most likely to visit different schools throughout the week rather than being based in one school.

[40] There was however, a significant number of schools with a small student population (29, and 33 students, 3,8%) or a big student population (200 and 270 students, 3,8%).

According to the principals, 67.9% of the schools had a student population that belongs to the middle socio-economic class, 20.8% of the schools had students with low socio-economic status and 11.3% had students with a high socio-economic status[41] (Graph, 9, Appendix 9)

5.3.2 Demographic information of the respondents (teachers and principals)

Teachers

Demographic information regarding teacher participants is included in Table 3; as this shows 17.6% of the participating teachers were male and 75.3% female; 7.1% did not state their gender. 50.3% belonged to the age category 20-30 years old, 38.1% were between 31 and 40 years old, 7.4% were between 41 and 50 years old and 3.2% were between 51 and 60 years old. Gender wise, this sample is representative, as according to a source from Teachers' Union (POED) the teacher population working in public primary schools during 2003-2004 consisted of approximately 80% female and 20% male teachers. However, the teachers of more than 40 years old were not well represented[42] in this sample, and therefore conclusions regarding the variable 'age' cannot be drawn. At the same time, as the largest proportion of the participants consisted of educators younger than 40 years old, this could lead to an assumption that mature teachers were not interested in the research subject perhaps because they do not use ICT. In terms of years of work (as a teacher) the mean was 9.9 (SD: 7.2), while for the variable 'years of work in the specific school' the mean was 2.9 (SD: 3.2)[43] which shows that there is mobility from one school to another for teachers, especially for the younger ones and newly appointed teachers as the skewed curve for each of these variables shows (Appendix 9, Graphs 10, 11). 77.9% of the teachers who completed the questionnaires had

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[41] For this reason, two of the schools selected for the case studies belonged to the middle socio-economic class, one in the low and one in the high socio-economic class as will be explained later.

[42] According to the same MOEC source there are approximately 80 % young teachers (under 40 years old) and 20% mature teachers (between 41 and 60 years old) currently working in the schools

[43] The SD for these two variables shows that the distribution around the mean is not normal; rather, there is a lot of disparity. (See Appendix 10)

responsibility for their own class, while 18.3% of them taught a subject or many subjects to different groups of students (See Table 3).

Table 3. Frequency distribution of teachers' demographic information

Variable	n	%	Median	SD
Gender			1.81	.393
Male	55	17.6		
Female	235	75.3		
Missing	22	7.1		
Total	312	100		
Age			1.63	.760
20 –30	157	50.3		
31 – 40	119	38.1		
41-50	23	7.4		
51-60	10	3.2		
Missing	3	1.0		
Total	312	100		
Class			1.19	.393
Own class	243	77.9		
Teaching different classes	57	18.3		
Missing	12	3.8		
Total	312	100		

Principals

Fifty-three out of the 69 school principals (76.8%) participated in the study. The response rate to the survey from principals was 73.9% and two principals were interviewed over the telephone (based on the principal's questionnaire). Notably, the majority of the participating principals were male and most of them were over 41 years old (Table 4). This appears to be disproportional when compared to the number of female teachers who work in the schools[44] although this could be explained either in relation to the increased responsibilities principals assume within the school and the increased responsibilities of working females outside their workplace (e.g. family and household responsibilities) or in terms of the status of women in traditionally patriarchal society such as the Cypriot society. Most of the

[44] as presented above approximately 80% of female teachers in comparison to 20% of male teachers

principal-participants had held their position as principals for 2 years (24.5%), others had 4 years (18.9%) and some others (17%) had 3 years of experience as principals. Fewer had experience as principals of 5 or more years. Also, most of them had one (22.6%) or two (35.8%) years of being a principal in that specific school (Table 5). It is important to mention here that, although most principals did not have more than five years of experience as principals, in effect it is expected that they have served before becoming principals as assistant principals undertaking responsibilities similar to the ones that are allocated to principals.

Table 4. Principals' Demographic information a

Gender				**Age**		
	M	F	NA	20-40	41-60	NA
N	28	19	6	6	45	2
%	52.8	32.8	11.3	11.3	84.9	3.8

Table 5. Principals' Demographic information b

Variables	**Mean**	**SD**
Years of being principal	2.5	2.03
Years of being principal in this school	1.9	1.5
Number of teachers in this school	13.26	7.2
Number of students in this school	186.15	107.541

5.3.3 Experience of educators in using ICT at school and in general

The survey aimed to elicit information on educators' general experience of using ICT as this is considered to be influential to the uptake of ICT by educators at school as a part of the implementation (Eteokleous 2004).

The mean of the variable 'years of using computers in teaching' for teachers was 2.65 (SD: 2.1), and the median for 'use of computers in previous school' was 1.00 (1 = yes, 2 = no) which both illustrate how only recently teachers started using computers at school. In contrast, in terms of using computer in general, most teachers reported during the interviews that they had been using computers for five or more years at home or outside school (see also 'Use of ICT at home and at school'). Similarly, an inquiry into how long principals have been using computers in managing schools generated a percentage of 34% of the participants who haven't been using computer in school administration (mean of 1.03 years (SD: 1.44). 22.6% of them said that they had been using computers in the administration of schools as principals for one year, and others (20.8%) for two years, while only 7.5% of them had more than 3 years of experience. 51.6% of the participants replied positively to the question, if they had used computers in the previous school.

Table 6. Frequency distribution of educators' confidence in using ICT in general

	TEACHERS				**PRINCIPALS**			
Variable	**N**	**%**	**Median**	**SD**	**n**	**%**	**Median**	**SD**
Confidence in the use of ICT			2.58	.833			2.00	1.09
Not confident	25	8.0			9	17.0		
Developing confidence	124	39.7			33	62.3		
Confident	115	36.9			4	7.5		
Very confident	44	14.1			1	1.9		
Missing	4	1.3			0			
Total	312	100			53	100		

Comparing the results between teachers and principals regarding their confidence in using ICT, 8% of the teacher participants commented that

they did not feel confident in using ICT, while a percentage of about twice as much (17%) of the principals said that they were not confident. 39.7% of teachers replied that they are developing confidence, while the majority of principals (62.3%) also answered that they are developing confidence. Interestingly, 14.1% of teachers stated that they feel very confident, while only 1.9% of principals stated that they feel likewise. Overall, 47.7% of the teacher participants stated that they lack confidence or that they are developing confidence (Table 6). As will be demonstrated later, confidence in using ICT plays an important role for educators to adopt ICT in their school practices and it is related to experience in using ICT.

5.3.4 Training of educators in ICT

Principals

Training is another important aspect of implementation, and the 'Evagoras' document referred to a goal regarding training teachers in ICT as part of the action plan. The information provided through the preliminary study regarding training was that the main body responsible for the training of the teachers is the Pedagogical Institute of Cyprus.[45]

The information elicited through the survey illustrated that more than half of the principals (67.9% /N= 36) received training in ICT which, however, included basic ICT skills. Only 7.5% of the sampled principals stated that they received training in school administration, while 30.2% (N= 16) did not receive any training. The mean for the hours of training received by the principals was m= 47 hours (SD = 30). Most of them attended the seminars of the Pedagogical Institute and learned basic computer skills (Table 7).

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[45] During 2003, training sessions of 70 hours were provided including 50 hours for training in basic computer skills and 20 hours training in the educational use of computers in the classroom. ICT Advisors were also responsible for organizing workshops for teachers and providing in-service training. In terms of training provision for principals, ICT Advisors informed the preliminary study that there was no specific training course for using ICT in school administration and further, according to a Teachers' Union source those who were allowed to participate to general training in ICT were required to have more than three years employment two or three years before retiring, means that principals were the least addressed group in terms of training. Despite this, when teachers are promoted to principals, school management sessions are provided to them, in which 'IT in education' units are incorporated, even though these last for short time (two or three 80 minutes sessions).

Principals' evaluation of the training they received can be viewed in Table 8.

Table 7. Training provision for principals

TRAINERS	**n**	**%**	**TRAINING CONTENT**	**n**	**%**
University	1	1.9	Basic computer skills	36	67.9
Pedagogical Institute	27	50.9	In pedagogical use of computer	13	24.5
ICT Advisors	6	11.3	In school administration	4	7.5
High school teachers	4	7.5	Other	2	3.8
Private Institute	4	7.5	Not applicable	16	30.2
Not applicable	16	30.2	No answer	1	1.9
No answer	1	1.9			

Table 8. Evaluation of the training program- principals

EVALUATION OF TRAINING PROGRAM	**N**	**%**
Not helpful at all	0	0
Potentially helpful but not relevant to my needs	4	7.5
Helpful	23	43.4
Very helpful	9	17
Not applicable	16	30.2
No answer	1	1.9
Total	53	100

Teachers

The survey enquired as to the principals' perceptions of their school's teachers' general ICT knowledge and skills; the questionnaire provided them with four indicators; 'considerably low' 'low' 'good' and 'considerably good'. The median for this variable was 3.00 (SD: .535). ((1.9%) n = 1 said 'low', (54.7%) n= 29 said 'good', (43.4%) n= 23 said 'considerably good').

Teachers who knew how to use the computer attended according to ICT Advisors (Hadjithoma 2003) sessions of all together 20 hours on educational applications of technology in the classroom.[46]

More than half of the participating teachers (61.2%) received training; 40.4% of them received their training by the Pedagogical Institute while 20.8% received their training by ICT Advisors. 43.6 % had training last year or in the last couple of years, and 17.9% had training 2 or more years ago. Overall, 35.3 % of the teachers did not have training which is a quite large number needed to be addressed by those responsible for teachers' training. The results of the survey are presented below in detail (Table 9).[47]

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[46] The issue of the content of the training was initially raised during the interviews with ICT Advisors who indicated their awareness that training courses address firstly to the novice users of computers, but that further training is required regarding educational use of ICT (Advisor 1: '...this is the first stage of training, those who attended the sessions have achieved the skills for using the computer, but then they are not yet ready to use them in the classroom, they have to be trained first in using the computers in teaching' (Interview 1, 2003). The reason provided by ICT Advisors for initially offering training in basic computer skills was that all teachers should have the basic skills before any other training is provided (Advisor 2: you can't start teaching the teacher about ways of using a computer program in education, when the teacher doesn't know the basics (for using the computer)... (Interview 1, 2003), (Advisor 1: '... our aim is not to create inequalities between the teachers, our aim is to have teachers who will be equally able to use technology, we would like to bridge the gaps...' (Interview 1). The survey suggests that teachers-participants are now in majority skilled in basic computer usage therefore the content of the training should be readdressed.

[47] Important to note is that teachers had the opportunity to tick more than one box with an answer-option, therefore the percentages for each answer in the table add up to more than 100%.

Table 9 Training of the teachers in ICT

WHERE? Out of the 61.2% of those teachers who had training the training took place: In their school, (8%) In their town (41.3%) In their region, (11.9%) and In another town (3.8%)
BY WHOM? By the Pedagogical Institute of Cyprus (40.4%) By the ICT Advisors (20.8%) By high school teachers (While they were at school or later) or private tutors (12.5%) By the University (4.5%)
IN WHAT? In basic computer skills (51.6%) In the pedagogical use of computers (34%) How to use the computer in classroom administration (17.9%)

Regarding the evaluation of the training, from those teachers who had training only 1.3% of the teachers reported not finding the training helpful at all, 32.7% described it as helpful, and 17.6% as very helpful. 6.7% found it potentially helpful but not relevant to their needs; (6.4% did not answer to the question).[48]

[48] Only a few teachers provided comments on their training including positive comments such as: 'it is necessary for everyone' or negative comments such as 'the training was inadequate' (including answers as follows: 'not sufficient, it could be better', 'it was very quick and not well informed', 'the trainer knew a lot but could not transfer his/her knowledge, I had many difficulties', 'tiring because it happened during a period when the schools were open'). Other comments included statements such as 'it is not relevant for good users of computers' and other participants gave comments such as, 'the advisor explained well the programs and exercises, or they provided other information (Med in Information Technology and 'I did Excel as well during some hours'). An interesting aspect of the training was revealed through some other comments: 'the big and liar words' 'it was very theoretical' 'a lot of irrelevant theory', 'I gained new knowledge but this doesn't mean it is easy to implement it in the classroom ...' which illustrates the gap between training provided and classroom practice. Finally, some participants commented that only part of the training was useful.

In the following section the response of teachers and principals regarding ICT infrastructure, provides information as to what ICT tools are currently available at their schools.

5.3.5 ICT resource level at the school

The Interactive Education project report informed this study that '84% of (English) schools report a strong vision statement' (2005, p. 8) and that 'the mandate for ICT in education settings has overwhelmingly been interpreted by schools as equipment acquisition (interviews with Heads and ICT Coordinators)' (2005, p. 2). Similarly to the English schools of the IE project, the Cypriot ICT policy document 'Evagoras' placed an emphasis on equipment provision to schools and followed a homogeneous provision development for all schools in Cyprus.

The MOEC is the main provider of equipment to schools, as demonstrated by the preliminary study (Hadjithoma 2003). In comparison to the UK where a more decentralized approach is followed, and local authorities in collaboration with schools have the initiative for developing their own agendas and policies, schools in Cyprus were expected to present a similar image with regard to equipment availability due to the centralization of the system. The findings, however, show diversity regarding educators' views on the ICT resources level at their schools. Teachers described the level of ICT at their school selecting between given indicators; 'very low' 'low' 'high' and 'very high'.[49] Surprisingly, the answers of the teachers are polarized as 41.7% of teacher-participants consider the ICT level at their school as 'LOW', while 40.7% consider it as 'HIGH'. 5.8% describe it as 'VERY LOW' and 4.5% as 'VERY HIGH' (7.4% did not reply to this question or gave invalid answer) (Table 10). Fewer principals than teachers described the ICT level as 'low' (26.4%) or 'very low' (Table 11) Most of the principals of the schools, described the level of ICT resources at their school as 'High' (49.1%).

[49] The lack of a 'sufficient' indicator was decided upon the assumption that it would be easier to distinguish between 'low level' and 'high level' and categorize the schools as such, while it would not be that clear what a 'sufficient level' category would include.

Table 10. ICT resources at school – Teachers

ICT level at school				
	Low – Very low	High – very high	NA	Total
n	148	141	23	312
%	47.5	45.2	7.4	100

Table 11. ICT resources at school -Principals

ICT level at school				
	Low – Very low	High – very high	NA	Total
n	16	29	8	53
%	30.2	54.8	15.1	100

The evaluation of ICT resource level by educators can be subjective, as it is based on their own judgment of what is considered 'high' or 'low' ICT level. To balance this possibly subjectivity, principals were asked to choose from a list the facilities that are available in their schools in order to clarify the description.[50]

- Internet connection at their school (either in the teachers' office or in the classrooms or in the computer labs) 98.1% (N = 52). Only 1.9% (N=1) said that there is no Internet because of undergoing anti-earth-quake constructions at the school)
- Computers in the classrooms 98.1%
- TV at school 98.1%
- CD player 94.3%
- Video player at the school 90.6%
- A computer lab at the school 52.8%

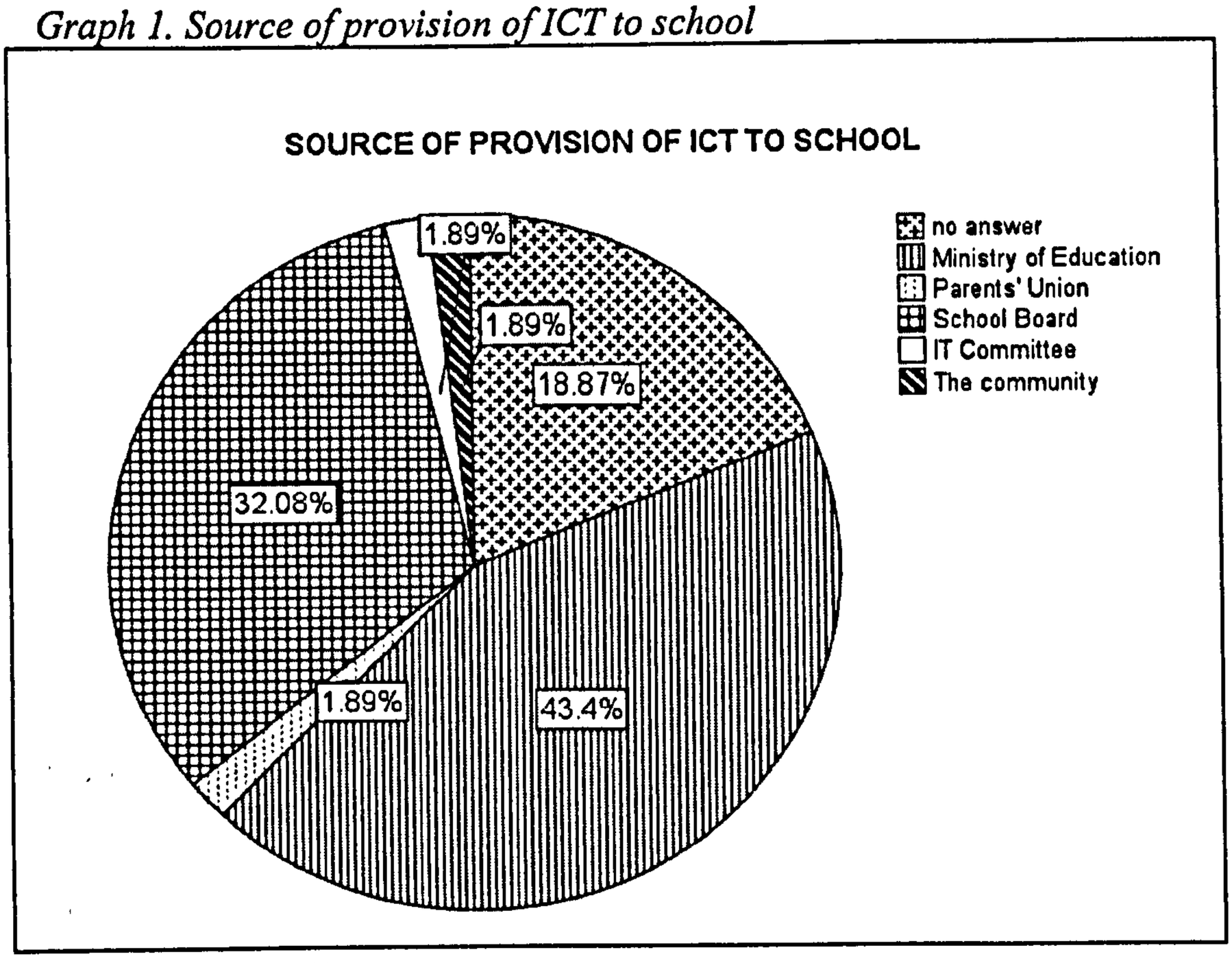
[50] An objective judgment of the schools would be to consider schools which have all of the following tools available as having a high ICT resource level, and those that do not have for example, a computer lab, web cameras, DVD player and projector at the school, as having 'low' ICT resource level.

- DVD player at the school 22.6%
- Web cameras at the school 18.9%
- Projector at the school 7.4%

Preconceived ideas regarding educators' participation in decision-making, based on the knowledge of the Cypriot educational system being centralized, were interestingly contradicted when principals were asked to provide information regarding having a say in the equipment provision procedures and with whom they collaborate, for provision of ICT to schools (replicating an IE question, in order to illustrate the differences between the systems in the two countries). 75.5% (n= 40) of the principals-participants also stated that they have the opportunity to say their opinion regarding which ICT will be bought for the school. The 20.8% of principals, who replied that they do not have the opportunity to say their opinion about the provision of ICT in their school, is also worth mentioning. It would be interesting within the frame of further study to enquire further about the reasons, 20.85% of the principals reported feeling this way. Most of the participating principals (73.6%) answered that they collaborate with the Ministry of Education and Culture, and 88.7% with the School Board (see also Graph 1).

An important factor of support for integrating ICT in schools, as indicated through the findings, is the presence of facilitators in the schools. In the following section the role of various resources of help for the educators is presented and analysed.

Graph 1. Source of provision of ICT to school



5.3.6 Use of ICT at home and at school

The survey indicated that 65.7% of the teachers use computer at home everyday, in comparison to 14.4% of the teachers who use computer at school daily. Most of the teachers (39.1%) use computers at school about weekly (Table 12). The same applies to principals regarding ICT use in the classroom, although to a lesser degree when it comes to home use of computer, as they use computer at home less. Even though more principals (28.3%) than teachers (14.4%) seem to use computer at school more frequently, a higher percentage of principals (18.9%), in comparison to teachers (11.2%), have never used the computer at school. Finally, 41.2% of the participating principals use computer at home everyday while 28.3% of them use computer at school daily (Table 13).

Table 12. Frequency Distribution of Teachers' Computer Use at school and at home

Variable	n	%	Median	SD
Computer Use at school			2.61	1.202
About Daily	45	14.4		
About Weekly	122	39.1		
About Monthly	66	21.2		
About Every trimester	28	9.0		
Never	35	11.2		
Missing	16	5.1		
Total	312	100.0		
Computer Use at home			1.51	.942
About Daily	205	65.7		
About Weekly	77	24.7		
About Monthly	7	2.2		
About Every trimester	4	1.3		
Never	13	4.2		
Total	306	98.1		
Missing	6	1.9		
Total	312	100.0		

Having considered teachers' experience (outside the school) in using computers, as a vital influence on their school practice, based on previous research (e.g. Impact2, 2002) the survey inquired further as to the kind of use of the computer at home by teachers. From the following options teachers selected as many as those that apply to them[51] :

- For preparation for teaching (89.1%)
- For finding information in journals /magazines /educational websites /others (77.2%)
- For communication with friends/family/parents of their students /colleagues/others (48.1%)
- For entertainment (34.3%)
- Other activities (9%)

[51] (as a result, the sum of the percentages provided is not cumulative to 100%)

Table 13. Frequency Distribution of Principals' computer use at school and at home

Variable	n	%	Median	SD
Computer Use at school			2.00	1.8
Daily	15	28.3		
Weekly	19	35.8		
Monthly	1	1.9		
Every trimester	1	1.9		
Never	10	18.9		
Missing	0	0		
Total	53	100		
Computer Use at home			1.00	1.6
Daily	22	41.5		
Weekly	11	20.8		
Monthly	6	11.3		
Every trimester	1	1.9		
Never	5	9.4		
Missing	0	0		
Total	53	100		

Table 14. Use of computer at home - principals

USE OF COMPUTER AT HOME	**n**	**%**
School administration	30	56.6
Communication purposes	12	22.6
For finding information	27	50.9
Entertainment	1	1.9
Other	4	7.5

Table 15. Use of computer at school - principals

USE OF COMPUTER AT SCHOOL	**n**	**%**
For organizing school archives	23	43.4
For communication with MOEC	32	60.4
For communication with staff	2	3.8
For communication with students' parents	8	15.1
For finding info on educational issues	26	49.1
For other purposes (e.g. to access circular letters)	5	9.5

Principals' use of computer at home and at school can be viewed in Tables 14 and 15. Interestingly, more than half of the participating educators used the Internet for finding information which may be influential to their work (for example, reading educational articles)[52].

A considerable amount of research on ICT also emphasized the ways into which ICT can be successfully embedded in classrooms and explored the factors that influence teachers' uptake of ICT at school (Angeli and Valanides 2005; Karagiorgi 2000, Eteokleous 2005). Therefore this study used the data available to examine the relationship between different variables and the use of computer at school by educators. The results are presented in the next part of this chapter.

5.3.7 Integration of computers in lessons

The way that teachers use ICT at school was considered as an important part of the implementation, although there were no specific guidelines by the policy-makers, ideas or resources, beyond those developed by the ICT Advisors.

Teachers were asked to report in which lessons they use computers (either in the classroom or in the computer lab) and the results are presented in

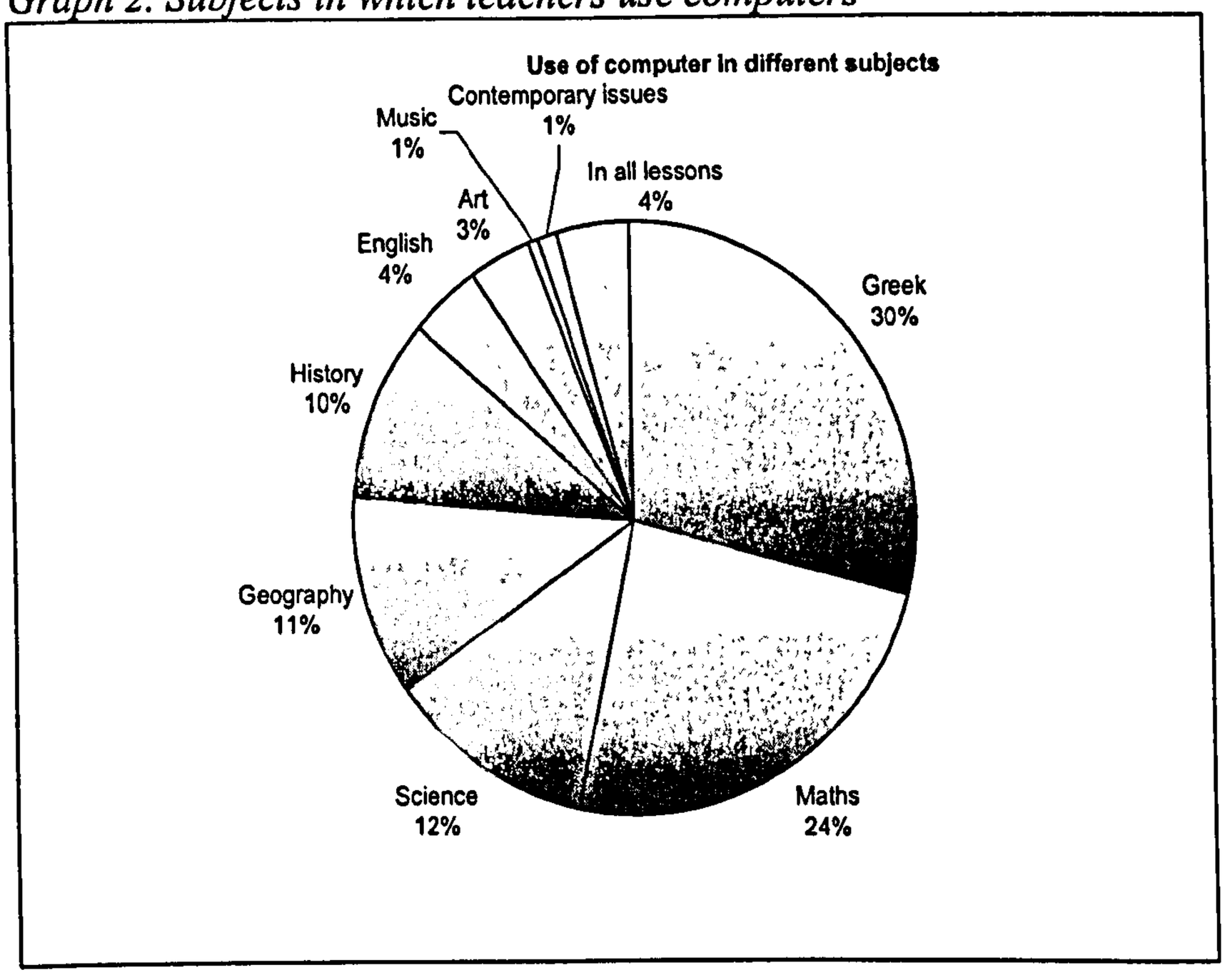
[52] Again educators could choose more than one answers and consequently the percentages presented in the tables are not cumulative to 100%.

Graph 2.[53] Given that during the period that the survey took place there was one computer per classroom[54] teachers were requested to provide a number of students to sit in front of the classroom computer each time; 35% of them answered that the number of students who work on the computer each time is from 1 to 3. 22% of the teachers stated that there are 4 to 6 students working on the computer, while 11% of the teachers offered an answer combination between 1 and 6 students. Only 3% replied that more than 6 students work on the computer (29% was missing data). The answers to this question relate to the way teachers utilize the 'one computer' in the classroom, by creating teams of 1 to 6 students who work on the computer in turn. 27.6% of teachers answered that they use the computer lab, while 25.6% said that they do not use it. 36.2% answered that there is no computer lab at the school (10.3% did not give an answer (or this was not applicable because they may not use computer at school), and 0.3% gave an invalid answer).

[53] The survey included an open question as follows: 'In which units do you use computers?' followed by space where educators could write their answers. In addition, few teachers provided examples of software that they use in the classroom: 'Kidspiration' was the one mostly mentioned, (25 teachers provided this), as well as 'Storybookweaver', (25) and 'Microsoft Word' (19). Also frequently mentioned by teachers are the following: 'Mathblaster', (10) 'Power Point' (9), material prepared by 'Klimakio' (ICT Advisors' group) (6). Paint (5) and Excel (6) are also used.

[54] It is important to remind the reader here (of what was presented above in the chapter section on equipment provision) that during the academic years that the study took place (2003 – 2005) the MOEC had equipped schools with one computer in each classroom in all the higher grades (4th/5th/6th) and one computer in some of the junior grades (1st/2nd/3rd) in most of the primary schools in Cyprus. Based on the results presented in Graph 4, it can be assumed that some schools may have more equipment than others offered by sources other than the MOEC, such as the Parents' Union or the Community, although this does not appear to happen often.

Graph 2. Subjects in which teachers use computers



5.3.7.1 Teachers views on integrating ICT in education

A replicated question from the IE project questionnaire sought to explore teachers' views on what influences succesful integration of ICT in the lesson. In the survey questionnaires teachers were asked to rank the following answers using number 1 for the most important factor and 8 as the least important factor. The results are presented below in order of perceived importance.[55] These results are similar to the ones of the Interactive Education project (ibid) where educators considered enhancing student motivation as the most important factor for lessons with ICT that go well. 'LESSONS WITH ICT GO WELL BECAUSE':

ICT IMPROVED STUDENT MOTIVATION (155)

ICT HELPED STUDENTS TO LEARN (74)

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[55] The number in brackets next to each statement is a sum of all grades '1' given by teachers to the statement to signify that it is the most important factor.
Answers that were ticked rather than numbered were graded as 1, and answers that were not ticked or numbered were graded as 8 meaning that they are not important factors at all.

I HAD PLANNED THE USE OF ICT IN THE LESSON AND GAVE IT A TRY BEFORE (49)

I WAS FAMILIAR WITH THE EQUIPMENT AND THE SOFTWARE (47)

THE EQUIPMENT WORKED WELL (22)

THE LESSON WENT AS I HAD PLANNED (21)

TECHNICAL SUPPORT WAS AVAILABLE (10)

In addition teachers ranked the following reasons with regard to the statement 'LESSONS WITH ICT DO NOT GO WELL BECAUSE':

I WAS NOT FAMILIAR WITH THE SOFTWARE AND THE EQUIPMENT (78)

THE EQUIPMENT FAILED TO WORK (72)[56]

MY PLANNING FOR USING ICT IN THE LESSON WAS NOT SUFFICIENT (41)

ICT FAILED TO MOTIVATE STUDENTS (27)

TECHNICAL SUPPORT WAS NOT AVAILABLE (23)

IT DID NOT WORK AS I PLANNED IT (14)

ICT WAS AN OBSTACLE FOR THE LESSON (9)

The teachers' answers to the above question positively relate to the statement that most teachers agreed with in a different question presented later ('ICT keep students' interest in the lesson and it is a motive for them'). Keeping students' interest and as motivation for them can also explain the second statement of this question which the participants ranked as second important, ('ICT helped students to learn'), as from the interview transcripts provided later in the chapter, it is obvious that teachers consider students' interest in the lesson as a factor that promotes learning.

[56] Similarly, English teachers (who participated in IE project) attributed to failure of the technology, the lessons with ICT that do not go well (IE report, 2005). It is worth noting however, that English schools usually have technical staff available, whereas in the Cypriot schools there is no such service.

As illustrated also in the interview transcripts that will be presented later in this chapter, familiarity with the equipment and the software plays a pivotal role for teachers, and makes them feel confident in using ICT. Also important for the teachers is to pre-plan the lesson, as well as previously having used ICT which they planned to embed in the lesson. The factor 'technical support was available' which was ranked as least important for lessons with ICT that go well is a result associated with the fact that technical support is not usually available to teachers at school, although the ICT Coordinators can help solve technical problems.[57]

Further inquiry into the teachers' perceptions regarding the use of ICT in teaching and learning was achieved through providing the following statements and asking the teachers to tick the ones with which they agree. The results are presented below[58]:

- 'ICT CHANGE THE WAY LESSONS ARE CARRIED OUT' – 214 (68.6%) teachers replied that this was the case and 197 (63.1%) of them replied that this change was positive
- 'ICT MAKE ME FEEL MORE PROFESSIONAL', 173 (55.4%) teachers replied that this was the case
- 'ICT CHANGE THE RELATION BETWEEN THE STUDENTS' 123 (39.4%) teachers answered YES, and of those who said YES, 107 (34.3%) of them said this was a positive change
- 'ICT CHANGE THE RELATION BETWEEN MY STUDENTS AND I' 133 (42.6%) replied YES, and 124 (39.7%) of them said that this is a positive change

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[57] However, as teachers mentioned during the interviews, despite the fact that ICT Coordinators are helpful, asking for their help is acknowledged by the teachers as something that will be offered on the good will of the coordinator during his/her free time and without any reward. (ICT Coordinator: '*I give from my free time, I don't have time for this purpose, if (emphasis) I want, I go, and if I am conscious, for example, today I was running during the breaks to prepare (he means to fix) some technical problems that colleagues had, which they couldn't face; This is not correct however, e, how long can you take it?' (School A, Interview 3, 100) Teacher 2: 'and somebody may feel sad as well to bring him (the coordinator, to solve a problem) during his off* ', Teacher 1(ICT Coordinator)*: 'the colleagues think and tell me 'I want* (your help) *but I will take your off* (period)*'; there is a problem*' (School A, Interview 3, 100).

[58] 49 Teachers (15.7%) did not reply to this question

- 'ICT ENHANCE MY ROLE AS A TEACHER', 87 (27.9%) teachers replied YES
- 'ICT UNDERMINE MY ROLE AS A TEACHER' only 5 (1.6%) teachers replied that this was the case.

The above statements indicate that the majority of educators who participated in the study have positive attitudes towards the introduction of ICT in education, in terms of the changes this brings in the way lessons take place, and in terms of improving their work professionally. Fewer teachers, however, believe that ICT alter the relationships they have with their students or between the students. This could be explained, if one of the goals of primary education for socializing students is taken into consideration; within this scope teachers aim to enable students develop social relationships, something that as educators reported during the interviews cannot be offered by ICT tools currently available to schools. Social education is part of the broader humanistic approach of the Cypriot system. The interviews that will be presented later in this chapter shed light on teachers' attitudes, and explain why computers (and other ICT) are not capable of changing the existing state of affairs in the classroom, as well as why teachers do not feel undermined by them (e.g. that ICT may one day replace them). Also, it appears that while a majority says it makes them feel more professional, only a minority agrees that ICT enhance their role as a teacher; therefore the meaning of these statements should be further investigated and clarified.

Finally, another question sought to illuminate teachers' views regarding the embedding of ICT in education. Teachers were asked to tick any of the following given statements which reflect their views.[59]

1) ICT KEEP STUDENTS' INTEREST IN THE LESSON AND IT IS A MOTIVE FOR THEM (291/ 312: 93.3%)

2) IT IS NECESSARY FOR EVERYONE NOWADAYS TO KNOW HOW TO USE COMPUTERS AND OTHER ICT (285/312, 91.3%)

[59] The percentages present the number of educators who agreed with each statement

3) ICT PROMOTE LEARNING (240/312-76.9%)

4) ICT HELP ME IN TEACHING (213/312-68.3%)

5) ICT KEEP STUDENTS QUIET AND OCCUPIED (96/312: 30.8%)

6) I DON'T KNOW IF THEY ARE USEFUL IN TEACHING AND LEARNING (24/312-7.7%)

7) ICT ARE NOT USEFUL AT ALL (1/300-0.3%)

The above statements also indicate how positively teachers feel about the introduction of ICT in schools and these opinions were clarified too through the interviews that will be presented later on. Principals were given a different set of statements to select the ones that mostly represent their views on the use of ICT in education (Table 16). Interestingly enough, and similarly to the teachers, they also had optimistic views about the usefulness of ICT in school administration and in teaching and learning. Considering the positive views of educators, the low use of computers at school is striking; the reasons one can assume for this are discussed later in this chapter.

Table 16. Views on ICT- Principals

VIEWS ON ICT	**n**	**%**
ICT are useful in school administration	52	98.1
They promote learning	50	94.3
They assist teachers in teaching	52	98.1
They help teachers to prepare for their lessons	49	92.5
They help teachers in classroom administration (organizing students' records etc.)	38	71.7
It is necessary for everyone nowadays to know how to use computer and other ICT	50	94.3
I don't know if they are useful in teaching and learning	0	0
They are not useful at all	0	0

5.3.8 ICT facilitators at the school

The survey results indicated the importance of the role of people within (colleagues, ICT Coordinators) or outside the school (children/friends outside school/family) who enable teachers to use computers. To the question 'To whom do you turn for help for using ICT in the classroom?' teachers answered that they mostly turned to colleagues and to children /friends/family outside school (Graph 3).

Similarly, principals demonstrated the sources from which they received help for using ICT in school administration; 64.2% of them stated that they received help from school teachers and 58.5% of them from the ICT Coordinator[60]. 49.15% reported receiving help from the ICT Advisor and 32.1% from the MOEC through general guidance or the MOEC website.

A few (13.2%) received help from educational websites and only 7.5% of them stated that they received help from students or (3.8%) from other sources[61] (Table 17). The adoption of ICT within a community of practice is one of the activities arising in the schools (as a response to the introduction of ICT) that seem to be supportive to the ICT policy implementation and influential on the outcomes. This will be described in the next chapter.

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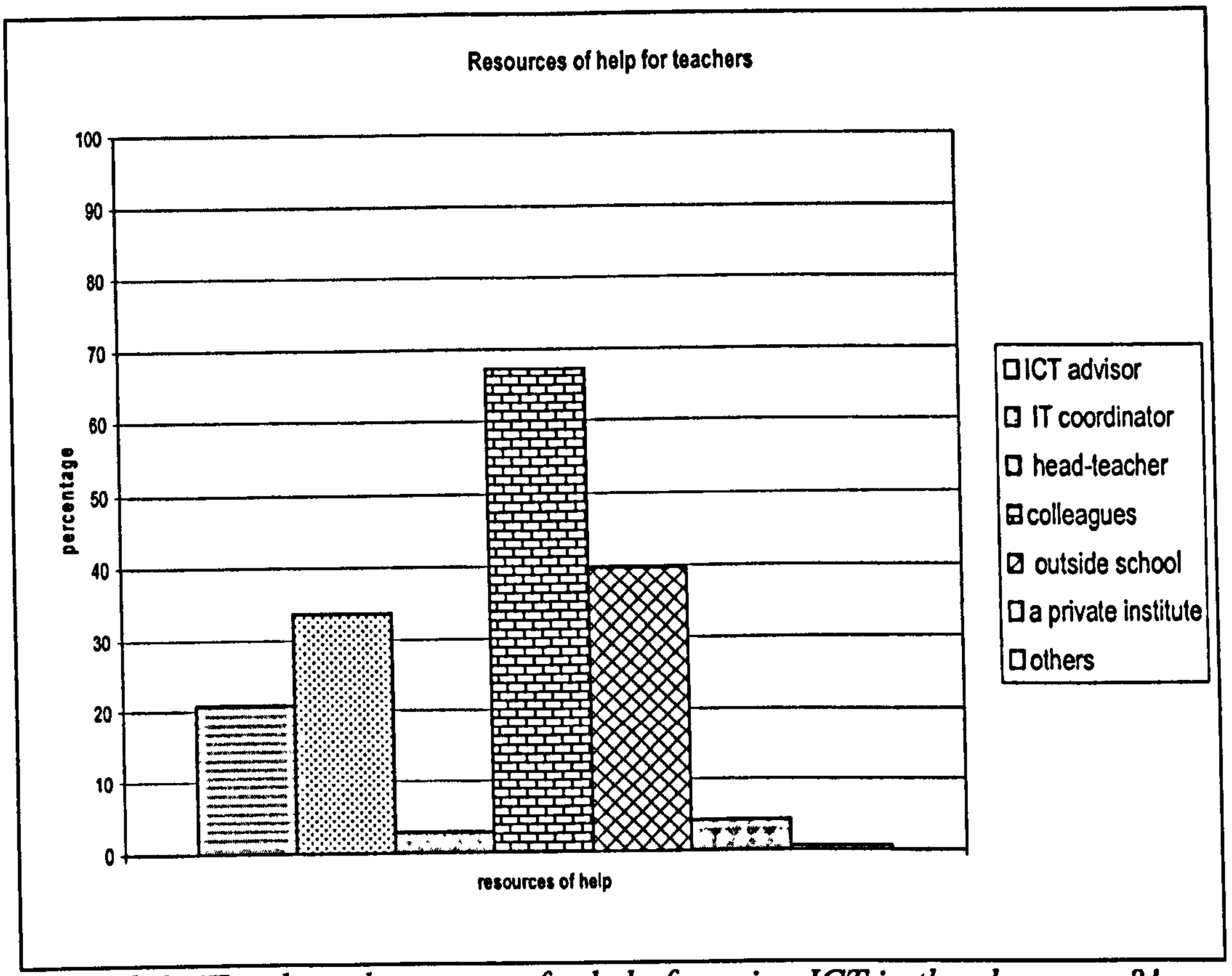
[60] Based on the data collected through the preliminary study, it was evident that the official or unofficial facilitators for embedding of ICT in schools are the ICT Coordinators and the ICT Advisors. ICT Coordinators (Συντονιστές Πληροφορικής) are educators working in the school, who may have some knowledge of new technologies and who use that to facilitate the use of ICT at the school, by helping their colleagues and solving technical problems that occur. As it will be described in a separate section of this chapter, their role in embedding ICT in schools is crucial, even though they are not officially appointed or rewarded for that. ICT Advisors (Σύμβουλοι Πληροφορικής) on the other hand, are teachers who have a specialization in new technologies, or in 'ICT in education' and thus, were officially appointed to work partly at the Ministry and the rest of the time at schools enabling ICT integration. Their role includes transferring the ICT policy of the Ministry to educators, developing material, evaluating Internet educational sites and informing teachers about these. They are also involved in the enrichment of the curriculum with the integration of goals for using ICT in subject teaching.

[61] Participants were allowed to select as many as those applicable to their case, therefore the frequencies presented are not cumulative



Graph 3. 'To whom do you turn for help for using ICT in the classroom?'

Table 17. Help for using ICT in school administration – principals

HELP FOR USING ICT IN SCHOOL ADMINISTRATION	**n**	**%**
ICT Advisors	26	49.1
MOEC	17	32.1
Educational websites	7	13.2
ICT Coordinator	31	58.5
School teachers	34	64.2
Students	4	7.5
Others	2	3.8
Missing	6	11.3

The evidence corresponding to the question 'Is there an ICT Coordinator at your school?' where 79% of the teachers answered YES was overwhelming, as ICT Coordinators are not employed by the government as such. Acting on their own will or because the principal appointed them, the individuals who undertook the role of the ICT Coordinator in the schools were found to be inherently important for the integration of ICT. Only 9% of the participants answered that there was no ICT Coordinator in the school and 6% replied that they do not know (6% did not reply). In the

same manner, a surprising 84.9% of the principals informed the study that there is an ICT Coordinator in their school, although the Ministry has not employed any the last couple of years. Of those who said that there is not anyone (13.2%) 7.6% gave a reason for that; 'no time is given by the Ministry' (3.85%), 'there is no IT specialist teacher in the school' (1.9%) and 'I haven't seen him' (1.9%).

Another question posed to teachers was 'If yes, do you think that the help you receive from him/her is important?' The highest proportion (41%) answered YES, 21% said NO, 22% did not reply and another 15% did not answer because this was not applicable to their case (1% gave invalid answer).

To the question 'Is there an ICT Advisor visiting your school?' 77% of the teachers replied positively. Only 6% replied negatively and 12% said that they are not aware of that (5% did not reply). And finally to the question 'If yes, how often does he/she offer you individual help yearly?' 65% answered 1 to 3 times. 8% said from 4 to 6 times and 1% say more than 6 times. 20% of them replied NEVER and 2% said NOT YET (assuming that they expected to receive help by the ICT Advisor during the rest of the year) 4% gave other answers ('whenever I need help', 'it depends' etc.).

In the principals' questionnaire the first question regarding ICT Advisors was 'is there an ICT Advisor visiting the school?'[62]. A very high percentage of principals (94.3%) informed the study that there were ICT Advisors visiting their schools. In addition, most of them (64.2%) reported that the ICT Advisor visits the school more than two times per year (Table 18).

[62] Question posed like this, in order to distinguish between the two types of IT related 'helpers' available to schools (since ICT Coordinator is based in the school, while ICT Advisor visits the school).

Table 18. ICT Advisor's visits to the schools - Principals

ICT ADVISOR Visiting the school				How often?				
	yes	no	NA	Once a month	More than 2 times a month	Once per year	More than 2 times per year	NA
N	50	2	1	13	1	1	34	4
%	94.3	3.8	1.9	24.5	1.9	1.9	64.2	7.5

Principals selected from a list the aspects that according to their knowledge and understanding constitute the role of ICT Advisors and ICT Coordinators. 75.5% of the participating principals agreed that one aspect of ICT Advisor's role is to inform educators about the decisions of the MOEC regarding the use of ICT in schools and 66% agreed that it is also a part of the role of the ICT Advisor to provide material to educators (for example, software). 58.8% said that the ICT Advisor has to provide technical help to the teachers and the principal and 34% that he/she has to do co-teachings and do model teaching for the teachers (Table 19). None of the principals answered that they did not know what the role of the ICT Advisor is and only 3.8% provided other aspects of ICT Advisors' role: 'presenting new programs/software', 'to exert pressure'.

Table 19. Role of ICT Advisor - Principals

ROLE OF ICT ADVISOR	**N**	**%**
Inform the educators about the Ministry's decisions about the use of ICT in schools	40	75.5
Provide material for the teachers (e.g. software/ICT handbook etc.)	35	66.0
Provide technical help to teachers and the principal	31	58.5
Do co-teaching and give examples of teaching to the teachers	18	34.0
Missing / NA	6	11.3

Similarly, 49.1% of the principals indicated that one aspect of the role of the ICT Coordinator is to inform the educators about the decisions of the Ministry regarding the use of ICT in schools (in comparison to a 75.5% of the principals who attributed this aspect to the role of the ICT Advisors

instead). Aspects of the role of ICT Coordinator within the school according to most of the principals are; 'providing technical help' (81.1%) and 'providing material to the educators' (such as software/handbook for the use of ICT) (58.5%). Fewer than half of the participants (30.2%) said that it is the role of the ICT Coordinator to do co-teachings and give examples to the teachers, possibly because they are aware that no time is allocated to ICT Coordinators or subtracted from their teaching responsibilities. Similarly to the answers given regarding the role of ICT Advisor by teachers none of the principals answered that he/she does not know what the role of the ICT Coordinator is (Table 20)[63].

Table 20. Role of ICT Coordinator - Principals

ROLE OF ICT COORDINATOR	Yes N	Yes %
Inform the educators about the Ministry's decisions about the use of ICT in schools	26	49.1
Provide material for the teachers (e.g. software/ICT handbook etc.)	31	58.5
Provide technical help to teachers and the principal	43	81.1
Do co-teaching and give examples of teaching to the teachers	16	30.2
Missing / NA	5	5.7

The role of ICT Advisors was described earlier (Chapter 2) and also in detail in the preliminary research (Hadjithoma 2003) while the importance of the ICT Coordinators' role in implementation is discussed later in this chapter.

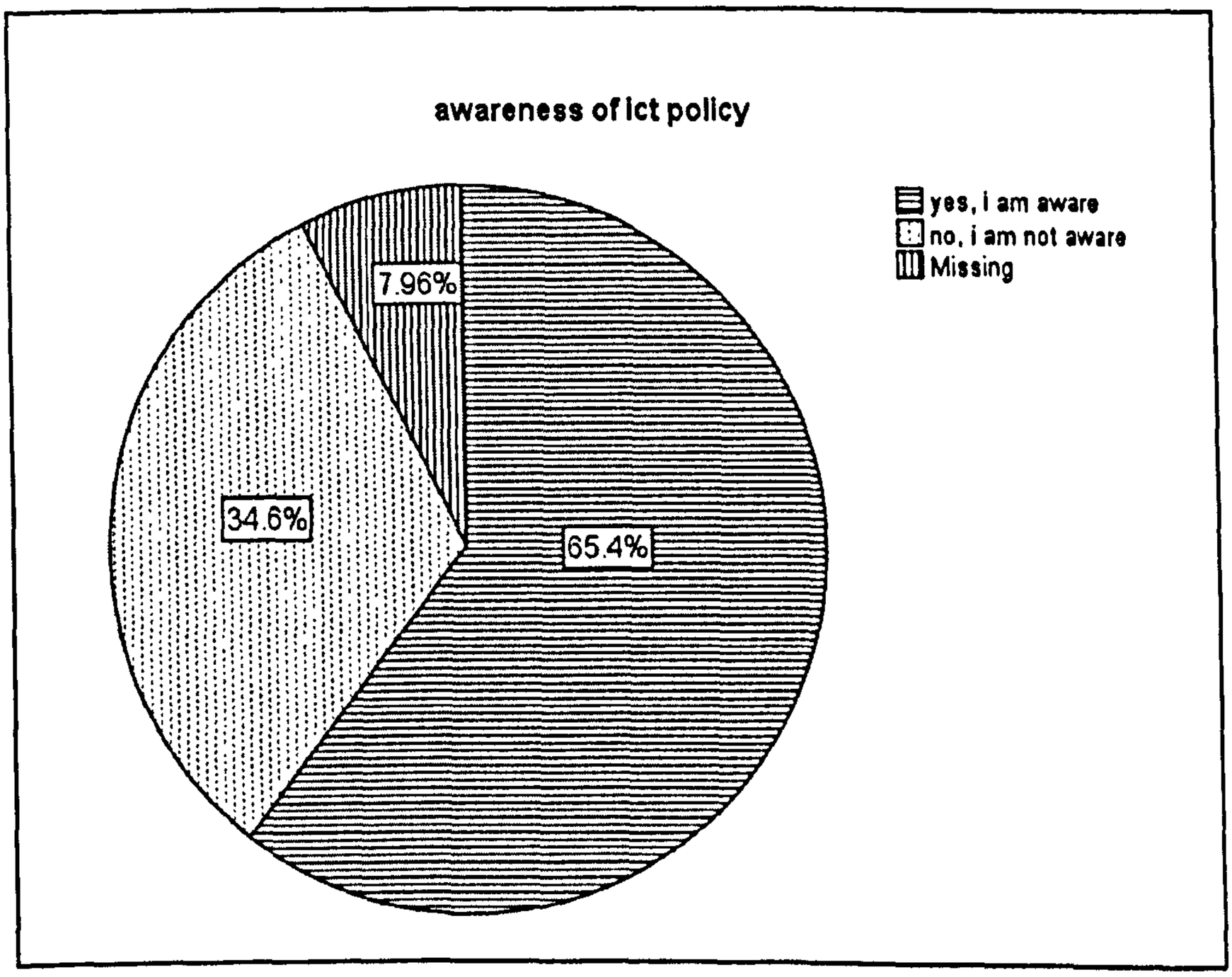
[63] Principals added some specific responsibilities that they attribute to ICT Coordinators; 'Deals with material and solves problems' and 'maintains hardware and software'.

5.3.9 ICT policy awareness

The study was concerned with the issue of awareness of the ICT policy by the educators therefore one of the questions asked; 'Are you aware of the decisions taken by the MOEC regarding the embedding of ICT in primary schools?' The results are presented in Graph 4.

The majority of the teachers replied that they were firstly informed through circular letters and secondly from colleagues and the ICT Advisors. Less often, they took this kind of information by the principal, the ICT Coordinator, and through the Internet. Those who were not informed, did not all give a reason for that but the reasons some teachers offered were the following; 'There is not information' (4.8%), 'I was not interested to find out' (1.6%), 'I am not a user of IT' (0.6%)[64].

Graph 4. ICT Policy – teachers' awareness

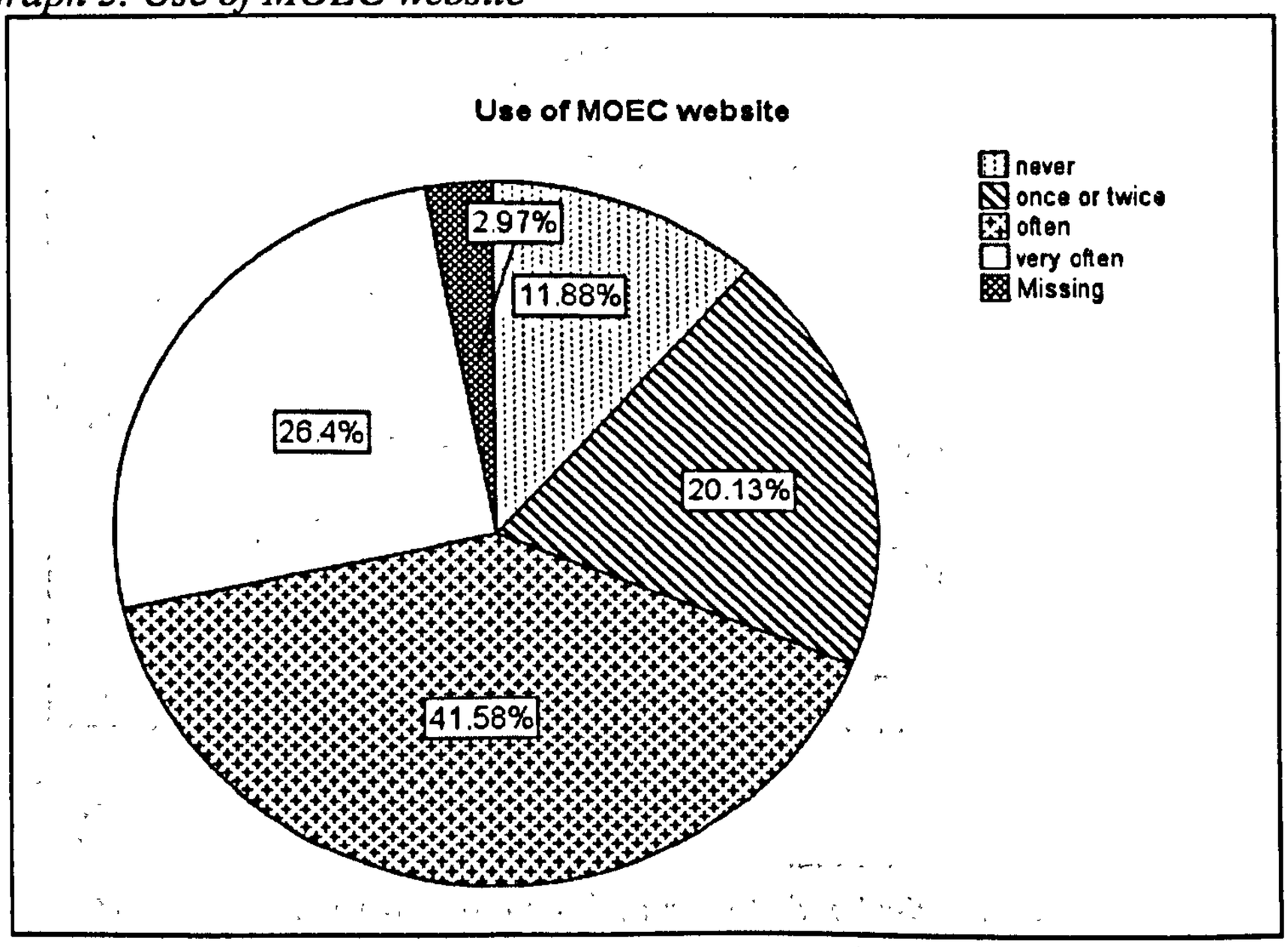


[64] **'There is no information'** includes answers such as 'circular letters are poor', 'not sufficient information', 'not updated information', 'there is no co-ordination between the Ministry, co-ordinators and pedagogical institute', 'the Ministry does not have a clear policy', 'even if someone in the school is informed, I am not informed', 'there is no specific advice'. **'I was not interested to find out'** includes answers such as 'I did not give attention to this' 'I am first year at the school' 'It is my fault because I didn't ask to find out'.

The Ministry of Education and Culture recently launched a website publicising information on educational issues, the circular letters and other useful links. The participating teachers were asked to indicate how often they use this website. The results are presented in Graph 5 indicating that most of them use this website often.

Teachers' awareness regarding the ICT policy was also scrutinized through questions such as; 'Does the Ministry send you instructions or advice on how to use ICT in teaching and learning? 36.2% replied 'yes', 29.8% 'No' and 29.5% 'I don't know' (Missing 4.5%). Of the 36.2% who knew that the MOEC sends instructions, 59.2% replied that they received these instructions in circular letters, 56.6% on the MOEC website, 69.9% orally or written by the ICT Advisor and 20.3% orally or written by the principal[65]. The information sent by the MOEC through circular letters includes general information, regarding planned training sessions or material (e.g. software or handbook on literacy with regard to the use of the Internet) that will be sent to schools[66].

Graph 5. Use of MOEC website



[65] (Important to mention is that the respondents could select more than one options for this question, that means the percentages above do not constitute the 100% of the 37.9%).
[66] (circular letters ΠΙ 7.7.09.04 23/6/06, ΠΙ, 15.2.01 16/5/05, 4.17.31.8, 15/9/04).

Teachers were not guided however, by the MOEC on how to use ICT in the classrooms, at the same time, when classrooms were equipped with ICT and thus schools developed a 'bottom-up' approach to addressing the initiative. Of those who answered that the MOEC sends instructions, (37.9%) 84.07% replied that they did follow these instructions. Of those who did not follow the instructions, only some commented on the reasons and these were the answers:

- Lack of time
- It's not easy to follow them
- I don't use computer
- They (the instructions) are not sufficient

The above findings indicate that ICT Advisors fulfil their responsibilities of transferring the MOEC policy to schools because a large number of teachers reported that they are informed about the policy through the ICT Advisors. As the preliminary study (Hadjithoma 2003) pointed out however, the work of ICT Advisors was not defined at the policy-making level, resulting in discretion being exercised by them, based on their knowledge, personal skills and attitudes which in turn influences implementation level and the way that 'ICT in education' is perceived and constructed by educators.

The most up-to-date ICT policy guidance available to teachers is a handbook titled 'Introduction of Informatics in Primary Education' and it includes the roles of people such as the ICT Coordinator, the ICT Advisor, as well as ideas regarding the way that computers can be integrated into different subjects of the national curriculum. This could be considered as a handbook for embedding ICT in classrooms similar to the other handbooks that teachers have, supplementing students' textbooks, and providing the lesson goals and plans as described in the national curriculum. This handbook was, however, distributed to schools only after the research took place (2005).

Part 1 of this chapter presented the survey findings that can be generalized to portray the way ICT are integrated into primary schools in Cyprus. The next part of Chapter 5 will enhance the survey findings using the qualitative material gathered. Subsequently Part 3 goes on further exploiting the survey data in order to identify specific variables that influence teachers' use of ICT at school.

5.4 Part 2: Elaboration on the practical issues of implementation through qualitative evidence and discussion

5.4.1 Introduction

The general picture produced through the survey indicated some issues that should be further elaborated upon, in order to better understand the way ICT are integrated in primary education. In the four schools case studies, 16 teachers were interviewed and three principals[67]. Three classroom observations took place in three of the schools and each school was paid a visit from two to four times for the purpose of data collection. The findings are presented under subsections concerning the equipment available to schools, the training of educators in ICT, the use of ICT by educators at home and at school, integration of computers and ICT in lessons, the views of educators regarding ICT in education and finally ICT facilitators at schools (including the ICT Coordinators' common characteristics).

This chapter refers to the practical issues of implementation; however, it yet does not explain the implementation process and the stages followed. This will be the aim of the next chapter on Findings.

The survey data indicated that there is diversity amongst teachers' opinion regarding the ICT level resource at their school, even though the MOEC follows a uniform national strategy for equipping schools (outlined in 'Evagoras'). The interviews aimed to explain this phenomenon, and to provide information with regard to better understanding the context and the centralized nature of the Cypriot educational system.

5.4.2 Equipment in schools

An explanation of the polarized views of educators regarding ICT resources (where almost half reported that the ICT resource level at their school is 'low /'very low' and the rest described it as 'high'/ 'very high') may be associated with the way different groups of teachers prefer to utilize ICT tools. During the interviews, some teachers explained that they prefer to use

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[67] (School A, 5 teachers and principal) (School B, 4 teachers) (School C, 3 teachers and principal) (School D, 4 teachers and principal)

the computer lab, while others prefer to use the computer in the classroom and thus would like to have more than one computers installed:

> '*I don't know if more computers can be brought into the classroom because this would help so that the level would be high; and in the classrooms too, so that more children would get help; because it is again difficult for a whole class to go down the lab.*' (School A, Interview 4, 443)

> Teacher 2: '*e...I, in the classroom, with the one computer yes, I don't have a problem, but in the lab, I have some difficulties. Because I know some things but not that well, so that I can move on ... The fact that I don't know everything so well, in order to be able to work with many children, while with some children it is easier to do that*' (School A, Interview 3, 001-042)

> '*I believe that both are useful. Yes, to have more computers in the classroom, and to have the labs as well*' (School C, Interview with principal, 334)

The level of ICT resources at each school seems to be dependant also on specific school characteristics. For instance, one of the schools case studies was used as an 'all day school' (where students stay during the afternoon, after the end of their lessons, and work in different groups, e.g. homework group, music group, computer group etc.), and for this reason, the school was equipped with technologies, as the principal explained:

> '*because of the all-day school, the technology was embedded earlier, in the afternoon school the children have the opportunity to be occupied with the computer, they are taught...*' (School D, Interview with Principal, 388)

In another school (School A) with high level of equipment according to the teachers interviewed (a school which was categorized among the High level-High use schools based on the survey results), some afternoon clubs were organized for children over 9 years old (including a club where teachers of the school taught students computer skills). Also, this school used to be in the past the 'home base' of the regional ICT Advisors (although they moved out later) which may explain the higher ICT level resource in comparison to other schools and to a longer history of the school in ICT.

Looking at the findings within context provides an explanation of the diversity in which educators describe ICT level at their school depending on their personal attitudes regarding how ICT can be used (in labs or in the classroom) and on the school tradition in ICT (base for ICT Advisors/ all-day school/afternoon clubs). Nonetheless, equipment provision to schools by the MOEC is currently homogeneous which means that in all schools there is a computer installed in all classrooms, and some extra computers are provided for computer labs in schools, where there is appropriate infrastructure for such a lab. Beyond teachers' evaluation of the school resources, principals' revelation that the biggest source of provision of equipment to the schools is the Ministry of Education and Culture (43.4% of the participating principals provided this answer to the question 'who equips school with ICT?') and the School Board[68] (32.1%) (Graph 2) delineates any possibility of big gaps between the levels of ICT resource amongst schools.

Finally, some teachers who were interviewed expressed the view that more equipment would increase its use by teachers:

> 'Q: *E... do you think that more equipment in the school leads to increased use too, by the teachers*?
> A: *Of course, if you don't have* (equipment) *you will not use, if you have one again which,... if you have one thing which is wanted by many, somehow it is limiting you from using it, if there was more equipment, it would be a motive for teachers to use it, e... not only as a motive for them, but also as a need finally; there is equipment, so you feel uncomfortable not using it when it is there; it's not an excuse, there is no excuse for not using it*' (School A, Interview 1, 202-225)

To sum up, the way teachers prefer using the available ICT (in the classroom or in the lab or both), as well as local initiatives (afternoon clubs, all-day school) are related to the perceived level of ICT resource by teachers, as the qualitative data explained.

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[68] The government allocates financial resources to the local School Boards, which in collaboration with the principal of the school manage these finances

5.4.3 Training

Moving on to another important aspect of implementation, the study draws on the interviews to clarify the survey results regarding educators' training. Although training was assumed to be important aspect for promoting implementation the survey indicated that there is no correlation between this variable and use of computer at school (see 5.4). Therefore the teachers interviewed were asked to elaborate on this issue.

At the time when the preliminary study took place, there were plans for organizing training sessions in ICT, especially for principals, however, during 2004-2005, when further study took place in schools; one of the principals mentioned that the training sessions addressing to them, do not satisfy their learning needs in terms of using ICT in the school administration and management:

> '*I dare to say straightaway, that we have not received any support from the Ministry; I believe that the principals, and the vice-principals, who are candidates to take the position of the principal, they should have received serious training in the subject, and not that, of the hurried three or four lessons that they are now doing so called for the introduction*' (School C, Interview with principal, 433)

An issue that was raised during the case studies was the availability of infrastructure in the schools in relation to the teachers' skills or knowledge to use this infrastructure. The following dialogue between two teachers who participated in an interview illustrates the weakness of the policy in terms of prioritising equipment provision and teachers' training:

> Teacher1: *First of all, their* (the Ministry's) *philosophy is for me wrong. If you see the existing models for introducing an innovation in education, we 'put the cart before the horse'. Instead of starting with the training of the staff, they wasted the millions, they brought those* (computers) *in the classrooms, and they were at the beginning a...*
> Teacher 2: *decoration*
> Teacher 1: *a decoration in the classroom; most of them didn't know how to use it and the training followed a decade after they* (computers) *were embedded. The things were done in an opposite way. Instead of convincing us first about their usefulness, that they are necessary, how to use them, they brought them and they put them into the classrooms with all the*

> *problems that occurred and now they are coming to train us ...*
> (School A, Interview 3, 193)

According to some teachers who were interviewed, the training they received was insufficient, opinion which highlights the need for more appropriate organizing of the training courses and their content, based on the needs of the targeted groups:

> '*... the training undergoing now is not... somehow training, it is teaching from scratch that means it doesn't help someone who already has some knowledge ...'* (School A, Interview 1, 174)

> '*... they start with stages which for most are already known, very very basic things....'* (School B, Interview 2, 354)

Teachers also commented on the form of the training taking place, suggesting that workshops and more practical training would be useful for them:

> '*more training and workshops ... the training to be done in the form of workshops not simply as a lecture... let's say 'I have the power point, for example, and* (they) *give me a leaflet where instructions are written.* (Instead) *I want training in a form of workshop ...'* (School D, Interview 5, 137)

> '*... instead it would be better for training to be done more practical one, to give us ideas of implementing the computer in the classroom, not general knowledge which we have'* (School B , Interview 2, 354)

The qualitative data, thus clarified that the content of the training in relation to the target group of educators is important, in order for this to be effective and useful for promoting ICT in schools.

5.4.4 Comparing the use of ICT at home and at school

Another issue that needed further amplification was teachers' experience in using ICT at school and at home. The interviews aimed to illuminate this subject with examples from practice, information also needed for describing what 'ICT in education' means in the Cypriot context. The integration of computers in lessons was enhanced not only through what the educators reported during the interviews but also through classroom observations.

It became evident through the interviews that teachers started using computers for personal purposes outside school much earlier than they started using computers at school and that exploring and practising with computer and various programs enabled them to gain knowledge and skills which in turn they may use at school.

> '*... 12 years, () since 1993, when I was still a soldier I had in my camp, a computer* (used) *for army work, I started learning since then... but I learned through the experience, and the practice with the programs'* (School A, Interview 1, 044-079)

> '*Alone; at the University,* (I learned) *the basics, ok, or even at school* (as a student) (I learned) *the most basics, mainly alone*' (School B, Interview 2, 228)

> '*e...training, I didn't receive either, I learned alone, () in America... basically I used it for the purpose of my study, e...and for the purpose of research* () (School B , Interview 1, 001, teacher 2)

> '*I went voluntarily for lessons, before they did the last series, e... but to tell you the truth, I learned limited things, if I didn't 'mess around' alone, I wouldn't learn...*' (School C, Interview 1, 002)

The gap between using computer at home and using computer at school was obvious not only through the survey but also through the interviews: 'I have been working for six years, and I haven't even started it (the computer) although I use it a lot at home' (School B, Interview 3, 025).

The following interview transcript extends the survey information regarding the ways that teachers use computer at home: for preparation of teachings, planning, looking at examples for teaching prepared by other teachers and finding information that interests them.

> '*E... I do my curriculum, e, my weekly planning on the pc, I stopped* (doing) *the written one; it is easier in ...synthesizing let's say my planning because I transfer again similar sentences, and you know, I change them and this thing is very easy, if by any chance, next year, I take the same class, I will do a very small change. I will not sit and write them from the beginning. It* (the computer) *helps me in my planning, e...it helps me in preparing sheets, in finding pictures and put, e...in finding ideas from other sheets, from other teachers through the Internet, there are many websites for educators, about educational*

programs, I get information through articles that interest me...'
(School B, Interview 3, 564)

Both principals and teachers seem to use the computer at home for schoolwork which highlights the nature of teachers' work, as one that extends from their workplace to their home environment.

Furthermore, teachers who were interviewed offered examples of lessons where computers (and Internet) were integrated.

5.4.5 Using computers in lessons

Evidently, some teachers use ICT at the end of their lessons for enhancing what they taught, while others construct the lesson around the use of it. The following quotes offer examples of use of computers and the Internet in school practice:

> '*E... in Science, for example, we could do through the ... when we had the categories of the animals, vertebrates and non-vertebrates etc. ... we could do something in PowerPoint, through the PowerPoint to use to make and project to their fellow students the various categories. Or this year, for example, within the scope of the Emotional Education*[69]*; after we talk enough with the children and we come to conclusions, they can make a story already they have done through Storybook, another program, they did a story about emotions, what it means emotional education, what it means for somebody to have emotions and feel something etc; another child within the scope of our ecological school, of which our subject is the rubbish they did a fairy tale, with... with one who is dirty, with the children who did a campaign for cleanness how the place became later, what message they gave to the people, that means wherever we can embed the computer, yes, and the same in Mathematics, the geometry shapes, the geometric bodies the 3d ones...*' (School A, Interview 2, 474)

> '*I happened to do let's say the... the Olympics. Last year. At the end of the theme, when we did* (completed) *many lessons, I did a program in the form of evaluation of that theme, and it was in Power point; it simply had questions, with three choices, and the students had to choose the right answer... there was let's say the relevant reward or the opposite, if their answer was correct, this; and it was in a form of evaluation, you could see what they learned, if they learned...* ' (School D, Interview 1, 020)

[69] (Συναισθηματική Αγωγή)

'*yes, e... in my classroom, some days ago, I was occupied in a cross-subject way, with the geometrical objects, I started in Mathematics, I used it in Arts, I used it in Gymnastics, and I thought of using it on the computers as well. While, in Mathematics, I saw the students, that they understood which is the triangle which is the square, and so on, however, to describe ... the characteristics of each shape, for example, the square, that it has four sides the same, four angles, even though they had it in front of them, they were holding square, etc. they didn't understood it so well, as when I put it for them on the computer, and they created one themselves, with their teams again, and through discussion until they made it on the computer, because their assignment was not only to create the shapes, but to write down the characteristics, each team alone... I used again Power Point, but also Word, e... ok, the auto shapes, you know to create the shapes, and to write the characteristics... it helped them a lot to understand better... because they worked together, 2, 3 teams, they saw the... they created it alone, not with pencil, it is different, because with the pencil it may be something that they already got used to it while to take the mouse, to move their hand, it was something different*' (School C, Interview 2, 479)

'*e, we do in cross-subject the transportation media, and... our goal was to organize them in a graph e, we used the program Kidspiration () em... and we put as a title, 'Transportation media, and we organized that in three teams,* (transportation media) *of the land,* (transportation media) *of the sea and* (transportation media) *of the air and...basically it was created by the children, because they know how to use it...E, it taught them to organize some... to organize specific words, for example, we can say species of flowers, they can separate now, they know how to organize... to find the categories, to organize it*' (School C, Interview 3, 095)

Below is the description of a lesson observation that includes the use of the one computer installed in a second grade class (7-8 years old students) (see also Graph 6 representing the classroom structure below). The computer was integrated at the end of the lesson, a lesson which was mostly based on the textbook and it was used to enhance students' learning of the day's learning goals. The use of observation field notes comes to support the other methods used for collecting data, and offer a complementary perspective on the information that teacher interviewees gave (Table 21, also in Appendix 10). The lesson description provides important

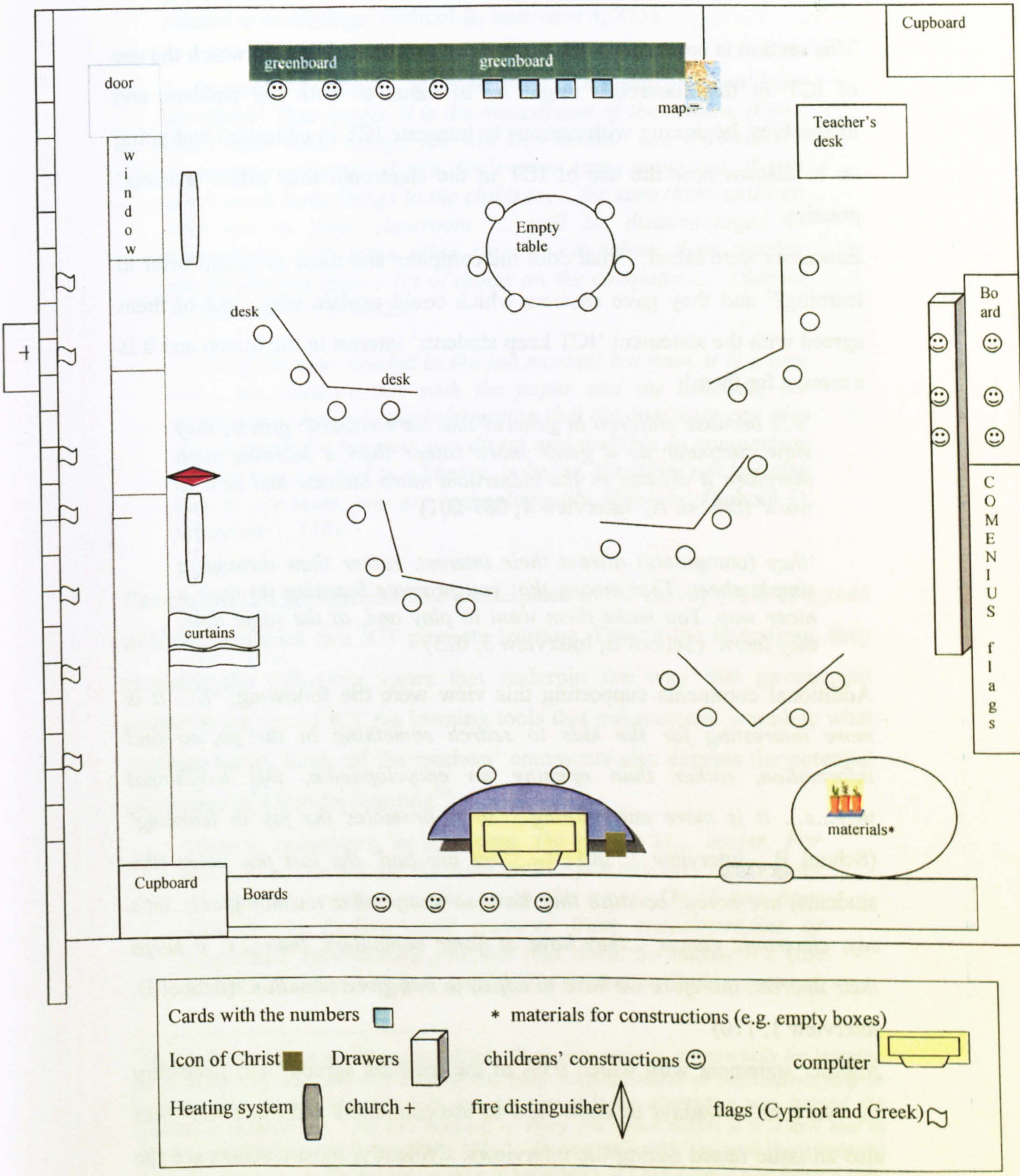
information on the way that the 'one computer' of the classroom was used, the program used and the number of students working with it.

Table 21. A classroom lesson with computers

'At the beginning of the lesson the teacher did some routine work with the students (reading from their textbooks and spelling test). At the same time, she came at the back of the class and started the computer. She was then, walking around and looking in the students' notebooks where they were writing. She returned to the computer and inputted a diskette (floppy) from a box of diskettes that she was holding, and when the spelling test finished, she asked one of the students to collect the notebooks and put them on her desk in the front of the classroom. Then she asked the students to open their reading books, cover the title and text (of that day's lesson) and to imagine a story based on the picture they could see in their books. They were raising their hands, and when given the permission by the teacher, they were telling their stories... she instructs them to have a look at the letter (in their books) and discuss with the student next to them about the important information given in that letter... Some of them looked at their pair, and they smiled happily, and not long after I could hear them talking with each other. The teacher allows them 1 minute and then she listens to their answers and writes the correct ones on the boards...Then she asks them to open their notebooks immediately and she asks them to copy the instructions from the board... Their exercise will be to write a letter about the cut to the water supply similar to the one they have in their books... 'First, however, we will all go back to the computer and I will show you something'. They gather all together, the teacher, sitting in front of the computer and the students standing around her. Three of them were still sitting at their desks and she asked them to come. Then she asked some of them to sit on their knees so that everybody could see the screen. She opened a Word document, and showed them the exercise: a letter, which they had to read in order to find and erase the words that are not needed (in terms of structure and meaning of the text). She explained to them by showing them what to do. 'You take the small mouse, you show the word and you use the little arrow to erase'. She then wrote back the word she erases, and told them that the little face would smile if they got it correct or it would look miserable if they did the exercise wrong. 'Ok, go back to your desks. The first team will now come to the computer.' A group of students goes back, two of them, girls, walk quickly and sit first at the two chairs, and the others stand, one boy on the one side the other girl on the other side. The one, who is sitting close to the mouse, uses the mouse, and she used her finger for typing. She talks more than the others, but the rest of them talk a bit as well around the computer, suggesting things to do. When they finish, the same girl who is sitting, is saving the document, and rolls down the document to find the letter for the 2nd team ...Meanwhile, the rest of the children in the classroom, work in their notebooks and the teacher goes from one desk to the other, helping them out with the work they have to do (to write a letter about a cut in water supply). She comes from time to time to the computer and she asks them to work on the document of their

team... The 2nd team stays more time at the computer, and the teacher says 'the 2nd team has 1 minute'. The girl who is standing is not giving much attention to the screen, and does not participate in the discussion... The other 3 students, read again, and the girl is wondering why the face does not change, and the boy says 'it is the teacher who will change it' and then he turns to the teacher 'Mrs. Isn't it you who is going to change the face?' she says 'yes' and comes close to them... the 2nd group finished but they come back because the girl says they should save it. She shows the icon of the floppy at the toolbar to the boy who is using the mouse and he saves it. Then the 3rd team comes to the computer, and again happens the same, the one who is sitting on the right of the computer is using the mouse...
(Observation notes, for full description see Appendix 10)

Graph 6. Representation of a classroom structure (School B)



5.4.6 Teachers views towards ICT in education

This section is concerned with teachers' views on the ways in which the use of ICT in the classroom might be of value to both the children and themselves; beginning with reasons to integrate ICT in education and going on to discuss how the use of ICT in the classroom may affect teachers' practice.

Educators were asked; 'what does the computer and these programs offer to learning?' and they gave answers which could explain why most of them agreed with the statement 'ICT keep students' interest in the lesson and it is a motive for them':

> '*e... because children in general like the electronic games, they view computer as a game more rather than a learning tool, therefore it creates in the classroom more interest and zeal to work*' (School A, Interview 1, 087-201)

> '*they* (computers) *attract their interest, rather than through a simple sheet. That means that you promote learning through a nicer way. You make them want to play and, at the same time, they learn*' (School B, Interview 3, 025)

Additional comments supporting this view were the following; '*E... it is more interesting for the kids to search something in the pc, to find information, rather than opening an encyclopaedia, this traditional way...e... it is more entertaining... so it promotes the joy in learning*' (School B , Interview 1, 001) '... *'lies are bad' the last few years* (the students) *are bored, because they have so many other technological...let's say, electronic games ...they have at home computers, their TV, it keeps their interest, therefore we have to adjust to this given situation'* (School D, Interview 1, 110)

Another statement with which 93% of the teachers agreed 'it is necessary for everyone nowadays to know how to use computers and other ICT' was also an issue raised during the interviews. Evidently, most teachers see the need for providing students with the ICT skills that they will need later in society and in their workplace. Likewise, they are aware that nowadays ICT skills constitute a new literacy:

'*E...* (she smiles) *without computer in our days* (nowadays) *you are considered* (to be) *illiterate; anything we see around us, is related to technology*' (School B, Interview 3, 275)

'*...the reality is that e... it is the 'fruit of the season', could we say* (this)*? That means, it is the mainstream of the season, if you don't know some things, you will stay behind. E... if you don't enter some websites, if you don't enter some programs, if you don't teach some things to the children..., for sure those children who are in your classroom ... will be disadvantaged in comparison with some other children, to whom their teacher maybe showed them a lot of things on the computer ...*' (School A, Interview 2 , 590-623)

'*...it will be later needed in the job market; but now, it is a new era... we couldn't stay with the paper and the textbook, the things have changed; the information that the computer can give you through the Internet, are direct and multiple in comparison to what you can find in a library, in books, therefore not knowing how to use them, you are technologically illiterate*' (School D, Interview 1, 110)

The majority of the teachers who participated in the survey (78.3%) agreed with the statement that ICT promote learning. During the interviews, they provided the following views that underpin the way that government promotes the use of ICT (as learning tools that enhance and complete what students learn). Some of the teachers' comments also express the potential of Internet as a tool for learning[70]:

'*Simply, sometimes, at any time, the access is... easier. For example,... you missed the news on TV; you can very easily enter* (start) *the... computer and go to the news. Or if you have difficulty in finding some pictures from encyclopaedias or magazines, immediately you will find them. So maybe it's* (the computer) *more handy... maybe it's easier in finding sources,*

[70] Additional comment related to this subject: '*Sure, they promote it, especially the learning as we previously said, through existing electronic encyclopaedias or the Internet help in learning, and in teaching they help too, because it is an alternative way beyond the traditional methods, or... the new methods of every era which occur, it is a new tool in learning*' (School A, Interview 1, 251 - 283) '*... For example, let's say, now they* (students) *learn the rectangle, or the national anthem in geography, if I had I could also bring a tape, let's say; the accession to some things is easier, or through the Internet to get information about something, how will you collect that* (information) *in a different way? It is an easy access to a lot of data, which maybe the educator would not have to, would not have to devote so much time to find, but because there is, let's describe it as easy solution, it offers something more to the students'* (School A, Interview 1, 087 - 201)

and (it is) *more complementary and it may do some things* (look) *more alive I think; it's not that it will show you new knowledge, rather than complete the knowledge you want, faster*' (School B , Interview 3, 528)

Alongside the above discussion the interviewees were asked to provide 'an example which shows that the computer helped the students to learn something which they wouldn't learn without it'. A general impression drawn upon their answers is that beyond computer skills there is nothing that students would not learn without the presence of the computer. Instead, teachers provided their views on the usefulness of computers, emphasizing however, how important the guidance of the teacher is, and the relation that exists between students and teachers, including personal contact:

'*...the human factor is necessary in the transfer of knowledge; simply it is a tool that helps their work. I do not consider it as a substitute*' (School C, Interview 2, 716)

'*... it brings students closer to technology... it makes them use new media of learning, beyond the traditional teacher, so, the computer can play the role of the teacher sometimes, it will not replace him, the children can learn alone too, if they learn how* (emphasis) *to learn and how to use the computer, they can learn many things alone. For sure the relation that is present between the teacher and the student will still be there, somebody sitting in front of a machine let's say, is different from having the teacher, but sometimes that* (computer) *is needed'... if the student does not comprehend something, ok, you will tell me that there is 'help' in the computer to search and find e... it is different to communicate with someone face to face, even over the phone; it 's one thing to have somebody in front of you and talking to* (him) *and over the phone, so you talk about a device which doesn't have neither emotions, nor...it's finally a cold device ...it is like talking to the wall*' (School A, Interview 1, 251-283)

'*e, the student has a teacher opposite him, first of all* (he) *communicates, ok? Because you can also communicate through the computer but it is a different, a different kind of communication, it is a different relation; there, there is a personal contact, very important thing*' (School A, Interview 2, 625)

The discussion was extended during the interviews encouraging teachers to reflect on the impact of computers on teaching and learning, illustrating once more, that the way teachers' view ICT is identical to the way that the

MOEC looks at them, as learning tools that enhance and reinforce what is taught. This example highlights the homogeneity of the system as reflected on educators' views in connection with the government's policies. In addition, the transcripts presented below illustrate the influence of the government's appointed facilitators in schools (ICT Advisors) and their success in transferring the MOEC ICT policies and views.

> '*I believe that the computer enhances the teaching, is not clearly a teaching medium, but it comes to help the student, as well as the teacher, to enhance, ok? With picture now, because one picture is equal with a thousand words, it comes to enhance what the student learned, practically now, visually e... creatively, it comes to support teaching*' (School A, Interview 2, 492-507)

The teachers were also asked, if the computer makes them more creative in their work, and some of them referred to getting creative ideas from the Internet. One of them however, argued:

> '*it may help you being creative, to give you ideas, but I think creativity it may be something that I think comes from you, that means, you are creative, and with the pc, e... you implement your creativity, for example, if you have an idea to do creative exercise, you will do it with the computer, without doing it by hand, let's say. Not necessarily, ... it* (the computer) *will give you ideas, but more than that, creativity is a matter for the individual; and the way you will use it, it is a matter of creativity, for example, an exercise that one could do in one way, someone else can use it in a different way on the pc, exactly the same* (exercise)' (School B, Interview 3, 001b)

The views expressed by teachers regarding the use of ICT in education indicate that teachers have already been developing specific attitudes in agreement with the philosophy underlying primary schooling. Thus, while they see the importance of providing students with ICT skills and notice the potential of ICT for enhancing teaching and learning, they report that teacher's role remains important for students' learning and socializing.

5.4.7 ICT facilitators at school

In this section there is some information regarding ICT facilitators at the school. This was one of the themes that emerged and which needed further

clarification, as the survey results did not explain the presence of ICT Coordinators in schools while the MOEC did not appoint any.

The survey surprisingly indicated that although the MOEC did not employ any ICT Coordinators during the years that the research took place, there are such individuals in the majority of the participating schools. Moreover, the survey indicated that there seems to be an overall agreement amongst the principals that the role of ICT Advisor is the one of transferring the policy decisions to schools and creating helpful material and distributing it to the teachers, at the same time, as providing technical help. However, ICT Advisors do not visit the schools very often; as a consequence, the ICT Coordinators are those who mostly provide technical help, as their presence at the school at all times allows for that, rather than informing the educators about the Ministry's policies. The role of both ICT Coordinators and ICT Advisors was therefore an issue to be revisited, during the case studies and the interviews aimed to identify the motives behind ICT Coordinators' work as such, as well as their role in implementation. The role of ICT Advisor was also documented through the survey and reemerged during the case studies.

The analysis of the interviews and the observations in the schools where there was an ICT Coordinator led to the identification of some common characteristics between the participating ICT Coordinators. These in turn, indicated that there may be a connection between these features and the characteristics of 'champions' as these appear in the existing literature, and therefore they may have a promoting role for the new structure (ICT). At the same time, however, the role of ICT Coordinators could also be the one of IT manager within the school and as a result, having a role of enabling only the use of ICT in the school, rather than promoting it. This issue is discussed in the next chapter, as one of the implementation activities arising within the schools and influencing the implementation process.

5.4.8 Explaining diversity in implementation -Teachers' characteristics

A main assumption of the study was that the degree of implementation would be homogeneous in all the participating schools, as a result of the

centralization of the system; however, the survey produced results that show diversity from one school to another. Therefore the use of interviews and classroom/school observations aimed to explain this phenomenon through more in depth data. In this examination, the teacher culture[71] is considered as an important characteristic of the specific context, and was assumed to be one of the influences on implementation. Based on the survey results the study was informed that the majority of educators are young (less than 40 years old). This could mean that the teachers who currently work in schools received pre-service training in the last few decades and thus they are informed about the modern theories on teaching and learning. Teachers interviewed reported using collaborative, explorative approaches to learning, and they appeared to have constructivist beliefs regarding learning:

> '*... at school, what I do consider, is that I want the kids to learn, and to research...*' (School C, Interview 1, 293)
> '*...now the learning becomes more as it should, child-centred and not teacher-centred. The role of the teacher, is not marginalized; the teacher is not set aside, simply e... the role of the child, for me the role of the child is more important, for learning, the child to learn how to learn, not to offer it (the child), ready-made knowledge*' (School B, Interview 1a, 180)
> '*...the children can learn alone too, if they learn* ***how*** (emphasis) *to learn and how to use the computer, they can learn many things alone..*' (School A, Interview 1, 251) (See also classroom observation, Appendix 10).

Having modern approaches to learning may possibly mean that teachers would more easily accept using computers and other ICT to make the lesson more child-centred, collaborative and exploratory:

> '*I decided,* (that we) *do a book ourselves, to follow all the stages, for example, 'how do I think of the heroes* (of the book)*', 'how will I do the chapters', ... and the teams were occupied with this thing, and then they came to the computers, we divided, on purpose we did six teams, so six chapters, and they came* (to the computers)*, they found the pictures, and they wrote paragraphs underneath...*' (School C, Interview 1, 036)
> '*...we also used it for communication purpose, because we are in a school which is in a European program, Comenius, it was related to exchange of information with other... other schools...*'

[71] This includes teachers' pre-service training, their socio-economic status and the characteristics of their profession (e.g. opportunities for promotion)

(School B, Interview 1b,001) (See also examples of lessons above and lesson observation)

Another part of teachers' culture relates to the status of teaching profession in the Cypriot society. The existing literature on Cypriot teachers' profile (Chapter 2) suggests that there are a number of teachers who choose this profession based on extrinsic motives (related to good salary/holiday/hours of work) which is assumed to have an impact on educators' involvement in implementation. The interviews thus aimed to gather information on the reasons behind teachers' choice of this profession. In agreement with the literature, some teachers provided intrinsic motives for initially choosing to become teachers: '*I always wanted to become an educator, it was a an 'operation' which I always wanted to do, that is why it was one of my first choices, and when I didn't pass* (the exams) *the first year, I aimed for that the 2nd year too, e... during which I succeeded anyway;*' (School A, Interview 2, 419-473) while others provided extrinsic motives, such as the good working times or the pressure they had by family, in order to choose this profession:

> '*...it was a sure profession at that time,* (he means that a work position was guaranteed) *not like today, that, ok, you have to wait for many years, e... I didn't want to go abroad in order to study, therefore it was a good solution, a sure job, good times* (of work), *good holidays, and since I didn't have problem with kids I think that it's a good choice...*' (School A, Interview 1, 044-079).
> '*Basically, at the age of 17, when I finished school, my opinion is that you are not mature enough to take decision, I was influenced by my parents, although I wanted to follow another profession; e, because of the salary, the vacations, you laugh, but this is how things are* (he laughs)' (School A, Interview 3, 001-042).

This evidence could partly explain why ICT use has not yet become an institutionalized school practice, bearing in mind that the implementation of ICT was non coercive. The fact that some teachers may have preferred their profession based on extrinsic motives may possibly imply that without such motives (extra reward/payment) they would not get involved in implementing optional initiatives, therefore this may have been an impediment to integrating ICT in their practices.

5.5 Part 3: Factors that influence teachers' uptake in the classroom – Discussion

5.5.1 Introduction

The scrutiny of the survey data was extended to identify the factors related to the use of ICT by educators at school, as this is a major part of implementation and has previously been examined by other studies (see Chapter 1). Making use of the teachers' data available through the survey, correlations (Chi Square tests for continuous and ordinal variables) were run between the variable 'use of computer at school' and all possible variables, in order to identify those of them that may influence teachers in using ICT at school. Not assuming a linear relationship between the variables the use of Chi Square test was the most appropriate in this case. In order to deal with variables the categories of which constituted of a small number, such categories were first grouped together and then the recoded variables were used in the cross tabulations. The variable 'use of computer at school' consisted of 5 categories (about daily, about weekly, about monthly, about every trimester, never), where the last two categories included small numbers of cases which in turn returned an invalid chi-square result. Therefore these categories were regrouped into only two categories (a) about daily or about weekly and b) about monthly, about every trimester or never. The same procedure was followed for other variables where small numbers required regrouping. The factors that were found to be significant can be categorized into personal factors, professional/organizational factors, and institutional factors (see Table 22) based on previous research on this subject (e.g. Eteokleous 2004). The results were then enhanced with the qualitative data.

Employing the theory on teachers' work (street-level bureaucracy theory) can be useful in understanding the factors (especially the professional factors) that were found to have a relationship with computer use in the classroom. Case studies offered more in depth information in relation to the factors that influence the use of computers by teachers at school; teachers interviewed reported different reasons to explain these factors.

5.5.1.1 Personal factors

Personal factors include those variables related to teachers' personal capabilities. Questions posed in the teachers' questionnaire relevant to this type of factors were their age[72], gender, years of work, experience in using ICT (years of using computers in teaching and learning, use of IT in previous school, self evaluation as a computer user, training in ICT), beliefs regarding new technologies and education, and attitudes towards the use of ICT at school[73].

The following variables were significant (at the levels of significance .05 or 0.1) in relation to use of computer at school:

'*Self-evaluation as a user of computer*' (not confident/developing confidence, confident, very confident) ($p<.05$, $df=3$, $X^2=21.512$) and

'*Use of computer at home*' (daily/weekly/monthly/every trimester/never) ($p < .05$, $df = 1$, $X^2 = 7.070$).

Confidence in using ICT is one of the factors that emerged both through the survey and the case studies. Although the correlation is not indicative of the strength or the kind of relationship, it can be assumed based on the interviews with educators that the more confident they feel, the more possibilities there are that they will start using computer in the classroom.

Similarly, the use of computer at home may be assumed to have a positive relation to using computers (and other ICT) at school, as the interviewees indicated that time to explore the hardware and software is important for them to gain confidence and to start using ICT at school. At the same time, it was assumed that self-confidence may have also a relationship with computer use at home, and another chi-square test was performed resulting to a significant relationship ($p < .01$, $df = 1$, $X^2 = 18.693$). In order to check for the interrelation of all three variables a test was performed between 'use of computer at school'; and 'self-evaluation as computer user' (confidence) with the variable 'use of computer at home' layered out, and indicated that

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[72] Although age cannot be used to produce generalizable results since the mature teachers (over 41 years old) were underrepresented in the survey as was presented earlier, the test included this variable in order to identify any possible impact.

[73] Where attitudes are opinions that are not settled and can be changed, while beliefs are settled opinions that are reflected in a specific behavior.

there is still a significant relationship between the first two variables. The same test was performed between 'use of computer at school' and 'use of computer at home', layering out 'self-evaluation' and confirmed that each of the variables 'self-evaluation as a user' and 'use of computer at home' have a statistically significant relationship with the 'use of computer at school', as well as between them.

A qualitative inquiry through interviews illustrated teachers' perspectives on what makes them feel confident in using ICT:

> '*E... that... I know many things, especially in the programs that the children will use, the programs that I don't know that well, I wouldn't use them, if I wouldn't be sure; when I have confidence that I know something well,* (then) *I will teach it'* (School C, Interview 2, 411).

Also, having time to explore computer and software; '*...A lot of time of exploration of the computer, makes me feel comfortable ...*' (School C, Interview 1, 002), being technically skilled '*I can say that I feel very confident, the only which makes it very difficult for me, very difficult, is the technical foundation...*' (School A, Interview 2, 419 –473), and preparation of the use of ICT in the lesson beforehand '*... to be well prepared for the ... how they will embed it in their lesson, it must be planned beforehand ...*' (School A, Interview 1, 079 – 086) are some of the ways in which teacher interviewees demonstrated as those that enable them to develop confidence in order to start using computers in the classroom.

Another suggestion for developing confidence, by a teacher was the following:

> '*... e... I would like to watch some other lessons, for taking at least some ideas, and to see that they can be implemented, this is the first;...**So, I want to see for sure, some lessons which have something creative, and that the computer is integrated...***'
> (School B, Interview 3, 449, emphasis is mine)

Finally, teachers think that more training would be useful. However, they require training that will enable them to integrate ICT in teaching rather than training in basic skills that most of them have received (see section on training).

Experience in using ICT thus appears to be one of the major factors influencing teachers' use of ICT at school. Time to 'play' with the available equipment is a viable way of engaging educators with using ICT more broadly.

Beliefs about/attitudes towards ICT

One question included statements that teachers were asked to select if they agreed:

Which of the statements below reflect your views about new technologies and education?
They are useful for keeping students' interest in the lesson and as a motive for them
To keep students quiet and occupied
It is necessary for everyone nowadays to know how to use computers and other ICT
They promote learning
They help me in teaching
I don't know if they are useful in teaching and learning
They are not useful at all

Each of the above statements was separately analysed (in the correlation tests) and the following were found to have significant relations with the variable 'use of ICT at school':

'*ICT help me in teaching*' ($p < .01$, $df = 1$, $X^2 = 11.320$)

'*I don't know if they (ICT) are useful in teaching and learning*' ($p < .01$, $df = 1$, $X^2 = 12.168$)

The first statement could be explained in relation to the characteristics of teachers' work, assuming that the lack of time/information/resources forces teachers to make use of utility maximized choices, based on their own perceptions and calculations regarding employing teaching and learning tools. Therefore the use of tools, such as ICT, will be adopted by teachers, if they think that these will enhance their work, helping them in teaching.

The second statement may relate to the feeling of uncertainty that teachers possibly have due to lack of evidence or knowledge regarding the influence

or impact of ICT on teaching and learning; this uncertainty may act as a negative influence on teachers using a tool, without knowing what impact it may have on students' learning. The statement '*I don't know if they (ICT) are useful in teaching and learning*' may thus be assumed to negatively relate to the use of computer in the classroom.

5.5.1.2 Professional/organizational factors

Professional factors are considered to be those which are related to the teachers' professional environment, their work environment and the characteristics of the schools (organizations) where they work. The following were found significant in terms of their relationship to the variable 'use of computer at school':

Having own class or teaching various classes ($p < .05$, $df = 1$, $X^2 = 7.080$)

Use of computer lab (yes/no/there is no computer lab): ($p < .05$, $df = 2$, $X^2 = 23.880$)

Use of software (yes/no): ($p < .01$, $df = 1$, $X^2 = 13.987$)

Evaluation of help by ICT Coordinator (yes, it is important help/ no it is not important help) ($p < .05$, $df = 1$, $X^2 = 4.20$)

Having own class or not, may be related to the heavy workloads teachers have to deal with (if having responsibility of own class).

The presence of computer labs in the schools and use of software relate to resources available to them which influence their work performance and provision of services. High ICT resource level at the school was a factor that in the first instance would be expected to lead to use of computers by teachers (as reported by other studies, see Becker and Ravitz 2001). However, although teachers indicated their preference in relation to using computers in the classroom or in the computer lab, they seemed not yet to have been convinced of the usefulness of 'the one computer in the

classroom'. Evidently, having only one computer in the classroom (as was the situation when the research took place) creates a situation where either the students who usually finish their assignments first are the ones who are using the computer as a reward for completing their assignments:

> '*e, there are two or three children maximum on the computer, who are usually the children who finish their assignments... but I think... as I told you before...that it* (the one computer) *is not offered that much, the problems that I face are that... usually the same students finish first and sit on the computer, e, the others are in a hurry too, having as a goal to finish too, they do superficial assignments for me, therefore...*' (School C, Interview 2, 518)

Alternatively, students are organized in teams and each team works on the computer in turn at different times/lessons '*it requires good preparation to organize teams, because we have only one computer, it is not very convenient. If I had three or four* (computers) *or a computer room, then for sure, it would be more useful*' (School B, Interview 3, 449). Although teachers attended training in ICT it is apparent that they have not been specifically guided as to how they can use 'the one computer in the classroom' beyond the two methods presented above which appear to be the most popular amongst teachers. As a teacher argued:

> '*... first of all, nobody showed to the teacher, how to use the one* (computer) *in the classroom; very important, that means the teachers may have skills, most of them have, I will not say all, we* ***have all been trained now, but the issue is how to take advantage of the one*** **(computer),** ***not only to have skills, but also how to integrate it in your lesson;*** *this is the problem, nobody showed to the colleagues how to integrate it, this is the problem*' (School A, Interview 3, 100, emphasis is mine)

In relation to the software, teachers reported during the interviews, that because some of the software is in English, the students have difficulties using it.

> '*Greek software which unfortunately doesn't exist, most of it is in English ...we have problem, because the kids are young, they don't know English so well to be able to use a program*' (School A, Interview 3, 100)

> '*...for the first grade there is only Kidspiration* (software title), *and I do not consider it completely, e... I do not consider it completely relevant; first of all, it is in English, first, they hear the sound in English, what the kid should do with it in English? ...the instructions and everything is in English, so the teacher should be above,* (close to the students) *that's why I tell you... things int...intangible...'* (School D, Interview 2, 332)

Similarly, lack of use of ICT amongst the teachers of younger classes was often associated by the interviewees with practical difficulties which younger students face, such as the use of keyboards, especially in schools where children face other learning difficulties:

> '*In the first grade, we have the problem that they cannot use the keyboard, they have difficulty, the kids, they are lost in that keyboard, the keyboard is not acceptable for the first grade, I think. If you think, that we have a big number* (of students) *with learning difficulties, a kid that sees a four-syllable word, and he sees it as a mountain, to put him in front of the keyboard, that has 200 symbols and letters on it, it is not acceptable...'* (School D, Interview 2)

The data collected through the case studies also supports the view that some school-specific characteristics, such as the low socio-economic level of students or the presence of students with learning or other problems in the school may determine the level of use of ICT by educators.

> '*because of special circumstances because we talk about children with special...these I cannot say that I use the computer that much'* (School D, Interview 2, 238)

> *'unfortunately, I see it also from the perspective of the financial factor, in the family, that the children who face financial problems or even they are in a medium to low financial situation, do not have computers at home, therefore you have to start from the beginning ()'* (School C, Interview 2, 660).

This effect, however, appears to be minor (as in one of school case-studies with low socio-economic situation for students the level of use of ICT at

school was high since more than 50% of the teachers used ICT daily/weekly although lower than the other schools case studies).[74]

Finally, the presence of an ICT Coordinator and more specifically his/her role in enabling ICT integration for their colleagues within the school is an important factor for teachers' use of ICT at school as presented through the correlation tests and confirmed also by the case studies. What the survey indicated was that the kind of help (the way teachers evaluated the ICT Coordinator's help) was the important aspect of his/her role, rather than just their presence in the school, and this was clarified through the examination of the data (quantitative and qualitative) available regarding ICT Coordinators in terms of identifying these individuals as 'champions' (leaders) or managers. The findings on this subject are presented later on.

5.5.1.3 Institutional factors

Institutional factors are those related to policy-making and policy distribution, and in general to the broader (educational) system, and thus ways of transferring policy decision to educators (in this case through the MOEC website and ICT Advisors visiting the schools) or offering guidance and directions on ways of using the computer in teaching and learning (IT committee website), are proved to be influential factors to teachers' uptake of ICT in the classroom. The following variables were found to have significant relationship with the variable 'use of computer at school'.

Use of MOEC website (never/once or twice/often/very often): ($p < .01$, $df = 3$, $X^2 = 25.034$)

Using (Klimakio) IT Committee website (never/once or twice/often/very often): ($p =< .05$, $df = 3$, $X^2 = 15.216$)

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[74] In addition, the categorization of the schools based on the survey data showed that participating schools with student population with low socio-economic level appear to have high ICT use by teachers at school.

ICT Advisor for the school (yes there is / no there isn't / I don't know) ($p < .01$, $df = 2$, $X^2 = 13.022$)

An ICT Advisor visiting the school (as a Ministry representative) may indicate the presence and development of a relationship between the Ministry and its employees in schools, a factor which is expected to encourage and reinforce teachers' implementation of the Ministry's policies, including the ICT policy. This factor may also be explained in relation to the role of the ICT Advisor's in schools, beyond transferring the ministerial policy which includes offering guidance and directions on how ICT can be embedded.

During the interviews, some other obstacles were reported by the teachers as constraints to their use of ICT, such as the lack of time, lack of materials/resources, the content-oriented system, the inspection system for their evaluation and the curriculum-driven school practice tradition:

> *'... the inspectors come and 'why are you in this text and you are not in the other?' 'Why did you do the 3rd and you didn't work with the 2nd?' Even though everybody tell us that our system is not content-oriented there is always this pressure 'why are you here and not further down'* (he means in the textbooks) *e, because it takes time to prepare them, as well as teach them, somehow, it* (the computer) *is not used as it should be used'* (School A, Interview 3, 026-060)

> *'and to tell you something? I feel the pressure of the content I feel that... because it* (the computer) *is something complementary something that it is... that means, there are so many things that...you must emphasize, I think that in order for this to be done, there must be less content, the unloading of the content, so that they have more time for this, to play, to enhance; the computer is not a waste of time, even if they spent half an hour during the first times, to learn it, it is not waste of time, but afterwards the inspector will come ...in order to do these things, it means that you will take some things out...that's how I feel...'* (School D, Interview 2, 285)

The barriers reported above could be described as system-specific characteristics (that characterize the whole educational system rather than individual schools) as there is one national curriculum and country-wide

rules and regulations for primary schools in Cyprus. These characteristics can be related to street-level-bureaucracy theory.

The findings presented in this chapter (Parts 1-3) are summarized and implications for policy-makers and practitioners are presented below.

Table 22. Correlation test results for the variable 'use of computer at school' with various significant factors

Factors	X^2	df	p
Self-evaluation as a computer user	21.512	3	.000
Use of computer at home	7.070	1	.008
Use of MOEC website	25.034	3	.000
'I don't know if they (ICT) are useful or not'	12.168	1	.000
Teaching own class or not	7.080	1	.008
Use of computer lab	23.880	2	.000
Use of software	13.987	1	.000
They (ICT) help me in teaching	11.320	1	.001
Evaluation of help by ICT Coordinator (important/not important)	4.207	1	.040
Use of IT Committee (Klimakio) website	15.216	3	.002
ICT Advisor at the school	13.022	2	.001

5.6 Summary of the findings (Chapter 5) and implications

As described in the literature review (Chapter 2), the Cypriot Ministry of Education and Culture (MOEC) embedded computers in primary schools as another learning tool. ICT Advisors, teachers with knowledge/skills in using ICT, were employed to undertake implementation of an action plan described in the document 'Evagoras'. This was authored, as described in Chapter 2, by a group of people who were involved in decision-making and policy implementation (some of them ICT Advisors) and it included information on the budget and the timelines in which computers, Internet and other ICT (e.g. web cameras) would be integrated in primary schools during the period from 2000 to 2005. 'Evagoras' also referred to the renovation of the curriculum and the team of people who would be involved in coordinating the implementation (ICT regional Advisors). The action plan in 'Evagoras' document was one of the policy discourses that guided implementation. Therefore some aspects outlined in the action plan, were also explored through this study.

The general picture provided in Chapter 5 on the Findings, offers evidence for evaluating the implementation of ICT integration in schools. The evidence was gathered with a long scale survey, interviews, informal (school), and formal (classroom) observations. The response rate to the survey was 76.8% from schools, and 35.8% from individual teachers. The response rate from principals was 73.9% and two principals were interviewed over the telephone[75]. The survey data were representative of the teacher population in terms of gender, although in terms of age the group of mature teachers (over 41 years old) was underrepresented. The four schools case studies were selected based on various criteria; they were thus representative, in terms of contextual characteristics such as location (urban/rural), socio-economic level of student population (low/medium/high) and they were in three different educational districts in Cyprus (Lefkosia, Lemesos, Larnaca). The four categories relating to the variables 'ICT use at school'- 'ICT resource level' that emerged from the

[75] (based on the principal's questionnaire)

survey analysis were not all represented, however three schools were selected from the category 'High ICT use'-'High ICT resource level' in which this study was most interested in (looking at cases where some implementation actually does take place). The fourth school was in the category 'High ICT use – Low ICT recourse level'. The four schools selected for the case studies were visited from two to four times, and interviews with at least four educators (teachers/ principals) took place, as well as observations. The data gathered for this study were triangulated through the use of various research methods and their interpretation was linked to the theoretical framework of the study.

The findings are summarized and implications are discussed below under subsections relating to the main issues presented in Part 1 through quantitative data and in Part 3 through qualitative data; ICT policy and integration of ICT in the curriculum, educators' experience in using ICT, use of ICT in school practices, ICT resource level (hardware/software), and finally, the role of ICT facilitators and the delivery of ICT policy decisions.

5.6.1 Embedding of ICT and curriculum change

With regard to the integration of ICT in the curriculum the findings indicate that ICT have been integrated only partly into the curriculum for primary education which resulted to creating gaps in the implementation. While the educational system appears to be curriculum driven, ICT was introduced to schools before the procedures for including learning activities with ICT in the curricula were completed. A part of the existing curricula for some subjects (Greek, Mathematics) was enriched with learning goals and activities that involve the use of computer (ICT). These changes were not been made available to teachers up until the time that this research took place and consequently educators appear to have little guidance with regard to how ICT tools fit into their classroom practice. This is reflected in the findings which suggest that during the implementation period of 'Evagoras' (2000-2005) implementation was general and was mostly based on the personal agency of the people involved, especially the ICT Advisors, the ICT Coordinators and the principals. The general character of 'Evagoras'

and the absence of specific guidance to educators generated in the implementation field various responses based on individuals' personal experience, knowledge, skills and personality. Educators sporadically adopted ICT to complement or enhance teaching and one of the reasons for that, is the lack of goals and guidance (related to the renovation of the curriculum) and the content of the training they have received up to date. Guidance is required on behalf of the MOEC in terms of how 'the one computer' (or the two/three computers in the near future) that teachers have in their classrooms can be employed in teaching and learning. There appears thus the need for informing teachers' practice, through the curriculum, as well as through training.

Moreover, the survey results indicate that ICT are not utilized for enhancing educators' work. Although it is important to mention that using ICT at home for preparation for the school work is something that the majority of the participating teachers reported doing, currently, only 28% of the teachers who participated in the survey agreed with the statement 'ICT enhance my role as a teacher'. The profile of teachers that was created through the interviews can explain why few teachers believe that ICT enhance their role; around 80% of them are young (under 40 years old), and many of them referred to modern learning theories and methods, such as constructivism, collaborative learning, explorative and joyful learning, team working which they do employ in their lessons, independently from using ICT. This indicates that new teachers bring with them new ideas and knowledge of modern teaching and learning methods, and if they are allowed so and not prevented by factors related to the system or other, they do use them in their classrooms. ICT, on the other hand, are currently new tool in the classroom in the use of which teachers have received very little cognitive and practical training; they are thus something that will add workload and require them to learn new skills and knowledge and, as a result, increase their already heavy responsibilities. However, participating educators do realize some of the potential of ICT to enable changes towards a more student-centred learning situation, and a more visual classroom environment similar to the one that students live in outside the school (Goodwyn 2000, Kress 2000, Jewitt

2003). This has important implications for policy-making in terms of using the potential of ICT on one hand to support young teachers' modern teaching methods to transform their work, and on the other hand to provide them the pre-service they need for this purpose. This training could also involve enhancing teachers' learning of subject knowledge, as Interactive Education findings suggest (during the IE project, teachers 'embraced learning for themselves and used ICT tools to transform their own knowledge of their subject areas and develop, expand and adjust their teaching repertoire') (Sutherland et al 2004, p. 420).

5.6.2 Educators' experience in ICT

Training in basic computer skills has been widespread amongst more than half of the teachers and principals. Just to remind the reader, 61.2% of teachers have attended training in basic skills and 67.9% of principals stated that they also received training. Fewer teachers have received training in the pedagogical use of ICT, and a small number of principals were trained in using ICT for the school management and administration. The research indicated that the provision of training must be delivered according to the needs of various groups amongst the teachers in order to be effective and have an impact on teachers' practice. The variable regarding training was not found to be correlated to the variable 'use of computer at school' and teachers who were interviewed explained that training currently provided equips them on one hand with basic skills, but on the other hand does not provide them with sufficient knowledge about the ways that ICT can be integrated in teaching and learning. Nevertheless, a striking 90.7% of teachers and 71.7% of the principals reported feeling very confident/confident or developing confidence as computer users, which shows that the majority of the Cypriot educators do have the basic computer skills needed as one of the pre-requisites to start using ICT at school, and therefore teachers' training in ICT should now turn from basic skills to the pedagogical use of it, and the skills and knowledge on specific programs of educational value.

The way teachers view ICT is in agreement with the way that the government currently sees ICT, as learning tools ('Evagoras'). This philosophy may well be justified through the broader humanistic (in contrast to instrumentalist) philosophy that underlines the Cypriot educational system. These findings can be compared to the IE findings which show that some English teachers (who participated in the project) face ICT as tools that can replace them in 'teaching' or as tools that 'cause' learning. Based on this, the IE project contributors suggested that the teacher's role is crucial in creating the learning environment into which ICT can also be incorporated to enhance learning, a view that for Cypriot teachers and policy makers is apparently an established way of thinking. In the Cypriot context, ICT are not treated as 'unproblematic innovation that will somehow enhance learning' (Sutherland et al 2004, p. 423). As presented in the first part of this chapter both educators and policy makers see ICT as helpful educational tools, however, educators consider their role as important and irreplaceable in enabling students' socializing and guiding their learning, with or without the use of ICT. In this respect, in relation to the goals of the primary education, ICT policy-making and the philosophy of 'Evagoras' and the way teachers view ICT can be positively evaluated, however, the potential of ICT should be seen from different perspectives and not attached solely to their instrumentalist use. Nevertheless, the findings regarding educators' views of the embedding of ICT in education are strikingly positive. 78.3% of them agreed that ICT promote learning, and similarly a significant number of them (93%) consider it 'necessary for everyone nowadays to know how to use computers and other ICT'. Also 70.3% of teachers agree that ICT help them in teaching and through the interviews, teachers and principals showed their understanding of how important ICT has become in society, in the workplace and in all aspects of life. Although not the only factor, educators' positive attitudes were widely viewed by other studies as an important aspect for successful implementation.

5.6.3 ICT resource level at schools

In terms of the goals of the 'Evagoras' action plan, equipment provision to schools can be considered a success, to the extent that all schools (except a few cases of schools where other construction work was taking place) are now connected to the Internet, and have classrooms with at least one computer each. Worth mentioning here is that 52.8% of the participating schools have computer labs. Although the provision of equipment to schools was homogeneous, the teachers appeared to have diverse views regarding the ICT resource level at their school. This diversity could be explained in relation to the information gathered through interviews, where teachers' responses appear to fall into three groups; those who prefer using the one computer available in the classroom, those who prefer the computer lab, and those who use both depending on the student group they have to teach. These models of use were described in the handbook of teachers recently distributed to schools by the MOEC (2005); firstly, the model of the one computer in the classroom, secondly, the model of the one computer in the classroom in relation to the computer lab (although not all schools have computer labs available) and finally, the model of the use of computer in the school management and administration.

Based on the assumption for homogeneity in the equipment provision as a result of the centralization of the system, the study did not expect to find that there are local initiatives or individuals who are locally involved in implementation. This assumption was contradicted, as 75.5% of the participating principals stated that they have an opportunity to offer their opinion regarding equipment provision to their school. Also, the case studies (that will be described in the second part of this chapter) identified local initiatives taking place in schools, such as afternoon clubs (including a computer club) or school policies (e.g. school action plan for ICT) and school visions in terms of the embedding of ICT in education. This supports the broader assumption of the study that implementation cannot be solely 'top-down' or 'bottom-up'; rather it has characteristics from both

approaches and that schools as organizations play a significant role in implementation. This issue will be further discussed in Chapter 6.

One of the implementation gaps mentioned by interviewees and observed by the researcher, is the availability of equipment in contrast to the lack of relevant skills of the educators to use the available equipment. In addition, the purchase of software and equipment although completed, has been causing some other problems as reported by participating teachers, one of them being the availability of software which is in English rather than the mother tongue of students, and the policy of the 'one computer in the classroom' which presupposed that the one computer be used in specific manners (e.g. by creating teams of students or for rewarding only good students). This evidence suggests that the way of distributing equipment to schools should be explicitly related to guidance for educators as to the scope of use of the equipment. This is in agreement with the IE finding that 'What few teachers have is knowledge and understanding of how effectively to incorporate ICT into teaching and learning' and with their suggestion that 'Teachers need to understand more about how to put ICT to use in teaching and learning' (IE 2005)[76]

5.6.4 Use of ICT at school and at home

The research explored the use of ICT in teaching and learning, as a part of implementation. It was indicated that the action plan, did not refer to any goals as regards to the role of educators in embedding ICT in schools. The initiative thus, for employing ICT to improve and enrich teaching and learning was left to teachers, who as presented in this chapter, either adopted ICT in their classrooms or not, without having, however, to face any consequences for their decision. The survey has shown that only during the last couple of years have educators started using computers at school, while they have been using them outside of school for longer. This is in agreement with other international studies demonstrating the gap between home and school ICT use. The IE project, for example, also indicated that '...few

[76] (http://www.interactiveeducation.ac.uk/about_findings1.htm)

teachers made full use of computers and other technologies in the classroom...the use of ICT in schools was 'sporadic' and 'disappointing' in the UK and internationally' (IE 2005)[77].

When it comes to the actual ICT use at school by educators, the findings reveal that even though equipment is in place and teachers have basic computer skills, as well as positive attitudes, the use of computers in school classrooms (or labs) is limited at this stage (11.2% of teachers never use computers at school according to survey results, and only 14.4% of the participating teachers reported using computer daily at school, although they do use other learning tools such as the board or books daily). When they do use computers at school, most of them weekly, they do it in order to attract students' interest to the lesson and as a motive for them, a finding similar to what the previous literature in different countries has shown (OECD 2001a,b). As much research has suggested (Wiesenmayer and Koul 1999, Underwood 2004, Cuban 2001, see also Chapter 2) in this case too, there has not been any implicit impact on classroom practice. This signals that the use of computers by educators has not yet become a custom in the classroom and its potential remains nonetheless untapped.

However, the educators appear to use computer at home for school work to an extensive degree which means that computers are integrated in teachers' practice, in preparation of the teachings and for finding educational material and information journals/magazines/educational websites/others. These results indicate similarly to reports from the IE project that 'the ways in which teachers use ICT at school are influenced by out-of-school cultures of use' (Sutherland et al 2004, p. 415) and that the use of computer outside school yet enables and enhances teachers' work. Using computer at home for preparing their teaching may be considered a result of the teachers having heavy workloads, and thus, the issues of the overloaded curriculum and the content-oriented approach should be addressed by policy-makers. This could also be an indication of educators' need to have time to explore and play with the computer (and Internet), in order to gain confidence and skills.

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[77] (http://www.interactiveeducation.ac.uk/about_findings1.htm)

Correlation tests were run in order to identify the variables which have a significant relationship with the use of computer at school. The variables which were found to have a relationship with the 'use of computer at school' were categorized into personal (self evaluation as a computer user/ use of computer at home, beliefs; 'ICT help me in teaching' 'I don't know if they (ICT) are useful') into professional/organizational (having own class / use of computer lab / evaluation of help by ICT Coordinator/ICT Advisor visiting the school) and finally into institutional factors (use of MOEC, use of IT Committee website). Although the correlation tests did not indicate the kind of relationship between these variables (positive/negative), the educators offered useful information regarding the above issues, during the interviews. Based on these findings, it is argued that teachers need the time to explore computers and other ICT, in order to gain self confidence; they need to have resources available, such as relevant, appropriate and easily functioning software and computer labs. Further they need more guidance on behalf of the Ministry (either through the websites or through other communicational ways). The presence of ICT Coordinator at the school proves to be crucial, as long as the individual who undertakes the role can offer the help needed and ICT Advisor's role as a transfer point between the teachers and the Ministry of Education and Culture is also important for teachers. The extra preparation and organization that the use of ICT requires by educators is another reason behind teachers' lack of regular use of ICT and it shows that more support in terms of the material provided, the preparation of example-lessons and the assistance of teachers within school would promote the use of ICT. Practical problems should be also addressed by the MOEC; for example, the adjustment of hardware to the learning needs of younger students or the purchase of mice and keyboards relevant to the students' skills and physical requirements, as well as the translation of software from English to Greek and, within a contextually situated nature.

Teachers who use computers at school offered examples of lessons, as well as examples of software they use. Through the survey questionnaire they were asked to rank the factors that contribute to successful integration of ICT in the lesson, in terms of importance and they suggested that firstly,

ICT improved the students' motivation, secondly that ICT helped the students to learn, thirdly that they had planned the use of ICT in the lesson and had given it a try before, fourthly that they themselves were familiar with the equipment and software, and finally that the equipment worked well and the lesson went as they had planned (ranked last). This evidence offers important information to policy makers, in terms of the needs of the teachers to be able to use ICT in their lessons; more specifically, allowing the space and time to teachers to become familiar with the infrastructure available and to ensure that technical help is available and that equipment works well. The fact that to pre-plan the lesson is important for teachers can be both a product and a part of the education culture in Cyprus. Indicatively, part of the studies of students-teachers at the University includes learning how to plan a lesson referring to the learning goals, the material that will be used during the lesson and evaluation/assessment methods of students' learning. Yearly, monthly and/or forth date planning is also a responsibility of teachers who work in public schools and sometimes their evaluation is based not only on their performance in the classroom but also on this bureaucratic preparation and planning of the lessons.

The main factor however, suggested by teachers as one that contributes to successful lessons with ICT is that they improve students' motivation. These findings raise questions as to the future use of ICT. There is enough evidence to suggest that if educators continue to see ICT just as tools for 'keeping students' interest in the lesson and as a motive for them', they will only be able to implement incremental changes to teaching and learning (and classroom practice), rather than transformative changes. The potential of ICT to offer new teaching and learning methods, (for instance own pace learning, multimodal learning, distance/online learning, communicative/collaborative learning) is currently taken into limited consideration, as it only becomes an addition to existing curriculum, existing teaching practices, and existing structure of schools/classrooms. Indicatively, 'Evagoras' describes that the necessity to use the potential that the computer offers arises from the curriculum, which requires the development of complex skills on behalf of the students, and thus the

computer as the ideal simulator of real-life problems offers this possibility to them; this, however, does not seem to be applied in classroom practice. Even though motivation can be considered as a serious reason behind using ICT to improve learning, there is yet more potential of ICT tools that need to be unravelled.

5.6.5 ICT facilitators at school and distribution of ICT policy decisions

Teachers who participated in the survey reported that they firstly turn to colleagues when they need help to use ICT in the classroom/computer lab, secondly to friends/family outside school, then to the ICT Coordinator if one is available in their school, and fourthly to the ICT Advisor visiting the school. Similarly, principals reported turning first to colleagues for help in using computer (and other ICT) in the school management and administration. A very small number of principals reported getting help from students, and thus a question arises as to why principals do not make use of the knowledge that students have, in terms of using computer and other ICT. If there is a way to remove any reasons that prevent principals from doing that, a suggestion for practitioners, could be to use the students as another helpful agent within the school, either for school administration purposes or other aspects of implementation. An example where this has been put in practice was the 'DO It Yourself –PC assembly' project launched by the Malaysian government within the frame of the goal of becoming a fully developed nation by 2020. This project aimed to teach interested students with the skills and knowledge to assemble computer systems, who will then help their own schools to maintain their computer systems[78].

In terms of the role of ICT Coordinators, although these are not formally appointed by the government or the school principal, it was striking that the majority of educators (79% of teachers and 84.9% of principals) reported having an ICT Coordinator in their school. 77% of teachers reported that there is an ICT (regional) advisor visiting their school. Both teachers and

[78] Reports on the project indicated that both teachers and students were interested in joining this training, and this positive outcome led to the extension of the project to more schools.

principals reported that ICT Advisor's role is mainly to inform them about the Ministry's decisions regarding ICT use at school, then providing educational material to teachers, and finally to offer technical help. On the opposite, the ICT Coordinator's role according to teachers and principals is firstly to provide technical help, then to provide educational material, and less than 50% of them reported that the ICT Coordinator should inform them about the Ministry's policy. The extent to which these are important findings, relates to the fact that no official statement was included by the Ministry in the action plan 'Evagoras' that describes the roles of the ICT Advisor or the ICT Coordinator. To the contrary, previous studies (Hadjithoma 2003, Sergiou 2005) found that the role of these facilitators is not clarified and there is controversy in terms of their responsibilities at the policy level. What is interesting thus is that at the implementation level, the role of the ICT Advisors and the ICT Coordinators is defined locally, and the image that principals or teachers have about these facilitators appears to be homogeneous. More on this issue are discussed in terms of the theoretical framework below.

Further, the data analysis supports the view that educators have the skills needed to access online information. Based on this it could be suggested that the MOEC should take advantage of teachers' use of its website (and the Internet in general) to disseminate its policies and distribute guiding information on the integration of ICT in schools.

5.7 Conclusion to Chapter 5

As the s-l-b theory assumptions are confirmed, there are reasons to believe, based on the findings presented here, that ICT could be used as tools for enhancing teachers' work and to support them by alleviating some of the difficulties that arise from the bureaucratic system they work in. Modernising the educational system is a follow-up of the modernisation that has been taking place during the recent years with the invasion of new technologies in all aspects of everyday life, in business, in entertainment, in office work, and in industry. Heeks and Bhatnagar (1999) have argued for

example, that 'information systems are central to the process of reinventing government in the information age' (quoted in Hazlett et al 2003, p. 447). Educational systems across the world have been often characterized as traditional 'hard to change' institutions. In an attempt to integrate a modern learning tool in an old system, the system characteristics become more obvious. When ICT were integrated into schools, teachers were expected to change their practices, and start using the computer as a tool for improving learning and as an 'ideal simulator of real-life problems' for teaching complex skills to students (as suggested by 'Evagoras'). It seems thus a paradox that the Ministry of Education and Culture in Cyprus has initiated introduction of ICT in the schools, considering ICT as such tools, without however, initiating any other changes for modernizing the educational system. The study argues that the system as bureaucratic prohibits teachers from incorporating ICT as transformational tools in their classroom. The conflict between the traditional circumstances that create the image of schools as hard to change institutions having a resistant culture, and the transformational ideas that emerge from ICT tools is evident. Teachers are resistant to change but cannot fully take the responsibility of failure of the implementation of innovation policy; rather they must share this responsibility with the constraints that the 'traditional' educational system poses on their work. Currently, teachers see ICT as a way to attract students' interest and as a motivation for them and they explain this is an important factor for students' learning. However, this should be enhanced and other potentials of ICT should be uncovered. The government approach towards the embedding of ICT ought to go through modification, to turn the attention from seeing ICT as just another educational tool, to seeing them as tools that will transform and change the system, e.g. by enabling administrative procedures, by transforming the massive classrooms to more individual-based learning, by saving time and effort for the bureaucrat-teachers. Reform is needed to bring change to teachers' professional environment so that teachers have more support in adopting innovation policies, including ICT. An inference that can be drawn based on the findings is that it may be possible that ICT can generate new forms of schooling if its potential in

child-centred, collaborative, exploratory learning is further tapped. Although this is not something that can be currently examined, future research should focus on the transformational aspects of ICT tools; a hypothesis arises; 'new technologies, new schools?'

To sum up what has been presented in the first part of the Findings chapter the use of Toulmin's argumentation model is used to offer in brief the claim, as supported by the evidence and the links with the theoretical framework:

Practical aspects of embedding ICT in education

Claim: *The educational system is bureaucratic, and as such it is not capable of adopting fast changing structures, such as ICT.*

Data: The evidence shows that teachers continue working in a bureaucratic context and as a result, ICT in primary education is not used for transforming teaching and learning, but as an additional educational tool in the existing classroom and, within the existing curriculum.

Warrant: *ICT has the potential to create new forms of learning, and new schooling forms will arise because of ICT ('Evagoras' arguments, and research on the impact of ICT in education)*

Backing: *Street-level bureaucracy theory applies to the educational system, and to teachers' work; teachers as such have to face time, resource, information constraints, and thus, if they adopt new structures such as ICT, they do that at a slow pace*

This study turns attention from exploring what teachers as individuals can do to integrate ICT to how the system can change in order to be able to adopt new learning and teaching structures/methods and tools that result from the expansion of ICT. The general picture described in this chapter offered evidence regarding the first, and partly the third and fourth research questions:

- How is the ICT policy in Cyprus implemented? (E.g. whether/how/when/where teachers use ICT at school and what/who supports them?)

- What are the influences on the implementation processes with regard to the a) Policy-making discourses ('top-down') b) Institutional context (including characteristics of teachers' work) (institutionalism) c) Educators' personal and professional capabilities ('bottom-up')
- What does 'ICT in education' mean in the Cypriot context? (What is the influence of that process on the outcomes?)

The s-l-b theory and the ones complementing this (Hatton, Schutz, Bernstein) were used to theorize the findings regarding the influence of teachers' work in implementation; however, these were not sufficient in explaining the process itself. Thus, in order to answer to the third research question ('at what stage is the implementation process in Cyprus'), a different theoretical framework was required. Chapter 6 utilizes a few perspectives from 'top-down' and more from 'bottom-up' implementation approaches in order to explain the role of policy-making and the role of implementers. However, the examination of the case studies indicated that implementation was different from school to school, even though this was unexpected due to the centralized character of the educational system, and that these differences were related to school specific features. Hence an institutionalist approach, looking at the schools as organizations was used to enhance the second chapter of the findings. Tolbert and Zucker's model will be used to describe the stages of the implementation followed (question 3) and the empirical evidence will provide illuminating examples to connect theory with practice. Further to this, chapter 6 will present some of the findings relating to the activities developed within the schools case studies. In this way, from the general picture described here, the thesis will move on to describe school characteristics that appear to make a difference for the process and the level of implementation.

6 CHAPTER 6 FINDINGS

6.1 Introduction

Chapter 5 presented the degree to which the ICT policy is implemented in schools in terms of practical aspects, such as equipment provision, the training of educators, the role of IT facilitators in implementation, the way educators perceive the ICT policy, and other related issues. Also factors that influence the implementation were identified through further analysis of the survey data. The findings were interpreted through the theoretical framework on teachers-implementers' work (Lipsky, Bernstein, Hatton, Schutz). Another theoretical framework was devised in order to shed light on a more theoretical subject, the implementation process. The third research question was framed as follows:

- At what stage of implementation is the integration of ICT in Cypriot primary schools? (In terms of the Tolbert and Zucker model)

While the fourth research question:

- What does 'ICT in education' mean in the Cypriot context? (What is the influence of the process on the outcomes?) flows directly from it.

What will be presented in this chapter builds on the previous knowledge regarding the ICT policy implementation in the Cypriot context. The preliminary study (Hadjithoma 2003) provided information regarding the way the ICT policy was made; it indicated its general and regulatory character and consequently turned the attention to the implementers and the way they interpreted this policy. On one hand a 'top-down' approach was useful in explaining the way the initial policy was formulated into an action plan ('Evagoras') and was transferred to schools. On the other hand a 'bottom-up' approach was relevant for explaining why various implementation practices emerged in the field, as a result of the discretion left to educators-street-level-bureaucrats to implement policy. The 'logic of appropriateness' (March and Olsen 2004) related to the 'bottom-up' approach could explain the diversity in the level of implementation that

emerged through the survey[79]. The ICT practices emerging in the field indicate that; Actors 'embedded in a social collectivity, they do what they see as appropriate for themselves in a specific type of situation' (March and Olsen 2004, p. 2). Educators thus deal with the newly arrived in their schools ICT tools, as appropriately within the frame of the educational system and the school environment where they work. Similarly, an institutionalist framework enabled categorizing the implementation activities in terms of the implementation stages model provided by Tolbert and Zucker, however, what emerges through this study is that these activities differ depending on the schools and therefore they cannot be described through a formula. While Tolbert and Zucker's model was useful in discussing the implementation stages, it did not provide any conceptual tools for explaining the activities observed in the field. For this reason, the study looked for further conceptual tools from different theories, and developed some others, in order to analyze these. Enclaves (or Islands of Innovations, see Forkosh-Baruch et al 2005) is a term that is used in comparison to school-wide groups of implementers to describe the response of the schools case studies towards the embedding of ICT. 'Champions' was an organizational literature term (DiMaggio 1988, Howell 1990, Markham 1998, Schon 1963) that is used to describe ICT Coordinators in schools. Both of the above concepts are forms of street-level-bureaucracy and naturally emerged in different schools as appropriately within the context of each school and as a result of the discretion allowed in terms of ICT policy implementation.

The role of the school context appears to have a major role in the way responses towards policy are shaped. For this reason, the study describes the four schools, using information collected through the survey, the interviews and observations, explaining the implementation activities taking place in different contexts.

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[79] Just to remind the reader, that the schools which participated in the survey were categorized in terms of the level of ICT use, into categories (low / high ICT use)

Therefore a typology based on some criteria, was used to characterize the schools-cases as 'introvert' or 'extravert'. In addition, the leadership style of the principals was another tool for characterizing the school climate.

Part 1 of Chapter 6 will present the Cypriot ICT policy implementation stages through the study's related theoretical framework. These are illuminated through examples from the field, and the process is explained, to the extent, that its complexity allows. Part 2 presents general information on the context of the four schools case studies, as well as the conceptual tools that further informed the study. Part 3 presents the findings from each school case-study regarding enclaves/school-wide groups of implementers, the leadership style of the principals and the ICT Coordinators' role, using these conceptual tools.

Finally, the 'Discussion and implications' section will summarize the findings, revisiting Toulmin's argumentation model and will finally make suggestions for policy-makers, as well as practitioners.

6.2 *Part 1: Explaining the implementation process: 'Top-down', 'bottom-up' or institutionalism?*

The implementation process proves to be complex as it is influenced by various agents at different levels and scales, depending on the context. Thus, concepts from different implementation approaches were employed in order to explain implementation.

Initially, the hierarchical representation of the levels of policy and implementation was related to the theories of 'top-down' and 'bottom-up' approaches to implementation. The centralized and hierarchical nature of the Cypriot educational system had links with 'top-down' theories. As indicated earlier in this chapter, there are powerful factors arising from the 'top' that constrain the 'bottom' such as limitations on material or human resources. For example, financial limitations from the 'top' define the number of people who are formally involved in implementation. As a result, fewer than fifteen ICT Advisors were initially appointed to coordinate implementation of the action plan 'Evagoras' in all 348 public primary schools. In a similar way, ICT Coordinators appointed in schools did not officially hold a position, and thus they were not paid or rewarded in any way for the services they offered within schools.

At the same time, what was observed through the research is that teachers' practices and the discretion they have in decision-making are limited within the availability of specific tools provided from the 'top'. The policy document 'Evagoras' included an emphasis on resource supply objectives and aimed to install one computer per classroom for the three higher grades in primary schools during the first year of the equipment provision process. Then, during the second year, the MOEC continued installing one computer per classroom for the three lower grades of primary school and subsequently continued to equip higher grades with a second computer and other technologies during the following years. This had implications, as indicated through the research, on the way ICT were embedded in the classroom, mainly by driving ICT Advisors and teachers to employ educational practices that would fit in the 'policy of the one computer in the classroom'. Some examples of the most popular practices developed by teachers in the

Cypriot schools was either to organize students into teams who would work in turn on the one computer in the classroom or rewarding students who would first finish some other assignments they were given, by allowing them to do activities on the classroom computer.

> '*e, there are two or three children maximum on the computer, who are usually the children who finish their assignments or a child that has difficulty in solving an exercise, I will take it* (the child) *to the computer...*' (School C, Interview 2, 518).

> '*My children in the classroom are always distributed in teams, we have four or five teams, depending on the lesson, so, one out of all the teams, a different one each time, will do an exercise on the computer. Not all of them can go* (and work) *on the computer, on the same day, so teams go turn by turn...*' (School A, Interview 1, 153).

Hatton's theory, on teachers' work and the concept of bricolage, enables understanding how the available tools influence teachers' practices. Like bricoleurs, teachers choose and employ from the existing strategies based on their personal judgment, and according to their understanding of the project. Therefore existing paper-based practices are transformed into a computer activity. Computers are also used as reported by teachers to substitute paper-based visual materials used during the lessons:

> '*I was teaching students the description, the process of description, e... we entered the site of the Cypriot Organization of Tourism, they had seen some picture and from some categories, each team chose... they had chosen the category of photos that they wanted, they selected the specific photo....*' (School A, Interview 3, 026 – 060, m).

Writing and text editing exercises are transferred from paper to the computer screen (mostly using Microsoft Word); for example, writing the new vocabulary of their text in a Word document (School B, lesson observation). A teacher interviewee referred to using assignments in the form of multiple choice or drill and practice (paper-based paradigm) enhanced with some mechanical reinforcement/feedback:

> '*At the end of them... I did a program in the form of evaluation of that theme and it was in Power point; it simply had questions, with three choices, and the students had to choose the right*

answer... Yes, yes, there was let's say the relevant feedback... if their answer was correct...' (School D, Interview 1, 020)

Other activities reported by teachers involve searching for information/images on the Internet:

'*one of the stations out of many, was the computer of the classroom, where they had to enter the internet, and find pictures from Google, to copy them, and put them into text...*' (School C, Interview 1, 036).

Activities that require a combination of knowledge and skills (searching for information, organization skills, describing, writing and editing text, presenting) employing the potential of computers and Internet were reported by few teachers:

'*I will tell you about geography of 6th grade. We had America, as a subject, and I decided that instead of doing for them a revising sheet, I would do an evaluation lesson on the computer, in power point; I asked them first to work in teams to find individually a piece that refers to the way of living of the Americans and compare it with our own way* (of living), *that means one child would write about the family life, another one about the school life, another ... about professions, sports, basketball and so on, so, they put together their assignments, I told them specific websites on the internet where they could find pictures, they first entered in power point and wrote the words, you know with animation etc. and then they used the pictures, and each team did their own presentation...**The fact, that they have visual image, with some pictures which they can understand better, the fact that they worked together, to give a result, that is different from the other assignments they did until now, because of the use of pictures, the colour, the motion, animation, I think it offered something...rather than a raw revising sheet**...*' (School C, Interview 2, 432, emphasis is mine)

On one hand, as described in the above examples, the development of classroom practices was influenced by the available tools. On the other hand, the fact that policy documents ('Evagoras') are not descriptive regarding the ways ICT can be used in practice meant that schools were required to exercise discretion over the implementation of the ICT policy while they are given no cognitive guidance such as theories on learning and ICT. Findings indicate that teachers in schools have discretion in

interpreting policy directions, and the way they deal with the ICT policy, the MOEC instructions and guidance. Teachers are allowed discretion to choose to use or not the computers that were embedded in the classrooms (as the integration is not compulsory), and consequently many of them did not do so:

> '*... if you are let's say dynamic, and as soon as the Ministry sends something and you have the appetite and the time to sit alone and say 'I will try to see how to use this thing' you will. But except from the PC, the Ministry does the same for so many other things, so unfortunately, we don't have the time to experiment.*' (School B, interview 3, 008)[80]

Consequently the work of teachers and the relative discretion they had in taking decisions regarding implementation of initiatives was related to 'bottom-up' theories, street-level bureaucracy and bricolage, as well as to the logic of appropriateness.

'Bottom-up' approaches to implementation focused on the importance of the role of street-level-bureaucrats on implementation, their will, attitudes and motivation. McLaughlin's (1987) thesis that 'will or the attitudes, motivation, and beliefs that underlie an implementer's response to a policy's goals or strategies, is less amenable to policy intervention' (p. 172) can be related to the 'rational actor model' of institutionalist approaches, which emphasizes the importance of the implementers' role. Similarly, theorists on change and innovation, such as Fullan (2001) and other recent studies (Duemer 2002) recognize the impact of individuals on implementing change; 'Educational change depends on what teachers do and think – it's as simple and as complex as that' (Fullan 2001, p. 115). The presence of ICT Coordinators in schools, without their formal appointment by the MOEC, was an unexpected finding (described earlier in the general picture of ICT integration in schools) which indicates that in practice part of the implementation related to the use of ICT by teachers works not because of

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[80] Additional interview transcripts that support this view: because we have to do other things, more essential, more ... important, and sometimes, we consider it as secondary to integrate that means, I may do an exercise, I may find it simpler to do the exercise on the sheet rather than doing it on the computer' (School B , Interview 3, 449) 'it could be that, because it requires special preparation to use it, (that) it was avoided in some cases where it could be used, because you would need more time, more preparation. Because it was not compulsory, e, 'lies are bad', it (the computer) was avoided' (School B, Interview 2, 354).

the power of the 'top' but because of the will of the same implementers, who act as ICT Coordinators supporting integration of ICT. Ignoring thus the implementers' will for implementing an innovation is a weakness of the 'top' over its perceptions of the 'bottom'. Indicatively: 'One of the reasons that educational innovations fail is because change efforts overlook people's behaviour, beliefs and skills in favour of regulations or materials' (Fullan 1991 in Charalambous et al 2002, p. 211).

At the same time, the 'logic of appropriateness' related to 'bottom-up' theories, applies to the Cypriot case of ICT implementation, as the evidence gathered also suggests that '...humans maintain a repertoire of roles and identities, each providing rules of appropriate behavior in situations for which they are relevant' (March and Olsen 2004, p. 4). Educators as street-level-bureaucrats and as bricoleurs base their practices on routines consisting of a repertoire of roles. The character of the Cypriot educational system underlines the behavior of public school educators and, within this context, 'actors seek to fulfil the obligations encapsulated in a role, an identity, a membership in a political community or group, and the ethos, practices and expectations of its institutions' (March and Olsen 2004, p. 2). Their responses towards new technologies have to agree thus with the ideals and the pedagogy underlying the Cypriot educational system. The humanistic ethos in primary education and its political assumptions for democracy shape the ways in which educators perceive ICT tools and their usefulness for education.

The preliminary research which constitutes the background of this study indicated that the influence on implementation was also evident in the work of the meso-level agents[81], the ICT Advisors. ICT Advisors are amongst the people who indirectly influence ICT policy-making in Cyprus and its implementation directly. As was evident through the interviews with the ICT Advisors, they are also allowed to exercise high discretion in the ways they implement policy decisions and in interpreting the policy-decisions while transferring them to the teachers:

[81] where 'meso-level' refers to the space between 'top' and 'bottom' of the ICT policy pyramid (see Chapter 2) ICT Advisors were characterized by Hadjithoma (2003) as the transfer point between policy-makers and implementers (educators)

> '*...my god, we are the ministry, we thought that we had the bigger responsibility...that we are those who make proposals and give ideas. The others* (the Ministry?) *send instructions; but we are those who create the material, we are responsible for this* (for the embedding of computers) *to work*' (Interview 2).

What is more, the ICT Advisors contribute to the development of the concept of 'ICT in teaching and learning' by developing a professional language about ICT, based on their knowledge and experience. They do so, as street-level-bureaucrats through the discretion they have in interpreting policy. They then provide this language to teachers through the in-service training. The Advisors also contribute to the development of routines or repertoires, including specific teaching material and handbooks for teachers. This has implications on the way 'ICT in teaching and learning' is constructed as ICT Advisors bring with them their own perceptions, knowledge and beliefs about ICT. Thus their role in embedding ICT in schools and in the implementation is important, especially for their contribution in theorizing the structure (in this case ICT), as will be explained further below. However, their activities are also not that powerful as their small number due to financial limitations (arising from the 'top') forces them to deal with schools and educators on a mass basis. As a result, each advisor is responsible for 20/30 schools which she/he visits on average four times a year.

The preliminary study findings indicated the presence of these meso-level agents and their important role in the implementation although this appeared to be constrained because of the 'top'. These findings provided the links with street-level-bureaucracy and the basis for the theoretical framework for the study presented here.

However, as the study progressed it was becoming apparent that the theoretical approaches of the 'top-down' and the 'bottom-up' implementation studies are insufficient in terms of fully describing such a complex process. Beyond the restrictions in terms of material and human resources deriving from the 'top' and influencing the 'bottom', and beyond the implementers' will and motivation, there are other issues which cannot be explained in terms of 'bottom-up' or 'top-down' approaches. While 'top-

down' approach considers the broader economic and social context, and 'bottom-up' approach does not ignore the role of the local initiatives such as the examples given in the previous section (afternoon school clubs), each of them looks solely at one level of implementation ('top' or 'bottom'). While 'top-down' adopts a macro-approach to implementation and the 'bottom-up' adopts a micro-approach to implementation, institutionalism takes a meso-implementation perspective and considers organizations as subsystems of a broader system. Merton's study in the 1940s (in Ryan, 1995) for the first time viewed organizations as 'societies in microcosm' and sought to test a functionalist social theory through the empirical comparative research of these organizations.

This study adopts a holistic[82] approach on exploring the implementation of the ICT policy, in agreement with institutionalist approaches which consider that implementation is the result of interactions among multiple actors and that there is a range of factors influencing implementation within and between organizations (see Ryan, 1995). A combination of both 'top-down' and 'bottom-up' approaches to implementation, as well as the institutionalist theoretical framework, provided the tools and concepts for explaining the findings. Figure 12 represents the way that this study now understands policy and implementation as this emerged through the findings. Within the system, various influences arise from different levels and each level is interacting with the others. For this reason, the various levels are presented in concentric circles.

[82] In Medical Sciences, 'holism' refers to 'the treating of the whole person including mental and social factors rather than just the symptoms of a disease' (Oxford Dictionary, 1998). Similarly, in this study, individuals and organizations are treated as parts of a system and cannot be treated in isolation.

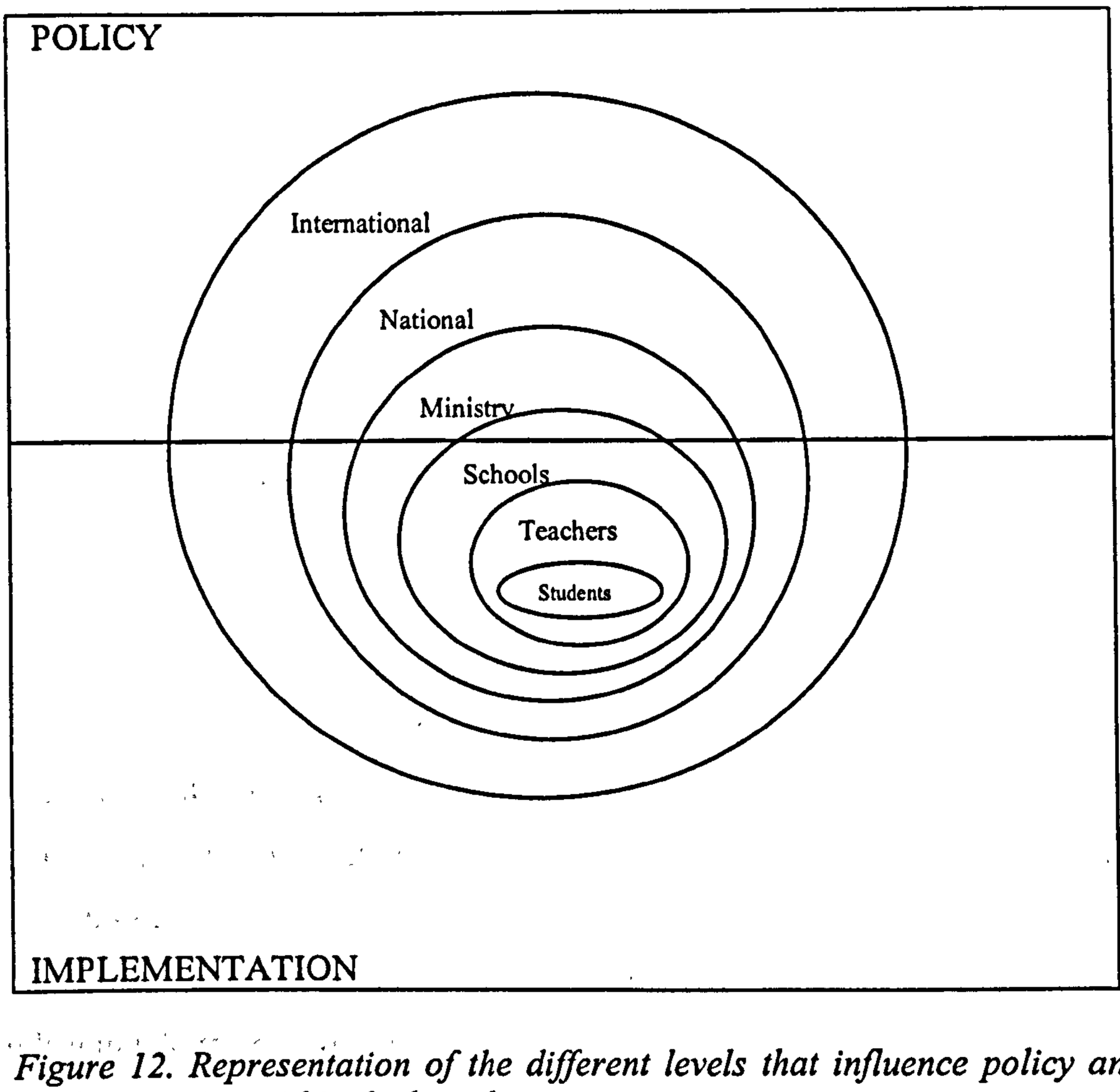

Figure 12. Representation of the different levels that influence policy and implementation within the broader system

6.2.1 Illuminating the implementation stages (using Tolbert and Zucker's model)

Institutionalist theory is useful in providing concepts which enable the interpretation of the findings presented in this thesis. More specifically the theoretical framework used, based on Tolbert and Zucker's model, follows four stages from initiation to full institutionalisation. A pre-requisite of implementation is the presence of a policy initiative. Although the introduction of ICT in primary schools was not based on an explicit policy[83], the action plan 'Evagoras', and the appointment of a group of people (ICT Advisors) who would undertake coordination of its implementation, with the support of a budget, was considered as an initiation of a policy and thus was

[83] which would include a declaration of a policy vision and directives as to the ways this vision would be realized, an action plan and the budget devoted to this, as well as evaluation criteria

put under investigation. This initiation of a descriptive policy may be considered as the preparatory stage for the formation of an explicit policy. Taking into consideration the content of the documents produced by the MOEC (e.g. circular letters addressed to educators), in addition to the content of the action plan 'Evagoras', as well as the views of the people appointed for coordinating implementation of the action plan (ICT Advisors), a preliminary research study used all the above to mean policy-making. The subsequent study which is presented in this thesis focused then on the implementation of the policy. Being aware though, that the introduction of ICT in all primary schools has been officially taking place since 2000, (and earlier at an exploratory level in some schools) the study did not expect to find that full institutionalisation (in terms of how Tolbert and Zucker describe it) was already accomplished. It rather, as confirmed by the evidence presented here, sought to describe the initial implementation stages through the theoretical framework it adopted. These stages are presented below, and the theoretical model (Tolbert and Zucker) is expanded.

At the beginning of the initiative, the integration of ICT in Cypriot schools was based on related discourses from the USA, the UK and the European Union context, as described in the background of this study (Chapter 2). The stages followed by the Cypriot government appear to have similarities with the stages followed in other countries. In Table 23 some indicative descriptions of the stages followed by different countries (selected from the review of a larger number of countries based on studies such as Plomp et al, Eurydice, and SITES, Appendix 2), show that the changes made for embedding ICT are mostly incremental and it is only recently that some countries have begun to show signs of doing transformative changes which are expected to lead to institutionalization. According to Tolbert and Zucker, an important activity that would lead to institutionalization is theorization (see also Chapter 3, Table 1). At the beginning of the initiation in the countries presented in Table 23 there is a focus on materials, and on basic knowledge (e.g. training in computer skills, but not in theories of ICT in teaching and learning). Later on, as represented in the table, theorization

starts taking place, when policies acknowledge the need for transforming pedagogies. It is not however possible, to assume or to predict that ICT integration will reach full institutionalization (the last stage of the implementation process).

Table 23. Stages of implementation: incremental and transformative changes (the information is taken from Plomp et al 2003

	UK	Cyprus	Finland	Japan	Malaysia
Infrastructure, Internet connectivity (incremental change)	1998 – 2002 NGfL	2000 – 2005 'Evagoras'	1995, Towards a Culture-oriented Information Society	1990, 1994, 2001,	1999, Smart schools project, 'The Program for Rebuilding and improving Existing schools' (PRIME) DO It Yourself –PC assembly
Training (incremental change)	1998 – 2002 NGfL	2000 – 2005 'Evagoras'	1995, Towards a Culture-oriented Information Society	20 years, 1993, in-service computer-coordinator course	2001
Curriculum change (transformative change)	2001 – 2003 Curriculum Online	2000 – 2005 'Evagoras'	1999, Information strategy for Education and Learning	'general goals of ICT in Education' (1998a)	2001 'The use of Information and Communication on technologies in teaching and learning', IT guidelines for existing syllabuses (1999)
Pedagogy change (transformative change)	2002 'Transforming the way we learn' & ICT in Schools Programme		1999 Information strategy for Education and Learning		

Tolbert's and Zucker's theoretical model (see chapter 3, Figure 5) of implementation stages is enriched here through the findings.

Stage 1: 'Innovation': new structures and changes are introduced as a response to new challenges imposed on organizations. As a response to various influences highlighted in Chapter 2, ICT are introduced to primary schools by the Cypriot Ministry of Education and Culture. A concept adopted from institutionalist theories, relating to the adoption of an innovation is the one of 'isomorphism'. According to Meyer and Rowan (1977), successful organizations are those that become isomorphic with the institutional environments in which they are situated by adopting structures that may or may not be objectively effective and productive. In an attempt to become isomorphic to the economic and social institutions with which an educational institution is related to in the broader environment, it adopts structures (in this case ICT) which other economic and social institutions adopted earlier and at a faster pace. That could explain why some educators, who participated in this study, reported that they used computers outside of school much earlier than they did at school. A hypothesis arising from this theoretical approach was to examine whether ICT are adopted by educational institutions based on mimesis, coercion, or normative process. The preliminary study indicated that the policy was initially developed based on mimesis and through 'policy transfer' (action plan 'Evagoras', constitution of IT committee). However, when it comes to the school level, the evidence indicates that the activity of the individuals (for example, the ICT Coordinators or principals) is not based neither on mimesis, (as educators are not informed about practices integrating the use of ICT) nor on coercion (since the ICT policy has optional character). 'Normative isomorphism' process could better describe the educators' attempt to integrate ICT in their practice, although this is related to personal qualities (for example, leadership style) as will be explained later. Consequently, following a 'logic of appropriateness', educators see ICT through the legitimate rules and practices embedded in the institutions in which they belong. ICT do not constitute an innovation that changes their practices and roles; rather it is something that educators attempt to fit in the existing context, as appropriately, depending on the school needs and priorities.

Stage 2: 'Habitualization':

At the stage of habitualization the adoption of the structure is characterized by variance, as the initiative for implementation is in the hands of implementers. Even though, the educational system in focus is centralized, which interprets to prescribing curriculum based teachers' handbooks, it is also important to note that what happens in the classrooms is left to the discretion of the educators. How to implement the curricula is therefore left to teachers' hands at least to some degree[84]. The 'Evagoras' policy action plan is rather descriptive than regulatory and falls amongst other initiatives that take place in primary education[85]. It was however, an optional initiative left to the implementers' will to implement or not. Few adopters, with the support of ICT Advisors and ICT Coordinators, adopt the use of ICT as another learning tool at school in their daily practices. In the process of the transfer of the policy to implementation field, an approach of 'logic of appropriateness' (March and Olsen) is followed and especially a 'local appropriateness' within schools. 'An institution is a relatively stable collection of rules and practices, embedded in structures of resources that make action possible -organizational, financial and staff capabilities, and structures of meaning that explain and justify behavior- roles, identities and belongings, common purposes, and causal and normative beliefs' (March and Olsen 2004, p. 5). Based on the context of each school-organization with its rules and practices, its organizational financial and staff capabilities and, within the frame of the broader system, ICT are embedded as appropriately.

A similar concept suggested by March and Olsen (WP, 04/09) that can explain implementers' behavior at this stage, is the 'institutional actor' model which according to organizational analyses could be used to describe individuals' behavior which is based on social norms and a repertoire of roles and identities. In this case, the 'institutional actor model' could describe teachers' practice in a bureaucratic system. Teachers' behavior is based on institutionalized norms and rules which underline the specific

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[84] For example, educators have discretion in employing different teaching methods or teaching tools

[85] For example, the introduction of the 'all day' school at experimental level.

educational system. At the same time, however, teachers' behaviour developed in response to the integration of ICT in education could be described based on the 'rational actor model'. The 'rational man' was a description of the discovery of early implementation studies which suggested that responses to policy programs by implementers are based on 'utility maximizing calculations', similar to the teachers in this case who chose to adopt or not adopt ICT in their practices, based on their understandings of the use of ICT in teaching and learning within the scope of the educational system and its character. The ways some educators respond to the introduction of computers and other new technologies in their classrooms (either these are based on their personal experience or the directions of ICT Coordinators/ICT Advisors/colleagues) have now become the current object of formalization. Tolbert and Zucker suggest that at this stage 'behaviours of actors that emerged through empirical processes, as a response to particular problems that need to be solved become habitualized, formalized in policies and procedures of one or more organizations, in the sense that actors do follow them without having to do a decision-making effort.' (p. 181). Signs of these activities are slowly emerging in Cyprus based on the interactions between implementation field and policy-makers and through ICT Advisors (at the meso-level, and as a transfer point between policy-makers and schools). The practices that educators developed partly initiated by the ICT Advisors and the ICT Coordinators, become formalized (Teachers' handbook), even though there is not yet consensus on the utility of ICT for teaching and learning. A new handbook for teachers 'Introduction of Informatics in Primary Education' (2005) which was sent to all primary schools in the country includes the first formalized processes that initially were observed in the field. Thus issues which were not included in 'Evagoras' are later described in the handbook for teachers. For example, ways of using the computer in specific subjects (Mathematics, Greek, Science and others) or the rationale behind having one computer in the classroom, rather than a computer lab, are ideas presented in the teachers' handbook. This adds some normative value to the embedding of ICT in schools and contributes to theorization of ICT in teaching and learning and,

at the same time, it takes away from educators some decision-making effort. In addition, the influence of ICT Advisors and ICT Coordinators at this stage is crucial in spreading the use of ICT. Some theorizing by ICT Advisors or ICT Coordinators invests the structure (ICT) with value, which may contribute later to its normalization. Thus the way ICT Coordinators and ICT Advisors promote ICT use by educators, through the development of discourses, resources and material, contributes to the theorization of the concept 'ICT in education'.

It is observed thus that across these initial stages there is a series of activities across all levels (policy-making and implementation):

Individuals suggest introduction of ICT to schools (1990-1991)→ The Cyprus Pedagogical Institute takes this on board and introduces computers in some schools for experimenting and exploring the activities developed → Policy Action plan 'Evagoras' (descriptive) → (Exploration stage) Interpretation of 'Evagoras' by ICT Advisors, educators, ICT Coordinators, students(?) → (Habitualization stage) Various mechanisms arise in the implementation field as a result of the response to 'Evagoras' (communities of practice/enclaves, champions/leaders) that support implementation, Formalization of the activities arising based on the above interpretation in teachers' handbook (The introduction of Informatics in Primary Education, MOEC, 2005) →...

In Figure 13 Tolbert's and Zucker's model is enhanced, with additions between the stages of innovation, habitualization and objectification.

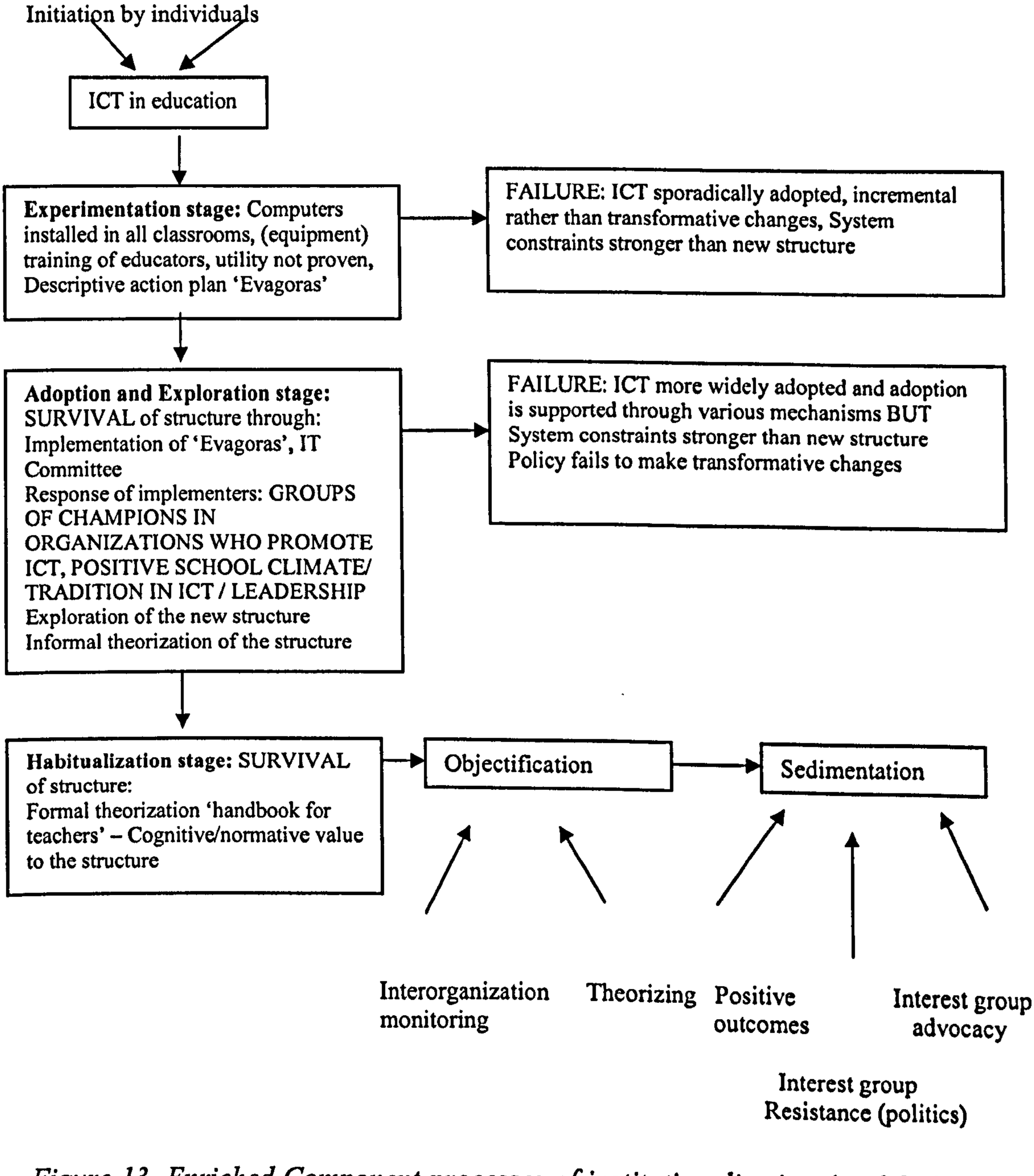

Figure 13. Enriched Component processes of institutionalization (modified, Clegg et al 1996, p. 182)

6.3 Conclusion to Chapter 6, Part 1

The study aimed to understand the implementation process. The research collected data which was useful in describing the activities developed at the first stages of implementation. During these stages the introduction of the new structure (ICT) is initiated by individuals with an interest and knowledge in this. ICT infrastructure is introduced to some schools, some basic training (skills) is provided to educators who work in these schools and ICT use is based on experimental activities. As changes continue to take place in the wider context, there are more economic, political and social reasons for adopting the new structure. Funding is secured from international organizations, (e.g. the European Union) for promotion of the structure. As a result, the innovation is adopted through imitative and transferable policy which assumes that the utilitization of the innovation (ICT) will be beneficial. This policy is translated into an action plan ('Evagoras') which describes main goals, in terms of the equipment provision, the training of educators, the renovation of the curricula with integration of ICT, with reference to the use of Internet and the use of ICT in school administration. The 'Evagoras' action plan is general and allows discretion to implementers. An IT Committee is appointed and training is provided, but within the schools there are no supportive structures. At the stage of habitualization, implementation is at risk of failure, as institutional theory predicts, however, the activities developed within organizations (schools) as a response to the policy support the spread of the structure and push the implementation process towards the next stage. However, the wider system is not changing radically. Its nature as bureaucratic prevents adoption of something, such as ICT that implies transformation in teaching and learning, and which requires changes in the school structure, the learning and teaching methods, and the teachers' role. The supportive activities that arise are in conflict with the wider institution (educational system) and the constraints that characterize the institution (lack of time/resources/cognitive guidance) suppress individuals with personal qualities (e.g. ICT coordinators) and prevent the spreading of the new structure leading to failure of institutionalization of ICT. If the innovation

survives this stage, then it becomes an object of theorization. Theorization of ICT activities become formalized through the production of new policy documents ('Evagoras' II, MOEC teachers' handbook) and cognitive value is given to the structure.

Objectification and sedimentation are stages which should be a subject for exploration through a long term study, after a period during which the structure (ICT) is fully formalized and given normative value. Only through a longitudinal study can the processes at the stages of 'Objectification' and 'Sedimentation' be explored. It can however, be expected based on the observations of this thesis that each of the institutionalization processes will have its own risk of failure.

Beyond describing the implementation stages, the present research demonstrated that the influences that implementation undergoes, during these initial stages of implementation are related to the context, and more specifically to the characteristics of the institution. Part 2 includes discussion of the role of the broader context in implementation, and the characteristics of the school case studies. Then it continues with presenting the conceptual tools that will be used to present the findings for each of the four schools.

6.4 Part 2 The role of the context in understanding the implementation process

Research into the use of ICT in education has predominantly been taking place in the USA and in the UK the last decades; however, the research into different contexts may indicate practices developed under the influence of situational factors. This research emphasizes the role of the context in implementation and therefore studied the characteristics of the Cypriot system. In Chapter 1 some of the broader characteristics of the Cypriot educational system were outlined and the influences that the system historically underwent were also presented.

The theoretical framework of the study provides, as mentioned above, the concept of 'isomorphism' to explain the introduction of innovations in organizations. The modernization of other sectors in society, through the invasion of ICT, created the need for the educational system to become isomorphic with the wider environment. Nowadays being computer literate is perceived to be a requirement for participating in civil society, for the work place and the broader environment modern people live in. Therefore the invasion of ICT into education can be seen as a consequence of 'isomorphism', as a response to the changes that society globally, as well as at a national level, has been undergoing the recent decades. The introduction of ICT that occurs in the case of Cyprus is initially based on 'mimetic isomorphism'. While, however, social context has been changing, the school context remains the same. The general image presented earlier in this chapter is that the ICT policy in Cyprus has been attempting to embed an innovative new tool in an old institutional system. Figure 14 illustrates the way computers were first introduced to schools, without any changes in the context of the classroom, but as an addition to the existing structures.

One of the implications of the way ICT are introduced to the Cypriot schools is that the bureaucratic characteristics of the system appear to be in conflict with the role that the computer can play in education, in modernization and in transformation of the traditional system. The hypothesis derived from the theoretical framework on 'institutional isomorphism' (Powel & DiMaggio, 1991) that there are difficulties in

reforming, transforming, or replacing institutions due to their culture which is based on routine and convention has been also confirmed by the findings which describe educators' practice as one of street-level-bureaucracy characterised by routine and convention.

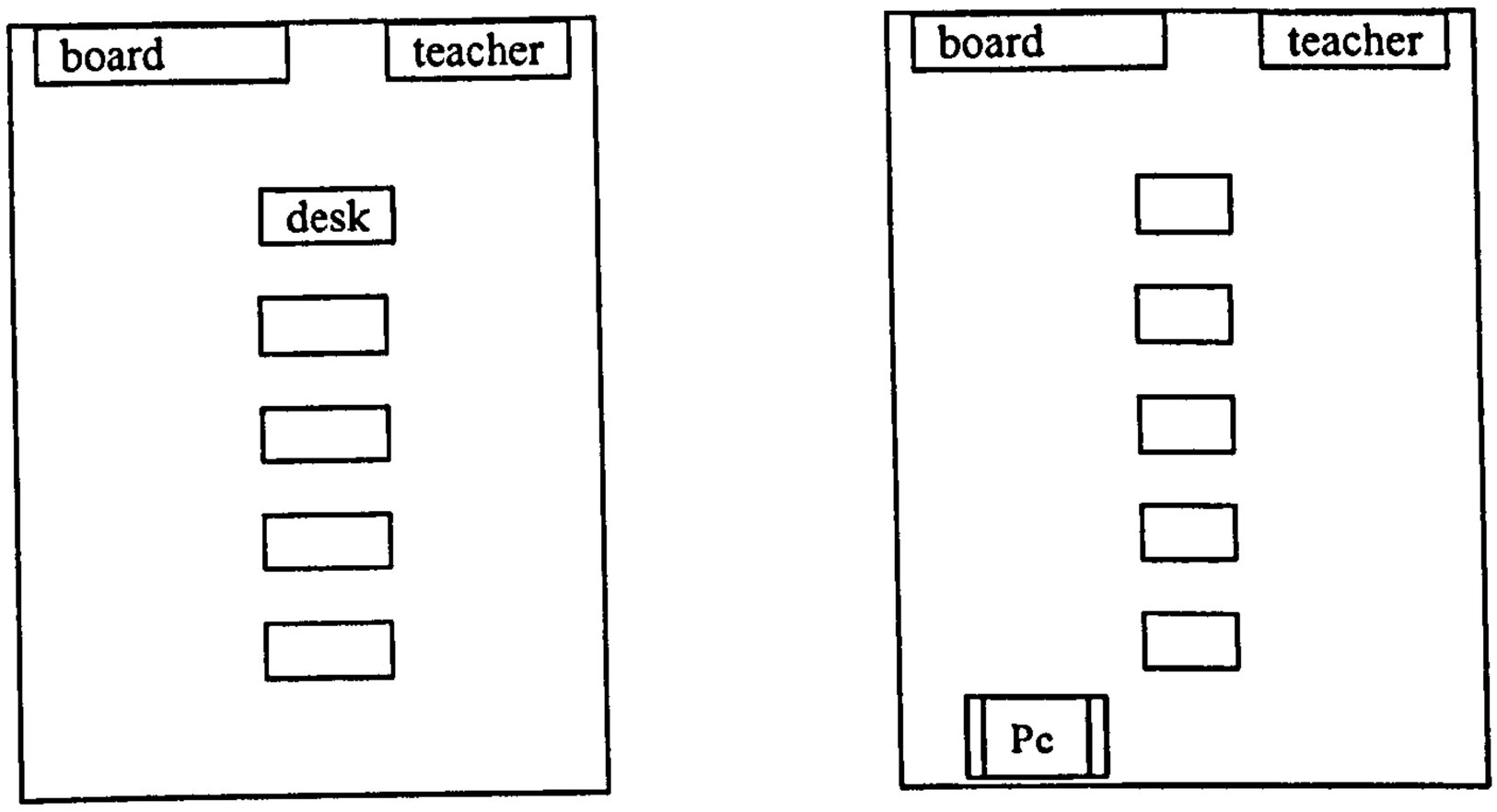

Figure 14. Introduction of computers in the schools: the same school, the same classroom, and a computer added as an extra educational tool

The traditional educational system is based on a mass-basis treatment which in turn creates time constraints. Lack of time was one of the major reasons educators reported for not employing ICT in their classrooms. The problem of 'top-down' bureaucratic procedures was also reported by educators as one of the system constraints. They are still required to produce bureaucratic reports, to fill in forms and to respond actively to various initiatives, sometimes within specific deadlines. Thus teacher interviewees mentioned that they could not afford time to explore and understand ICT for teaching and learning or to develop practices with them. Furthermore, educators are nowadays evaluated by inspectors who are appointed based on experience and age, and as such, perhaps bring with them the traditional content-oriented and curriculum-driven evaluation criteria. The problem of resources is one that characterizes educational systems. Distribution of resources from the Cypriot government to schools/teachers continues to be based on traditional methods (post, paper-based material) although ICT could contribute to making production and distribution of resources easier and faster. Resources are no longer based on paper production and are no longer

restricted within national boundaries. Rather they can be more affordable and more available at any time through online resources. The MOEC has been recently using the Internet to publish its circular letters, the annual reports and other general information, such as the ministerial structures online. However, these are a few indications which constitute incremental changes to the educational system. Restricted by the current circumstances teachers are resistant to the adoption of innovations and in the same way have rejected or postponed the use of ICT as a transformative tool. Uncertain about the impact of ICT on learning, and having no cognitive guidance (e.g. theories on the impact of ICT on teaching and learning) educators appear to imitate practices of their out of school environment and embed them into their school practices, a response which 'results from standard responses to uncertainty' (p. 67) where 'uncertainty is a powerful force that encourages imitation' (p. 69) (Powell and DiMaggio 1991). As presented previously, home use of ICT by teachers influences the way they adopt ICT in classrooms.

Understanding the context of implementation is important for understanding the process. For this reason, further to focusing on the broader Cypriot context, the study selected different school cases in order to compare the influence of school specific characteristics on implementation. The following section draws on broad information (mostly statistical) that enables making general comparisons between the schools that participated in the case study.

6.4.1 General information on the case studies

The analysis of survey data from 54 schools led to the categorization of the schools in four categories, as described in the Methodology chapter (Chapter 4). The four school case studies represented different categories and consequently had different characteristics which were expected to be influential on implementation.

Below, some general characteristics of the four school case studies can be viewed through comparative numbers, based on both the teachers' and the principals' questionnaires. The importance of outlining the differences

between the schools is to better understand the influence of the school context on the integration of ICT.

The four schools were assigned letters from A to D, which are used throughout this thesis.[86]

In Table 24 it is evident that School A presents the highest percentages of educators who participated in the research, as well as in terms of the training received and self confidence in using ICT. Graphs 7 and 8 demonstrate the gender and age groups of the teachers who participated in the survey. In School C, 100% of the teacher participants were below 40 years old. This may be related to the principal's pacesetting leadership style, as it can be argued that a principal who is mature and more experienced than teachers who work at the school may follow a pacesetting leadership style, setting standards and examples to follow for the teachers. This may also explain why the principal did not turn to colleagues to get help as reported in Table 24. Graph 7 indicates that School B has the highest percentage of female teachers, as was also observed during the visits to the schools. This may be related to the development in this school of a community of practice; however, further enquiry should take place in order to confirm this. At the same time, the figures show that this school was also represented with the highest scores regarding teachers getting help from colleagues which supports the findings regarding the presence of a community of practice in this school (presented in detail below). In School C where there is evidence that an enclave exists rather than a school-wide group of implementers, just about half of the participants turn to colleagues for help as reported in the survey results.

Based on the principals' questionnaires (Table 25), the figures regarding evaluation of teachers' knowledge and skills, as well as getting help from the teachers, are supportive of the findings in relation to the principal's leadership style, presented later in this chapter. The principal in School C is characterized as following a pacesetting (sets high standards for

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[86] Although an initial idea was to present the schools with some names in order to show that the thesis perceives them as institutions with a character rather than neutral objects, it was difficult to select names with neutral meaning that would not by associated with the school climate or the staff character etc., therefore letters were used instead.

performance or 'do as I do, now'). The survey results showed that he evaluated teachers' ICT skills as 'good', while all other principals evaluated them as 'very good' and, at the same time, he did not appear to turn to teachers to get help, like other case study principals did; instead he provided them with examples and standards to follow. Also, the two schools where teachers reported that there is no ICT Coordinator (Schools B and D) have had the highest percentages in terms of teachers' awareness of the ICT policy. This can be related to the school relying on ICT regional advisor who transferred the ministerial policy to the school, rather than to an ICT Coordinator within the school, who may not be as well aware about the policy as the regional advisor.

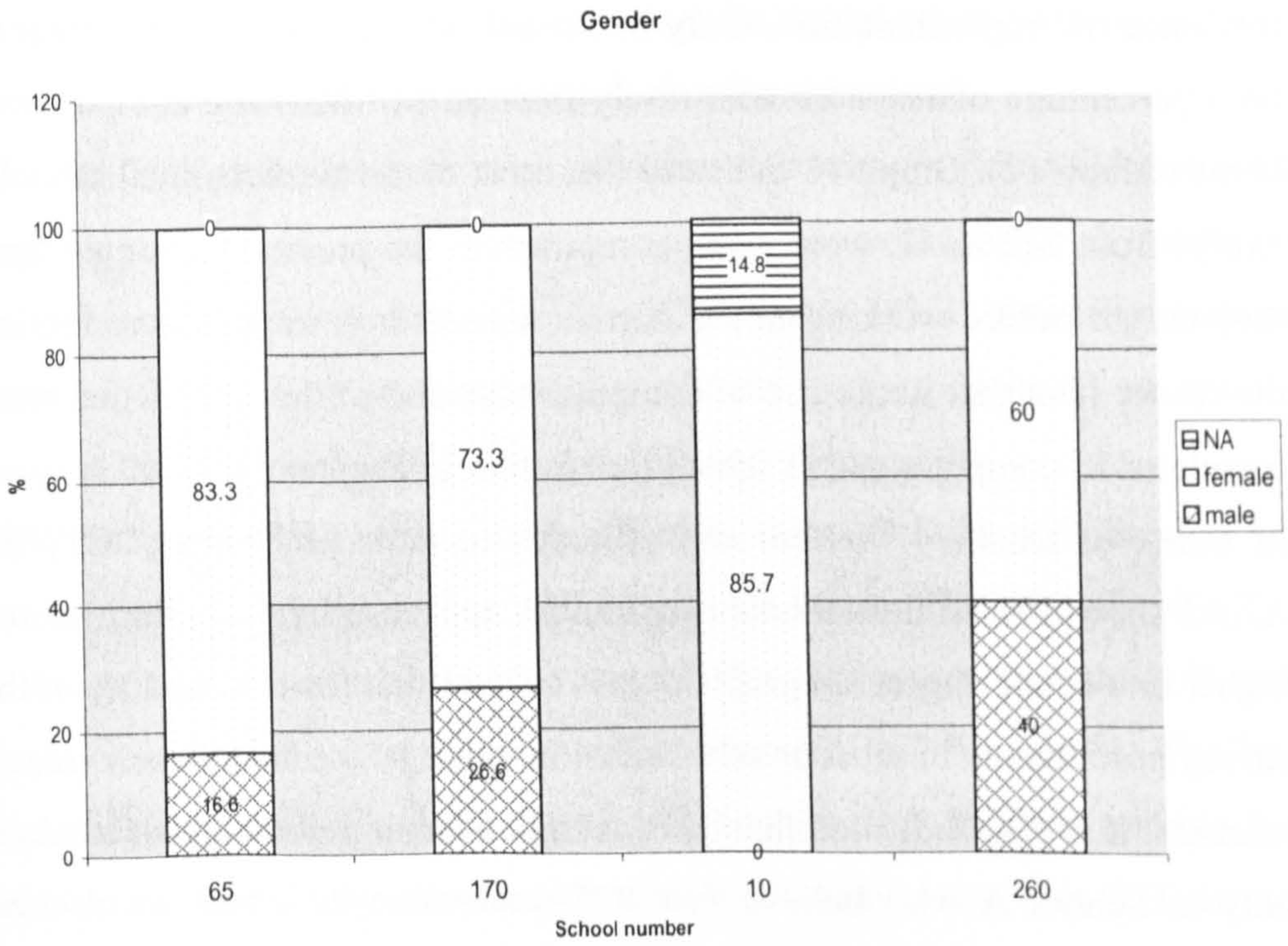
Table 24. Characteristics of the school case-studies -Teachers' questionnaires

	School A High ICT Level-High Use	**School B** High ICT Level-High Use	**School C** Low ICT Level-High Use	**School D** High ICT Level-High Use
Participants	71.4%	53.8%	35.3%	41.6%
Use computer daily/weekly	80%	71.4%	66.6%	60%
Received training	66.7%	57.1%	57.1%	26.7%
Turn to ICT Coordinator for help	33.3.%	14.3%	33.3%	20%
Turn to colleagues for help	53.3%	85.7%	66.6%	40%
Feeling confident/very confident in using ICT	86.6%	42.8%	66.6%	40%
Being aware about the Ministry ICT Policy	46.6%	71.4%	50%	80%
Receiving instructions by the MOEC for using ICT	6.6%	28.6%	50%	40%
Accessing the MOEC website often/very often	66.6%	71.4%	83.3%	40%

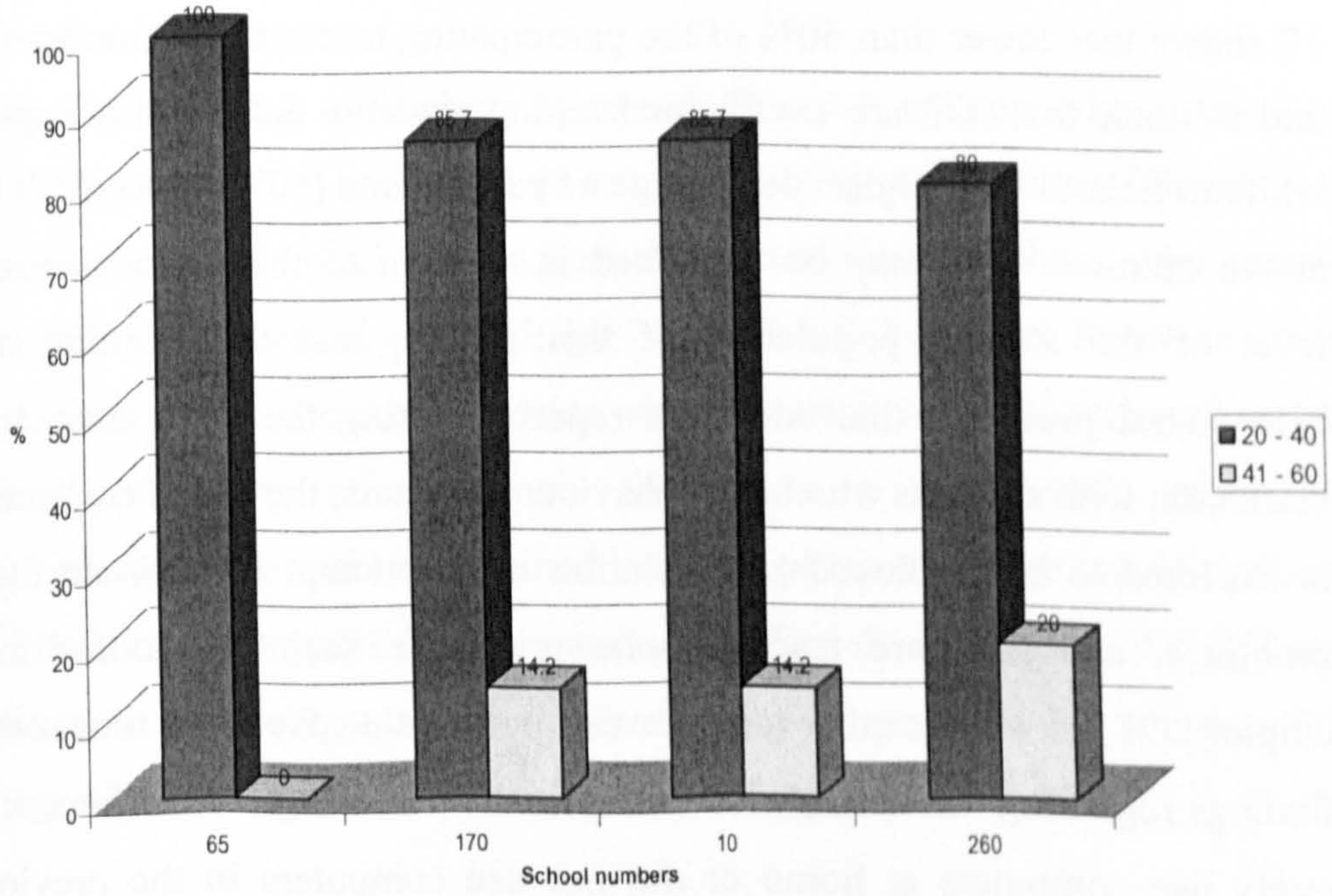
Table 25. Characteristics of the school case studies-Principals' questionnaires

	School A	**School B**	**School C**	**School D**
Number of teachers	21	13	17	12
Socioeconomic level of students	Middle	High	Middle	Low
Teachers' ICT skills and knowledge	Very good	Very good	Good	Very good
% of teachers who use computer in the classroom	80%	50%	60%	100%
ICT level at the school	High	High	High	High
Offering opinion about purchase of ICT	Yes	Yes	Yes	Yes
Use of ICT at school daily/weekly	Yes	No Answer	Yes	No
Turn to ICT Coordinator for help	Yes	No Answer	Yes	Yes
Turn to the teachers for Help	Yes	Yes	No	Yes

Graph 7. Gender of the teacher participants in each school[87]



Graph 8. Age groups of the teacher participants in each school



[87] In all graphs School A is represented by the number 170, School B is represented by number 10, School C is represented by number 65, and finally School D is represented by number 260.

The graphs presented in Appendix 9 (Graphs 12-21) extent the general picture of each school and highlight differences that may possibly have an influence on implementation. Only in Schools C and D did there appear to be a percentage of teachers who rarely (instead of often) use computers at home (Graph 12). Graph 13 indicates that most of the teachers in all schools, except from School D, were using computers in the previous schools where they taught before working in the current school. It is important to remind the reader here that home use of computer was one of the factors that were correlated to computer use at school (see Part 3, in chapter 5).

In terms of teachers' beliefs and attitudes towards embedding ICT, the results show that all the schools case studies appear to have similarities at a higher or a lesser degree. In graph 14 it is evident that fewer than 50% of the survey participants in all four schools believe that ICT enhance their role as teachers. It is also indicated that there is only a small percentage of teachers only in School A who believe that ICT undermine their role as teachers (Graph 15). Most of the teachers in all schools (with Schools C and B having the highest percentages) think that ICT are useful for keeping students' interest in the lesson and as a motive for them (Graph 16). Graph 17 shows that fewer than 50% of the participating teachers in schools A, B and C think that ICT are useful for keeping students quiet and occupied, while in School D, a higher percentage of participants (60%) agree with the above opinion. This may be explained in relation to the socio-economic level of the student population of this school, and the learning and behavioural problems that educators reported during the interviews. In a classroom with students who have behaviour problems, the use of computers is expected to be employed as a solution in an attempt to alleviate these problems, and therefore teachers who undertake such classrooms may employ ICT, as well as other tools for this purpose. At the same time, other findings regarding this school, for example, the percentage of teachers who rarely use computers at home or did not use computers in the previous school where they worked, may be related to teachers having a less sophisticated attitude towards computers and, as a result, seeing computer mostly as a tool for keeping students quiet and occupied. The lower level of

use of ICT in this school could also explain why some teachers agreed with the above statement, as teachers who have not used ICT in the classroom may not be aware that the students may be noisy when working on the computer, as other teachers reported during the interviews.

The majority of the teachers in all schools (with schools B and C having the highest percentages) think that it is necessary nowadays for everyone to know how to use computers and other ICT (Graph 18). In a similar manner, most of the teachers in three of the schools (School D is an exception) support the opinion that ICT promote learning (Graph 19).

60% or more of the educators in all schools (with School D, having the lowest percentage) think that ICT help them in teaching (Graph 20). The lower percentage of teachers who support the above view in School D may be also explained in terms of the characteristics of the school. The low socio-economic level and the learning difficulties that children have in this school, as reported by educators-interviewees, may mean that ICT do not help them; rather they create problems for them that add to the already existing learning difficulties. Such problems reported by teachers of this school were the difficulty of using an English keyboard or software operated in English language.

A small percentage of teachers in schools B and A acknowledged that they do not know, if ICT are useful or not, in teaching and learning (Graph 21), while only in School C there is a small percentage of teachers, who agreed that ICT are not useful at all (Graph 22)[88]. This is helpful to know, in order to explain the circumstances under which an enclave was developed in the school, while in other schools there was a school-wide group of implementers. As will be explained later, the presence of a group of teachers which does not support the integration of ICT or do not believe that ICT are useful, is a pre-requisite for another group of people who support ICT integration (enclave) to arise within the wider group of educators.

[88] Based on the two statements from the survey questionnaire: 'I don't know if ICT are useful in teaching and learning' / 'ICT are not useful at all'

6.5 Presentation of the conceptual tools for describing the implementation activities and the situational influences on implementation

The study devised conceptual tools and used others from the relevant literature to describe the activities arising in the field as a response to the introduction of ICT, as well as the school related influences on implementation. This section continues with presenting these conceptual tools, in order to utilize these later in the presentation of the findings for each of the four school-case studies.

The four schools selected to participate in the case studies had differences with regard to the ICT resources, as perceived by the educators of the school (based on their judgment) and different level of use of the available technology tools by the teachers. They also differed in terms of their location, and the socio-economic level of the student population. The above information was collected through the survey, while further characterization of the schools was achieved during the case studies. Below, the typology used to characterize the school climate is described, followed by the description of 'enclaves' and the leadership styles, and finally an outline of the term 'champions'.

6.5.1 School climate

It was observed that school climate, referring to 'the collective personality of the school, the overall atmosphere of the school' (Pashiardis 2000, p. 224) affects implementation. A typology was therefore developed to enable characterizing each case study, in terms of school climate. This typology was based on the following criteria:

- the structure of the building (physical distance between principal's office and teachers' office, access to principal's office)
- the use of the staff room by teachers (how long teachers used to stay in this room, what were they doing while in the staff room)
- the exchange of practice/ideas between the teachers in the staff room

Based on the above, each of the four schools was characterized as 'introvert' or 'extravert'. 'Introvert' schools were seen as the ones where a long physical distance existed between the principal's office and a 'closed door' access to the principal's office was observed during the data collection. In an 'introvert' school, the staff members did not use the staff room often, during their breaks, rather they used to stay in their classrooms or form small groups in other areas in the school; when they used the staff common room, they were involved in individual activities (e.g. correcting students' essays). In comparison, in an 'extravert' school staff used their meetings in the staff room for social interactions and to exchange information on their work or other issues they were interested in. Discussion between the staff related to their work, and activities of exchanging educational materials were observed more often in an 'extravert' school rather than in an 'introvert' school. Each of the school case studies was characterized as 'introvert' or 'extravert', as will be presented later, and this appear to be an influence on the level of use of ICT by educators.

It is important to mention here, however, that this characterization of the schools only applies to the specific time period that the research took place, since each academic year there are changes in the appointment of staff members and thus school climate may change depending on the changes in the staff members.

The next section elaborates on the concept of 'enclaves' in contrast to school-wide communities of practice within which ICT were adopted.

6.5.2 Enclaves (Islands of Innovation) or school-wide groups of implementers

When referring to enclaves in this thesis, the term is used to describe groups of people that are developed within another group within institutions. The literature refers to enclaves as a deliberate strategy for spreading mostly industrial innovations, by appointing a group of people who promote the innovation and support its use. An example where such strategy is used is in the implementation of the Microsoft Education project, (http://www.microsoft.com/education/default.mspx). The stated aim of this

project is to spread technologies and bridge the digital divide, by using a group of 'champions' to promote the use of technology in each institution and country where Microsoft implements the project.

However, in the context of the study presented in this thesis, it was observed that in some schools, enclaves emerged naturally (under certain circumstances related to the character of the school as 'introvert' or 'extravert' and the principal's leadership style), rather than being created purposefully with the interference of policy-makers. An example of a non-artificial 'enclave' referred to in the related literature is the enclave model observed to emerge as a reaction to an initiative, the TVEI (the Technical and Vocational Education Initiative) a major educational innovation in the post-war UK (Dale et al 1990). The enclave model was one of the two models of reactions (the other model being 'universalism') to the initiative. Its features were described as follows in Dale et al (1990, p. 61); 'the idea of this cohort is taken very seriously (it exists 'de facto' as well as 'de jure'), the resources are concentrated in a relatively narrow range of identifiable activities (especially the development of unequivocally technical and vocational subjects) and the TVEI has a distinct identity within the school'. On the other hand, where the 'universalism' model was observed, the TVEI had very low or not even existent profile within the school. What is of interest to this thesis is that the two abovementioned models were school-determined, and therefore it was observed that there were differences in the schemes developed locally, emphasizing different aspects of the guidelines; this was termed 'the TVEI effect'; 'what TVEI meant within any school'.[89]

Another study that uses the term 'Island of Innovation' to describe an enclave was the study of Forkosh-Baruch et al (2005) that participated in the international study IEA SITES (Second Information Technology in Education Study). Two patterns of implementation of ICT innovative practices in schools were observed in Israeli schools case studies, according to Forkosh-Baruch et al; the 'islands of innovation' and 'school-wide

[89] As it is explained 'the combination of the TVEI guidelines and the scheme's salience within a school were mutually influential, and their relationship together with the effect on the scheme of any changes in the major part of the school, gave the TVEI effect its internal dynamic and determined the nature of the school's response to external factors' (p. 63).

implementations'. The first pattern described schools where only 15% of teachers and students employed innovative practices, while the second one was associated with schools where 50% or more of teachers and/or students were involved in implementation of innovative practices.[90] The findings suggested some differences in the school culture between the cases that correspond to the two patterns.[91] Forkosh-Baruch et al suggest that there has to be a specific predisposition of the school (its vision, history of innovations in the school), as well as formal training and communication procedures, for SW implementation to emerge. External factors involved in the innovations (Ministry of Education, Municipalities, Parents, Expert teacher, national and local ICT policy, finance) are more evident in IoI cases. The study described above, is important for this thesis, in indicating that specific school characteristics differed between School Wide or Island of Innovation cases.

Similarly, this research indicated that enclaves naturally (that is, without any strategic interference by policy-makers or principals in the schools) emerged, in different contexts and under specific influences, and had an impact on implementation. Thus the analysis of the data was extended to identify the circumstances that enabled or prohibited the development of an enclave (a smaller group within the school) in contrast to a school-wide group of implementers. In two of the schools case studies (B, A), around 80% of the teachers reported using ICT in their classrooms daily or weekly, which could be described as a school-wide implementation. In both these schools which were regarded as 'extravert' a community of practice was in place. In School C, however, which was described as 'introvert', there were

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[90] The study of Forkosh-Baruch et al examined the data looking at elements such as innovation, communication agents, time frame and social system in order to understand the implementation processes.

[91] In Islands of Innovation (IoI) 'learning time and scheduling were defined more flexibly and teacher-student relationships were more open and equal than in the School Wide implementation schools' (p. 209). In comparison, in 'School Wide' (SW) implementations the innovative projects were integrated within the school timetable. In SW implementations a school policy was in place that promoted the innovation while in IoI implementations a leader or small group of leaders initiated the innovation, and relationships between teachers and students were promoting the innovation and contributed to the image of IoI as student-centred and process oriented. It was also indicated that in SW implementation cases, the principal plays a crucial role in initiating the innovation while in IoI cases, teachers, the ICT Coordinators and the students took the initiative.

two large groups of teachers, one including teachers who daily/weekly used ICT, while the teachers of the other group rarely or never used ICT at school. The analysis of the data looked further at the characteristics of the school and the individuals working within this to identify some of the criteria related to the development of enclaves.

Vast literature provides definitions and characteristics for communities of practice but it seems that little research is done in the area of enclaves and their role in implementation. The importance of communities of learning for organizations has been emphasized by many studies. Fullan (2000) considers 'professional learning communities' and 'programme coherence' as two fundamental organization structures. Similarly, Bryk et al (1998) identified stimulation of professional learning communities' development with the involvement of educators, parents and students, as one of the main components of large-scale reform. Newmann and Wehlage et al (1995) found that more successful schools had educators who created a professional learning community[92]. Joyce et al (1999) provide 'peer coaching' as a key component of capacity building as it allows teachers to extend their teaching repertoires (p. 470).

According to Wenger (2004) 'Communities of practice are groups of people who share a passion for something that they know how to do, and who interact regularly in order to learn how to do it better' (p. 2). The three fundamental characteristics of communities according to Wenger, are firstly the domain, that means the field which brings a group of people together, secondly, the community, as the group of people interact with each other and develop relationships in order to face the problem and thirdly, practice, that is, the knowledge and material (tools, documents, methods etc.) that are accumulated through the years.

Enclaves can be considered as a type of community of practice, although they are different in that they constitute a group within a broader community.

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[92] along with focusing on assessment of students' work and changing their practices according to the assessment.

Based on the existing literature this study identified some criteria to uncover the presence of a school-wide group of implementers or an enclave in the school case studies.

Criterion 1: the domain; that is the level of interest in ICT. As the introduction of ICT was not seen as a priority for Cypriot Primary education, the educators who had an interest in the use of ICT either developed an enclave within the broader school community or promoted the use of ICT and shared practice with all the school staff members within a community of practice. A general pre-condition which would contribute to the development of enclave within the school would be the presence of negative attitudes on behalf of some teachers who would be resistant to new technologies. This would thus leave space to those who would have interest in new technologies and have positive attitudes towards the integration of ICT to develop their own smaller group of implementation within the broader school community.

Criterion 2: Interactions and relationships among the staff members. In the school which was characterized as 'introvert' based on the typology presented earlier in this chapter, a broad community of practice did not seem to exist, while in schools characterized as 'extravert' a community of practice was already existent within the school, and thus the use of ICT became a part of the shared practice within this community. It was expected therefore that in 'introvert' schools, an enclave would arise, in cases where criterion 1 was satisfied. It should be recalled here that the role of the principal in creating positive school culture is also important; this is described later in the chapter.

Criterion 3: Set of a common policy and implementation goals for the school and development of strategies from within the school. Where embedding ICT became an important part of the school's life, and was amongst the priorities of the school policy goals, and where various strategies were developed, either by appointing an ICT school coordinator or creating local after school clubs (for teaching ICT skills to students), this would enhance the development of a school-wide group of implementers.

However, a school policy itself could not prevent the development of an enclave, in case some resistant to ICT educators existed in the school.

Criterion 4: Consistency and permanence in the staff (when staff members who support the initiative leave the school, then the implementation of the initiative is not any longer supported in the school). It could be argued that the more teachers serve in one school, the friendlier the climate becomes, although this does not always assume the presence of a community of practice.

Based on the criteria described above an enclave or a school-wide was identified in each of the schools case studies and was related amongst other factors to the level of use of ICT by educators, as a part of implementation.

It was observed during the research in the field that the presence of enclaves or school-wide communities of practice was related to the principals' attitude towards the staff and the relationships developed between them. Thus further descriptive tools were sought in the literature related to the ways in which principals run their schools in order to identify how the principal's attitude and the school climate influenced implementation.

6.5.3 Principalship and ICT policy implementation

In the existing literature the role of principals in implementation as promoters of change and innovation, and the role of leadership are sometimes taken as one and the same thing. Other times, however, these are considered as two distinct roles. Cuban (1988, in Bush et al 2005a) provides a definition for each of these concepts. He links leadership with change while management to a maintenance activity:

> *'By leadership, I mean influencing others' actions in achieving desirable ends. Leaders are people who shape the goals, motivations, and actions of others. Frequently they initiate change to reach existing and new goals... Leadership ....takes...much ingenuity, energy and skill'* (p. xx)

> *'Managing is maintaining efficiently and effectively current organisational arrangements. While managing well often exhibits leadership skills, the overall functions toward maintenance rather than change. I prize both managing and learning and attach no special value to either since different settings and times call for varied responses'* (p. xx).

On the contrary, Fiedler argues against a firm distinction between leadership and management, claiming that they have an 'intimate connection' and 'a great deal of overlap, particularly in respect of motivating people and giving a sense or purpose to the organisation' (1997, p.26). In the UK, for example, the school principal assumes leadership, as well as management role.[93] On the contrary, in the Cypriot context, principals are appointed as managers of the schools. According to the MOEC (www.moec.gov.cy) a principal is responsible for the smooth and effective management and operation of a school (with three or more teachers) and the development of the work and life in this school, including the close observation of teachers' work, those who serve in the school unit. The principal also undertakes teaching responsibilities within the frame of the school program and the curriculum and keeps and maintains the archives and the property of the school. In addition, the principal executes any other responsibilities he/she is given for the interest of the students, of the school and of education in general

Cypriot teachers are promoted to principals on the basis of their experience, the years of work and their qualifications (masters/doctoral degree) as stated in the Educational Service Commission website (www.eey.gov.cy). Before they can be appointed as principals they must have worked as assistant principals.[94] Also, in comparison to what happens in the UK, in Cyprus the decisions for the appointment and promotion of staff are taken centrally at the governmental offices.

As noticed by Bush (2005b, p. 52); 'In centralized educational systems there may be limited scope for institutional leaders to determine school aims

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[93] The Headteacher has overall responsibility for the leadership and management of the school. As the leading professional, the Headteacher should ensure the school is well managed and organised, providing leadership and direction. In order to support teachers and other staff they should ensure there are appropriate policies and procedures in place, resources and accommodation are used effectively and efficiently and good relationships are fostered within the whole school community'.
(http://www.teachernet.gov.uk/teachinginengland/detail.cfm?id=512).

[94] 'The assistant principal is expected to help the principal with the smooth and effective operation of the school in the management as well as in the educational aspect. He/She undertakes teaching responsibilities within the frame of the timetable and the curricula of the school. He/She is responsible for the activities within the school that the principal allocates to him/her and actively participates in all the work, events and activities of the school. He/She executes any other responsibilities he/she is given for the profit of the students, the school and education in general (MOEC website).

because these are set by national or local government'. As such, the Cypriot educational system does not allow for personal initiative to be developed and thus not much space for the development of leadership roles, rather it 'seeks maximum efficiency through rational approaches to management' (Bush 2005b, p. 43). In practice, however, it is observed that principals do what Fiedler describes as 'motivating people and giving a sense or purpose to the organisation' (ibid). Since the integration of ICT in Cypriot schools was not prioritized in the national educational policy and was rather considered as an optional application, it was left to the principals to enable ICT integration in their schools. During the period of implementation of the 'Evagoras' action plan, it was observed that principals transferred responsibilities to teachers who had the skills and knowledge to act as leaders to manage and promote the use of ICT in schools (ICT Coordinators). In turn, with their own behavior and attitudes towards the embedding of ICT in education others enabled the integration and others hindered it, similarly to what Nachmias et al (2004) describe in their study of 10 schools case studies, within the frame of the wider study SITES; 'principals and leading teachers' involvement in implementation was rated high' and that; 'Teachers see the principals as visionaries, role models, encouragers of innovation, open to new ideas and facilitators of teamwork. 'The innovation will go on as long as the principal is in the school, because he's mad about it...' (teacher quoted in Nachmias et al (2004, p. 298). Also, other literature suggests that 'projects that received support by principal had more chances to succeed as principal's involvement meant that the project is taken seriously and, at the same time, principal's support contributes in recruiting both material resources and psychological support' (Marsh 2001; Berman and McLaughlin 1977 in Nachmias et al 2004). Similarly, Law indicates that the principal's 'vision and understanding' of IT in education strategy in China Hong Kong, enabled innovative pedagogies to emerge (Law in Plomp et al 2003, p. 128).

Either through their own involvement or through the appointment of relevant staff to undertake the integration of informatics to schools, and their approach towards staff, the role of principals is found to be influential to

implementation. As the study continued in the field, it was evident that the way principals dealt with the introduction of ICT varied amongst the four schools, and that their general behavior towards the staff members had an influence on the degree of implementation.[95] For this reason, the study turned to the literature to find appropriate conceptual tools in order to describe principals' behavior and attitude.

Of particular relevance here is the work of Goleman. He links leadership with emotional intelligence (2000) and attributes personal qualities to leadership (2004)[96]. Goleman presents six leadership styles[97]; Coercive

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[95] The current MOEC policy expects from principals to assume management responsibility for the implementation of the integration of ICT to schools, however this policy was distributed only recently and thus, during the first years of implementation during when this research took place, the principals did not have any policy guidelines to follow. The most recent publication of the MOEC 'Informatics in Primary Education' teachers' handbook, (2005) includes suggestions as to the responsibilities that principals are expected to undertake for the effective use of computers in the school unit. These are provided in the form of suggestions in the teachers' handbook thus the implementation of the program is assumed to be optional. More specifically, the school principal:

- is informed about the rationale of the integration and use of Informatics in the teaching process
- integrates Informatics in the broader school planning through a specific action plan
- observes the work and the progress taking place in the school unit in terms of Informatics, according to the action plan that was developed at the beginning of the school year
- Appoints an ICT Coordinator from the members of the staff at the beginning of the school year
- Encourages educators to use Informatics in their teachings and provides motives for encouraging more educators to participate in the program
- Enables educators and the ICT Advisors (in terms of time and space) in order to achieve effective implementation of the program
- Encourages educators to be trained and wherever possible arranges training seminars within the school unit
- Encourages and promotes the use of computers by children with special educational needs
- Communicates and collaborates with the relevant authority (School Board or Regional authority) or computer company, which provides technical support to the school
- Maintains in the school archive the folder 'Informatics' which includes whatever is relevant to the program (documents that the IT Committee sends, meeting minutes, technical specifications of the computers and others)
- Keeps a calendar with the Informatics events organized at the school

The handbook was distributed to schools after the survey and case studies took place, therefore the study did not address any of the above issues, although activities described above were observed in some of the schools case studies.

[96] Bush (2005b), Leithwood et al (1999) and Yukl (2002) notice that definitions of leadership involve a process of influence. Fiedleer et al, (1977, in Crawford et al (1997) p. 27) argues that 'leadership style is an innate, relatively enduring attribute of our personality which provides our motivation and determines our general orientation when exercising leadership'.

[97] Goleman draws on a research that included a sample of 3871 executives, and indicated six leadership styles that influence the performance of the company. The same research

leaders demand immediate compliance ('do what I tell you'), authoritative leaders mobilize people toward a vision or ('come with me'), affiliative leaders (create emotional bonds and harmony (or 'people come first') democratic leaders build consensus through participation (or 'what do you think?') Coaching leaders develop people for the future (or 'try this') and finally pacesetting leaders (expect excellence and self-direction, setting high standards for performance or 'do as I do, now') (2000, p. 80).

More specifically, a coercive leader does not allow for flexibility, follows a 'top-down' decision-making, and therefore does not allow staff to take initiatives and undertake responsibility. This kind of leader destroys the rewarding system of the staff, and does not provide clarity and commitment to a shared general goal.

Authoritative leader on the opposite provides a clear large vision of the organization defines standards related to that vision and motivates people towards that. Furthermore, rewards are based on that vision, and there is flexibility in the means of achieving the targets.

An affiliative leader values people more than goals, and hence builds emotional bonds and a sense of belonging which in turn lead to having loyal staff members. There is flexibility, trust, and discretion in the delivery of services. This leader motivates staff members by providing positive rewards on their performance.

A leader with a democratic leadership style 'builds trust, respect and commitment' (p. 85), workers have a say in decision-taking, and in taking responsibilities.

Pacesetting style applies to a leader who 'sets extremely high performance standards and exemplifies them himself; he is obsessive about doing things better and faster, and he asks the same of everyone around him; he quickly pinpoints poor performers and demands more from them; 'If they don't rise to the occasion, he replaces them with people who can' (p. 86). This attitude results to having low motivated overwhelmed workers, and in relation to the

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indicated that effective leaders combine different leadership styles, rather than relying on one of them.

lack of flexibility and a rewarding system, have negative effects on the company's performance.

A leader with coaching style, identifies workers' personal strengths and weaknesses, focusing on personal development, and provides flexibility and clarity.

Goleman suggested that the first and the last leadership style had negative influence on the organization culture and the rest had positive effects on culture and performance of the organization and he argued that 'the more styles a leader exhibits, the better' (p. 87). Although Goleman's leadership style emerged from research related to private companies, the tools provided can be used in defining a school principal's attitude towards the staff, and his/her way of managing the school.

It was observed during the visits to the schools case studies, that the relationships developed between the principal and the staff differed in each school case-study and had an influence on ICT implementation. Leadership thus is perceived in this study not as change/transformational leading, but as a personal quality of the principal, that affects the relationships amongst the staff, as well as the school climate. Taking into consideration the discretion that principals had in supporting ICT integration in their schools, as well as the hierarchically higher position of principals in the Cypriot schools, this thesis attempted to describe the principal's behaviour based on the school observations, using Goleman's frame on leadership styles. The above literature is therefore used to identify leadership styles that match the way a principal builds his/her relations and works with his/her colleagues. In addition, this study attempts to explain the way that the leadership style of the principals influenced the members of staff in terms of ICT integration in their practices.

The findings presented in Part 1 of this chapter indicated that although teachers do not turn to principals to get help for using ICT in their classrooms, the existence of ICT Coordinators who were important for the implementation within the school or/and the existence of a group of educators (school-wide/enclaves) who used ICT in their classrooms, was related to the principal's relationships with staff and in general the school

climate. Through the interviews with three principals in three out of four school case studies, and through observations in all four schools-case studies, it was observed that each principal had a different style in supporting ICT policy implementation within the school.

These findings enhance previous research that sees the importance of the leaders-principals as being the visionaries within the schools and the ones who practically and emotionally support implementation, even though they may not undertake leadership for implementation activities. Later on, in this chapter the participating principals are described through Goleman's frame in the presentation of the findings for each case-study. Some background information regarding principals' role in embedding ICT, drawn on the preliminary study findings, as well as on other studies, can be found in Appendix 11.

Beyond the principal's role, the ICT Advisors and the ICT Coordinators, educators with knowledge in ICT, were identified as important influences on implementation. Below, the conceptual tools regarding 'champions' were relevant for describing the ICT Coordinators' role in implementation and as a result, the related literature was explored.

6.5.4 Champions

ICT advisors (educators seconded in ministerial offices as members of the IT Committee) were identified as important links between policy and policy implementation levels and their contribution to implementation (for example, through theorization) was also identified through the research in the implementation field too. These are appointed by the Ministry of Education and Culture, and can be considered to be the team of leaders that is strategically created to support ICT implementation. A surprising survey finding, however, as described in the first part of the Findings chapter indicated that although the Ministry of Education and Culture of Cyprus did not appoint through employment any ICT Coordinators, 79% of the teachers who were asked if there is an ICT Coordinator in their school answered YES while only 9% answered NO (6% replied that they do not know and 6% did not answer this question). Also, 84.9% of the participating principals

informed the study that there is an ICT Coordinator in their school, and of those who said that there is no ICT Coordinator in their school (13.2%), 7.6% gave a reason for that; 'no time is given by the Ministry' (3.8%), 'there is no IT specialist teacher in the school' (1.9%) and 'I haven't seen him' (1.9%). This finding led to the assumptions that firstly ICT Coordinators are the 'champions' within the schools and secondly that they promote the use of ICT based on their own motivation and will. In order to check the correctness of this assumption, a definition and characteristics of champions were sought through a review of the relevant literature. The contribution of 'champions' in spreading the new structure, (ICT use in educational institutions), their characteristics that appear to be homogeneous (e.g. their personal interest in ICT, computer skills, postgraduate educational qualifications) and the circumstances under which they seem to arise, in the specific context where the implementation process takes place, are under scrutiny.

The importance of 'champions' during the first stages of implementation (Habitualization) was outlined by institutionalist theories. According to institutionalism, champions are the individuals 'with a material stake in the promotion of the structure' (DiMaggio 1988 in Tolbert & Zucker 1996 in Clegg et al 1996); champions usually emerge when there is potential for the innovation to spread. In order to manage to 'sell' the innovation 'champions' have to produce theorization of an organizational problem and provide arguments for a formal structure to be used as a solution to that problem, as well as provide examples of successful cases where the structure was used. Champions appear at the phase between habitualization and objectification stages (in the institutionalization processes of Tolbert and Zucker 1996) and they contribute to theorization which leads to diffusion of the structure.

Other literature suggests that champion is an individual who informally emerges in an organization (Schon, 1963; Tushman and Nadler, 1986) and promotes the innovation, as his/her own, through informal networks, although this may involve risk taking for his/her own position. According to Schon (1963, p. 84), 'the new idea either finds a champion or dies'. Peters

and Waterman's (1982) study also emphasized the role of champions in successful innovation in companies. Achilladelis, Jervis, and Robertson, (1971, p.14) identify as champion the one who makes 'a decisive contribution to the innovation by actively and enthusiastically promoting its progress through the critical [organizational] stages'. Smith et al (1984) characterized a champion as the 'major salesman to management'.

Howell and Higgins (1990) in their research on champions of technological innovation used three variables in order to compare champions and non champions: personality characteristics, leadership behaviours and influence tactics. They used questionnaires and interview transcripts of twenty-five pairs of champions and non champions and revealed that champions are characterized by risk-taking, innovativeness, inspiration and intellectual stimulation characteristics related to transformational leadership behaviours, at a higher level than for non champions. Their research demonstrated that champions are informal transformational leaders who spontaneously emerge within organizations. It was also indicated that there is a more positive relationship between personality characteristics and leadership behaviours, as well as between personal characteristics and influence tactics for champions than for non champions.

Markham's study (1998) defined champions as 'people who (1) adopt the project as their own and show personal commitment to it, (2) contribute to the project by generating support from other people in the firm, and (3) advocate the project beyond job requirement in a distinctive manner.' He also found that risk-taking is a characteristic of champions, and the use of influence tactics is one of their strategies for involving others in the promotion of a project (rather than working themselves on a project). However, Markham's study did not support the idea that champions essentially contribute to the performance of the project, rather that they influence other people's behavior especially, if they have positive personal relations with them which in turn, has an impact on the project. His research indicated that champions tend to use more cooperative than confrontive tactics for influencing other people, however, the choice of tactics does not play an important role in the final performance of the project.

The above literature emphasizes personal characteristics of 'champions', and the research presented in this literature mostly applies to business firms. As such, this literature has weaknesses, when it comes to educational institutions, as the latter, are harder to change, while business institutions change more easily. Therefore this literature has to be used cautiously, when applied to the educational context. It is however, useful in providing ideas and concepts for identifying champions. A pre-requisite for this, was to define what an ICT Coordinator is, and the study used the UK case where the ICT Coordinator has a formal role in the school to compare the role that the individuals undertake informally as ICT Coordinator in the Cypriot context.

6.5.4.1 The role of the ICT Coordinator

In the UK the role of the ICT Coordinator is accompanied with the relevant definition and set of responsibilities. More specifically, in the UK aspects of ICT coordination include according to BECTA; developing an ICT vision for the school, strategic and operational planning, coordination and monitoring of the Key Stage 3 ICT Strategy and Key Stage 4 implementation, coordination and monitoring of ICT usage across all National Curriculum subjects, coordination and monitoring of information management systems, system and resource deployment, management and maintenance, ensuring appropriate technical support arrangements, ensuring appropriate staff training and ensuring that the school is aware of relevant hardware, software and service developments (BECTA website). Nowadays BECTA is pushing towards a group development for IT coordination in the school, rather than one ICT Coordinator assuming all responsibilities.[98] The

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[98] - raising standards in ICT within the 5-14 National Guidelines (establishing a program of work with ICT, related to the national guidelines, providing in-service training and support to the staff, assembling and producing teaching resources
- identifying and disseminating effective ways of teaching using ICT, co-ordinating the use of ICT across the curriculum (collaborating with colleagues and supporting them to introduce ICT in their lesson planning)
- ensuring the school's ICT resources are maintained and used effectively (work that should be supported by technical staff, sorting out hardware and software problems, installing software, advising the principal on relevant purchases, managing the school network, keeping archives of the school ICT resources, Internet filtering and maintaining the school email accounts). It is also stated on the BECTA website that 'to achieve the above the ICT

role of the ICT coordinator according to BECTA is underpinned by the school ICT policy, which he/she is responsible for reviewing when necessary.[99]

In the case of Cyprus, in the contrary, the role of the ICT Coordinator is not officially defined. A reference to the 'Coordinator of the school unit', in the policy document 'Evagoras' is acompanied by the explanation 'the teacher with basic knowledge of hardware and software' ('Evagoras' 1999, p. 60), however, there is no other definition or reference to what ICT Coordinators do, in this basic official document. Previous research in ICT implementation in Cypriot primary schools using the BECTA checklist, described that ICT Coordinators hold an unofficial position designated by the school principal and they are mainly responsible for guiding colleagues to ICT use and they are generally 'in charge' of ICT in their school. Furthermore, they deal with the duties of a 'regular' teacher in a primary school and are exempt from advantages such as salary increases or free teaching hours' [100] (Sergiou 2005).

Comparing therefore between the UK and the Cypriot roles of an ICT Coordinator, it is observed that while in the UK the ICT Coordinators are expected to develop a leadership, as well as a management role, in coordinating and promoting the implementation of ICT, in Cyprus the role of the ICT Coordinator has been recently defined formally as a role of a IT manager within the school.[101] This appears to have similarities to the role of

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co-ordinator should work closely with the senior management team and other members of staff, each of whom will need to share some of the workload.'

[99] (http://schools.becta.org.uk/index.php?section=lv&catcode=ss_lv_lea_02&rid=3747)

[100] (ICT Coordinators was a decree which was introduced only for a year, during which the MOEC allowed the ICT Coordinators 4 hours – out of the teaching hours- weekly to devote on their role as ICT Coordinators) Sergiou informs us that *'A possible measure tested a couple of years ago, was based on employing teachers working as ICT Coordinators as well, for specific teaching periods. Even though this procedure was stopped due to insufficient governmental funds to finance this innovation, the ICT Coordinators agree that this would be a solution to allow them time to employ their duties as ICT Coordinators in their schools'.* (Sergiou, 2005, p. 47)

[101] In the handbook for teachers published by the MOEC in 2005 and currently distributed to schools, the role of the ICT Coordinator in the implementation of the program 'Introduction of Informatics in Primary Education' was defined as follows:

- Supervises the progress of the program and informs the principal of the school and the regional ICT Advisor
- Informs the principal and the rest of the staff about Informatics issues and his/her contacts with the IT Committee and the Regional ICT Advisor

the principal, who has more management responsibilities rather than being a leader. Another difference between the two countries is that the role of the UK ICT Coordinator was defined at the beginning of the introduction of ICT to schools, while the ICT Coordinators in Cypriot schools emerged spontaneously within schools, even though their role was at first initiated by the Ministry. The initiation was not however, followed by definition of the role or legitimized with professional status, and thus these individuals were either appointed by the principals of the school or they offered themselves to take the role as ICT Coordinators, without being rewarded. In the UK, on the other hand, the ICT Coordinators are formally appointed and paid for the services they provide in schools. Based on this, the Cypriot ICT Coordinators could be characterized as champions, those who first adopted ICT in their practices, and promoted the use of ICT by their colleagues within the school, based on their own interest in ICT, their skills and knowledge in using ICT, as indicated in the previous chapter, which outlined the common characteristics between the three ICT Coordinators working in the school case studies. Appendix 12 provides further background information regarding ICT Coordinators in Cypriot schools.

The survey results presented in Chapter 5, indicated that while no official document refers to the role of ICT Coordinators, it appears that educators within the schools (principals and teachers) have created an image about this role (of the ICT Coordinator) and that they distinguish between the roles of the ICT Coordinator and the one of the ICT Advisor (Chapter 5, ICT facilitators at school)[102]. Similarly, to the answers given regarding the role

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- Keeps a program for the use of the computer lab (if one is available) so that it is used at the best possible level in terms of time, and by as many as possible of the school year teams and teachers
- takes care of issues regarding the protection of the available devices, solves technical problems, orders consumables (e.g. ink for the printer) etc.
- coordinates the effort of presenting childrens' essays that were completed on the computers on boards in public areas of the school

[102] When principals were asked about various aspects of the role of ICT Coordinator 49,1% of the principals said that a part of the role of the ICT Coordinator is to inform the educators about the decisions of the Ministry regarding the use of ICT in schools (in comparison to a 75,5% of the principals who attributed this aspect to the role of the ICT Advisors instead). Most principals identified as most important part of the role of ICT Coordinator 'providing technical help' (81,1%) and 'providing material to the educators'

of ICT Advisor, again, none of the principals answered that he/she did not know what the role of the ICT Coordinator is. What is interesting thus is that at the implementation level, the role of the ICT Advisors and the ICT Coordinators is defined locally, and the image that principals have about the ICT Coordinators is homogeneous. Also important is that the ICT Advisors, as well as 'Evagoras', view the role of the ICT Coordinators as one of providing technical help in problems related to the software and hardware available to the educators in the schools.

In terms of the practical help that educators have within the schools, most of the principals stated (in the survey questionnaire) that they turn to colleagues, the ICT Coordinator, as well as to ICT Advisor for help.[103] Besides, the majority of teachers (41%) evaluated the help they receive from the ICT Coordinators as important. Finally, the correlations run using the survey data (presented in part 1 of this chapter), indicated that receiving help from the ICT Coordinator (and evaluating this as 'important') is related to the use of computer in the classroom by the teachers[104].

The survey results indicated the importance of ICT coordinators in providing support for teachers who integrate ICT in schools. The question that arose was whether ICT coordinators were just IT managers within the schools (in the way they are now officially defined in the recent teachers' handbook 'The introduction of informatics in primary education') or champions too.

The case studies indicated that ICT coordinators are those who identify the project of embedding ICT in schools as their own, by carrying responsibilities within the school, they do provide support to their colleagues, and they do that beyond the requirement of their job. More specifically, the following characteristics were identified as common amongst the ICT Coordinators who participated in the study and support the

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(such as software, handbook for the use of ICT) (58,5%). 30,2% agreed that it is the role of the ICT Coordinator to do co-teachings and give examples to the teachers.

[103] 49,1% said that they receive help from the ICT Advisor, 32,1% from the instructions and the website of the Ministry of Education and Culture, 13,2% from educational websites, 58,5% from the ICT Coordinator, 64,2% from the teachers of the school, 7,5% from the students of the school, and 3,8% from other sources.

[104] ($p=.005$, $x^2 = 7.866$, $df=1$)

idea that ICT coordinators were not only IT managers but also champions at the initial stages of implementation. (Findings from Sergiou (2005) are also used in the quotes for supporting the findings of this study; all these are presented in the footnotes).

Self identification with the project

According to Markham's study (1998) and according to Schon, (1963) and Tushman & Nadler, (1986) 'champions' identify themselves with the project, and they promote it as their own. The ICT Coordinators who participated in the interviews also identified themselves with the project of ICT implementation, by defining goals, developing action plan for achieving the goals and referring to the project as theirs.[105]

Self-motivation for doing the project

The ICT Coordinators of the study informally emerged within the institutions, without being employed by the Ministry and without being rewarded for their contribution to the project. The ICT Coordinators interviewed acknowledge the work they are doing as Coordinators admitting that it is based on their own initiative and willingness to help, as they don't receive any rewards such as increased salary.[106]

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[105] S170a: '*our goal of course is not for the students to learn skills...' (School A, Interview 3, 026- 060) and 'e... we are in a very good fate in comparison with other schools, because we have the lab, few schools have lab; it is very positive for us, that there is a computer;'* (School A, Interview 3, 125)
S65: '-*... for example, in the school, we did an action plan, I don't know if the principal told you*
- No, no (he didn't tell me)
- Which says, for example, in the first grade, the kids should know these three things, for example, to know how to use the mouse the one the other,
- A, regarding ()
- That means, (at) each grade, something should be built.... I wrote it myself with some one else, five things, five goals ... what we will do for the school. And every teacher got this; now, if they implemented it, ok, if they didn't... it's another issue' (School C, interview 1, 345).

[106] '*yes, I give from my free time, I don't have time for this purpose, if (emphasis) I want, I go, and if I am conscious; for example, today I was running during the breaks to prepare (he means to fix) some technical problems that colleagues had, which they couldn't face; This is not correct however, e, how long can you take it? e, millions of pounds were wast... were wasted for this innovation and they do not give one hour, for example, in each school for the coordinator who will help the a or b colleague, either technically, or showing some*

Signs of theorizing of the project

One of the characteristics of the ICT Coordinators was identifying the problem (education system not effective enough/modern society requires technological literacy) within the institution and offering the project (use of ICT) as a part of the solution (transformation of education) although there is no general consensus on the usefulness of ICT in teaching and learning. This involved overcoming uncertainty of the success of the project and risk-taking, as well as role taking of an informal transformational leader (Howell and Higgins 1990). In the institutionalization process (Tolbert and Zucker 1996) champions emerge at the phase of habitualization where their contribution in theorizing behaviours and meanings related to the structure (use of ICT) is important for progressing to the next step, the objectification of the structure. The ICT Coordinators involved in this study, contributed to theorizing the use of ICT, based on their own beliefs, knowledge, and the policy of the MOEC.[107]

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programs, or helping do a lesson; I was invited by colleagues, and I went to the lab to show them some programs, but at the end why should you go? ... you don't have a motive' (School A, Interview 3, 100)

S170b: '*we are here with M...(name of the coordinator) with whom you are going to talk later, but we don't have any periods, if a colleague wants something, we will go either during the break, or.. during some time that is convenient for both (of us)*' (School A, interview 1, 174)

S65: '*e, this, for which reason, I told to the principal too, for which reason, should I miss my free periods, to fix computers? I am not a technician, I am not a programmer, and neither they pay me 'extra'* (he uses this word) *for this... for example, I have also all the other responsibilities that the others have, but it's this, it is very time-consuming, every time I come to install programs, to go and buy programs* '(School C, interview 1, 155).

ICT Coordinator: '*The computer coordinating at school acts in "tax" of our free time*' (Sergiou 2005, MSc dissertation)

[107] '*this is its philosophy in primary* (education), *it is a tool, it's not a new subject, although I don't know if there is a reason to be embedded, if they give some hours, because it is up to the teacher if he wants to bring the kids in touch with the computer, if there were some hours, I don't know if it's correct or not, it is a very different philosophy the one which exists at the high schools where there are separate hours, they start clearly with skills and they leave (aside) probably the educational sector, they teach them only skills, while we, mostly introduce to the children the process, to use it as a tool to do an exercise, in the high school education they see it as a very different thing; ...*' (School A, Interview 3a, 141)

R: '*the software that you have available, makes you plan the teaching differently, than before? ...Or that the computer is present in the classroom, does it change the teaching?*

T: '... it depends what you mean by 'changing'; let's say from teacher-centred to like this... to child-centred? To tell you the truth, I was always a fan of another method, so it (the computer) didn't change some things; that means, if there wasn't computer, again, I would find something for them (the students) to occupy themselves, alone, to search, to do

R: again, the teaching doesn't change, it just happened...

Having enthusiasm about the project and its potential in the organization and seeing a space for this project to spread

'Champions' believe in the potential of the project, and have an enthusiasm about it, and similarly, the ICT Coordinators appear to use their enthusiasm to stimulate others to participate in the implementation of the project.[108]

Personal involvement in learning about the innovation (ICT)

It is expected that the champions have knowledge about the innovation or structure they promote, and that their enthusiasm emerges from that knowledge and their personal attribution to the artefact of the project. It appears in addition, that the ICT Coordinators acquired the knowledge they have through trial and practice and through their own investment (in time/effort/money) to learn about the artefact (ICT) they promote.[109]

T: yes, it is a tool, which helps me to implement this ideology that I have let's say, in the teaching' (School C, interview 1, 105)

'*the children nowadays, have to learn how to learn, either with the computer, or alone, or with anything else they use, they have to learn the way to learn, not knowledge, because knowledge is huge, even how many we tell them, they are not enough, they have to find alone, either we help them in this way, how to find something, to solve a problem of their own, by using either the computer or anything else. To know where to go (run) and how to use it in order to find something that they need*' (School A, interview 1b, 312)

[108] '*no, it's not a fashion that will pass, for sure, they (computers) came, they will stay, and maybe there will be more, there is still more 'part of the pie'... only the internet itself, just because of the internet, there is no chance that they (computers) will be removed from the schools, for me the internet; it is a terrific tool, but it should be used carefully*' (School A, Interview 3a, 257)

'*...nowadays, learning is not limited into school, but goes beyond the school...you have the computer now (),...and it is a useful tool, let's say the computer skills you will have, it is useful tool out of the school too, you may sit at home, find what you want, which is beyond learning* ()' (School C, interview 1, 223)

'*... we all need, I guess the computer, in our preparation and in the classroom too; maybe it is not used daily, the computer in the classroom, because as we said before it is time-consuming at the beginning etc., but it became necessary, that means, there cannot be schools now, which do not have computers at all*' (School A, interview 1b, 312)

[109] ' *I went voluntarily for lessons, before they did the last series, e... but to tell you the truth, I learned limited things, if I didn't mess around alone, I wouldn't learn...*'(School C, interview 1, 001)

'*...I may discover something, let's say; I don't keep it, it's not only for me, I discuss about this with other friends of mine, who are usually teachers, we talk, that I discovered this thing, which you can use for this or something else finally, e in the classroom ... I* (emphasis) *help myself* (he smiles)' (School A, interview 1b, 160)

ICT Coordinator: 'Personal pastimes were helpful in learning about ICT. My first experience with ICT was at the Pedagogical Institute. However, if the teacher doesn't

Open-mindedness about teaching and learning

In addition to the descriptions of champions by other studies, the ICT Coordinators champions of this study also had in common ideas about teaching and learning that appear to be far from the traditional teacher-centred, transferable-knowledge methods of teaching and learning. This could be related to the characteristics of innovativeness and intellectual stimulation that Howell and Higgins (1990) attribute to champions. They therefore employ collaborative, explorative methods of teaching in their classrooms and they find that the project (use of ICT) enables them to apply these methods.[110]

Based on the above, it could be argued that the hypothesis that the ICT Coordinators are the 'champions' within the schools is positively confirmed, although the level of involvement of each ICT Coordinator in implementation differed from school to school in the four case studies. The School C coordinator, for example, limited his involvement in managing the ICT infrastructure, while the School A Coordinators were involved in organizing in-service training for teachers (seminars), and thus appearing to a higher degree as champions; leaders rather than managers. Therefore the role of the ICT Coordinators in implementation through their influence on spreading the new structure (ICT) was further examined. The following points relate to this question regarding 'influence tactics' (Markham, 1998) that champions may use to influence others.

Sympathising (empathy towards) colleague's feelings about the innovation

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acquire his own computer and devote some time he can't learn about computers. Most of the software has a very user friendly interface' (Sergiou 2005, MSc dissertation)

[110] '*To tell you the truth, I was always a fan of another method, so it* (the computer) *didn't change some things; that means, if there wasn't computer, again, I would find something for them (the students) to occupy themselves, alone, to search, to do... yes, it is a tool, which helps me to implement this ideology that I have let's say, in the teaching...I would call it exploratory, I like doing research*' (School C, interview 1, 105).
'*My children in the classroom are always distributed in teams, we have four or five teams, depending on the lesson, so, one out of all the teams, a different one each time, will do an exercise on the computer*' (School A, interview 1b, 153)

Using influence tactics to stimulate colleagues' participation in the project may require that they first understand their colleagues' feelings towards the project, and that they develop empathy towards them. ICT coordinators understand why some teachers may be afraid to use something new such as ICT or that they may not have the time to use it etc. [111]

Having a point of reference for comparison of their school with other schools/countries and evaluating the work done in their school

This could be one of the influence strategies they use in order to invite others to implement the project, by comparing their own groups with other external groups (other schools/countries) and promoting competition with external factors.[112]

This section used the existing literature to identify characteristics of champions that could also describe the ICT coordinators. The findings that will be presented in the next part of Chapter 6 indicate the role of the ICT Coordinators in each of the schools case studies and their role in implementation, either as managers or champions within the schools.

In the following paragraphs the interview data are used in order to further explain the level of implementation, in relation to each of the above

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[111] '*it's the fear of* (something) *new ... you know, always the fear of something new... in any profession....*' (School A, Interview 3a, 257)
'(teachers) *of mature age, I am talking forty fifty years old, the people are justified; that means the ignorance causes terror...*' (School A, interview 1a, 386)
'*the big majority* (of the teachers) *do not use; now the reasons, either they don't know, or it is time-consuming, either, I don't know, they think that it is not useful, or it will not repay ...many reasons*' (School C, interview 1, 178)
ICT Coordinator: 'Most *teachers feel insecure in using technology in their teachings*' (Sergiou 2005, MSc dissertation)
ICT Coordinator: 'Teachers are afraid to use technology in their classrooms.' (Sergiou 2005, MSc dissertation)

[112] '*in most of the classrooms unfortunately, - in our school this is not happening that much- but in most of the schools, the computer is a plant pot let's say, they may put on it a vase with a flower too...*' (School A, Interview 3a, 026- 060)
'*the positive thing about here, is that we have clubs in the afternoons, where some colleagues teach skills mostly*' (School A, Interview 3, 026- 060)
'*No, simply, because ...I was occupied with projects, I am usually coming in touch with persons, I see what is valid, or what happens in other countries; in comparison to some countries, we are in a better position, some others... nothing... Yes, and there are others, there is the Grundvig, even with the Youth 0.*' (School C, interview 1, 345).

presented factors (school climate/principal's leadership style/enclave or school-wide group of implementers, ICT Coordinator).

6.6 Part 3 Findings - Presentation of the case studies

6.6.1 Introduction

Presentation of each school case study based on the criteria regarding the relationships amongst the staff members ('introvert', 'extravert'), the leadership style of the principals, the presence of an enclave or school-wide group of implementers, as well as the presence of an ICT Coordinator within the school, are explored in each of the schools, as characteristics that influence the implementation process.

6.7 School A

School A is situated in an urban area has a majority of students with middle socio-economic background, according to the school principal. It is one of the big size schools, with 21 teachers, including a speech therapy teacher and a special education teacher and 308 students. There are 12 year groups (2 of each of the six year groups of primary education), each class has one computer installed and connected to the Internet. The principal characterized the ICT level of the school as high and stated in the questionnaire that 80% of the teachers use the computer at school, which was confirmed also through the analysis of the teachers' survey data. It thus belongs to the first category of schools where most of the teachers consider their school highly equipped and most of them use the computer daily ('High ICT Use-High ICT level'). The principal reported that teachers have very good IT knowledge. There is also a computer laboratory equipped with 16 computers and a library with software packages. In the staff room, there is a computer with a printer, a scanner and audio devices. (Worth mentioning here is that the principal requested from the teachers to complete and return the questionnaires, as he said during one of the visits to schools and as a result, 15 teachers returned the questionnaire completed).

This school used to accommodate the regional ICT Advisors in the past, although they had already moved out from this school, when this research was taking place. However, their 'legacy' was evident in the infrastructure

of the school, with a computer lab, a software library, and the tradition in ICT that possibly contributed to the high level of use of ICT amongst teachers. In the afternoon, after school clubs operate in the area of the school, including a computer club where school teachers and other staff teach students computer skills.

6.7.1 School climate

In terms of the relationships between the staff members, this school could be characterized as 'extravert', since the principal's office was next to the staff room, and the door was usually open to the teachers and the students. The relationships between the staff were friendly and teachers were observed to spend time together socializing in the staff common room. In this school, a school-wide community of practice was observed in place and the principal's leadership style was positive for implementation as will be described below.

6.7.2 Principal's leadership style

This school principal was described as having an affiliative style, a more 'people-oriented' approach and this was observed in relation to the high use of ICT by teachers and the presence of a community of practice. The relationships developed amongst the staff and between the principal and the staff, are believed to have enabled implementation. These relations could be characterized as friendly and open and they were reflected in the way the principal, as well as the teachers, approached the researcher, asking about the studies or in the way they talked to each other openly about their age, their studies, and in general the informal and atypical way that characterized the interactions between them.

The open-door approach that the principal had established was obvious in the behavior of the people surrounding him. During the second visit to the school the principal was in his office talking on the phone with an open door. He was apparently frustrated about the issue he discussed. A teacher from the staff room, who overheard the conversation, as well as other members of the staff, entered the principals' office and started a discussion

with him regarding the issue he was talking about on the phone and he shared information with them, involving them in discussions that other principals might have not.

The principal seemed to have friendly relations with the staff members, attitude which was revealed during the visits to the schools. By being cheerful, for example, joking with the teachers or addressing them informally, as well as allowing for often interactions between him and the teachers, the principal kept the distance between authority-principal and staff-employees short, thus enabling communication and collaboration amongst the staff. An incident described in the field notes which indicates the friendly relations between the principal and staff was the following; 'At the end of the staff meeting after getting the names of the teachers who would participate in the interviews the principal joked 'you will not interview my teachers for one hour and make them tired right?' and he also mentioned that he would offer extra time to those teachers who would participate in the study while he would replace them in their classroom. Other examples that indicate the principal's approach 'people come first' were, when the principal had warned the researcher, that there were road works on the way to school, and explained on the phone how the researcher could find the school or when he allowed the school cleaners to leave the school during working hours in order to complete some personal bureaucratic paperwork.

The principal promoted roles that teachers undertook and in this way showed that he supports them. He described the ICT skills and knowledge of the teachers as 'very good'. He introduced one of the ICT Coordinators to the researcher and in general he seemed to believe in the capabilities, knowledge and skills of people around him.

The style of the principal of this school was identified as affiliative (creates harmony and builds emotional bonds or 'people come first'). This approach adopted by the principal allowed for leaders or champions to emerge and as a result, two voluntary ICT Coordinators undertook responsibilities for coordinating the implementation. The friendly school climate can be related to principals' open relationships with the staff, and thus a broader

community of practice seemed to be present in the school, promoting the ICT use by teachers who were interested in employing ICT at school.

6.7.3 Enclave or school-wide group of implementers

In this school the circumstances observed did not allow for development of an enclave. Below, the four criteria employed for exploring the presence of an enclave or a school-wide group of implementers are presented with relevant evidence.

Criterion 1

The domain; that is a general interest in ICT

The interest in the use of ICT was shared amongst the majority of the staff members of this school, and 80% of them stated using computers (or ICT in general) at school, daily or weekly.

It became evident through the interviews that educators sought help from each other or from the ICT Coordinators who voluntarily undertook that role, in order to share ideas and practice; 'Many times, e, I cannot say that I help others for example, but e, when I have difficulty I will ask, when some have difficulty they will ask me, it happened many times that some (teachers) asked me to... how to work one program or the other program (School A, Interview 2, 554-590)

A teacher reported becoming aware about the ICT policy through talking with colleagues (Interview 2, 698), and the ICT Coordinator mentioned during the interview that he was invited by colleagues to show them some computer programs (Interview 3, 100). These examples indicate that teachers in this school were interested in learning to use ICT.

Criterion 2

Interactions and relationships among the staff members ('introvert'/'extravert')

The interactions and the relationships amongst staff members were friendly and the school was characterized as 'extravert'. During the visits to the schools teachers would freely come into the principal's office and discuss with him, and the principal had adopted a 'people-oriented' affiliative

leadership style. Interactions amongst the teachers were observed and mentioned by the interviewees too:

> - *I receive help by the Coordinators*
> - *And by colleagues? Do you take ideas?*
> - *By colleagues yes. When I see that someone did something on the computer, and it can be implemented in the 1st grade...* (School A, Interview 4, 397).

Worth mentioning is that the word 'colleagues' occurs in the interview transcripts from this school (only used by the interviewees) 13 times. The meaning of this word can be connected to the presence of a community of professionals, therefore by using this term to refer to the other members of staff the interviewees indicate that they belong to such a community.

Criterion 3:

Set of a common policy and implementation goals for the school and development of strategies from within the school.

The appointment of two teachers-volunteers who acted as ICT Coordinators within the school was important for providing support for school-wide implementation. In this school, the ICT Coordinators seem to be active, and in order to meet the interest and learning needs of the staff members, they organized various activities, for example, training seminars in the school (School A, Interview 2, 419-473) or lessons-examples in the computer lab (School A, Interview 3, 100). Also, an initiative related to the ICT implementation, which was put into practice at this specific school, were the afternoon clubs. Teachers of the school were involved in teaching basic skills to students, which in turn had a positive impact in the progress of the students in using ICT in cross-subject areas during school lessons, as reported by interviewees. The afternoon clubs also enabled the teachers who worked there to gain some confidence in using ICT and broaden their knowledge and skills:

> '*E, now that I am doing the clubs with the kids* (she means teaching in the clubs), *every time I do the lesson with the kids I discover as well new things; because I may have been thinking that no way that the children can do this thing; instead, by working every Wednesday with the groups, I can see that they like it more, and they ask for more, more more*' (School A, Interview 4, 519)

Criterion 4:

Consistency and permanence of the staff

Although the principal was appointed to this school for the second year only, some other members of staff were employed longer in this school. Important here is that the ICT Coordinator has been actively engaged in the ICT implementation for many years and was additionally participating in seminars as a teacher-trainer. The other ICT Coordinator also mentioned that he has been using computers for 12 years and that he feels confident using computers. They brought thus with them to this school their interest in ICT use and they both have worked in this school for more than one year, which means that they have contributed to the development of a tradition in ICT at the school.

The mean of teachers' work in this school is 2.4 (min = .76, max = 7) (SD= 1.7), which is higher than in the two other schools-case studies (except from School D).

6.7.4 ICT Coordinators, champions or managers

Two ICT Coordinators were interviewed in this school. One ICT Coordinator was introduced to the researcher by the principal, who asked him to offer the researcher any help needed during the research. This ICT Coordinator mentioned that he is a member of the Teacher's Union Committee. He has completed a Master's degree and mentioned (during informal conversation) that he applied to a British university for PhD studies. He has been using computers in general, for 15 years, and in school for 6 years; he participated in computer training seminars and he also worked as teachers' trainer in such seminars.

The second ICT Coordinator, in School A, was introduced as such himself and he was also mentioned as such by his colleagues. He worked as an educator for 10 years, and he has been using computers for 12 years. Through practice he learned to use various programs and he reported feeling confident to use computers.

The ICT Coordinators in this school acted as champions by offering in-service training, as well as managers, solving technical problems that

occurred. As individuals they had some common characteristics which describe them as champions. These were identified earlier, in Part 2.

6.7.5 Conclusion – School A

School A constitutes an example where positive conditions enabled school-wide, high level implementation of the ICT policy. The categorization of this school based on the survey data, as 'High ICT level resource'-'High ICT use' school can be explained through the qualitative data. The school climate, as well as the principal's leadership style, was encouraging for the implementation, and the presence of a large number of educators, who were interested in ICT, led to the adoption of ICT within a school-wide group and to the exchange of ideas and expertise between the members of this group.

6.8 School B

School B is in an urban area, close to the city centre; it is a medium sized school, separated into two parts, each of them run by a different principal. The part of the school that participated in the study was the one including the lower year groups (1st to 3rd year). In the lower school, only female teachers were present during the data collection visits and the principal was also female. Most of the educators in this school were young teachers (below 40 years old). The building of the school was square like, it constituted by ground floor, which accommodated principal's and staff room, as well as some classrooms, and the first floor which accommodated the rest of the classrooms. In the middle of the building there was the yard and courts and on the other side of the building was the part of the school with the higher grades of the school.

According to what some teacher interviewees reported, this school has a long tradition in using ICT as it was one of the experimental schools that were first equipped with computers at a pilot stage of introducing ICT in primary schools and belongs to the first category (High use-High level). It was characterized by the teachers and the principal as having high ICT level, and students belong to a high socioeconomic class.

One of the teachers informed the research during the interview that the school also participated in the recent past in a Comenius program (European Union initiative) within the frame of which students contributed to the development of a website in collaboration with other schools abroad:

> *'because we are in a school which is in a European program, Comenius, it was related to exchange of information with other... other schools, we had... a there is a website, for these schools, in which there was information integrated from all the schools, e... related to the weather... e... with the.... () the time that the sun rises and sets in each country, and through this the students were studying and they were doing...() information, with the children of the other schools... they* (the students) *were doing the selection, the things to put on the website, e... ok and to enter in this* (website) *and search for the information'.*

The main reason reported by the teacher interviewees for not using computers is the young age of the students (6 – 9 years old) who do not yet have the computer skills to be able to use the computer for learning purposes.

During the visits to this school, a high activity of exchanging information on practice and ideas on materials was observed, leading to the conclusion that the teachers in this school formed a community of practice. This was related to the absence of an ICT Coordinator in the school.

6.8.1 School climate

During the data collection period the principal seemed to spend a lot of time, in the staff common room, while her office was situated next to the staff room and was easily accessible. The relationships developed between teachers and between teachers and principal seem to be professional and friendly at the same time. Teachers addressed to the principal in plural. They engaged in conversations for socializing, as well as talking about their work. Based on these observations this school could be characterized as **'extravert'.**

6.8.2 Principal's leadership style

In this school even though the principal did not have time to be interviewed, because of a visit of an evaluation team to the school and because of other responsibilities (preparing/organizing for a school performance on the occasion of a National Day), the researcher could characterize the principal's leadership style through the observations. This could be described as mixed, affiliative but mostly tending to be pacesetting leadership style. The fact that the principal adopted these leadership styles may have been related to the period that the researcher visited the school, when the school was preparing for formal events, and was involved in evaluation by the Ministry. As a result, the principal appeared to be giving directions to teachers and students, on an attempt to maintain a good image of the school for the evaluation. This involved the students' discipline, wearing their school uniform and arriving to school on time. Hence the principal, beyond advising the students during a gathering, she ensured that teachers distributed a 'behaviour handbook' to their students. Another example indicating the pacesetting style of this school's principal, was the award for the cleanest classroom, given to the students who kept their classroom clean for a specific period, event that took place during the school gathering. In the same manner, during the gathering, the principal publicly punished a student who was late coming for the gathering, by asking him to sit on the bench.

The principal was observed allocating tasks to the teachers (to distribute some papers to their students, to make copies etc.), and everyone seemed to be participating in the preparation for the school celebration events and the evaluation. Teachers although seemed to follow the instructions of the principal, they reacted to this behaviour in different ways. One of them was heard saying that the principal is overreacting, that anyway they would do everything as they did always, and that she got bored of listening all the time about the small book, (a handbook for students that included school rules) or about the boards.

At the same time, the affiliative leadership style matched some aspects of the principal's behavior, such as that she often seemed to be outside her office, with the teachers, sharing ideas on various issues and that she personally introduced the researcher to the teachers. The fact that there were all female teachers in this school, may have also contributed to the image of the principal as one that gives emphasis to colleagues/employees as people, and the development of a broad community of practice.

In this school various other influences, such as the location of the school in the same area as the ICT Advisors' office and his/her often contact with the school, supported ICT integration. Similarly, the presence of a community of practice amongst the teachers enabled ICT implementation. Consequently the principal did not have to take any specific role in terms of promoting ICT use amongst the teachers; however, her leadership style may be related to the development of a positive school climate in which a community of practice exists.

The interviewees in School B mentioned getting help by the ICT Advisor (the regional coordinator), as well as from each other:

> *'when the coordinator* (ICT Advisor) *came to the school, gave us some ideas'* (School B , Interview 2, 275)
> *'one colleague attended a seminar, and she informed us about what she saw, and basically, a week, ago, something that was very useful for me, the pc coordinator* (ICT Advisor) *came to the school, and I told him, that I have a problem, that I don't know how to integrate it, and he showed me some idea'* (School B, Interview 3, 449).

6.8.3 Enclave or school-wide group of implementers

In this school, a school-wide community of practice seemed to be in place, and some of the school characteristics presented above may explain this; for example, the fact that the educators in this school were all female and in majority young or that principal's affiliative leadership style may have allowed for friendly relationships to be formed between the staff members. The criteria presented in the other case studies are presented here as well to support this.

Criterion 1

The domain; that is an interest in ICT

More than 50% of survey participants from this school reported using computer at school daily or weekly, therefore the school was classified in the category 'High ICT Use'. During the interviews, all the participants expressed an interest in using ICT in their classrooms although they acknowledged that the use of computer with young age students is difficult, and as a result, some of them did not up till now integrate computers in their teaching. The teachers interviewed reported all knowing how to use computers and that they learned in their own time through practice or through help from family members/colleagues.

They referred to using computer in preparation of their lesson planning or to find/develop material. There was no obvious divide between teachers who want to use ICT and those who don't, even amongst the mature teachers, as one interviewee noticed:

> *'I think that older* (teachers) *ones, started realizing, that they have to use, in the specific school or in other schools, the older applied for the training, even though they didn't know* (how to use computer), *they understood that they cannot avoid it'* (Interview 2, 354).

Beyond that, the interest of the educators in ICT was expressed in the participation of this school in a European program, Comenius, as mentioned earlier.

Criterion 2

Interactions and relationships among the staff members ('introvert'/'extravert')

The school was characterized earlier as 'extravert'; teachers were observed often in the staff room sitting in a circle and discussing about various issues, including exchanging ideas on practice. The principal addressed to them as 'colleagues' and during the interviews the participants often referred to their colleagues for gathering information or ideas:

> *- From which sources do you get information, regarding using computer in the classroom?*
> *- I* (take) *from other colleagues...basically, or by colleagues who have been occupied* (with computers) (Interview 1, 001)

> '...*we have one or two colleagues who are occupied more. If we need something we talk* (to them)' (Interview 2, 260)

An occasion that indicates that the teachers formed a community of practice is described in the narrative notes from the observations:

> '*She* (a teacher) *came in later, and she sat and started talking about the lesson she was preparing for the next day. She told them* (other teachers) *about which text she chose from the book, (she said that that was the most suitable from the 3 remaining lessons in this textbook, it's subject was the Luna park) she said, that she thought also about a lesson regarding the 1st of April* (National day) *but as she added, the students don't live this, and they may not be interested. She said that she chose the other* (the Luna Park) *because it is more interesting for them, they know about it. She explained her idea, about how to structure the lesson, she said she will prepare some games for them, to play, she said 'how many things you can do...?' and she added 'you have to see what you have first- and then decide what to do' and the other added 'yes, you don't have much time...'. The mature teacher got up, and she was looking at something on the board. Then this teacher next to me, said, 'yes, at the end of the lesson you can ask them* (the students) *to represent the Luna Park'. The other teacher who was sitting there, she said 'it's one thing to say that you will do all these, and another thing to do them... it takes time... Mrs....* (said her name)' (School observation)

Also, the questionnaire analysis indicated that 85.7% of the participants, the highest percentage in comparison to the other school case studies, reported turning to their colleagues to get help in the use of computer/ICT in the classroom.

Criterion 3

Set of a common policy and implementation goals for the school and development of strategies within the school.

The operation of the school seemed to be well-structured and organized. The principal continuously gave directions to teachers, regarding things to do; artefacts were produced, such as a students' handbook with school rules, and events such a competition for the cleanest classrooms were part of the school life. Although there was no ICT policy as such, perhaps due to the proximity of the school to the ICT Advisors' office in that city, the ICT Advisor was often visiting and offering advice and guidance to teachers.

During the interviews all teachers mentioned the visits of the ICT Advisor to the school, and some of them also mentioned that during staff meetings teachers who had participated in training seminars shared ideas with their colleagues:

> '*...some ideas, I heard from other colleagues, who are already working with the pc in the classroom, and during staff meetings we did, they already mentioned some ways in which we can integrate it* (the computer)' (Interview 3, 449) (emphasis is mine)

> '*... one colleague attended a seminar, and she informed us about what she saw, and basically, a week, ago, something that was very useful for me, the pc coordinator came to the school, and I told him, that I have a problem, that I don't know how to integrate it, and he showed me some ideas; which, however, in order to do (implement) them, I must sit and get organized*' (Interview 3, 449) (emphasis is mine)

The school was active in terms of participation in programs; in addition to 'Comenius', the school is an ecological school (participating in a program for integrating environmental goals in the lessons, and organizing related activities and events) and in the front yard of the school, there was an exhibition of drawings and essays that students prepared within the scope of this program.

Finally, worth mentioning is that the word 'colleagues' was used by the interviewees eight times.

Criterion 4

Consistency and permanence in the staff

The teachers interviewed reported having two or more years in this school. The mean of years of work in School B for teacher participants is 2.2 years (min= 1 max= 5) (SD 1.3).

6.8.4 ICT Coordinators, champions or managers

In this school, there was no allocated ICT Coordinator, although there were a couple of teachers who the other staff members considered more knowledgeable about ICT and thus they turned to them for help, as reported in the interviews. There was no person informally or formally appointed as ICT Coordinator and therefore no 'champion' in the school. However, the

other factors mentioned above (ICT Advisor's often visits to the school, presence of a community of practice) have contributed to the spread of ICT use, even though there was no individual 'champion'.

6.8.5 Conclusion – School B

This case also belongs to the 'High ICT level-High ICT use' which can be related as presented above to the location of the school (closer to ICT Advisor's offices) which enabled educators getting ICT Advisor's help often, the interest of the majority of the teachers in ICT, and the presence of a community of practice. However, this case is useful in highlighting some school-specific features (different from the other school case studies) that acted as barriers to the implementation; for example, the age of the students (under 10 years old) related to lack (or lower level) of computer skills. Another school feature appeared to negatively influence the school climate, and in turn the implementation process; this was the pacesetting style of the principal, although this had a minor effect, because it was combined with another leadership style that was regarded as positive.

The presentation of the findings continues with the case study that brought to the surface the presence of an 'enclave' in contrast to school-wide implementation.

6.9 School C

This school is situated in a rural area, has 250 students and so it is also considered a big school, especially for a rural area. It should be mentioned however, that it also serves students from neighboring villages, some of which host refugee families. The area is mainly agricultural and parents of the students are occupied with land cultivation, stock-breeding, crafts or they are educators (in primary or secondary education). The school principal informed the study that the majority of students come from a middle socio-economic background. The school covered a large area where an old building that hosted the principal's office and two higher grades classrooms and a newer building with rooms served classrooms, staff room, secretary's

office, and the vice-principal's room. Except from the big yard, there was a basketball court and a garden.

Teachers drew a distinction between this school and schools in urban areas referring to students as more 'active' in comparison to the students of cities described as 'passive' or referring to extra facilities that teachers in urban schools have. An observation was that teachers in both rural schools were dressed less formally than those who worked in schools situated in urban area.

Noteworthy is that this school has a secretary to complete administrative tasks, which is not unusual for large schools; however, this differentiated this school from the other cases. During the visits to the school, the secretary usually had the radio playing in the staff room, and this created non-formal atmosphere in the room. The cleaners in this school were continuously visible taking care of cleaning or watering the plants.

This school falls into the category 'High use-Low ICT level' as more than 50% of the teachers who participated in the survey stated that they use computer at school daily or weekly, however, there was a percentage of teachers (more than 25%) who stated that they use computer monthly or every trimester school[113]. This school was therefore an interesting case to study. The principal characterized the level of IT high, while most of the teachers (67%) characterized it low and only a smaller percentage (33%) characterized it as high. The principal in this school stated that 60% of the teachers use computers at school, according to his estimation. The school has a computer lab, with six new computers and two older ones.

The school principal mentioned that he organized electronically the archives of the school, he appointed ICT Coordinators, and he developed a school

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[113] The reader should be reminded here, that the way schools were categorized was to characterize a school as having High USE of ICT, when more than 50% of the participating teachers answered that they use computers daily at school. In a similar manner, school with Low ICT USE, was the one where more than 50% of the participating teachers reported using ICT at school monthly, or every trimester. As there were not many such schools, however, based on the survey results, the schools where a considerable percentage of teachers reported monthly/trimester use of ICT and had other characteristics important to be taken into consideration (socio-economic level of student population) were included in the selected schools for the final selection of the case studies.

network where he maintains circular letters, other announcements and material that teachers can access:

> *'I found an archive, which was not organized, it was not organized at all, and it confused me, at the beginning, and it scared me a bit. I decided to leave that aside and create my own. So, really, I divided... the files that are there* (he points to me the folders arranged on the shelves in his office), *are present in here* (in the computer) *too, everything is in there, in the computer...' (403).*

During a visit to the school, it was observed that another teacher was showing the principal how to operate the computer, and it may therefore be assumed that the above task was completed by other teachers rather than the principal, but with his own initiative. This principal seemed to be well-informed regarding ICT policies. During the interview, he referred to the Lisbon strategy, emphasizing the need for reaching the strategic goals of technological literacy and 'knowledge society':

> *'E. it is the attempt to become... what we say, the Lisbon strategy, until 2010, that Europe has to become first, as a knowledge society worldwide, they have thus realized the importance of access to knowledge, the use of knowledge, in production of knowledge, and it is considered that technology is a source which really covers distances in relation to this 'road'; e... we have, I believe departed from the notion of, we have one meaning of illiterate, the illiterate in reading and writing, and so on, now we have also the ...technologically illiterate human, and I believe that as we say, no child should leave the school without knowing how to read and write, like this I believe, no child should leave the school, as long as this has the responsibility of the state, not to leave, without knowing how to use and have access to this modern technology medium.'*

This principal also supported the view that computers should be taught as a subject in primary school, like other subjects include technical skills (e.g. the unit 'Design and Technology'). He also referred to his expectations regarding teachers' reaction to the new initiative of embedding ICT in schools: 'of course, they (the teachers) are more modern people, sure, it is them who are upgraded, I believe that the teacher who avoids integrating, even timidly, slowly, is the person who... doesn't dare to take a risk, and in

our job, the professional risk is important, in order to dare... I believe in the audacity, that a teacher must have.'

The principal mentioned (and this was observed happening during the visits to the schools) that he wrote some ideas or directions for teachers on the announcement board, in the staff room, some of which were ideas on how to use the computer.

All the above examples show the principal's awareness in terms of ICT policy not only at a national but also at international level (EU). He therefore used his knowledge and skills to promote ICT amongst the staff members of his school too. However, only 6 out of the 18 teachers of this school returned the survey questionnaires completed, and during the visits to the school, not many of them offered to collaborate with the researcher and contribute to the study. The principal mentioned during the first visit to the school that it was left to the teachers to decide if they wanted to participate in the research, although during the visits to the school he offered to interfere in order to convince teachers contribute to the interviews/observations. This attitude can be related to the principal's pacesetting leadership style that is presented below.

6.9.1 School climate

Based on the typology presented above with regard to the relationships amongst staff, this school can be characterized as 'introvert', since during the visits to the schools, it was observed, that the teachers used the staff room for socializing less often, and when they were there, they were completing work. Some of them stayed in their classrooms during breaks or during their 'offs' and there was no indication of often exchange of information on practice between the members of staff, although 66.6% of the participating teachers reported in the survey that they seek for colleagues' help. The atmosphere in the school was more typical than friendly, the principal's office was in another building situated away from the staff room and teachers were not observed to be often present in the principal's office. A vice principal's office was between the principal's and the staff room.

6.9.2 Principals' leadership style

In this school the leadership style which would best match the principal based on the observations, was pacesetting (sets high standards for performance or 'do as I do, now'). The school belonged in the category 'High use-Low ICT level' as more than half of the teachers reported in the survey questionnaires that they used the computers at school, however, a significant percentage of them rarely used the computer at school. The principal was knowledgeable in terms of ICT use and was aware of ICT policies. He reported organizing the archives of the school electronically, he created an internal network and he encouraged teachers to use it.

> '*...yes, yes, there is networking in the school so, everybody is connected with me. And my teachers, when they want (), and they know this, if they want to find something that they lost and so on, they are able through the networking that is there, to enter there, and find, in the file with the circular letters, to find a circular letter that their lacking, in the file with our demands towards the School board, to find these things then, they* (the teachers) *have this possibility, and I have invited them to enter because there are really in there all those data, which, there is no problem if my teachers know, and these are subjects, on which we decide together in most of the case*' (403)

At the same time, however, the principal seems reserved as to what information he offers to the staff members, which indicates that there is a distance between him and the staff:

> '*I put everything that the teachers can see without being afraid; I avoid putting things that I don't want... I will not put their evaluation data, and neither will I put data...e, some other data, that can create conflicts between them, because there is networking in the school, there is access to my own PC*' (403).

The above quote, as well as the way this principal promoted the embedding of ICT in the school, created a competitive environment amongst the staff members and put some pressure on specific individuals to accomplish tasks, as reported through the interviews. Although in all the schools case studies, it was observed that the principals often allocated tasks and responsibilities to individuals, each principal had different approach in doing that. This school's principal, was directive, typical and insistent in achieving the

standards he set. During the visits to schools, the principal was observed giving directions to teachers and students, of things to do, for example, he asked the vice-principal to arrange the meetings for the interviews, and said that he insisted that the ICT Coordinator creates a school website, which, however, did not happen, as the ICT Coordinator mentioned, that he did not have time to do that. Setting high expectations for the teachers was also reflected in the views of the principal on educators' work; '...I believe that the teacher who avoids integrating, even timidly, slowly, is the person who... doesn't dare to take a risk, and in our job, the professional risk is important, in order to dare... I believe in the audacity that a teacher must have' (379).

The ICT Coordinators in this school were appointed by the principal rather than volunteering. One of them mentioned that he experienced pressures by the principal to undertake ICT Coordinator's responsibilities; '...I told to the principal too, for which reason, should I miss my free periods, to fix computers? I am not a technician, I am not a programmer, and neither they pay me extra for this' (School C, Interview 1, 155). The principal also admitted asking one of the ICT Coordinators to do some extra work:

> *'website, we didn't do, website, we said with Mr. ... who knows about these things and so on, e... yet, he didn't show... we talked, and he said that he would work, he didn't show active interest to move on, even in the one page, that Cytanet*[114] *gives* (offers). *I was expecting that he would do it... but ... he told me many times, that it takes time, it takes time, I kindly requested from him to move on with it... we stayed to that...'* (403).

An incident which shows that the principal's style was strict in terms of setting standards was during the first visit to the school, when the principal ensured that the researcher will not take more than five minutes of the staff meeting for introducing the research. Another example showing that the principal was typical in terms of keeping the standards was when he required that the participation of the school in the research was reported in the minutes of the staff meeting, and also when he was writing directions/instructions for teachers on a notice board in the staff room; 'on

[114] (the public Cypriot Internet provider)

the board of announcement where I write, I make a note that, for example, in Classroom 1 there is that disc, there is that educational material and so on, that I found this so that they are informed and use it...,' (433). During the visits to the school, it was observed, that teachers responded in various ways towards this standards-setting by the principal; some of them, with disapproval; 'he is not doing well' was the expression of one teacher (expression that disapproves of something) when seeing a board announcement. On the board the principal had written: 'In Microsoft Word you can find a file on 1st of April' and 'give creative work to the students'.

The principal's attitude seemed to promote the existence of an enclave by identifying different groups amongst the teachers, those who adopted ICT and those who did not.

The pacesetting style of the principal could be also seen in his relationships with the students:

> *'E... the children of this school... I can say that they don't cause discipline problems, () they are children who cooperate, you can talk clearly with them more than you can talk with the children in the towns, e... they try to respond to their responsibilities, e... in general, e... when you encourage them, they move on, when... you push them, they are pushed'* (242, emphasis is mine).

There were also some signs of coercive leadership style in the principal's behaviour ('do as I tell you') as in his attempt to help the researcher get the interviews needed he suggested that 'if the teachers don't want' he could interfere.

When the principal sets standards the teachers seemed to become more competitive between them. In this school, interviewees drew comparisons between them and colleagues, referring to the way they use computers e.g. 'some do it to show off' or 'one of the Coordinators is helpful, the other one I told him many times but he didn't help' (Interview 2, 553). It is suggested that the competition and in general the broader typical rather than friendly climate and atmosphere in the school may be preventive in the development of collaborative community in the school and that the circumstances enable an enclave to arise that in turn influences the level of the implementation.

6.9.3 Enclave or school-wide group of implementers

The school is presented here in relation to the criteria regarding the presence of an enclave or a school-wide group of implementers. In a previous case study (School A) these criteria were such that did not allow for the creation of enclaves in the school. The lack of the same criteria in the second case is assumed to have contributed to the development of an enclave within the school.

The presence in this school of two different groups, one that constituted of frequent users of ICT at school, and the other one consisted of teachers who were rarely or never using ICT in their classrooms, is a pre-requisite for the development of an enclave. This was consistent with what the principal reported during the interview. He identified the presence of 'groups' amongst the teachers, the group of frequent users and the group of novices or those who do not use computers at all The principal's attitude towards the staff seems to enable the formation of an enclave:

> *'I have teachers, who ...almost half of them, are very well trained in the use and of the modern technologies in education, and we have others who are novices, they are at the start, so the half use enough, from little to enough, and the other half, almost not at all, the computers; those who are not able to use the PCs at all yet, I see that they prefer the overhead projector* ()(265).

The one group then with an interest in the use of ICT could be considered as an enclave amongst the wider group of the school staff.

Criterion 1

The domain; that is a general interest in ICT

Educators in this school acknowledged the presence of limited number of individuals who use ICT in their classroom practices, and those who did have an interest; 'e... from others, it is a bit limited, because there are not many who are occupied (with computers) ... (School C, Interview 1, 086). The same ICT Coordinator also reported that the 'large majority (of teachers) do not use' ICT, and other teachers indicated that there are a few colleagues in the school who are involved in ICT implementation.

Criterion 2

Interactions and relationships among the staff members ('introvert'/'extravert')

The school was characterized earlier in the chapter as 'introvert' and the school climate, as well as the relationships among staff, were typical. There was no indication of usual exchange of practice between educators in this school during the data collection period, and interviewees reported working alone on learning to use the computer rather than learning from each other; '... for the 6, 7 years that I work now, to nobody; if I need help, (I go) to friends who are more occupied with computers, who are not educators' (School C, Interview 1, 155) 'the help of other colleagues whom we collaborate, they may tell me some ideas' (School C, Interview 2, 462).

In comparison to School A and B, the word 'colleagues' in this school was used only once by the teacher interviewees.

Criterion 3

Set of a common policy and implementation goals for the school and development of strategies from within the school.

Although a school action plan for ICT use in all grades was written by the ICT Coordinator, the principal or other teacher interviewees did not mention that during the interviews, and the ICT Coordinator expressed his doubts about his colleagues implementing the plan; '... I wrote it myself with some one else, five things, five goals ... what we will do for the school. And every teacher got this; now, if they implemented it, ok, if they didn't... it's another issue' (School C, Interview 1, 345).

In addition, the principal mentioned his attempts to create a school network, '... there is networking in the school so, everybody is connected with me. And my teachers, when they want (), and they know this, if they want to find something ... they are able through the networking that is there' (School C, Interview with the principal, 403), although teachers who were interviewed did not report the school network. The initiatives in this school, similarly to the Island of Innovation cases, were taken by individuals, who although they aimed at involving everyone in implementation, this failed.

Criterion 4

Consistency and permanence in the staff

The ICT Coordinator of the school who was interviewed has been in this school for only a year now. For this school the mean of years of work in this school of the teachers who participated is 1.5 years (min= 1, max = 3) (SD= .83), in comparison to the mean of years of work in other schools.

6.9.4 ICT Coordinators, champions or managers

The ICT Coordinator in School C was not introduced by the principal to the researcher, but he himself offered to participate in an interview, and mentioned that he is one of the two 'unofficial' Coordinators in the school. He works as a teacher for seven years, and one year in the specific school, and he learned to use the computer alone as he said through 'the many hours that I wasted at home'... 'a lot of time of exploration of the computer, makes me feel comfortable'. He reported however, as mentioned in a previous part of this chapter that he experienced pressures, to fulfil his role as ICT Coordinator. Also, one of the interviewees mentioned that one of the Coordinators was helpful, but not the other one; 'there are two persons, who are occupied with the computers, I depend more on the one because to the other coordinator, while I told him repeatedly that I need something, some help ... there is not initiative' (School C, Interview 2, 553). These observations, as well as the fact that only a few teachers were interested in the use of ICT in this school, indicates that the ICT Coordinators in this school were not fulfilling the role of champions, rather they were appointed as IT managers by the principal. However, the ICT coordinator who participated in the interview appeared to have similar characteristics to the other coordinators, and therefore it could be argued that under different circumstances he could act as a champion rather than a manager only.

6.9.5 Conclusion - School C

School C proved to be an important case for this study, as it provided the opportunity to spot differences in the implementation process. Although this school was also identified as 'High ICT use' the percentage of teachers who

reported using ICT daily/weekly was lower than in the schools A and B. This could be explained through the above findings but also in relation to the size of the school; this was the largest school participating in the case studies, and therefore it might be expected that amongst a higher number of educators, there will be a number of teachers who are not interested in ICT, as it seemed to be happening in this school. The presence of such a group of teachers (who were not interested in ICT) was a pre-requisite for the development of an enclave, which in turn affected the implementation. At the same time, the principal's leadership style as defined during the period of the study was negative for the implementation and the role of the ICT Coordinator appeared to be only partially helpful.

6.10 School D

In school D the student population belongs to a low socioeconomic class. The parents of students are occupied with agriculture; they are farmers and craft technicians. This school also operates as an 'all day' school, and that is one of the reasons that the principal mentioned, in order to explain the high ICT resource level. Beyond having all the classrooms equipped with computers, the principal initiated the development of a computer lab, which used to be a storage room in the school area. This was used mostly in the afternoon school, as teachers mentioned. During the afternoon school, the students have the opportunity, amongst other things, to learn how to use computers.

The principal also initiated organization of seminars on the use of computers in Mathematics education, utilizing one of the educators who were knowledgeable about the subject. The principal also reported that 100% of the teachers use the computer at school, although teachers stated that the use of computers is not one of their priorities, as they have to deal with other learning and behavior problems arising from the students' social and economic background. The principal himself acknowledged that he has limited computer skills; however, he is trying to use computers as much as possible in the administration and management of the school. One of his aims is, as he mentioned, to put the school's archive in electronic files.

Although there was no ICT Coordinator appointed in the school, the principal mentioned that the regional ICT Advisor is supportive, and was thus often invited to the school to provide help to teachers, something that was also reported by the teachers-interviewees.

The principal and the teachers related the low socio-economic level of the student population to problems faced by teachers in this school, such as learning difficulties of the students, behavior problems or the need for teaching students social/life skills; (for example, during the data collection period at the school, a policeman who belonged in the community was invited to the school to talk about discipline problems that the community faces, such as young people using explosives or illegally driving motorcycles). The majority of the students belong to refugee families, as reported by the principal and the teachers, and the school culture incorporated learning about the recent history of Cyprus. In the main building of the school there were exhibitions, photos on the occupied areas, and slogans such as 'I don't forget' 'the chains cannot kill the hopes' and others. The appearance of the school did not indicate that it is located in a poor area; there were football and basketball courts, a garden, big playground, and in general the school seemed tidy and clean. There was furniture of large wooden bookshelves, as well as a stage to be used at the school events, both offered (as a label indicated) by the twinned Athenian school to this school. It was evident that the school had available resources and material, as some of it was exhibited on the boards in the main building; one of the boards, close to the entrance demonstrated pictures and photos of traditional costumes and customs of Cyprus. There was a scanner, a photocopying machine and a spiral tool in the staff room and a separate room with computers, as well as a room for 'housekeeping' equipped with sinks, a TV, and other infrastructure.

There is no administrative staff in the school while cleaners were also running the canteen of the school and made their presence obvious when the research was taking place. During that period it was observed, that the school was open for parents, who seemed to be interfering with the school's operation (e.g. one mother who came to school after her child called her

from a mobile phone to say that he was involved in a fight with other students, incident that happened during the data collection process).

6.10.1 School climate

The relationships amongst the staff seemed to be friendly and the school could be characterized as 'extravert', although there were two groups of teachers, the one comprising of young teachers, and the other with mature teachers including the principal. High activity of socializing between them in the staff room or in the yard of the school was observed especially within the group of the younger teachers.

The principal's office was open to teachers, and was physically connected with the staff room. The principal's style, as will be described later in this chapter, was one of supporting the staff, working as a visionary for them.

During the visits to the school, it was observed that principal and teachers had to solve discipline problems, such as students climbing on trees or the issue of parents' interfering in the school life. This indicates that the school was connected to the broader community, and social problems of the area affected the school directly. At the same time, even though the school was facing such problems, it was, however, involved in initiatives such as 'twin ship' with a school in Greece. This program included exchange of visits between staff and students. Beyond the problems arising from the broader community in which the school was situated, the friendly relations amongst the staff, and principal's style maintained a good level of work at the school. Some of the teachers interviewed were enthusiastic about their profession and mentioned feeling ethical satisfaction when teaching. The principal and the teachers did not treat the researcher as an outsider and it is worth mentioning that there was another research student visiting the school at the same time.

It was therefore not surprising that the school was categorized as 'High ICT use-High ICT level', even though its location (rural in a refugee community) and low socio-economic level of the student population were expected to be prohibitive factors to the spread of ICT. Principal's attitude seemed to have

played a positive role in overcoming the problems arising from the community and addressing the use of ICT at school.

6.10.2 Principal's leadership style

The leadership style that could better characterize the principal was 'coaching' (develops people for the future or 'try this'), as well as authoritative, (mobilizes people toward a vision or 'come with me'). These were described as styles that have positive influence on the culture of the school and are possibly related to the relatively high use of ICT by teachers in this school (60% of them stating using ICT daily/weekly). On the other hand, the number of teachers who indicated that they rarely or never use computer at school may be explained by other serious problems that the school faces, for example, the low socioeconomic level of the students and the big number of students with learning difficulties as reported by both the teachers and the principal. This indicates that although there are situational factors that appear to be prohibitive to the implementation, the leadership of the principal can bring some changes. In this school the principal appeared to be a visionary in terms of embedding ICT in the school. He initiated the conversion of a storage room into a computer lab. He also recognized that the school is advantageous in terms of resources, as it is the all-day school of the area, and he saw the positive impact of that on students' computer skills. This principal stimulated teachers' motivation by organizing events such as a conference in the area where a school teacher presented the use of ICT in Mathematics education and distributed a CD with suggestions on practice. The principal aspired for the school to become a centre for teaching computers; 'we hope that ... (the area) may become a centre of teaching computers ... and that it will be modernized' (School D, 493). He also utilised any help that could be provided by people around him, for example, he kept as he said often contact with the ICT Advisor and he invited him to the school to talk to the teachers about the use of computers in the classroom. In their turn, the teachers mentioned that they often sought the help of the ICT Advisor and they characterized him as very helpful.

The principal did not seem to be scared of the innovation although not a master of ICT, rather he looked forward to using it to organize the archives of the schools electronically, as he said. At the same time, while creating a team around him and aspiring to lead this team towards a vision, the principal kept his authority, by being the coach, the one who organizes, coordinates and distributes tasks to the members of his team. He did that in a friendly way, without imposing and although he acknowledged the difficulties that the school faced he did not stop inspiring the teachers towards the vision. He seemed to keep a status of higher authority, this by being the one to whom the teachers sent the students who were not disciplined or the one who solved the problems arising within the school. During the visits to the school, the principal was hardly ever being seen in his office with closed door, rather he was mobile, and involved in various activities going on in the school. He was observed monitoring the activities of the school, he was giving responsibilities (e.g. to start the general gathering) and allocating tasks to teachers (e.g. to guide the children to clean the school garden from the wild plants). During the staff meeting the principal was sitting in a circle amongst the teachers, rather than behind his desk, and during the interview, he also avoided sitting behind his office, and hence avoided to create the image of authority or hierarchy-based relationships. He was observed, praising teachers, at the same time, as giving them responsibilities.

This principal's leadership style contributed to maintaining a vision for the school, although teachers' work in the specific circumstances did not allow them to fully share this vision with the principal. Having a visionary within the school, gave teachers an example, set expectations and goals for the future, even though the environment in the school was prohibitive. This school's teachers were aware that the specific context in which they work is influencing their choice not to use computers at school:

> *'If you think, that we have a big number* (of students) *with learning difficulties; a kid that sees a four-syllable word, and he sees it as a mountain (then) to put him in front of the keyboard, that has 200 symbols and letters on it; it is not acceptable.' (School D, Interview 2, 493)*

> '*... they don't have the abilities to use the computer, ok, the level in general of the class is not that high, so that... we have other problems...*' (School D, Interview 4, 541)

The teachers in School D are all also aware that the level of ICT resources is higher than the needs/demands in this school:

> *'What we have, we don't (even) use, this is what I see... We have a computer room, I don't know what's happening, I didn't see any classroom to go there during the morning, to have a lesson there;*' (School D, Interview 2, 285)

> '*We are at the first steps. Of course, the school of* ... (name of the area) *is considered first, (amongst the other schools) from the perspective that because of the all-day school (initiative), the technology was embedded earlier, in the afternoon school the children have the opportunity to be occupied with the computer, they are taught, and I believe, all those who stay (at the afternoon school) have a sufficient level of knowledge of use...*' (School D, Interview 3, Principal, 388)

In addition to having a principal who supported, with his attitude and the activities he initiated, teachers' use of ICT, there was no group of teachers who were more or less interested in ICT.

6.10.3 Enclave or school-wide group of implementers

In this school, the teachers were friendly to an extent that was not observed in any other school visited, however, the presence of a community of practice requires exchange of ideas and information on practice, and something like this was not observed during the visits to this school. The criteria used below, show that there are positive circumstances for allowing the development of a community of practice; however, beyond the socializing the teachers did not use their relationships to improve/share their teaching practices.

Criterion 1

The domain; that is an interest in ICT

All the teachers interviewed expressed their positive views about new technologies (including the Internet) and considered its integration in schools important both for students and teachers:

'I am not 100% sure, but what I see is that it adds a lot of interest, which is very important, you try a lot to attract the children, let's say, in awareness and in interest because 'lies are bad' the last few years (they) are bored, because they have so many other technological...let'/s say, electronic games, I don't know what, they have at home computers, their TV, it keeps their interest, therefore we have to adjust to this given situation' (Interview 1, 110)

'Of course, I consider that it is a very effective medium with many possibilities, e...it offers a variety of activities, it has, tremendous possibilities... ' (Interview 5, 103)

The principal also appeared to be very interested in integrating ICT tools in the school, and reported that ICT extend learning possibilities. The principal's attitude and views are important as he appears to be the visionary for other teachers.

'...knowledge and use of the PC, connection to the Internet, communication with other schools, electronic library, and so on. All these are another horizon, big (horizon), another window of knowledge' (432)

'...but the pc, it is another extra, which has unimaginable possibilities ...help for the teacher; and the teacher should and must know the new technologies, in order to be modern, and also
0
- You think then, that (it) promotes learning?
- sure, sure, sure' (451)

All teachers interviewed reported using computer for personal purposes, as well as for preparation of the teachings, although not all of them integrate it in the lesson.

<u>Criterion 2</u>

Interactions and relationships among the staff members ('introvert'/'extravert')

This school was characterized as 'extravert', teachers were seen often in group, discussing about various issues although rarely to educational issues. There was a high activity of socializing, although not much evidence for exchange of ideas on classroom practices. However, the participants stated their collaboration with colleagues during the interviews:

R:... *and from where do you take ideas? Which are your resources?*
T: from colleagues, from ready-made programs, from the programs, which the Ministry, the IT Committee, provides us...whatever our advisor brings us here...these' (Interview 1, 034)

'e, if any problem occurs, with the colleagues or if it is something more complex, that we don't know, we will call the Advisor' (Interview 1, 074)

The principal of this school seemed to be more active than in any other school visited, he was mobile and visible at all times, in every part of the school 'taking care' of the smooth operation of the school. The principal's room was open for the staff, and the staff room was very close to this.
The atmosphere in the school was relaxed and there were incidents (such as teachers playing table games during their 'offs') or the jokes between the group of younger teachers that show that the teachers were not under pressure or in a stressful environment. The younger group of teachers was observed using the school yard (as the weather was good during the visits to the school) to sit in a group and socialize, while the mature teachers used the common staff room and seemed to have different attitudes towards teaching and in general. This difference however, could be due to the age gap between the two groups, and there was no indication that there was either an enclave or a community of practice in place.

<u>Criterion 3</u>

Set of a common policy and implementation goals for the school and development of strategies from within the school.

The close connection with the regional ICT Advisor and his involvement in events such as in-service training or the provision of material to the teachers, as well as the activities initiated by the principal, such as seminars for the use of computers in Mathematics, could be considered as strategies that supported the spread of ICT use. The school is active and even though there is no explicit policy (a document) there were various implicit strategies that supported teachers to integrate ICT in their lessons. The related activities were initiated by the principal who was a visionary and a leader in terms of

transforming the school to a 'technology centre', something that had a positive impact on the implementation.

Criterion 4

Consistency and permanence in the staff

The principal has served in this school for 3 years, and the mean for teachers' work in School D is 4.8 years (min = 3, max = 12) (SD = 4.02), the highest comparing to all case studies. It can be therefore argued that the longer teachers serve in one school, the friendlier the climate becomes, although this does not always assume the presence of a community of practice. Even though there was a high activity of socializing, this did not include sharing information or ideas on practice.

6.10.4 ICT Coordinators, champions or managers

Similarly to School B, in School D, there was no ICT Coordinator introduced as such and teachers who were interviewed referred mostly to the ICT (regional) Advisor and to colleagues when asked to whom they turn for help; 'if any problem occurs, with the colleagues or if it is something more complex, that we don't know, we will call the advisor' (School D, Interview 1, 074) 'he (the ICT Advisor) will come once every trimester or when we tell him, but it is important help (that he provides)… He is very helpful as a person too but also, all (he) brings, are very helpful' (School D, Interview 1, 164). 'we have a teacher here who knows,... (his name) e… he knows better than us I think, e… I ask here and there, outside… (I ask) T (the ICT Advisor who visits the school) many times, for …when we had problems with the Internet, I asked T…' (School D, Interview 2, 277) 'yes, yes,… (the name of the Advisor) comes, he is very willing, he helped us a lot, and in (regarding) programs that I wanted; simply is that, ok, I don't do it, to call him all the time, you know I have that problem, because anything may emerge, because, the colleagues are well informed, we can complete each other' (School D, Interview 5, 050)

6.10.5 Conclusion- School D

School D, also had a lower level of ICT use, than schools A and B, however, this was related to dissimilar factors than those related to lower degree of implementation in School C. The low socio-economic status of the student population and the behaviour and learning problems arising from that, as well as the different attitudes of teachers in this school towards ICT in education, seemed to constrain implementation. At the same time, the principal's positive leadership style, the helpful ICT Advisor who often visited the school, and the high level of equipment worked as 'equalisers' for enabling and supporting the implementation.

6.11 Chapter 6 Summary of the findings and discussion

Seeking to describe the implementation stages through an existing theoretical model (Tolbert and Zucker 1996) the study shed light on various activities taking place in schools and activities developed as a response to the specific policy (ICT). Tolbert and Zucker's model was enriched with examples from the field, thus the study makes an important contribution to knowledge by connecting theory and practice.

This chapter started with describing that as social structures undergo changes through the introduction of ICT, the educational system also attempts to integrate ICT tools, as a result of the process of 'isomorphism' (Meyer and Rowan 1977). Although other literature has described institutions (more specifically educational institutions) as difficult to change, with resistant cultures, the study argues that institutions do change, although through long-term processes, in order to adjust to the broader environment in which they are situated. Hence, educational institutions are not independent from social, economical and political institutions at different scales (international/national). The case of ICT explored in this thesis, is an example that illuminates this argument. Chapter 6 aimed to describe what happens in the schools when ICT are embedded, through the implementation stages model. Building on the background information regarding the way ICT policy-making was initiated (Chapter 2) it shed light on activities that

take place in schools, during the first two stages, that of the introduction of the innovation and 'habitualization'. At these initial stages, there is variance in terms of the adoption of the new structure (ICT) and the level of the implementation depends on individuals such as the ICT Advisors, the ICT Coordinators and the principals. The discretion left to individuals is based on a 'logic of appropriateness' which results in interpreting the notion of 'ICT in education' in various ways. Therefore it was important to highlight at the beginning of the chapter, the context in which ICT was introduced, so that the reader understands how the optional and general character of the ICT policy was interpreted in relation to the humanistic and socializing approach to education that underlines teachers' practice in Cypriot schools. The centralization of the system and, at the same time, the discretion of the educators (and ICT Coordinators) as street-level-bureaucrats to interpret the policy, were important factors that shaped the responses observed in the schools and the different characteristics of the institutions also influenced the circumstances in which the implementation took place. The responses of individuals (educators) and the organizations (schools) towards the introduction of computers (ICT) in their work environment were shaped by the characteristics of the context. The constructions of what 'ICT in education' means are then transferred to policy-makers through the ICT Advisors and become normalized. There is thus an interaction between policy-making level and the implementation field which results to some theorizing of ICT; an activity leading to the next implementation stage (objectification).

Describing the implementation stages using a theoretical model should not be assumed as an attempt to put the implementation process in a formula, as this proves to be a complex process influenced by interacting agents and the characteristics of the context in which it takes place. However, it does illuminate the role of these agents and the circumstances that enable or prohibit implementation. As implementation is a long-term process, the study cannot yet describe any of the next stages. What it does, however, is that it provides information on situational factors that influence the implementation. Examining four schools as case studies enabled the

research to shed light on these factors. The survey data, as well as the observation notes and the interviews, were all sources of information that enabled characterizing the school case studies. Some of these factors, such as those related to communities of practice or the principal's leadership style were based on observations during the data collection process in the field, and were not expected at the beginning of the study, to emerge. Therefore while the broad theoretical framework employed by the study helped explain the implementation stages and teachers' behaviour as s-l-b and bricoleurs, further theoretical concepts were used later to describe the activities arising in the implementation field. The conceptual tools used are offered as criteria for evaluating the implementation process and outcomes. The degree to which ICT were habitualized in each school depended on the school climate ('introvert'/'extravert'), the principal's leadership style, the presence of an enclave or a school wide community, and the support of an ICT Coordinator or an ICT regional advisor.

The findings presented above are further discussed below, and this chapter is followed by a general conclusion to the thesis (Chapter 7).

6.11.1 Principal's leadership style

It was expected, at the beginning of the research study, that all principals in the school case studies would promote the use of ICT in their schools. This happened though in different ways. In School A the principal appointed ICT Coordinators to lead the ICT implementation and he did not appear to get involved in implementation himself.

The principal in School C also appointed ICT Coordinators; however, he also took the initiative to promote ICT use by creating a school network, as well as offering advice to educators about resources and providing ideas for teaching with computers (ICT).

In School D the principal stated having a vision of creating a regional centre of new technologies in his school. He thus initiated the transformation of a storage room into a computer lab; he initiated organization of events such as regional seminars/workshops for the use of ICT, and kept close communication with the regional ICT Advisor, at the same time, as utilizing

him, and other skilful, knowledgeable educators for promoting the use of ICT.

School B is situated in the city centre close to the ICT Advisors' offices, and possibly due to this fact, the ICT Advisor responsible for this school, was often visiting the school as reported by the teacher interviewees. This may have been the reason, that the principal did not undertake any responsibility of promoting ICT use. Other reasons why the principal did not seem to promote ICT use, was the young age of the student population (6 – 9 years old), which as teachers reported, constrained ICT use. In addition the presence of an informal community of practice amongst teachers supported the development of sharing practice and ideas about various issues including ICT.

The observed behaviour of the four principals that affected the ICT implementation was described through Goleman's framework of leadership styles. The field notes and the narrative descriptions produced during the visits to the schools in addition to the interview transcripts were used to identify characteristics of the principals in the four case studies that would relate to Goleman's leadership styles. The evidence presented under each leadership style describes the character and behaviour of the principal and his/her relationship with the other members of staff. It should be mentioned here however, that Goleman suggests that different people could adopt different styles at various times, and therefore the evidence gathered should be supported through further observations in the same schools case studies. Through the data analysis and their interpretation through Goleman's framework, it was evident that principals in the four schools case studies followed different approaches towards managing the staff of their school. As principals and managers of the schools they all gave instructions and distributed responsibilities to the staff, in order for the school to function. However, the way that each of them did this was different from principal to principal. It was indicated that in a school that was most successful in the implementation (A) as the majority of the teachers used daily or weekly computers in their classroom, the principal was characterized by the affiliative style. The 'people come first' approach was related to a series of

developments within the school that supported implementation (community of practice, appointment of champions, etc.). While in another school where the principal set high standards for performance ('pace-setting' leadership style') it was indicated that only some of the teachers worked for the implementation.

It was also observed that the leadership style is an important factor on the organizational culture which in turn affects the implementation, however, it can be overridden by other factors such as problems that arise from the socioeconomic level of the student population (as it happened in School D). Having a vision, in cases such as this school (D) it is important for keeping the educators 'doing their best', and the school 'progressing at its best' although there are obstacles that hinder this.

Bearing in mind the above findings, policy-makers should address principal's training needs not only in basic computer skills or the use of computer in school administration, but also in leadership. Principals should become aware of the influence they have on the school climate, and also of the various leadership styles that they can adopt when managing schools. Further research should seek to establish a longer period of observations in schools in order to confirm and extend the findings regarding the impact of each leadership style.

6.11.2 Enclaves or school-wide groups of implementers

The presence of a school-wide group of implementers was related in the four case studies to frequent ICT use at school, an important aspect of the ICT policy implementation, while an enclave within the school indicates that the implementation is not widespread amongst educators; rather a smaller number of them adopts or attempts to introduce ICT in their teachings. Both an enclave and a school-wide group of implementers were relevant to other characteristics of the school (principal's leadership style/school climate) that were outlined above through evidence. Although in all schools case-studies the implementation was taking place, more specifically, educators adopted ICT in their practices to a higher or a lesser degree, it can be argued that school-wide groups of implementers are more

effective, as the adoption of the new tools (ICT) is widespread and has a more normative value, given to it through the local school-wide initiatives developed (e.g. afternoon ICT clubs, voluntary ICT Coordinators organizing in-school seminars etc.). In contrast, in a school with an enclave, the use of ICT is not widespread amongst the staff. These findings are important, because they identify some positive and negative conditions in which school-wide implementation can take place. The above examples also indicate the importance of the role of the principal in creating a positive climate in the schools through his relationships with the staff members. Policy-makers could address the issues presented above, in order to promote the development of communities of practice, for school-wide implementation of the ICT policy. However, longitudinal research is required for confirming the suggested criteria through long-term observations in the field.

6.11.3 ICT Coordinators and their influence on implementation

The role of the ICT Coordinators as champions proved to be important through this study, as their presence in schools could be characterized as a lifebelt for those educators, who are willing to use ICT in teaching and learning. Their contribution proves to be very important in terms of solving immediate problems such as technical (hardware/software) problems that arise, offering ideas on ICT applications, as well as offering their enthusiasm, their knowledge and skills to support their colleagues. It is not a coincidence that the ICT Coordinators are appointed by the principals and their colleagues within the schools, as those who 'know better than us about computers'. Previous studies (Christofi 2006, Eteokleous 2004, Hadjithoma 2003, Sergiou 2005) identified the important role of the ICT Coordinator in the implementation of the ICT policy at the initial stages. This phenomenon, however, as ICT Advisors have noticed, raises questions as to what are the qualifications of those appointed as ICT Coordinators. As the Cypriot government has not legitimized their position, and consequently there is no definition or criteria for employment of the ICT Coordinators, it becomes difficult to evaluate their contribution. Furthermore, their role in the latter

stages has to be assessed in order for the position of an ICT Coordinator to be established. Currently, the role of the ICT Coordinator is defined locally, and it appears that their contribution is a matter of personal qualities. This study identified a number of characteristics that the ICT Coordinators, who participated in the study, had in common. The ICT Coordinators are intellectually stimulated individuals, they are open to new ideas and they have a personal interest in ICT which led them to exploring it on their initiative and in their own time, gaining knowledge and confidence. All the above are characteristics that differentiate them from the group of educators who at a slower pace adopt the new structure, and thus they could be characterized as champions within the schools. Their absence, however, was not associated with lack of implementation. On the opposite, the role of ICT Coordinator arose in schools where there was a need for a person to lead the use of computers. Where for example, there were other priorities (for example, solving learning difficulties arising from the low-socioeconomic level of student population, in School D) or where the educators seemed competent at individual level, and shared practice, through a community of practice, rather than having a person guiding their practice (e.g. in School B) no ICT Coordinator was appointed or introduced as such by the interviewees. On one hand, in School D, educators did not have ICT use as one of their priorities, due to other local problems, and on the other hand, School B, accommodated students of younger age for whom using ICT is not offered as much as for the higher grades according to teachers, and at the same, the school is situated closer to the office of ICT Advisors and this enabled collaboration with the regional ICT Advisor. In addition, as observed in School B, although there was no ICT Coordinator, there appeared to be a high level of communicational activity between teachers, in terms of sharing practices and ideas, and thus it can not be concluded that the presence of an ICT Coordinator within a school is necessary for the development of communities of practice or communities of learning, although the presence of such an agent within an institution may contribute, along with other factors, to the development of a community of practice.

The role of the ICT Coordinator as a champion also helps increasing the use of computers (ICT) by educators within the school (which is a short-term goal of the ICT policy), however, theorizing of the project, (a longer-term goal) as part of being a champion depends mostly on personal abilities and involves building on personal beliefs/attitudes/knowledge and hence theorizing within local units, may not lead to generalization, and then objectification of the structure (ICT) to use Tolbert and Zucker's terms, as it may differ from person to person (from 'champion' to 'champion'). The absence of an ICT Coordinator (for example, in School B, and in School D) does not immediately presuppose lack of use of computers (ICT) by the teachers, as School B belongs to the 'High use-High level' category. In School B, teachers created a peer network in exchanging help/knowledge and material with their colleagues, and they mentioned regular visits by the ICT Advisor. Similarly, in School D, while there was no ICT Coordinator, although there was a teacher within the school who was knowledgeable in terms of computers, and offered his help when needed as the interviewees said, the help received by ICT Advisor, as an external agent, (coming from outside the institution) had obviously an effective impact on the use of ICT by teachers, although, in this school the frequent (daily/weekly) use of ICT was not that high and the use of the facilities was not extensive.

Based on these findings, this study agrees with Markham's study that champions, although important for influencing others (supporting others) to implement a project, they do not appear to be necessarily contributing to the performance of the project, if, it should be added, the performance is measured in terms of long-term goals. As many recent ICT policy documents by international/national organizations turn their attention to embedding the use of ICT into long-term goals such as transforming pedagogies or transforming the educational system, the raw measure of the statistical variable 'use of computers by teachers at school' does not co notate any relation to such long-term goals. Therefore the contribution of the ICT Coordinators could be characterized as important for the first stages of the implementation where educators in Cypriot schools are just beginning to

use ICT, however, their contribution to further institutionalization processes may be doubtful.

Through a literature review the criteria were chosen to examine the extent to which the ICT Coordinators are champions within institutions, and if as such they contribute to the performance of the project. The findings tend to be controversial, since the ICT Coordinators in Cypriot schools have the characteristics of champions, however, their presence in schools does not necessarily contribute to the performance of the project, as in some of the cases presented here, their absence, does not relate to the absence of positive performance by adopters of the project. The number of the participating ICT Coordinators was small, and although the common characteristics between them, as individuals, were strikingly evident, which led to theorization of their role based on research regarding champions, a larger number of ICT Coordinators should participate in future research, on this subject.

Future research will indicate if the role of the ICT Coordinators is finally officially established, as well as enhanced through further training, and promoted. If this happens, it is expected that individuals who are formally appointed as ICT Coordinators may be able to contribute to theorization of the use of ICT in education, as ICT Advisors do. If however, this does not occur, the role of the ICT Coordinators, informally appointed individuals will be limited to the management of ICT within schools, at a higher or lesser degree and their contribution in solving immediate technical or other problems. In case the MOEC appoints technical staff in the schools, then ICT Coordinators may not be yet necessary for supporting the implementation, even though some individuals will be the champions of implementation and will support the 'habitualization' of the structure.

6.12 Conclusion to Chapter 6

Findings presented in Chapter 6 illustrated the implementation process with examples from empirical evidence, identified the stages that the ICT policy is undergoing in Cypriot schools. Further it described the activities that emerge within the schools and the school related influences on the process

and the outcomes of implementation. Hence the claim presented at the beginning of the research regarding implementation was supported through the data:

The implementation process

Claim: The implementation process has to be considered in relation to the context, as it is influenced by various factors at different levels. ICT are not hitherto institutionalized in the Cypriot primary education, although they have survived through the initial stages of the introduction and habitualization

Data: The evidence has shown that the implementation process relates to the context, and it is influenced by various factors, as well as that ICT are not yet institutionalized in primary schools

Warrant: Institutionalisation of ICT is desirable due to external pressures and changes in society, which require ICT skilled workforce and new forms of literacy for future citizens

Backing: 'Bottom-up' and 'top-down' implementation theories are relevant but not sufficient for explaining the implementation processes. Institutionalist approaches which view organizations as micro-societies are more relevant to understanding the changes that organizations undergo. Institutionalist theories refer to the stages of implementation.

Chapter 7 summarizes the thesis, from Introduction to the Findings and provides directions for future study.

7 CHAPTER 7 CONCLUSION

7.1 Introduction

This thesis presents a study that was interested in understanding what happens when a policy is transferred to the implementation field. Educational institutions were the focus, and the response of the individuals within schools towards the challenges introduced by the policy was put under scrutiny. More specifically, the study attempted to answer to the following research questions:

1) How is the ICT policy in Cyprus implemented? (E.g. whether and how/when/where teachers use ICT in teaching and learning)

2) What are the influences on the implementation processes with regard to the

- Policy-making discourses ('top-down')
- Institutional context (including characteristics of teachers' work) (institutionalism)
- Educators' personal and professional capabilities ('bottom-up')

3) At what stage of implementation is the integration of ICT in Cypriot primary schools? (in terms of Tolbert and Zucker's implementation stages model)

4) What is the influence of the process on the outcomes? (What does 'ICT in education' mean in the Cypriot context?)

While the first question generated information on practical issues of the implementation, such as equipment/training provision, policy awareness amongst educators and the actual use of computers (and ICT) in the classrooms, the second and third questions involved linking the findings with the theories used.

The implementation process proves to be a complex activity, influenced by various interacting factors that are found at different levels (at policy-making level, the meso level of implementation and in the implementation field). This study undertook a challenging task, to reach an understanding of

this process in a specific context. This was enabled through the use of a multi-theoretical approach to framing, analyzing and interpreting the data.

The findings provide an argument for implementation theorists who seek to describe this activity through a 'top-down' approach or a 'bottom-up' approach. This thesis suggests that the implementation process should be viewed from an institutionalist perspective which integrates a holistic approach including not only the practicalities that previous research is concerned with (training/equipment provision, technical help, implementers' attitudes, skill and knowledge) but also the characteristics of the system, the institution itself.

Thus the importance of the context is highlighted in the thesis and the specific circumstances in which implementation takes place at a higher or a lesser degree, as well as the characteristics of individuals, who are formally or informally involved in implementation were presented through evidence and discussed.

In this final chapter, the thesis chapters are summarised, and suggestions are made for further study.

7.2 Summary of the thesis

The first chapter outlined the importance that has been placed the last decades on the use of computers and other Information and Communication technology (ICT) and presented policy discourses that acknowledge the changes that ICT bring with them. The vagueness that accompanies ICT as continuously evolving and indefinitely changing tools has implications on the way ICT tools are adopted in educational organizations. Policy-makers attempt to embed ICT in existing educational structures. Most of them turn firstly to easily measurable initiatives, such as equipment provision. This turned out to be a costly way of embedding ICT in schools, as educators remained puzzled as to the use of ICT in their practices, and therefore they marginalized it or adopted it to a limited degree. In addition, policy discourses now recognize that the evaluation of the use of ICT, through general benchmarks such as computer/student ratio has failed because 'one practice cannot fit all'. Based on this background, this study embarked on a

journey to understand the way ICT were adopted in a specific context. The case of Cyprus primary education was the focus of the study, however, the general context, the experience of other countries, and more specifically the UK experience, were used as highlights that enable better understanding of the uniqueness of the Cypriot context and the implications this has on implementation and the outcomes ('ICT in education').

Therefore Chapter 2 provided on one hand information on the Cypriot educational context, and on the other hand brief presentations of ICT policies in other countries and background information on the Cypriot ICT policy.

The structure of the Cypriot educational system is characterized as centralized and hierarchical and this led to the assumption that the ICT policy implementation will have a homogeneous character. The humanistic emphasis underlying the Cypriot primary education and the attention to socializing of the students were expected to influence the way educators adopt ICT and shape their responses towards the policy. The pre-service training that teachers undergo and the profile of the Cypriot teacher were also presented in this chapter as they proved to be important influences on the way ICT are adopted in schools.

The historical and cultural influences both from Greece and the UK that the Cypriot educational system underwent and that are evident in educational policies were briefly presented. Even though Cyprus is now becoming a state with the capacity to support its educational system financially, through provision of higher education and funding allocation to research and development, imitative policy transfer that has been followed through the history of the Cypriot educational system was expected to influence the way the ICT policy is made, as indicated in the same chapter.

This section included references to examples of expenditure (e.g. on ICT equipment provision) and also evaluations of those policies that have been taking place. SITES international study and Eurydice (2001 and 2004) were important resources for this purpose. The point made when presenting these was that, in practice, policy discourses follow similar stages.

Finally, the chapter presented information on the history of integrating ICT (computers) in Cypriot primary schools, information which is important to know when looking at the current policy. The chapter described that the ICT policy in Cyprus aimed to integrate computers and other ICT in Cypriot primary schools, as another learning tool in the classroom. The findings of a preliminary study (Hadjithoma 2003) which identified some influences on ICT policy-making were also presented in this chapter as they were used as a foundation for the PhD study.

Chapter 3 included the theoretical framework of the study. The first section explained that 'top-down' implementation analysts have focused on the capacity of policy programs while 'bottom-up' implementation approaches emphasized the role of implementers and indicated the influence of street-level-bureaucrats on implementation. Then, this chapter introduced the main beliefs of institutionalism and some of the concepts used such as 'isomorphism', 'institutional/rational actor model', as well as a model of implementation stages (Tolbert and Zucker 1996), based on which the second research question was developed. Other theoretical concepts used, such as Bernstein's recontextualizing fields were included in the theoretical framework in order to explain the relation between the policy field and implementation field. The framework used for describing teachers-implementers' work was based firstly on Lipsky's theory on street-level-bureaucracy, that offers some of the characteristics that underlie teachers' work as public officers, and secondly, on Hatton's theory, on teachers' work as bricolage. These theories have contributed to developing the part of the third research question regarding the influence of teachers' work on implementation. Schutz's concept of 'recipe knowledge' was briefly described, as it was expected to be used in explaining the way that educators construct knowledge for using ICT at school.

Chapter 4 dealt with the methodology of the study. It started with presenting the research design. This was based on the use of Toulmin's argumentation model for shaping the claim (the argument made), the kind of evidence needed to support the claim, as well as the theories used as warrant for the claim. Then, the chapter provided a rationale for using both quantitative and

qualitative research methods and explained how these complemented each other by using, for example, a large scale survey to get general information and select the schools for the case studies. The chapter raised the issues of reliability, validity and ethicality of the research and then set out to describe the sampling procedures. The sample of schools was randomly selected from the Ministry of Education and Culture official list (for the year that the research was taking place) and then the questionnaires were posted to these schools and returned also through post. The sampling for the case studies was based on the survey data analysis. All the schools were categorized according to the variables 'use of ICT at school' 'ICT resource level' and according to their location (urban/rural, district), as well as students' socio-economic status, and finally four representative schools were selected to participate in further study. The chapter also provided information on the research instruments (survey questionnaires/ interview guide) and the piloting process. A description of the data collection procedures and the way both quantitative and qualitative data were analysed were followed by brief reflections on these procedures indicating the learning that emerged through the research process.

Chapter 5 identified first the links between the theoretical framework and the evidence, and then presented the findings in three parts; the first part provided information on the first research question regarding various practical aspects of the implementation through empirical evidence from the survey. The second part elaborated on some of the practical issues of implementation, using the qualitative data, and finally the third part presented the results of further analysis of the survey data identifying significant factors related to the use of ICT by teachers at school.

This chapter included information regarding the training of educators both teachers and principals, their experience in using ICT at school or outside school, equipment available to schools, examples of use of computers in classroom, and the perceptions of the participants regarding the ICT policy.

The findings presented in this chapter indicated that teachers have been using computers at school the last couple of years while principals started using computers in school administration only the last year. Teachers started

using computers at home (or outside school) much sooner and longer than they did at school. More than half of the participating teachers reported feeling confident or very confident using ICT and more than half of them already received training in basic computer skills. The teachers who employ computers in their teachings, they do it in cross-subject way, in Greek, Mathematics, and to a lesser degree in Science, Geography and History.

The majority of educators (both teachers and principals) were found to have positive attitudes towards using ICT in teaching and learning, as well as positive beliefs about ICT in general.

Interestingly a high percentage of the participating teachers reported that they are aware of the Ministry's ICT policy stating as their resources of information, the circular letters, colleagues and ICT Advisors. In addition, the majority of the teachers asked, use the Ministry of Education and Culture website often or very often, a factor which was found, amongst others, to correlate to teachers' use of computers at school. Influential factors on teachers' adoption of ICT were categorized into personal/attitudinal (self confidence and use of computer at home, beliefs 'ICT help me in teaching' 'I don't know if ICT are useful or not'); factors related to teachers' professional environment (Having own class, use of computer lab, use of software, the help given by the ICT school coordinator and an ICT Advisor visiting the school). Finally, institutional factors included the use of MOEC website or the use of the IT Committee website. All the above factors were interpreted through the theoretical framework of the study, demonstrating that both the implementers' personal capacity and the capacity of the wider institution (educational system) are important for implementation and both influence the process and the outcomes. In the case of the Cypriot educational system, although implementers' capacity was found to be positive for enabling implementation to take place, the capacity of the system was prohibitive and put constraints on teachers' practices.

The practices that educators developed appeared to be similar in different schools, as a result of the centralized nature of the educational system and the policy of the 'one computer in the classroom', as well as the homogeneous equipment provision to all primary schools and homogeneous

training provision for all primary school educators. General problems that educators face, arising from the bureaucratic nature of the system were also found to be similar from school to school. Lack of time, lack of relevant resources and material, lack of guidance, allowed educators to choose either to use or not ICT at school. The level of using ICT often (daily/weekly) at school although high (53.5%) it does not unravel the potential of ICT to make teaching and learning more effective, rather it plays a complementary role to teaching and it currently is a tool useful for 'keeping students' interest in the lesson and as a motive for them'. This kind of response by educators towards embedding ICT can be explained not only in relation to their personal motivation and attitudes but most importantly, in relation to the wider educational system. The system is seen as an institution the function of which is interconnected with society and with multiple interacting agents at different levels (policy-making level, meso-level of implementation and implementation field).

The discussion of the findings of Chapter 5 describes that the study agrees with previous research which indicates that teachers' perceptions, attitudes and skills in implementing an innovation are important (Fullan 1991, Karagiorgi 2000, Eteokleous 2004, Van Braak et al 2005, Angeli and Valanides 2005). This thesis, however, seeks the answers to the question of implementation not only from the implementers' perspective but also from the perspective of the system and its capacity.

Describing the professional environment where teachers currently work through the concepts provided by theories, such as Lipsky's street-level-bureaucracy or Hattons' theory, on teacher work as bricolage, was useful in explaining teachers' responses towards embedding ICT in schools. In the case of Cyprus there appears to be a conflict between the system and the implementers, as the first is bureaucratic whereas implementers although they do not have more than one computer in their own classroom, are in majority ICT skilled and have constructivist beliefs about learning, characteristics which are expected to lead to regular use of ICT in the classroom, as other research suggests:

> *'where teachers have reasonable expertise in using computers themselves, where they have clusters of 5 to 8 computers in their own classroom, and where they believe more strongly in a constructivist pedagogy that attends to making learning activities meaningful to students (rather than just transmitting content), a clear majority of teachers have students use computers regularly in their academic classes'* (Becker and Ravitz 2001, p. 2)

The structure of the classroom remains the same, the role of the teacher in the bureaucratic, content-oriented, curriculum-driven, centralized system remains the same, and along with these, ICT are not allowed much space to bring long-term transformative changes.

Hence the thesis (Chapter 5) claimed that there is a continuous interrelation between the system and its people, and one influences and changes the other and it supported this through evidence. It argued thus that some individuals (e.g. ICT Coordinators champions) and activities taking place within the system (e.g. communities of practice) enable change, whereas, the system as a whole is characterized by resistance towards change and allows changes only through long time periods.

Then part 1 of Chapter 6 presented the findings in terms of the implementation stages (Tolbert and Zucker 1996) (third research question). The role of various implementation theories in interpreting the findings was also described in this chapter; 'Top-down' implementation theories were useful in describing the implications of the centralized system on the implementation outcomes, and 'bottom-up' theories applied to the way educators' personal attitudes, beliefs and factors such as self-confidence, skills, knowledge and experience influenced their reaction to the policy. However, the institutionalist theoretical framework was the most appropriate in explaining the implementation process itself, providing tools, like Tolbert and Zuckers' implementation stages and concepts like isomorphism or the (rational/institutional) actor models. The institutionalist approach was also useful in emphasizing the role of the context. The use of case studies for collecting evidence was appropriate for uncovering the local characteristics that influence implementation (school's student socio-economic level, location etc.).

Empirical evidence indicated that implementation of the ICT policy in Cyprus is so far undergoing the first stages, of introduction and habitualization. During the 'introduction of the innovation' the new structure (ICT) introduced as a result of social and economic changes is adopted within institutions sporadically and more as an imitative act, rather than a normative one. Embedding ICT in Cypriot schools, is therefore formalized in policies (e.g. 'Evagoras'[115]), however, it is adopted by small numbers of people (the first adopters, champions and leaders), who as this study indicates are important for its spread within organizations. Although they are still at an early stage of being integrated, ICT are being theorized by the first adopters (e.g. the ICT Coordinators), however, their theorization as a new structure is so far at an embryonic stage. Only future and long term research will indicate if ICT use in education are characterized by historical continuity and will survive through generations of organizational members and as a result, become institutionalised (the final stage of the implementation process). Institutionalization process, proves to be complex, long-term and under the thread of failure at each of its stages.

The second part of chapter 6 addressing the second research question presented the role of the context, identifying similarities between the ICT policy in Cyprus and that of other countries. This aimed to show how various countries initiated the embedding of ICT in education, based on incremental changes, such as equipment provision, and basic computer skills training and only recently, few countries have turned to looking at how to bring more transformative changes, such as pedagogical change, for example. Similarly, the findings from the Cypriot field indicated that currently, educators adopt ICT on the basis of using them as an addition to the existing structure, as a complementary medium to enhance teaching and learning. The implication this has on the institutionalization process is that the adoption of the new structure (ICT) is based on mimesis or it is based on individuals with personal interest in ICT to promote it and spread its use.

Part 3 included a presentation of these conceptual tools that were used to present emerging themes related to implementation, following in Part 4.

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[115] The first official action plan for introducing ICT in primary education; 'Evagoras', 1999

The finding that shows the importance of the principal's leadership style that is, his/her behaviour and attitude towards the school management and his/her colleagues, was enhanced with Goleman's frame of leadership styles because the latter understood leadership as a personality characteristic of individuals.

Similarly, the ICT Coordinators were found to have some characteristics in common similar to the characteristics that, according to the literature, champions or leaders of innovation have. Their voluntary service in contributing to ICT implementation within their school, without any payment or enablement (e.g. free time from teaching) was a surprising finding, which was explored in relation to the evidence and the literature on champions. The interest in ICT, their personal involvement with learning ICT through personal effort/time and resources, were qualities that characterised the participating ICT Coordinators. Promoting ICT use amongst the teachers was a task they undertook as their own task, and they supported ICT implementation through organizing training seminars, through solving technical problems or providing ideas and educational material to their colleagues. Their influence in implementation as champions was important, as this study argued, and consequently their role was added into the existing model of implementation stages.

The findings regarding the influence of communities of practice or enclaves on the adoption of the new structure were part of the implementation responses towards the ICT policy. Where a school-wide community of practice existed in the school, the interest in using ICT in teaching and learning was accommodated within this community. Where, however, such a community was not present, those individuals who were interested in ICT, in comparison to another group of individuals who had not similar interest, developed an enclave within which they collaborated for integrating ICT. The existence of communities of practice or the development of enclaves was related to the school climate, and a typology was devised in order to make comparisons between the four schools-case studies. Therefore a school that was described as 'introvert' allowed the space for the development of an enclave amongst the staff, while in two schools that were

described as 'extravert' a community of practice was present that improved implementation.

The impact of individuals such as the ICT Coordinators and principals or groups of individuals (communities of practice) on implementation can be positive, as the study findings demonstrate, especially at the first stages of implementation. However, since the policy under focus (the ICT policy in Cyprus) is thus far at the beginning stages of integration, it cannot be argued that these factors will continue having a positive impact on implementation at latter stages and that they will contribute to institutionalisation of the innovation (in this case ICT).

The school characteristics described for each school participating in the case studies were useful in identifying differences related to the local context that influenced implementation. For example, the low socio-economic level of the student population of one of the case studies negatively influenced the adoption of ICT by teachers, as other priorities emerged due to students' behaviour or learning problems. In comparison, the case study school where local initiatives, such as afternoon school clubs took place including computer lessons for students or its history in ICT (e.g. base for ICT Advisors) influenced implementation positively. School climate was described based on a typology devised in characterizing the school case studies as 'extravert' or 'introvert', and was found to be related to the principal's leadership style, which in turn was connected to the development of a school-wide group of implementers or an enclave and these were factors that influenced the degree into which implementation took place.

Chapter 6 was also followed by a discussion through the theoretical framework on implementation.

This final chapter summarised what was presented in this thesis. The summarised findings indicate that the process, the individuals involved in the process, as well as the characteristics of the institution and organizations within this, all influence what 'ICT in education' means (fourth research question).

This section continues with identifying the contribution of this study in the field and concludes with directions for further study.

7.3 Contribution of the study

The contribution of the study can be summarised in the following points:

- This thesis provides a useful example of ICT implementation in a humanistic, centralized, and bureaucratic educational system. In order to explain implementation, it employs a multitheoretical approach that can possibly be used for evaluating other innovation policies in different countries. The theoretical framework is based on theories and concepts that can best describe the situation, with regards to teachers' work characteristics, teachers' behaviour within an institution, and teachers' role in implementation. It is also useful in explaining the implementation stages, the process of implementation and the influences on it.
- Beyond the multitheoretical approach, this thesis employs a multi-method research approach to gather the information needed to answer the research questions. This allows a variety of perspectives on the subject, and the collection of more in-depth, as well as generalizable data.
- The results are presented fully, in order to create a general image, taking into consideration the macro, meso and micro-level influences on the implementation process. This study extends the knowledge based on previous research, by looking on the subject through a holistic approach, identifying the importance of the context where implementation takes place. While previous studies examined ICT policy in relation to practical issues, including teachers' training, skills and attitudes, as well as availability of resources, this study made a step further. Rather than exploring these incremental short-term aspects of implementation the research presented here aimed to identify the changes required for more long-term, transformative implementation outcomes. It thus, turned the attention from the individual and the school unit to the broader educational system.
- The original contribution of this study is also related to the links made between theory and practice. Beyond providing practical guidance and suggestions to policy-makers and practitioners, the

thesis took the challenging task of testing theoretical assumptions and provided a methodological way of doing that. It thus informs researchers who are interested in theory-testing and researchers who are looking on the subject of policy implementation from a theoretical viewpoint.

- During the period that this study was taking place; various smaller-scale studies (e.g. Masters Dissertations) took place, exploring ICT policy in Cyprus. The author was continuously informed by, and informed these studies. The present thesis provides the broader image, based on other studies, as well as on the research presented in this thesis. As a result, the MOEC has currently a wide base of knowledge regarding the integration of ICT in Cyprus, and can use this for future policy-making.

The next, concluding section provides directions for future study.

7.4 Directions for further study

This study shed light on the initial stages of implementation, firstly the innovation, the way ICT are introduced to a system, based on mimesis, goal/policy transfer and secondly the habitualization, based on sporadic adoption, the spread of the innovation by leaders or champions, and some theorizing that may lead to the next stage of implementation (objectification). Situating the research in the implementation context enabled the research to identify various responses arising in the field, as a reaction to the innovation. These seem to be part of the first stages of implementation. Future research may indicate if implementation reached the next stages of institutionalization.

The limitation of this study due to its nature as a PhD study is that it does not allow for longer exploration of the implementation process, which as mentioned above is a long-time process. The most important finding, however, relates to understanding the nature of organizations and the way these adopt changes. Thus this could be characterised as a study of the 'psychology of institutions' focusing both on the organizational level and on the individuals within this. The study employed various quantitative and

qualitative methods to triangulate the evidence gathered, and used a multi-theoretical perspective to understand and interpret the evidence. Hence, it makes a sound contribution both in research regarding ICT in education, and in research that investigates policy implementation. As such, this study is interdisciplinary and provides useful information for practitioners, researchers and policy-makers. The conceptual tools developed and the related criteria should be enhanced through further research in the same field, in order to identify similar responses to the ones described in this thesis. If further research supports the use of these conceptual tools, these could be utilized by policy-makers for the development of future ICT policies and their evaluation.

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9 APPENDICES

Appendix 1: Narrative descriptions of a school day

<u>School A</u>

'...As I entered the main building I saw immediately the office of the principal on the left, with a label with his name on the closed door, I knocked, I entered and introduced myself. A teacher was leaving at that moment, through another door that was leading to a different large room, which seemed to be the staff room, since there were armchairs, as far as I could see from the principal's office. In the principal's office, there was a wooden cupboard with glass doors and with many box files and books lying on the shelves. On another shelf, next to the cupboard there were some cups and on the wall there was a board with the school program and other notes pinned on it. The principal was sitting behind his desk, and in front of the desk there were armchairs, and a smaller table on which a vase with flowers was placed....'

'After the interview was completed, I asked the interviewee (who was also the ICT coordinator) if there was a chance to see the computer lab, and he replied immediately, that he would show me around; he took the keys from the principal's office, the doors of which were open, and we went through the central yard (around this there were classrooms on the ground and 1st floor) and through a corridor, close to the car park of the school... The lab was a large room, with three rows of desks looking towards the walls, with 5 computers at each row, and along one of the walls there was the teacher's desk. I asked the coordinator, if it is difficult for the teachers using the lab as the students always look towards the walls and the computer screens and thus have their backs towards the teacher who is at the front of the room in the middle, and he replied that yes, this was the case but that this is the only way to connect them (the computers to the network), and continued asking me, if there was another way... he entered the smaller room, where the Internet connection cupboard was, and was looking at something, because as he said there was a problem with the connection. On a shelf, I saw a lot of software packages; I commented 'you have a lot of software', and I asked if it is them who buy that software. He answered, that some of it has been sent from the Ministry and others have been donated or brought by them. Then, I went back to the lab, and out with him, and on the way back to the room, he was telling me that he applied to do a distance learning doctoral degree with the Open university in England and that he is waiting for a reply....'

'During the interviews and the breaks, the principal was coming in the office he was making jokes, because the other teacher let him see that I offered them biscuits, and he asked me why didn't I offer to him, commenting that I was discriminating (of course he was smiling because he was joking)...many teachers came in the office again, and sat around the table, some were making copies of handouts, etc. the younger teachers were asking me about my studies, the degree I am studying for...'

School B (see also classroom observation in Appendix 10)

'After the interview, I and the teacher that I interviewed went back to the teachers' office. We sat at the armchairs, and there were two other teachers there as well. One who was working at the computer commented 'I did these so many times... these calculations' (she prepared different sheets of paper with calculations and she was printing them on colorful cards). The teacher I interviewed sat close to her. I asked her how many teachers are there in the school, then I asked her what time there would be break, and she gave me that information, so I told her that I thought I could wait at the school, since I would have another interview soon, instead of going away and coming back again. She agreed with that. Afterwards, while she was waiting for the printer to finish, she started discussing with the teacher who was working on the computer, about different things, for example, ideas about what kind of dress to wear at a wedding; the other teacher who was there was talking on her mobile phone. The teacher I interviewed, talked about the visit of the evaluation team (from the Ministry) to the school, she said that the principal is overreacting, that anyway they would do everything as they did always, and that she is bored of listening all the time about the small handbook (with rules for the students), or about the boards... She then called her mother to ask about her son who was sick, and then she called the doctor and booked a meeting for her son, later on that day.

Another mature teacher came in and started talking to me about the weather. Then she was asking me, where I studied and if I was studying in a primary school in a specific area, because she used to work there and I seemed familiar to her. I told her that I had younger sister who studied in that school and that perhaps she may remember her. She commented 'yes, you are growing and you change...'. Then she went out with some Mathematics tools. She came in later, she sat and started talking about the lesson she was preparing for the next day. She told the other teachers about the text she chose from the book, (she commented that that was the most suitable from the three remaining lessons in this textbook; its subject was the Luna Park). She said, that she also thought about a lesson regarding the National day of the 1st of April but as she added, the students don't live this in reality, and they may not be interested. She said that she chose the other lesson (the Luna Park) because it is more interesting for them; they know about it. She explained her idea, about how to structure the lesson, she said she will prepare some games for them, to play, commenting 'how many things you can do...?' and she added 'you have to see what you have first and then decide what to do' and another teacher added 'yes, you don't have much time...'. The mature teacher got up, and she was looking at something on the notice board. Then this teacher next to me, said, 'yes, at the end of the lesson you can ask them to create representations of the Luna Park'. The other teacher who was sitting there said 'it's one thing to say that you will do all these, and another thing to do them... it takes time... Mrs.... (saying her name)'. The mature teacher let the others know that she has to find some markers too and she went to find them; then she returned with some colorful A4 cards.

A student came in the room, and the teacher, who was close to me stood up to give him a large picture, that she took from one of the drawers in the

office. Another teacher wondered loudly 'when is the Palm Sunday? Why are you doing (teaching) this from now?' (as the picture was representing Palm Sunday; the entrance of Jesus in Jerusalem. Then it was break, and many other teachers came in the office. The one I was going to interview next, saw me and said 'hi'; I asked her, if she would like to have break before doing the interview. She noted yes, and she sat between me and the other teacher that I interviewed before, and she started talking about measuring (food) calories... A student's mother came in, looking for the teacher who went out to talk on the phone, and she waited for her, outside the office.

The principal came in the office, sat next to another teacher, talking about furniture, and everyone who was sitting there, was giving their opinion or their ideas about that. (I didn't realize what this was about, and for where the furniture was, and if for the school, either for teachers' or principal's office, or personal). Then the principal was giving to some teachers handouts saying they should give them to the students (as I understood later, this was a notice addressing to the students' parents). Earlier, another young teacher came in and showed the principal this handout, and the principal said it was ok asking the teacher to copy them and put the pages together, so that they would give them later to the students, and the young teacher (who was addressing to her in plural) went out to do that.

The principal sat in the circle of the teachers and started saying to one of the teachers there that one of the students still didn't come wearing uniform. The teacher responded that it is also parents' fault. At the end of the break, the principal said, they would do a gathering. The teacher I was going to interview, who was sitting next to me said she would go for the meeting and come back in ten minutes. I said, 'no problem' with that. Then the bell rang and everybody went out, except from one teacher who was occupied with something, and the other one who was talking earlier on her mobile phone... I asked her if she did a postgraduate degree in the USA because she mentioned earlier during the interview that she was in the USA in the past. Then I asked her regarding the subject (of her studies), and if she is using that degree now, she waved her head 'no', twice, and then she said that she is doing something completely different, at the Ministry (she mentioned a program she is involved in). Afterwards, she started going out and she explained 'I am going out as well to listen'; while the principal started talking, telling a student to go and sit at the bench, because when the bell rang, instead of coming for the gathering, he went to drink water. Then she talked to students about the time they come to school, that some students were late today, she told them about the uniform, that they should come with the grey trousers or grey/white shirt, which is the uniform of the school. She talked to them about their behavior in the classroom and informed them that they will be given a small handbook that includes behavior rules, one that they had before and which, they should follow. Then she called one of the students, to announce which classroom was the cleanest and would win the price, because earlier on, there was a group of students who were entering the classrooms and evaluating if they were clean. I heard earlier the teacher who was with them, saying to the principal who asked her how that went, that all the classrooms were clean but beyond that, there was something else

and she continued saying that in some of them, children kept food and left-over food under the desks (there is a shelf under each desk). One of the students then went in front of the microphone and announced the class that won the price, the rest of the students, cheered up, and then the principal congratulated them, finished her speech and asked them to go to their classrooms…'

<u>School C</u>

'I had arranged since yesterday to meet this teacher during the second period. I went earlier to the school at 8:15 to talk to the principal and inform him about the progress regarding the interviews. I entered the school, from the same entrance, which is in front of a smaller building separated from the others that accommodates, I think, two or three classrooms. There is a path made of concrete, and on the sides of the path there are a few small palms, and flowers. Closer to the parking place, at the north, there are some trees in the garden of the school…I walked through the path, and towards the front yard, which is covered with gravel and went through the yard, towards the principal's office. I could hear teachers and students from the classrooms that were on the side of the yard. I went up the stairs, towards the principal's office and I heard teachers and students also from the two classrooms on the sides of the principal's office. His door was half opened. I knocked, and I entered when he replied 'yes' and saw him sitting in front of the computer, looking on the screen from very close with his back bended forward (which is an unhealthy posture of working at the computer) …'

'After I walked out, I went towards the teachers' room; I saw the young girl, who seemed to be the secretary of the school holding some papers and entering some classrooms on that side of the building (because the classrooms at the lower level of this building look towards the opposite direction, towards the courts, which were at the lowest level of the school area). I entered the teachers' room, where the teacher I interviewed yesterday was talking with two other teachers. One was sitting in the armchairs close to the big table, while the other two were sitting around the table, close to each other, relaxed back on their chairs and they were talking about magazines with gossips of famous people (e.g. movie stars). I don't remember if I said 'good morning' when I entered, because they didn't turn to greet me, instead they continued their conversation. I sat at the chair close to the door…. the teacher who was sitting next to me on the armchair, looked at me, and said 'is it at 25 past, that the period is changing?' I said 'I think, it is half past'. And the male teacher commented that the bell will ring when the period will change. They continued talking about celebrities' magazines and the male teacher commented that all the women he knows read this kind of magazines, and he asked the mature teacher; 'yourself, you don't read them? Don't tell me that you don't' and she replied positively mentioning the name of one of those magazines, but then added 'I read mostly the ones that talk about healthy eating or…'. I was just smiling, without making remarks, while I was looking outside in the yard, from time to time. When the bell rang for the 2nd period, the teacher next to me got up, (she was wearing jeans, and sports shoes, and left the room…'.

'The young secretary came in the staff room for a while (I forgot to describe her room: it was not very big in size, not much light coming in because there were only a few windows; there was one desk on one end, and another (semi-cyclical) desk with a computer, monitor and screen on it. She had also a radio on her desk playing all the time modern Greek songs. I enjoyed the music while sitting in the teachers' room, and I think teachers liked this as well. I didn't see this in other schools). The secretary was standing talking with the two teachers, complaining about some health problems; all of them mentioned something that was wrong with their health and each one was making suggestions to the others. After that, the secretary went back to her office. At some point, a woman with a young boy came in, said good morning, and asked the teachers if the secretary (using her name) was in. She went in the secretary's room and when she was coming out, the blond teacher wished her happy birthday for her son. The mature teacher asked how she knew it was the boy's birthday (because the boy was young and not a school student) and she replied that she hears the news from his sister; who was probably her student). His mother described how sleepless their night was because the kid was very sick. Then the mother looked at the notice on the whiteboard and started talking with the two teachers about the date for the school end of year performance. The mother suggested that it was late, just on the previous day before the last day of the school, and the mature teachers seemed surprised too, and she mentioned that indeed it is late; she wasn't there yesterday (probably they had a meeting to decide that). Then she said that they must have a reason to arrange the performance date so late. She asked what day that was and the mother answered that it must be Tuesday. The mature teacher said that she is not that involved in the ceremony, that the children of her class have only a small part in the ceremony but maybe the teachers of the 6th grades may have suggested that date because there is not much time left for the preparation; they calculated with the other teacher that after Easter holidays (1st of May is the Easter day, and 16th of June, schools are closing) there are only some weeks to prepare for the ceremony. The mother said (and it was then that I realized that she is a member of the Parents' Union) that she is not going to impose her opinion about the date. Then she asked the blond teacher if she could occupy her for sometime because she would like to talk about her daughter ('she is not doing her homework these days and she is concerned'). During all that time, her son wanted to go out and he was complaining and pulling her from her hand to go out. She explained to him 'they are not yet out for the break, you have to wait a while to see her' (I think she meant her daughter; obviously the boy wanted to see his sister). The blond teacher replied 'sure'; they then went out stood outside the door and they were talking. The other teacher started again correcting students' notebooks and I took out of my bag, a childrens' book that I brought to give to the principal. When I finished looking at that, it was 10 minutes approximately before the break. When the bell rang for the break some female teachers came in said 'good morning' and sat there, the woman from the canteen already brought drinks and coffees and the teachers were taking them from the tray on the table...'

School D

'When I arrived at the school some children in the front yard were doing gardening. I entered the main building, and I asked somebody who was standing there (I assumed that was a teacher), where the principal's office is. It was two steps away and I went there, but I saw that the principal (who surprisingly was a priest) was talking on the phone, so I waited outside his office for a while... A teacher asked me what was I looking for there and I replied that I was waiting for the principal to finish his telephone conversation; I said that he is waiting for me, and knows who I am. Another woman (either a cleaner or a teacher) came close to me and asked me, if I wanted to drink something while waiting ...At the same time, a woman was screaming at some children and I initially thought that she was a teacher, but later I watched as the principal came out of his office and was talking to her. She was a mother of a student who called her using his mobile phone because some other children quarreled with him. The priest-principal calmly talked to her and tried to solve the problem, and then he came to me and suggested we go to his office where he offered me a place to sit, and asked the cleaner of the school to bring me something to drink....I waited in his office until the end of the lessons, and then the teachers started gathering in the office for the staff meeting.'

'The principal was walking at that time towards his office, and I followed, but in the office, there were two male teachers with three boys, who were brought in the principal's office because, as far as I could understand, they threw stones at each other, and used insulting words. So, I stopped at the door of his office, the other two male teachers left and the principal sat and talked for a while with the students asking them what happened. One of the boys was telling that the other one threw stones, and the priest said '*but it is not only the stones, your teachers said that you used bad words too*'. He talked with them just for a minute, and then told them, that he had work to do so they should come back during the break... the bell rang for the first break. Then many other teachers almost all of them young came out of their classrooms towards the big table where a woman from the canteen came earlier and placed a tray with many different drinks; tea or cold coffee and another tray too with sandwiches. The teachers came close and they took their drinks and sandwiches, and one of the female teachers suggested to the other female teacher to go outside and sit under the sun....

After that, the other male young teachers went out too, while first some of them talked for a while with the principal who was standing there. The principal was eating a sandwich and he asked me, if I would like to eat anything, but I replied that I was ok. He sat and another teacher, older than the others, male, came close and sat at the table. I said good morning and he replied. The principal asked him, if they had a nice time yesterday and he replied that he asked the students to write about it and they commented in their report that they have had a wonderful time. He started describing to the principal what they did, he mentioned that they went to the monastery and then they walked and they found a 'path of nature'. The teacher told that there were labels for every flower and plant referring to their name, and the principal made a remark that the scouts are the ones who must have created that 'path of nature'....The teacher then commented that he believes it is

better when one group of students goes for a trip, and not all of them together. The principal answered back that it is as much as it can be that it depends on the costs too, if it is more expensive. Then the principal went away and the teacher turned to me and asked me from which university I am....'

Classroom observation (School D)

'The students' desk were placed in an open square shape, 3 students sitting on one side looking towards the doors, and 4 students on the other side looking towards the windows, as well as 5 students on the side of the classroom looking towards the front, the boards, and teacher's desk. In general, in this school the student groups are small groups... During the lesson I was observing, I was impressed of how the young students (1st grade: 6-7 years old) were disciplined, and they had an order in whatever they did, and when the teacher was asking them to do something they would do it immediately. When she asked them to sit back they would sit properly at their chair, crossing their arms on their chest; when she asked them to take their pencil case out of their bag, they would do it, and some of them were proud saying that their pencils were sharpened today....I entered again the main building and the teacher that I was going to observe was going back towards her classroom and said to me that they were going to have a small gathering before starting the lessons. I sat at the big table, where there were some young teachers talking, two women and two men, and at that point I heard the bell ringing, and the students started gathering with noise. They stood in lines by class starting from the 1st to the 6th grade, so you could see them standing from the shortest to the tallest. All of them almost were wearing school sports clothes, many of them grey but others especially students of higher classes, had black, or red or pink sports clothes on (which is not the national school uniform). They stood in lines and the teachers went to stand close to them too...The principal came out of his office, and asked the mature male teacher to start the meeting, doing their prayer, and himself he walked back to his office. So the mature teacher went at the front, in front of the stage, and he asked them to do the prayer (this is how all the gatherings usually start in the Cypriot schools, when they take place first thing in the morning). The older teacher said, as soon as the prayer finished, that a police-man was going to talk to them about fireworks, because as he said these are not funny but dangerous.... The younger children lost interest at some point during the meeting and were talking with each other but one of the teachers noted 'shhh' to make them stop talking, even if the teachers were talking between them during the gathering. At the end of the speech, the police-man, said that it was not what he wanted to talk about, but he took the opportunity to refer to the dangers of driving motorcycles especially for those who are young and still drive them...

The 1st grade children went immediately back to their classroom because their room was close, and they immediately sat at their chair, while I was hearing noise and screaming from outside, from other students for many minutes later, after I sat in the 1st grade classroom. The teacher seemed stressed that so much time passed during the gathering although she commented later that it was worth...She stood at the front of the classroom

and she asked me to go there too; she introduced me to the children 'this is Mrs. Christina, whom I talked to you about yesterday, she came to watch our lesson because she heard many good things about you', and she asked them to think of two questions they wanted to ask me...I went to sit at the back of the classroom next to the computer, as I said before to the teacher that I would do, in order to be close to the computer. Some children looked at me for a while but then turned to their teacher and she commenced the lesson. She took a large plastic bag with shopping and she pretended that she walked in through the door, and she asked them 'where do I come from?' the students seemed interested, and replied to that saying things like 'from 'the name of an area'' (because probably she lives in 'this area' and she is driving to school everyday) 'supermarket' 'grocery store' 'hypermarket' etc. some of them mentioned the names of big brands of supermarkets, for example, 'Orphanidis' and the teacher explained that these are names of supermarkets. She put the bag with the shopping on her desk at the front, and she wrote on the whiteboard, with big nice letters the names of the places the students mentioned. Then she asked them to guess what she had in the bag, and they replied naming things like 'juice', commenting that they can see it through the bag. Then the teacher started taking out of the plastic bag a packet of biscuits, a bottle of water and she was putting these on her desk, while the students were naming the things she was holding, as she asked them to do. (*Maybe she did this kind of lesson that I observed previously because she was telling the students often during the lesson, that 'we did this before' or 'we did that before many times'; when she gave the students a text to read, one of them at some point said that they read that before and she told him that this was not the one, it was another one. Maybe she had prepared them more than she should for this lesson; because I would be there observing and she wanted it to be a good lesson. What I saw was a well-prepared lesson, and the level the students showed in their learning was higher than expected for a rural school like this*).... The teacher then took a big (A2 or bigger) picture, a colorful one, presenting people who were in a supermarket, and she brought a chair at the front, between the desks of the students, in order to put it there; then she changed her mind, and she put it on the whiteboard, at the marker holder (a narrow shelve along the lower part of the board) holding it with her hand. She said to the students 'I want to hear complete sentences; what do you see?' Almost all the children were raising their hand, and were describing the picture like this: 'in the picture I can see someone who is standing in front of the mirror'. One of them asked showing at a part of the picture 'what is that?' and the teacher replied that these (showing with her hand) were sweets. Then she asked them where these people are, since there were clothes in that place, as well as food and they answered that it must be a supermarket. Almost all the students gave at least one answer until then, but there were two, a girl at the back row, who was not raising her hand (and from time to time she was turning and looking at me...) The teacher offered a paper to each student on which there was text in a frame and a small picture underneath ... the teacher said 'Mrs. Christina wants to listen to us reading' and then to me in English 'they all know to read except from one; two have problems, it is normal for ... (the name of the village) we have

other problems here'. She stands in the middle of the class and she reads once the text then she says that many of them will read, even though 'we don't have much time'. Then, she asks some students to read, while she is sitting on a students' desk (nobody was sitting behind her). Then after some of them read a piece of text, which I thought it was quite long for a 1st grade class (more than half a page, in letter with font 12; she also commented that it is a bit long text), she asked them who are the people that the text refers to, and they answered, while she got up and went close to the students who do not raise their hands, and asked them questions. The other activity, was to underline the sentences that showed who were the people in the text. She said 'Take out your pencil-case', and they did so, some of them commenting that 'Mrs., my pencils are sharpened today' 'mine too' 'Oh Mrs. I forgot to sharpen my pencils'. (I thought that this was part of their training, she taught them to bring to the classroom sharpened pencils, so that they can use them without wasting time to sharpen them in the classroom. This is part of the educational goals for the 1st grade, to teach the students discipline and order in doing things). As soon as they found their pencils she gave them instructions 'underline the sentences that show what the kids asked for' (she meant: what the children of the text asked for in the supermarket) (I thought that it was impressive that the children knew what it means to 'underline' which in Greek language is a long and complicated word). One of them asked 'but the whole sentence?' and the teacher replied that not the whole sentence, but the words that show what the children asked for; those that have question mark. 'Question mark?' a student repeats; and the teacher replies 'yes, you remember 'question mark' we did this before'. She is then going close to a student, who has some difficulty to read, he reads the sentence with her help and she encourages him saying loudly 'Bravo! Bravo my baby!'; she is then telling him to read the sentence again and he starts reading a bit loudly, even after they changed activity (so she went close to him, saying, we "gave him air" (meaning 'we encouraged him') to read and he cannot stop, but he continued reading, and then she said 'I have to turn your paper upside down since you cannot stop (reading)' and she did that). She goes close to the other students too, and she helps them with the exercise. After this activity goes on, the teacher returns in the center of the classroom again, between the desks and she asks for the sentences that the children underlined in their text. She is writing these on the board, (after erasing the previous words) and then she asks them to find the first word of each sentence. She asked the two students who were not raising hands and one of them, the girl started looking in the text, in the paper in front of her, but the teacher told her 'here, here E..' showing with her hand towards the sentence on the board. She is underlying the first word with a red marker on the blue sentence. One student is raising the hand and saying loudly 'me, me' and the teacher tells her that 'raising the hand means 'me', you don't have to say 'me, me'. She gives turn to the weak student (who she was helping earlier to read the first word of the 3rd sentence she had on the board). Then she asks 'was the way the children asked polite? Which words, do they show this?' The children answer giving the words 'please' 'I would like' etc. Then she asks them to tell her sentences 'if you were going to the supermarket'. They tell her nice sentences using the polite words 'please' 'I

would like' etc. Many of them are using the Cypriot vernacular, and the teacher does not correct them, she accepts that, since she is sometimes using the Cypriot vernacular too. ..The next activity is this; she says that two pairs of them will come out at the front of the class, and they will pretend that one pair of them are in the clothing shop, (she uses the word shop assistant so, she asks them to say what it means, and one answers; 'the one who sells', and the other one in the restaurant. So the first pair comes, a boy and a girl and they pretend that they are in the shop, and the girl asks the assistant if she can try on a skirt; the boy pretends giving her a skirt and, at the same time, the teacher is correcting their sentences. The same happens with the second pair, a girl is sitting on a chair, the boy is the waiter, the girl asks for a sandwich, but the teacher suggests that she should ask first for the menu. The teacher corrects the students like this; 'I think you should say this instead;...'. Then she asks them how we do call the person who sells meat and they answer.

Then the teacher says; 'some of you and I will tell you now who are these are going to work on the computer and the rest will, as well, by turn. I will tell the names of the children who will go now to the computer', and she says the names but warns them; 'not yet; in a while'. She continues giving instructions for the papers and then she takes her big plastic chair and she goes and sits in front of the computer screen, asking the three boys she named to come there too, with their chairs. She starts the computer, which starts quickly, and she prepares the software, she looks for it in the files, while the three boys bring their chairs quickly and sit next to the teacher in front of the computer screen, in a cyclical way (as the computer is on a semi-cyclical desk too). The teacher opens a window on the screen, which has on one side many fruits and vegetables, colorful ones, and shows the students what to do; to drag the objects, clicking on them with the mouse, and bring them in the empty space in the middle of the window. As soon as she clicks on one, the name of the fruit or vegetable is announced in English. Initially, the voice came out aloud, so the teacher put the voice a bit lower. She transferred a few objects to show them how to do it, and she asks them to continue doing that, then to name the objects and finally to separate the fruits from the vegetables. Then the one, who was sitting next to her, tried to do that and she helped him to use the mouse, putting her hand on his hand holding the mouse. She commented to me that there is space to write the words, the names of the objects, but it is very difficult, she said that they need another keyboard, because this one has small symbols (not appropriate) for students of first grade. The second student looked scared, and he didn't want to try, while the third one took immediately the mouse, and he managed to drag the object. Then he told the teacher that the second student didn't want to try. She came close to them again (because previously she went to help other students with their paper exercise) and she asked him to try together with her. She was again holding the mouse above his hand, and helped him to drag the object on the screen. It seemed a bit difficult to do that exercise. The third student, who seemed to be more comfortable than the others commented referring to the second student 'he cannot do it' and the teacher said 'it's because he didn't practice a lot' while she was helping the second student. The teacher commented talking to me that the window

(on the screen) would not become bigger, and she tried to make it bigger with the tools at the top right side of the window. I suggested that maybe, if she dragged the sides of the window it would become bigger, but she said she tried that before; she tried it again but it didn't work. She said also that unfortunately it (the software) is in English; I asked 'is it Kidspiration?' and she said 'yes'. She left again, because the other students in the classroom were noisy and she went to help them. The third student was asking loudly the first student to do again his turn, and drag an object, impatiently waiting for his turn. The first student however, was thinking, and he turned and asked the teacher; 'and what shall we do then? The teacher came and she said, name them, and then separate the fruits from the vegetables. (And turning to me commented; 'another difficult thing to do'). I agreed, and at that point the bell rang for the break, the students asked her, if they would continue later and she replied positively. ..'

Appendix 2: Examples of ICT policies

The following countries were selected randomly from the literature review (Plomp et al 2003) to provide examples of ICT policies to inform this study. Due to space limitations, however, these are presented in the Appendix, rather than in the main text.

In Catalonia, a Strategic Plan for the 'Information Society: Catalonia Network Connected', was developed by more than 250 experts from education, training and other sectors. XTEC a suite of infrastructure and telecommunications services based on the Internet (www.xtec.cs) as well as virtual teaching and learning communities were developed and can be accessed freely by the education community (SITES p. 88).

In Chile, a program called 'Enlaces' (1992) introduced ICT in some schools (as a pilot). Emphasis was given to teachers' training and equipment of the schools. One of the important elements of the program was the creation of the 'Technical Assistance Network' (Hinostroza et al, in Plomp et al 2003).

Danish government aimed to be amongst the best five to ten in the world in terms of ICT implementation. Various initiatives were developed ('Learning Lab, UNI-C: ICT Centre for Education and Research, Sektornet). An evaluation study (Lieberg & Morgan, 1998), funded by the Danish Ministry of Education identified Sektornet as a unique European ICT project.

In Japan, the first policy was implemented in 1990 by providing all primary schools with 2 computers. Since 1995, 100 educational software packages were produced, as a result of the funds that the Ministry of Education has put into Research and Development funds for Educational Software. Mostly the computers became available in computer laboratories, this leading to their use during whole class activities directed by the teacher (Shimizu et al, in Plomp et al 2003).

In Chinese Taipei, in the early 1990s, the 6-year National Construction Plan, was launched and included 'the Plan for Developing and Disseminating Computer-Assisted Instruction Software to the Elementary and Secondary Schools'. By the end of 1999, all primary schools had at least one computer lab, with many computers, and in-service training for teachers was provided across the country. Since 2000, the government's priority was to transform Chinese Taipei's economy into a knowledge-based society, and the initiative 'the ICT Education Master Plan' is related to this goal (Law et al, in Plomp et al 2003).

Malaysia, set the goal to become a fully developed nation by 2020, and thus its educational system has been going through various reforms, related to a shift from the main economic resource, agriculture to low-technological manufacturing and services provision industries. Worth to mention is the initiative of the Smart schools project, which was launched in 1999, aiming to transform schools to learning institutions for preparing children for the Information Age (Smart School Project Team, 1997). Smart schools are fully equipped with ICT they are linked to the Internet, and although the project ended in 2002, the aim was to implement this concept to all schools by 2010. Another project was the DO It Yourself –PC assembly which aimed to teach interested students with the skills and knowledge to assemble computer systems, who will then help their own schools to maintain their computer systems. All teachers and students have today access to 'a rich IT-

enabled learning environment'. A central unit to source, review and recommended suitable content was set up as well as a 'procurement scheme' for discounted prices for schools to buy software. As a result, teachers can now select from a variety of learning resources (993 courseware titles, 1431 Internet websites, 10 online databases and 2 electronic magazines). Also the MOE has published 22 titles, for Mother tongue languages, civics and moral education etc. and 10 CD-ROMS (Hashim, in Plomp et al 2003).

Appendix 3: Letter by the MOEC allowing permission to conduct the PhD research

Ministry of Education and Culture
Office of the Principal of Primary Education
1434, Lefkosia

30 of September 2004

Mrs. Christina Hadjithoma
Address

Subject: Permission granted for conducting research amongst educators of primary schools

I refer to your letter related to the above subject, dated 14th of September 2004 and I inform you that your inquiry for conducting research amongst teachers in primary schools with a title: 'A qualitative research in the use of new technologies in primary education, through the implementation of the relevant policy in Cyprus and in the UK' for the current academic year 2004-2005, is approved.

It is taken for granted that permission by the principals of the schools that you will visit and of the teachers, with whom you will collaborate, is agreed before hand, for the necessary arrangements to be made so that the smooth operation of the schools is not interrupted.

The content of the questions that you will use in the questionnaires and the interviews has to be especially selected, so that the work of the teachers, the school environment and the families of the students are not disturbed. The completion of the questionnaires by the teachers, as well as the interviews, should not be done during their teaching time. For conducting observation you have to get the permission of the teachers who are influenced and you have to do this (the observation) in a scientific way. It is also noted that it is necessary to report the results anonymously and that the information that you will gather will be used confidentially and only for the purpose of your research.

Please note, that the dissertation of your previous research should be submitted hierarchically, that means to the Principal of the Primary Education and not to the General Co-coordinator of the ICT advisors' group. Finally, this permission is granted under the condition that, as soon as this is completed, you will make the results of your new research known to the Department of Primary Education for relevant study and to be used accordingly.

Name
Principal of Primary Education

Appendix 4: Letter that was sent to schools with the survey questionnaires

THE PRIMARY SCHOOL PRINCIPAL
15/10/04

Dear sir/madam,
My name is Christina Hadjithoma, I am a primary school educator with a permanent position and I am currently on an educational leave due to postgraduate studies. During the current academic year 2003-2004, I will be conducting research in which I ask for your participation. The title of the research is: 'The embedding of Information Communication Technology (ICT) in teaching and learning through the implementation of the related policy of the Ministry of Education and Culture for primary schools.'
Large amounts of money have devoted by governmental and other organizations to research regarding questions about the use of new technologies in education, for example, research related to the way new technologies influence learning.
At a time when the European Commission, at the Lisbon meeting in 2000, declared the goal of transforming Europe into the most dynamic and competitive knowledge society, through action plans, including e-learning, such research is important in order to understand the nature of technology and its impact on teaching and learning.
There has not been yet however, much research into the related policies that have been developed in different countries and more specifically in the way these policies are implemented in schools, influencing the way that educators understand what has been established in other countries as 'ICT in teaching and learning'. Therefore the research I will be conducting is concerned with the way ICT are used in schools and with the educator's experiences of using or not ICT. I intend to explore the procedures through which such innovative policy is implemented in schools, and how the educators' work is shaped and possibly changing through the embedding of new technologies in education. In Cyprus the attempts of embedding computers into primary schools have started at the beginning of the 90's. However, beyond the newly developed policy, the case of Cyprus is interesting because of the history of its educational system as well as its recent integration into the European Union.
For conducting my research thus, I ask for your help, in order to collect the information that I need, through questionnaires, interviews and observations in the schools. I would thus appreciate it if you inform the school staff about my research and if you distribute the questionnaires (together with the small envelopes) that I send you to the teachers. Either they use or not ICT, educators' opinion is important and each questionnaire returned is an important contribution to the research.
I kindly ask you also to complete the questionnaire that is addressed to the school principals and I enclose a stamped envelope for you to send me all the questionnaires to my address, within two weeks at the latest.
Address

I also include a letter from the Principal of Primary Education, which grants me permission for conducting the research. If you need more questionnaires please notify me as soon as possible.
Thank you for your valuable contribution and I will be available to inform you regarding the progress and the results of the research.

With regards,
Christina Hadjithoma
Email: christina.hadjithoma@bristol.ac.uk

Appendix 5: Teachers' questionnaire

Questionnaire addressed to the teachers

Information on the research

This questionnaire is part of a research that aims to study how the policy for the embedding of Information Communication Technology (ICT) is implemented in schools, in order to offer the possibility for improving the existing strategies. Another aim of the study is to study through the experiences of teachers how ICT influence teaching and learning. I will also study the reasons why the new technologies are not used in schools, therefore every opinion is important. This questionnaire is being sent to 20% of the primary schools in Cyprus and aims to collect information to describe a general image of how ICT are used and experienced by educators in schools and later there will be interviews and observations in three schools. All the information gathered will be used confidentially and anonymously. This research has the approval and the support of the Ministry of Education and Culture. **Please complete the questionnaire and return it to the principal/secretary in the envelope provided within TWO WEEKS.** If you have any questions about this questionnaire or the research, please do not hesitate to contact me:

Email: christina.hadjithoma@bristol.ac.uk (tel. ...)

Thank you in advance for the important contribution to this study.

Note: The term ICT refers to Information Communication Technology including computers, web camera, Internet, mobile phones, TV, DVD, CD, VHS etc. In some questions I refer to computers, in others I refer in general to ICT.

A) PERSONAL INFORMATION

- You are: Male Female

You belong to this age group: 20-30 31-40 41-50 51-60 61+

- How long have you been teaching in primary schools? _____

How long have you been teaching in this school? _____

- Do you have your own class ☐ or

Are you teaching a subject to different classes? ☐ Which subject? _____

- How would you describe the level of ICT resources in this school?

Very high High Low Very low

B) EXPERIENCE IN INFORMATION COMMUNICATION TECHNOLOGY

- For how many years have you been using computers in teaching? _____

- How would you describe yourself as a computer user in general?

Not confident Developing confidence Confident Very confident

- Did you use ICT in the previous schools where you taught (if you did)? YES NO
- Because: There weren't any at the school/I didn't know how to use them/ for the same reasons I am not using them now either/ other

---

- How often do you use computer:

	At home	At school
About every day	☐	☐
About every week	☐	☐
About every month	☐	☐
About every trimester	☐	☐
Never	☐	☐

- What are the activities you do when you use computer at home?

Preparation for teaching ☐
Communication (e.g. email) with friends /family/parents of my students/ colleagues/others ☐
Finding information in journals/magazines/educational websites ☐
Entertainment ☐
Other (please specify) ☐

- Did you receive training in ICT? YES NO

IF YOU ANSWER NO PLEASE GO TO THE NEXT SECTION: <u>VIEWS ABOUT ICT</u>

IF YOU ANSWERED YES:

- When?

In the last year ☐
In the last couple of years ☐
More than two years ago ☐

- Where?

In your school ☐
In your town ☐
In your region ☐
In another town ☐

- How many hours did the training last? ____
- Who were the trainers?

University ☐
Pedagogical Institute ☐
ICT advisors ☐
High-school teachers ☐
Private institute ☐

- What was the training about?

Basic computer skills ☐
Pedagogical use of computers ☐
Use of computer in classroom administration ☐
Other-please specify ☐ _____

- How did you find the training program?

NOT HELPFUL AT ALL POTENTIALLY HELPFUL BUT NOT
RELEVANT TO MY NEEDS HELPFUL VERY HELPFUL

- Please add here other comments about the training you have received

_____

C) VIEWS ABOUT ICT

- Which of the statements below reflect your views about new technologies and education?

They are useful for keeping students' interest in the lesson and as a motive for them ☐
To keep students quiet and occupied ☐
It is necessary for everyone nowadays to know how to use computers and other ICT ☐
They promote learning ☐
They help me in teaching ☐
I don't know if they are useful in teaching and learning (→ continues) ☐
They are not useful at all ☐
OTHER _____ ☐

D) USE OF ICT IN THE CLASSROOM

- In which units do you use computers? _____

- How many students usually work on the computer? _____

- Do you ever use the computer lab?

YES NO THERE IS NO COMPUTER LAB

- Do you use any software, which is available in schools? YES NO

(IF YES PLEASE NAME EXAMPLES)

_____

- Is there an ICT school coordinator in your school?

YES NO I DON'T KNOW
If YES do you think that the help you receive from her/him is important?
YES NO

- Is there an ICT advisor visiting your school?

YES NO I DON'T KNOW
If YES, how often does she/he offer you individual help ____

- To whom do you turn for help for using ICT in the classroom?

ICT advisors ☐
IT school co-ordinators ☐
Head teacher ☐
Colleagues ☐
Children/friends outside school/family ☐
Private tutor ☐

- The lessons in which ICT is incorporated **GO WELL** because:

(You can put numbers if you want, starting from 1 as the most significant. You can skip the factors you don't find significant.)

ICT helped students to learn ☐
ICT improved student motivation ☐
I was familiar with the equipment and the software ☐
I had planned the use of ICT in the lesson and gave it a try before ☐
The equipment worked well ☐
Technical support was available ☐

- The lessons that incorporate ICT **DO NOT** GO WELL because:

(You can put numbers if you want, starting from 1 as the most significant. You can skip the factors you don't find significant.)

ICT were an obstacle for the lesson ☐
ICT failed to motivate students ☐
I was not familiar with the software and equipment ☐
My planning for using ICT in the lesson was not sufficient ☐
The equipment failed to work ☐
Technical support was not available ☐
It did not work as I designed it ☐

- How do you think the use of ICT in schools affects you as a teacher? (Tick as many boxes as you want)

ICT enhance my role as a teacher ☐
ICT undermine my role as a teacher ☐
ICT make me feel more professional ☐
ICT change the way lessons are carried out ☐ Positively/negatively ☐
ICT change the relation between my students and I ☐ Positively/negatively ☐
ICT change the relation between the students ☐ Positively/negatively ☐

ICT POLICY AND IMPLEMENTATION

- Are you aware of the decisions taken by the Ministry of Education and Culture regarding the embedding of ICT in primary schools?

YES NO

If yes, how do you come to know about these?

_____

Why NOT? _____

- Have you ever visited the website of the Ministry of Education and Culture (MOEC)? (www.moec.gov.cy)

NEVER ONCE OR TWICE OFTEN VERY OFTEN

Who informed you about the website?

_____

I did not know about it ☐

- Have you ever visited the website of ICT advisors? (http://www.moec.gov.cy/dde/klimakio/)

NEVER ONCE OR TWICE OFTEN VERY OFTEN

Who informed you about the website?

_____

I did not know about it ☐

- Does the Ministry send you instructions or advice on how to use ICT in teaching and learning?

YES NO I DON'T KNOW

IF YOU ANSWER NO PLEASE GO TO THE NEXT SECTION: PARTICIPATION

IF YOU ANSWERED YES:

- In what form do you receive these instructions/advice?

In circular letters ☐
On the MOEC website ☐
Orally or written by the ICT advisor ☐
Orally or written by the principal ☐

- Do you follow these instructions/advice YES NO

Why NOT?

PARTICIPATION IN THE RESEARCH

Would you be willing to be interviewed if your school is chosen to participate as a case study in this research?

YES NO MAYBE

Would you agree to participate in classroom observation while you are using ICT?

YES NO MAYBE

THANK YOU FOR YOUR PARTICIPATION IN THE RESEARCH

Principals' survey questionnaire

Questionnaire addressed to the principals

Information on the research

This questionnaire is part of a survey conducted within the scope of my postgraduate studies. The general aim of the research is to study how the policy for the embedding of Information Communication Technology (ICT) is implemented in schools so as to make it possible to improve the existing strategies and the way policy is made. It also aims to study how ICT are related to teaching and learning, in practice. The questionnaire has been sent to the 20% of the primary schools in Cyprus and aims to collect information on how ICT are used and experienced by educators in schools. During the research, I will be doing policy documents analysis, a large-scale survey, interviews and classroom observations. Therefore, I would I ask you to signify if you would be willing to allow the staff at your school to participate in the interviews or the observations and if yourself would be willing to be interviewed. All the information gathered will be used confidentially and anonymously. This research has the approval and the support of the Ministry of Education and Culture. Please answer the questionnaire and return it to my home address with the other questionnaires, in the stamped envelope provided, in two weeks at the latest.

Home address:...

If you have any questions about this questionnaire or the research, please do not hesitate to contact me. Thank you in advance for the important contribution to this study.

Note: The term ICT refers to Information Communication Technology including computers, web camera, Internet, mobile phones, TV, DVD, CD, VHS etc. In some questions I refer in general to ICT, while in others I refer to computers.

A) PERSONAL INFORMATION

- You are: Male Female
- You belong to this age group: 20-30 31-40 41-50 51-60 61+
- How long have you been a principal of primary schools? _____
- How long have you been a principal in this school? _____

B) INFORMATION ABOUT THE SCHOOL

- How many teachers work in this school? _____
- How many children study in this school? _____
- Is there an ICT advisor visiting this school?

YES NO I DON'T KNOW

IF YES: How often?
Once a week ☐
Once a month ☐
More than two times a month ☐
Once per year ☐
More than two times per year ☐
Not at all ☐

- What are the main roles of the ICT advisor in the school?

Inform the educators about the Ministry's decisions about the use of ICT in schools ☐
Inform the educators about the Ministry's decisions about the use of ICT in schools ☐
Provide material for the teachers (e.g. software/ICT handbook etc.) ☐
Provide technical help to teachers and the principal ☐
Do co-teaching and give examples of teaching to the teachers ☐
I don't know ☐
Other (please specify) ☐ _____

- Is there a school ICT Coordinator or a teacher who helps teachers and you using ICT?

YES NO If NOT, why? _____

- What is the ICT coordinator's role?

Informs the educators about the Ministry's decisions
regarding the use of ICT in schools ☐
Provides material for the teachers (for example software,
ICT handbook) ☐
Provides technical help to teachers and the principal ☐
Does co-teaching and gives teaching examples to teachers ☐
I don't know ☐
Other (please specify) ☐ _____

- How would you describe the level of ICT resources in this school?

VERY HIGH HIGH LOW VERY LOW

- What kind of technology is there in the school?

Computers in the classroom ☐
Computer lab ☐
Web cameras ☐
Whiteboards ☐
TV ☐
VIDEO ☐

DVD player ☐
CD player ☐
Other (please specify) ☐ _____

- Who equips school with ITC? _____

- Is there Internet in the school? YES NO
  If not, do you know why?

_____

- Do you have the opportunity to tell you opinion regarding what kind of ICT will be bought for the school? YES NO YES, BUT I AM NOT OCCUPIED WITH THIS

- With whom do you collaborate in order to equip the school with ICT?

Ministry of Education ☐
Ministry of Finance ☐
ICT advisors/ ICT coordinators ☐
Parents' Union ☐
School board ☐
Charities ☐
Local authorities ☐
Other (please specify) ☐ _____

- What percentage of students would you estimate having computer at home? _____

- How would you describe the socio-economic situation of the student population of this school? LOW MIDDLE HIGH

- How would you describe the general knowledge and skills in ICT of the teachers in this school? CONSIDERABLY LOW LOW GOOD CONSIDERABLY GOOD

- What percentage of teachers do they use computers in the classroom in this school? _____

C) EXPERIENCE IN INFORMATION COMMUNICATION TECHNOLOGY

- For how many years have you been using computers in managing schools?

- How would you describe yourself as a computer user?

NOT CONFIDENT DEVELOPING CONFIDENCE
CONFIDENT VERY CONFIDENT

- How often do you use computer:

	At home	At school
About every day	☐	☐
About weekly	☐	☐
About monthly	☐	☐
About every trimester	☐	☐
Never	☐	☐

- What are the activities you do when you use computer at home?

School administration work ☐
Communication (e.g. email) with friends/ family/parents of my students/ colleagues/others ☐
Finding information (journals/magazines/educational websites) ☐
Entertainment ☐
Other (please specify) ☐ _____

- For which purposes do you use computer and the Internet at school?

Organizing the archives of the school ☐
Communicating with the Ministry of Education & Culture ☐
Communicating with the staff ☐
Communicating with the students' parents ☐
Finding information on educational matters ☐
Other (please specify) ☐ _____

- From whom do you get help in using ICT in school administration?

ICT advisor ☐
The instructions and the website of the Ministry of Education and Culture ☐
Educational websites ☐
ICT coordinator ☐
The school teachers ☐
The students ☐
Others (please specify) ☐ _____

- Did you receive training in ICT? YES NO

IF YOU ANSWERED NO PLEASE GO TO THE NEXT SECTION:

<u>VIEWS OF ICT</u>

IF YES:

- When?

In the last year ☐
In the last couple of years ☐
Two years ago or more ☐

- Where?

In your school ☐
In your town ☐
In your region ☐
In another town ☐

- How many hours did the training last? _____

- Who were the trainers?

The University ☐
The Pedagogical Institute ☐
ICT advisors ☐
High-school teachers ☐
Private institute ☐

- What was the training about?

Basic computer skills ☐
Pedagogical use of computers ☐
Use of computer in school administration ☐
Skills in using other ICT (please specify) ☐ _____

- How did you find the training program?

Not helpful at all Potentially helpful but not relevant to my needs
Helpful Very helpful

- Please add here other comments about the training you have received:

_____

D) VIEWS ABOUT ICT

- Which of the statements below reflect your views about new technologies and education?

They are useful in school administration ☐
They promote learning ☐
They assist teachers in teaching ☐
They help teachers to prepare for their lessons ☐
They help teachers in classroom administration (organizing students' records etc.) ☐
It is necessary for everyone nowadays to know how to use computer and other ICT ☐
I don't know if they are useful in teaching and learning ☐
They are not useful at all ☐
Other (please specify) ☐ _____

E) PARTICIPATION IN THE RESEARCH

Would you be willing to be interviewed if your school is selected for a case study?

Would you agree with the teachers to participate (voluntarily) in interviews if your school is selected for a case study?

YES NO MAYBE

- Would you allow me to do classroom observations and general observations in the school if this school is chosen for a case study?
  YES NO MAYBE

- Do you have any requirements, regarding me accessing the school?

YES (PLEASE SPECIFY)

NO
I DON'T KNOW YET

THANK YOU FOR YOUR PARTICIPATION IN THE RESEARCH

Appendix 6: Interview guides

Interview guide for the interviews with teachers

Personal information

1) How long have you been working as a teacher? How long have you been working in this school?
2) Do you have your own class or teaching a subject to different classes?
3) Could you talk about yourself, your studies, and the reasons that led you become a teacher?

Experience in ICT

1) How did you learn to use computer? For how long now have you been using computer?
2) Did you receive training in using ICT in teaching and learning? Do you use the skills that you acquired through training, in the classroom? If not, why is that?
3) What was the training about? Do you think that the training should be different in order to help you more? In what sense?
4) For how long have you been using the computer at school?
5) Do you use the computer at home to prepare for the teachings? How do you use it for preparation?
6) Do you feel confident in using computers at school? What makes you confident (or what makes you feel not confident)? In which ways do you develop confidence?
7) Has the use of computer become a custom in your life?

The school

1) Do you think that the level of ICT resources in this school is adequate? What for is adequate?
2) What do you mean by low or high ICT resources? What would you consider as very high level of ICT resources at school for the next couple of years?
3) Do you think that more equipment in the school will lead to increase of use by the teachers? Could you say more about that?
4) Is the way that computers are used in this school different from the way it is used comparing with other schools (from what you know from friends of yours)?

Definition

1) What does it mean for you, 'ICT, Information Communication Technology'?

2) Do you think that is necessary for everyone nowadays to know how to use computers and other ICT? (survey finding) Why?

ICT in education

1) Why do you think the Ministry of Education and Culture is embedding computers and other new technologies in schools?
2) Do you think that the introduction of ICT in schools is a result of Cyprus's integration into the EU?
3) Do you think that the computers promote teaching and learning? How?
4) How do you think education has changed with the embedding and use of computers and other new technologies in schools?
5) Has the computer changed your way of teaching? Do you like these changes or would you prefer a different way of teaching?

ICT in the classroom

1) When do you use computers in the classroom and how often? Do you make decisions about when and how to use computers in the classroom or do you follow instructions? If yes, whose instructions are that?
2) How aware are you of any advice from the Ministry or other sources of advice for using new technologies in the classroom?
3) When you do not use computers in the classroom, what are the reasons for not using them?
4) Would you please give me examples of how the computers helped students to learn things that otherwise they would not learn?
5) Because of which other reasons did you find computers useful or not useful?
6) Many teachers answered in the survey that ICT help them in teaching? Is this the case for you too? How do ICT help you in teaching?
7) Do you think that the computers and the software make you design the lesson in a different way than you used to do when computers were not available? Is this change positive or negative?
8) Do you change the goals of the lessons in order to use computer or do you use computers according to the existing goals of the lesson?
9) Do you use computers in specific subjects? Why in these and not in others?
10) What kinds of problems arise because of the embedding of computers and other new technologies in schools? How do you solve these problems?
11) Do you think that the use of computers in education would be more positive under different circumstances? Could you explain this, with examples?
12) How do the students react when you ask them to use the computer in the classroom? Are there any students who do not like to use computers? How do you deal with these students?
13) Do you think that the way students use computers at their home influences their expectations of using the computer in the classroom?
14) Are there problems because of the number of computers in comparison to the number of students?
15) How do you deal with these problems and in general, the policy of the one computer in the classroom?

16) How do you transform the classroom when you use computers?

Help in using ICT in school

1) To whom do you turn for help when you want to use ICT in the classroom? Why to these and not others?
2) What would be the most important help that you could get in order to feel confident in using new technologies in the classroom?
3) Are there ICT school co-coordinator and ICT advisor in the school?
4) How often does the ICT advisor visit the school? How does she/he help you?
5) How does the ICT school co-coordinator help you?
6) Do the above people explain to you why the computers are embedded in education?
7) Do you think that these are the experts in using ICT in education?
8) Are there technicians in the school helping you to solve technical problems?

Theories on ICT and teaching and learning

1) From which resources do you take information regarding the use of ICT in teaching and learning?
2) Do you think that if there was a repertoire with examples of use of computers in the classroom, would you use it?
3) From where do you take ideas for using ICT in the classroom?
4) Do the above sources give references to learning theories in relation to the use of ICT? Do they give specific examples?
5) Does the use of computer help students share knowledge and meanings?

The role of the teacher in relation to ICT

1) Do you like your work as a teacher of primary education?
2) How do you think your work is changing because of the embedding of computers and other new technologies in education?

Is there anything you would like to add?

Interview guide for the interviews with principals

The school

1) For how many years have you worked as a principal? How long have you been principal in this school?
2) How would you describe the social and economic level of the student population in the school? Please give arguments to support your answer.
3) Is it considered a big sized school or a small sized one? How many teachers are there working full time and how many are visitor teachers at this school?
4) How many students are there in the school? How many classes are there and how many students are there in each classroom?
5) Do you think that the level of ICT resources in this school is low or high? What do you mean by low or high ICT resources? What would you consider as very high level of ICT resources at school for the next couple of years?
6) What is the percentage of teachers who use computers in this school?
7) Do you expect all the teachers to use the computers or do you leave it up to them?
8) Why do you think not all the teachers use computers?
9) Do you think that more equipment in the school will lead to increase of use by the teachers? Could you please say more about this?

Definition

3) What does it mean for you, 'ICT, Information Communication Technology'?
4) Do you think that is necessary for everyone nowadays to know how to use computers and other ICT? (survey finding) Why?

Attitude towards the embedding of ICT in education

6) Why do you think the Ministry of Education and Culture is embedding computers and other new technologies in schools?
7) Do you think that the introduction of ICT in schools is a result of Cyprus's integration into the EU?
8) How is introducing ICT in education different from introducing anything else?
9) What kind of advice do you get and from whom, in this attempt to introduce ICT into the school? What advice do you get in purchasing computers or in managing computers in the school?
10) What do you think about the way schools are equipped, having one computer in each classroom, then in the next years having a second and then more computers in each classroom?
11) Is there a service contract available for solving technical problems?
12) Do you think that is more useful to have computer lab rather than computers in the classroom?
13) Do you think that the computers promote teaching and learning? How?
14) Do you think that computers are a good value for money?

15) What do parents think about the embedding of new technologies in schools? Do you get pressure from the parents to use computers in the school?
16) How do you think education has changed with the embedding and use of computers and other new technologies in schools? Do you like these changes or would you prefer a different way of teaching?

Experience in using ICT

1) How long have you been using computers in general? At school?
2) (If they use;) How do you use them in managing the school?
3) Did you receive training in using the computer in the school management? Do you use those skills acquired through the training?
4) What is the most important training need for you and the teachers?
5) What kind of problems does the embedding of computers in schools brings with it?
6) To whom do you turn for help when you want to use ICT in the classroom? Why to these and not others?
7) Are there ICT school co-coordinator and ICT advisor in the school?
8) How often does the ICT advisor visit the school? How does she/he help you and the teachers?
9) How does the ICT school co-coordinator help you and the teachers?
10) Do the above people explain to you why the computers are embedded in education?
11) Do you think that these are the experts in using ICT in education?
12) How do you help teachers in using ICT in their classroom? Do you encourage them or discourage them using ICT?
13) Which do you think are the difficulties that teachers face when they use computers in the classroom?
14) Are there any other sources from which you take information of how to use ICT at school?
15) How do you think your work is changing because of the embedding of computers and other new technologies in education?

Appendix 7: Letter sent to the schools selected for the case-studies

TO THE PARTICIPANTS IN THE STUDY ON THE ICT POLICY IMPLEMENTATION IN PRIMARY SCHOOLS IN CYPRUS (2004-2005)

PARTICIPANT INFORMATION LETTER

This letter is addressed to you in order to inform you about the study and about your role as participants in this study. Together with this letter, I am sending you another letter that I need you to read and sign, and return to me, when I come back to your school for the interviews and the observations. These are typical procedures that have to be completed before research starts. This is called taking informed consent from the participants, to ensure that they are taking part in the study voluntarily and knowing what this study is about, how the data collection is conducted, what their role in this is, and how I as the researcher will deal with the ethicalities that arise.
Below are some things I would like you to know:

MY ROLE AND YOUR ROLE IN THE STUDY

- This is a research I do for my studies; I am not working on behalf of anybody, and though the Ministry of Education and Culture has given me permission to access the schools for the purpose of the study, in no sense I am doing this research for the Ministry, and or they will have any privilege to access the information collected. This means that I neither wish to nor I would be able to evaluate in any way your work. I aim to gather information about the ways that ICT is integrated in the schools and by no means I am the expert in this subject; on the contrary you are the ones who are gaining expertise through practice, and that is why I am addressing you to get the information I need. My role will be to observe enough cases, in order to describe what currently is happening in Cypriot schools, and come up with theoretical and empirical conclusions.
- Teachers participants can choose to give me interview or let me sit as an observer in their classroom, or both. I consider both ways important for gathering information but I give at the moment priority to interviews.

INTERVIEWING

- The **interviews** will take 30 minutes, they will take place during the periods that you have off, or during breaks. If you agree, I would like to record the interviews on tape, because that would make it easier for me later to transcribe them. There are no correct or wrong answers, but only opinions.
- You do not have to prepare for the interviews. That is why I am not sending you beforehand the interview guide. Interview guide is just a set of questions that will lead our discussion, and they are based mainly on the themes of the survey questionnaire. The questions are there, just for me, to know what to ask about, but you should feel

free talking about the subjects that I am raising and others that you have in mind that I may not have thought of. During the interview, you should feel comfortable to talk to me as a colleague.

OBSERVATIONS

- You do not need to prepare for the observation I will do in the classroom. You have to behave as any other time and create the image for the students that I am invisible in the classroom because I would prefer to not interfere while being in the classroom as observer. You do not need to contact the IT advisor, in order to prepare the lesson, unless you would do that normally, even if I wasn't there. If you do contact him/her or someone who will help you with the preparation of the lesson, I need to know who these are (e.g. your husband/wife/a friend/IT advisor etc.) just because I am interested in seeing the influences on teachers' use of ICT.
- During the observation, I will observe how the computer is integrated in the classroom and other things, such as its location, the number of students using it, and the stage at which is embedded in the lesson. I will need to take some notes during the observation, but if that makes you feel uncomfortable, please let me know beforehand.

ETHICALITIES

- The information that I will gather will be used in my thesis anonymously, that means, I will not refer to teachers' or principals' names, neither to school names or other information that may make the school identifiable. I will not use either the names of the educational districts where the schools belong to, unless this becomes necessary. The information will be confidential and will be used only in reports on this study.
- If you wish, I will send you the transcriptions of the interviews.
- You should not feel obliged to participate in the research just because you stated so when I first visited you, or because the principal asked you to. Finally, I wish you to know that you can withdraw from the study at any time without being obliged to give a reason for that.

I look forward to visiting your school and talking to you. Please do not hesitate to contact me if you have any other queries regarding the study. My contact details are:

Address ....

Email: christina.hadjithoma@bristol.ac.uk

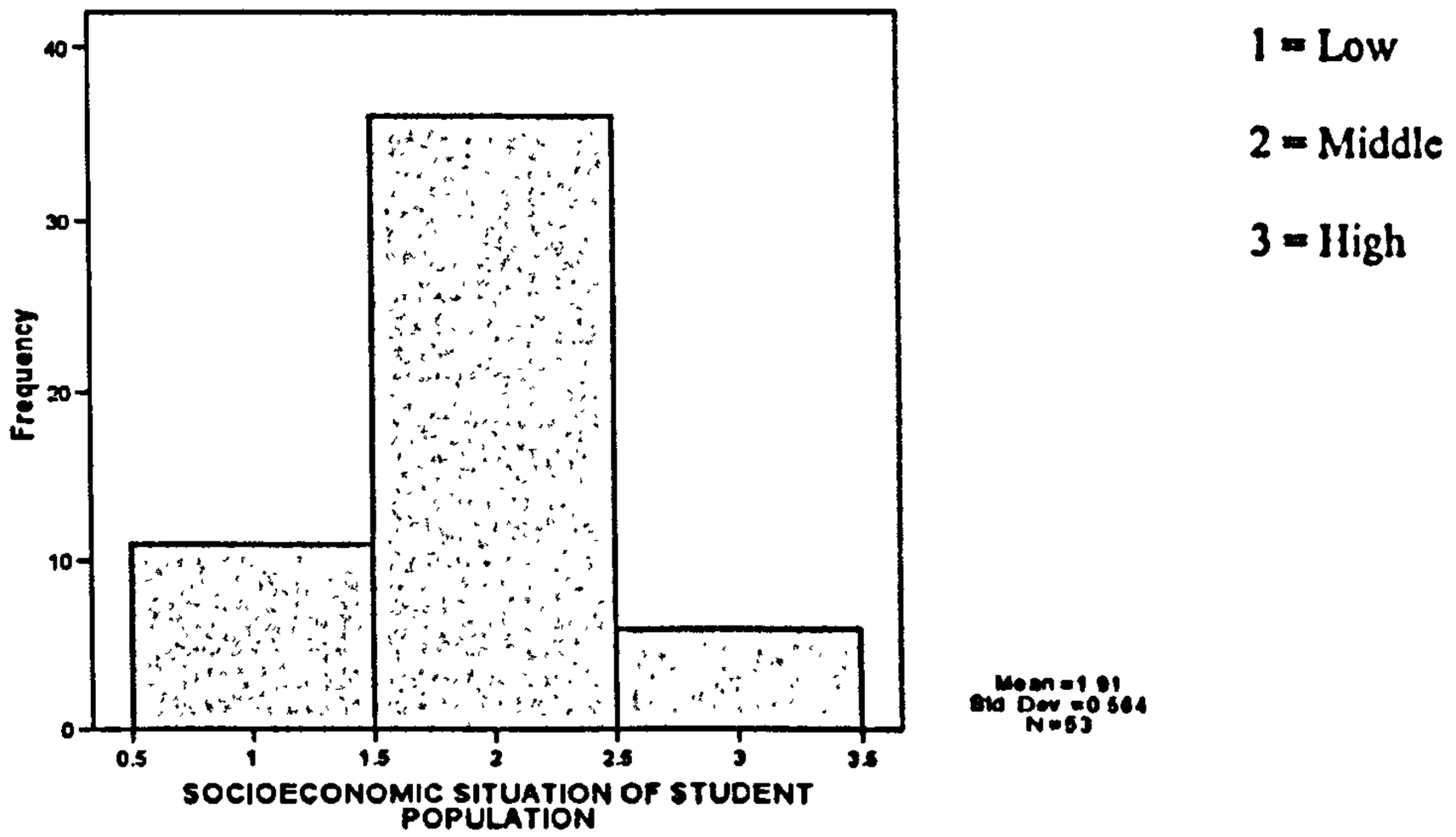
Tel. ...

Appendix 8: Timetable of the study

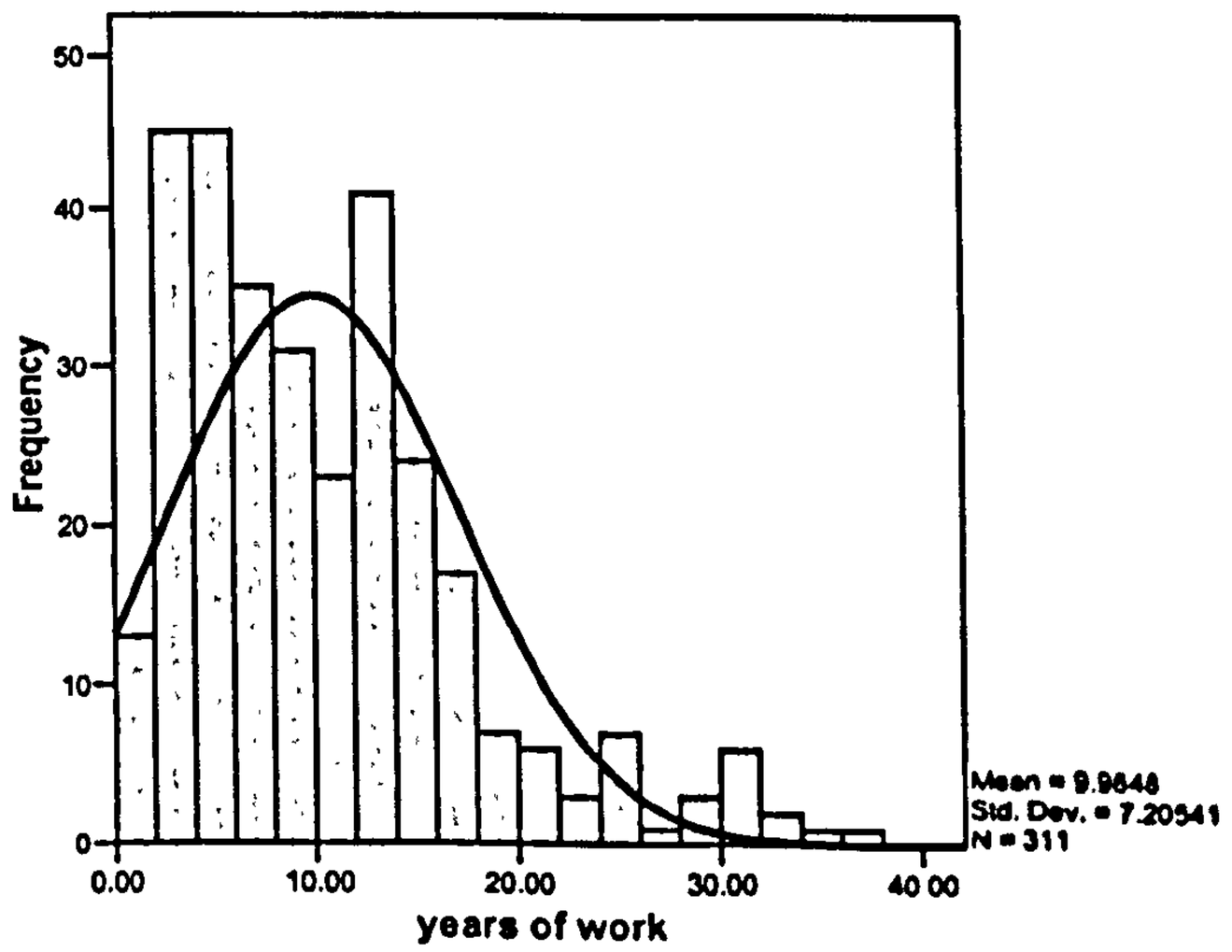
October 2003- June 2004	**Completion of the MPhil training course Reanalysis of Masters data (interviews with ICT advisors) Construction of a theoretical framework Literature review Design of research methods and research instruments Ensuring access to schools and permission to conduct the research**
September- October 2004	**Pilot survey Preparation for main survey 2 Pilot interviews at schools Survey (post the questionnaires to schools)**
November December January 2005	**Input of survey data, selections of 4 schools for case studies Report of the results (presentation to the General Principal of Primary Education in Cyprus)**
February- April 2005	**Visit to the schools case-studies Preparation for the case-studies (interview guides) Preparation-literature review on research methods**
March-April 2005	**Pilot interviews in Bristol with Cypriot teachers Visit in Cyprus for 3 weeks of fieldwork Upgrading examination from PhD to MPhil**
May-June 2005	**Analysis of data, Interpretation of findings**
November 2005 – October 2006	**Analysis of data, Interpretation of findings Writing up thesis**

Appendix 9: Statistical results

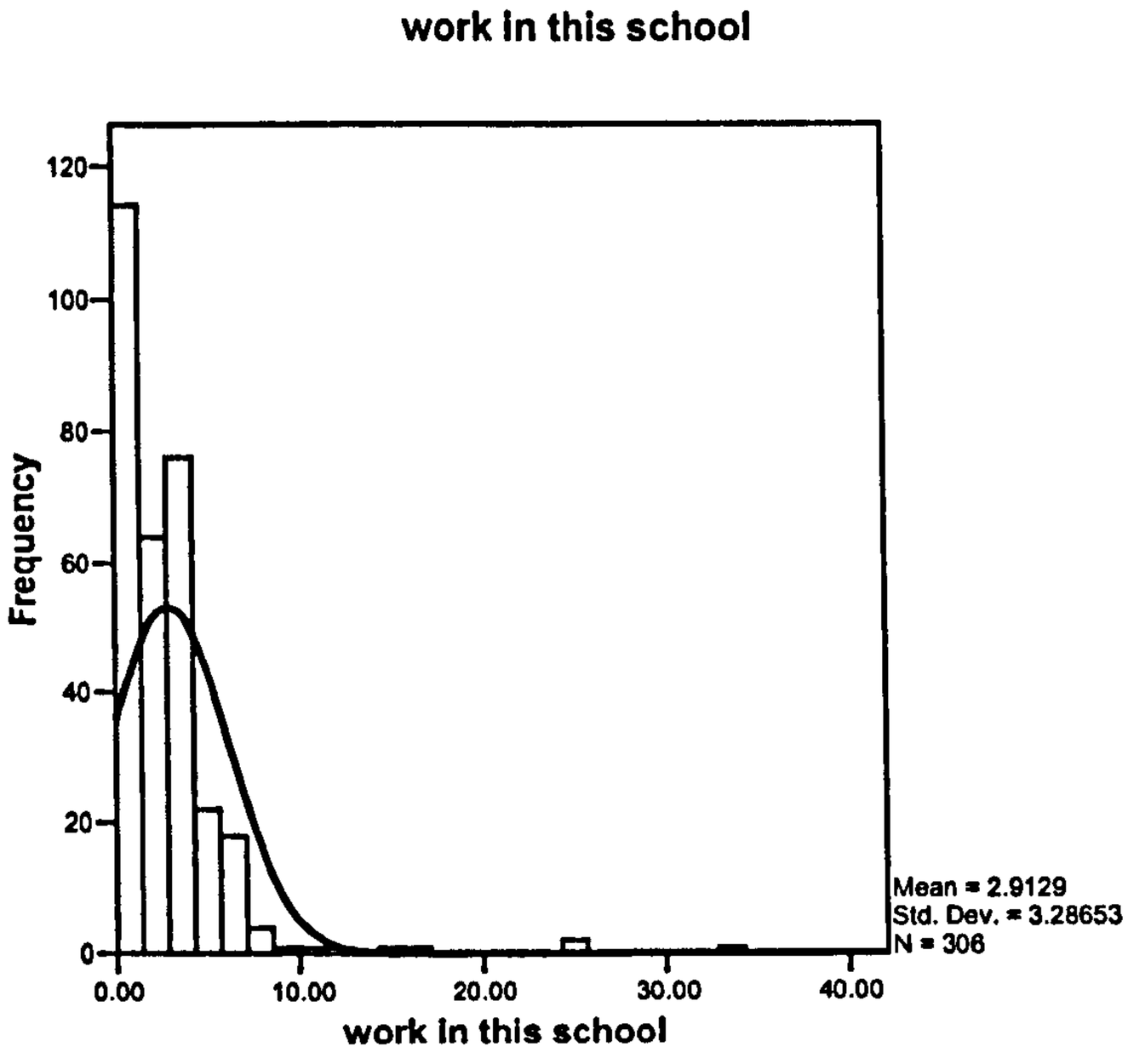
Graph 9. Socioeconomic status of student population



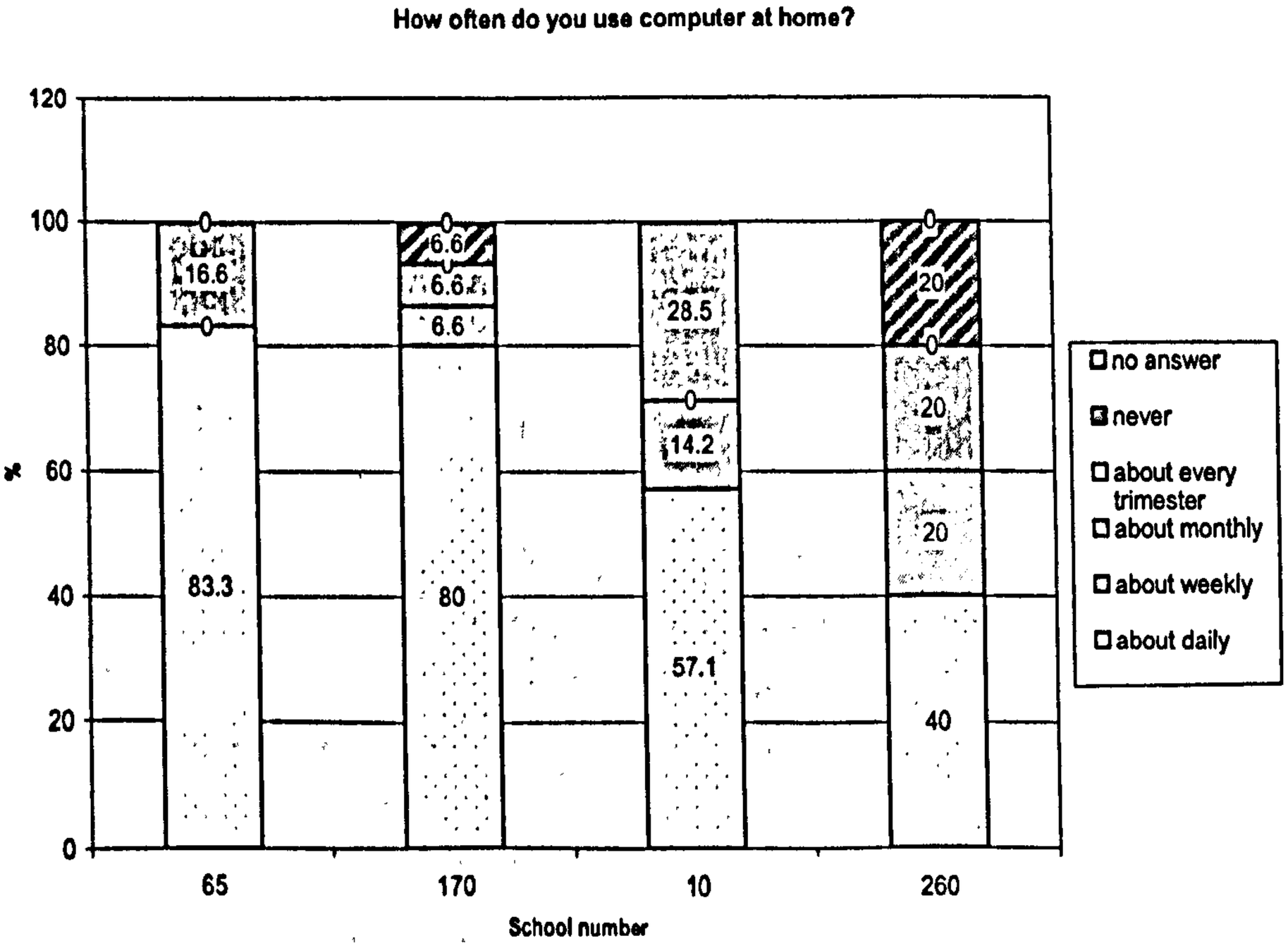
Graph 10. Years of work as a teacher



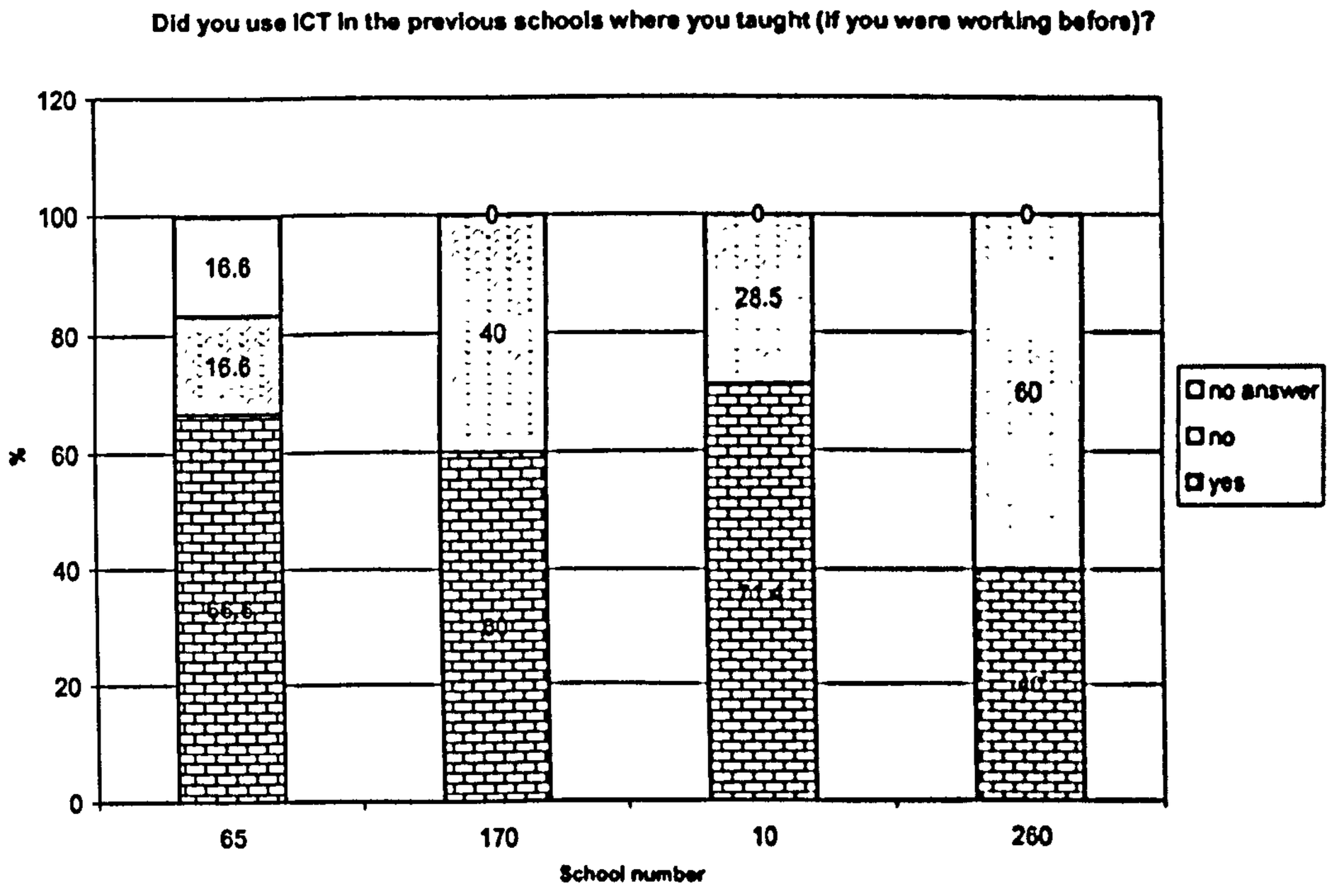
Graph 11. Years of work in this school



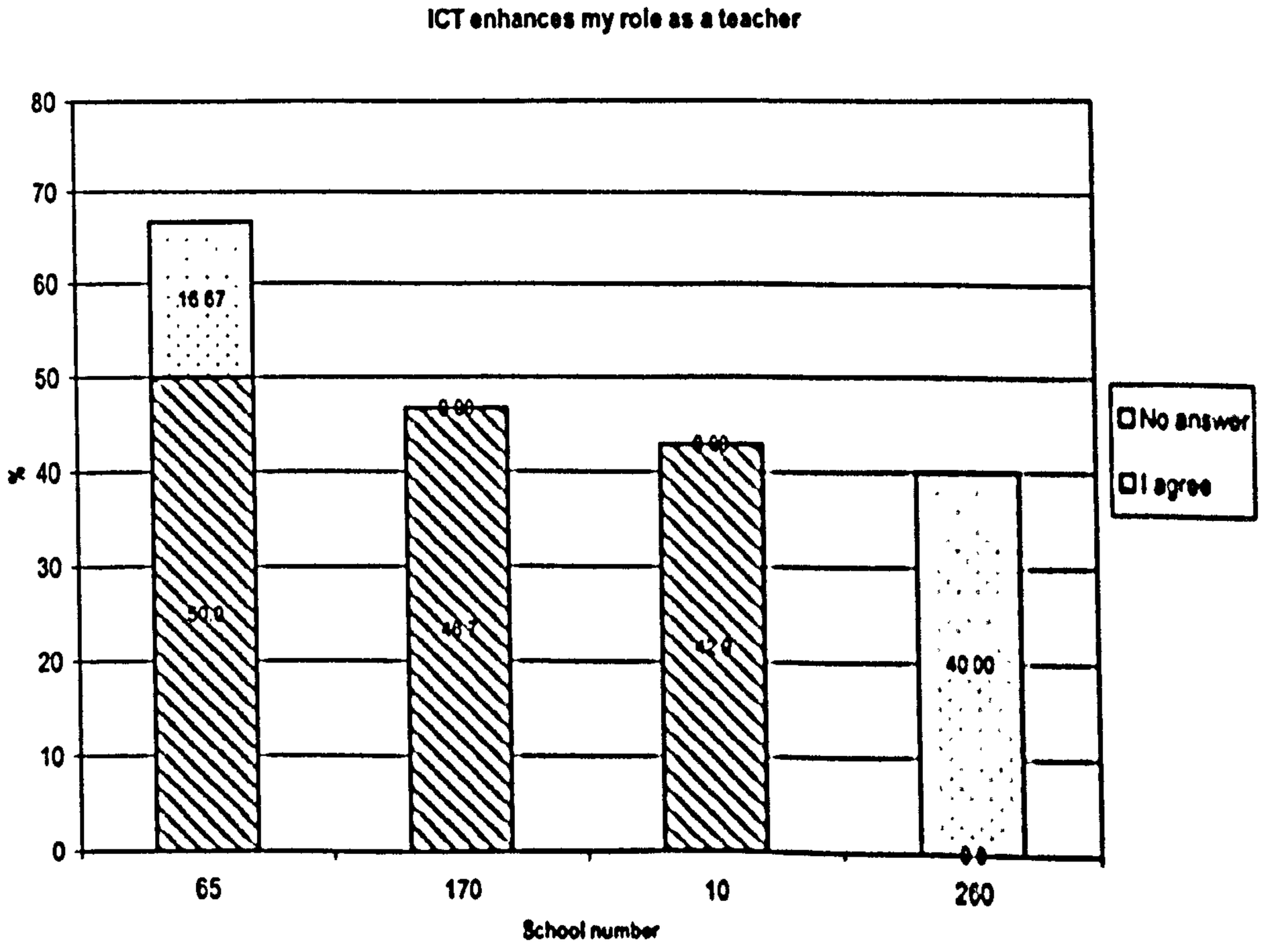
Graph 12. Computer use at home by teachers



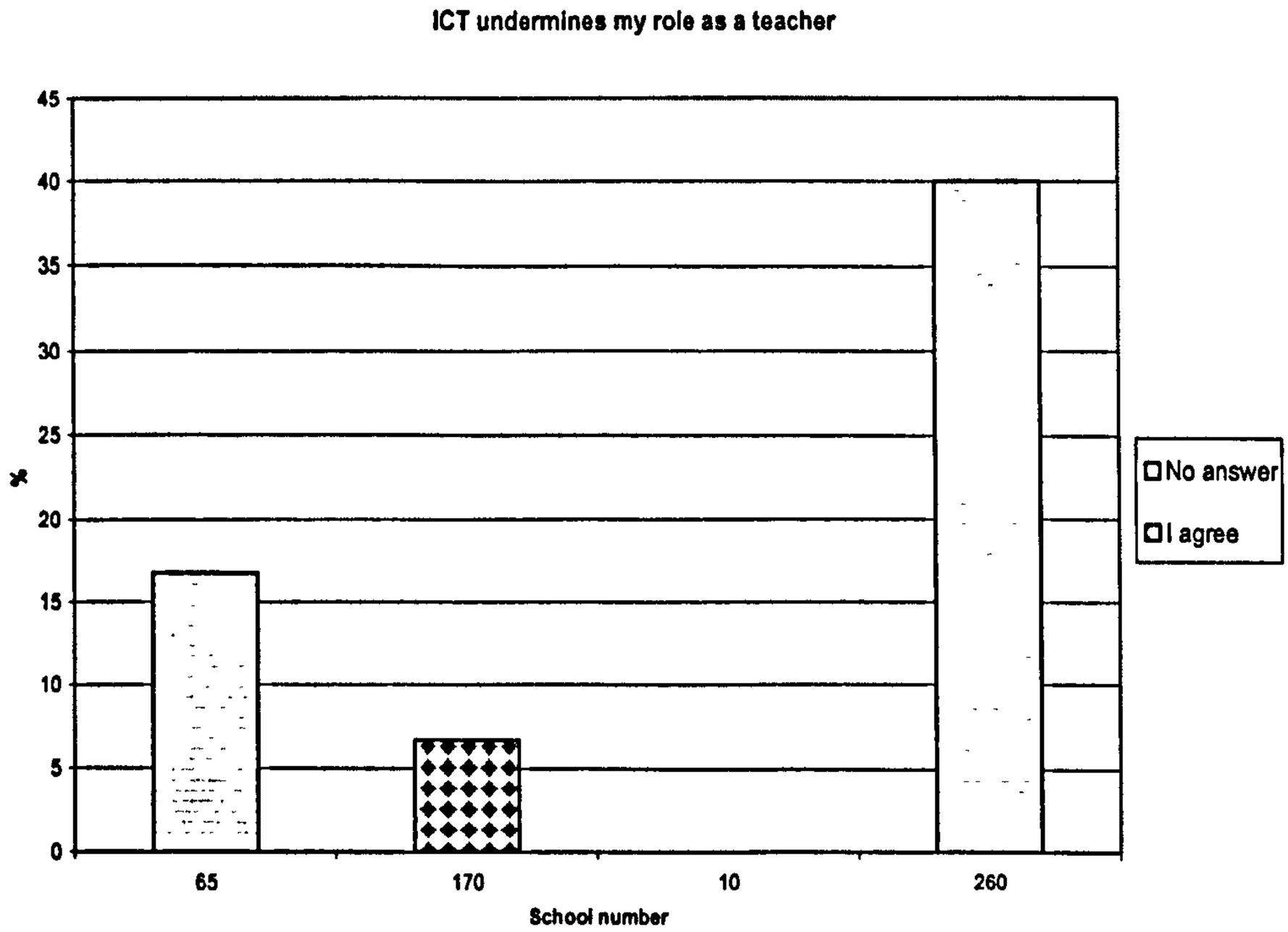
Graph 13. Use of computer in previous schools



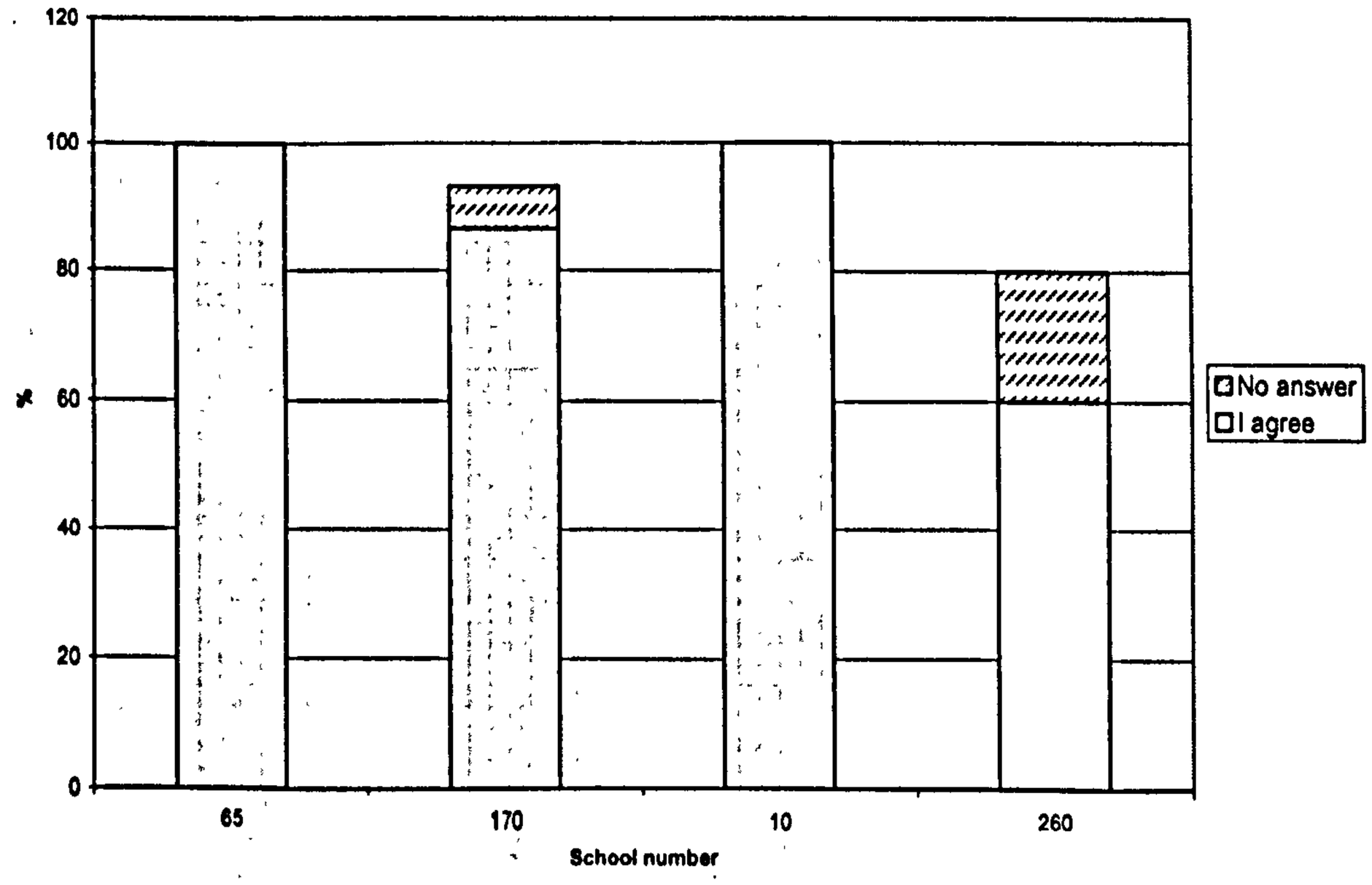
Graph 14. Beliefs about ICT - A



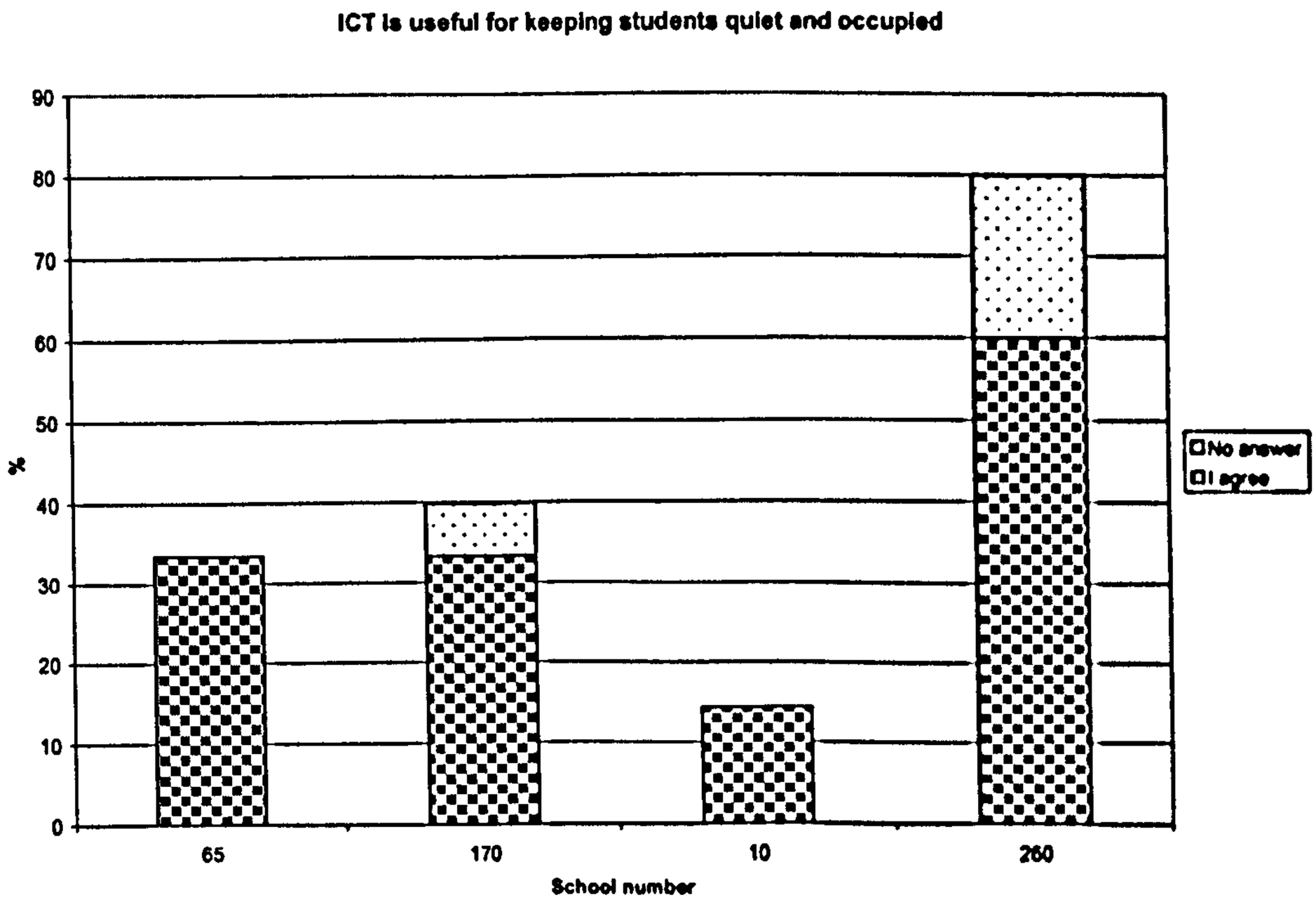
Graph 15. Beliefs about ICT - B



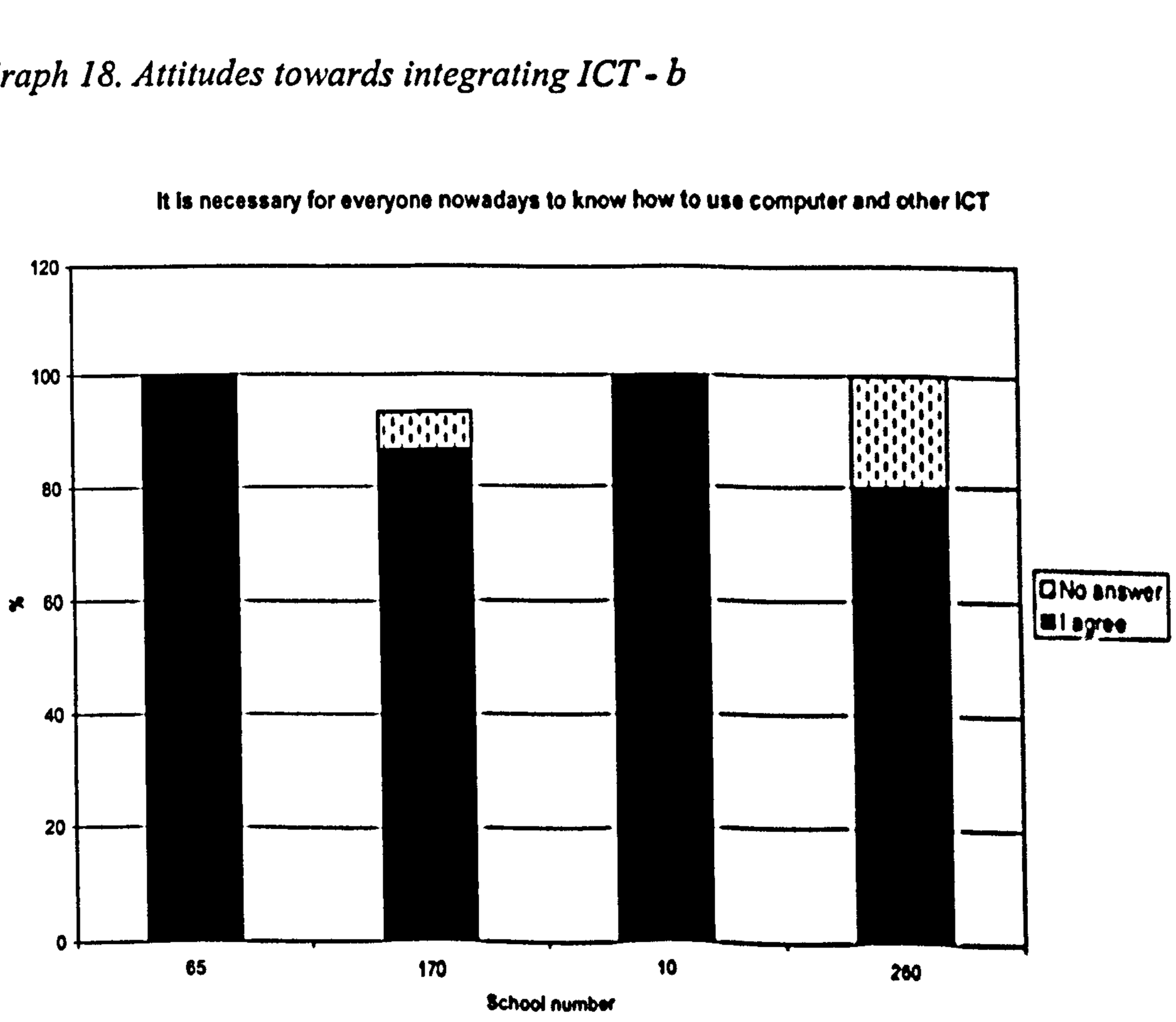
Graph 16. Beliefs about ICT - C



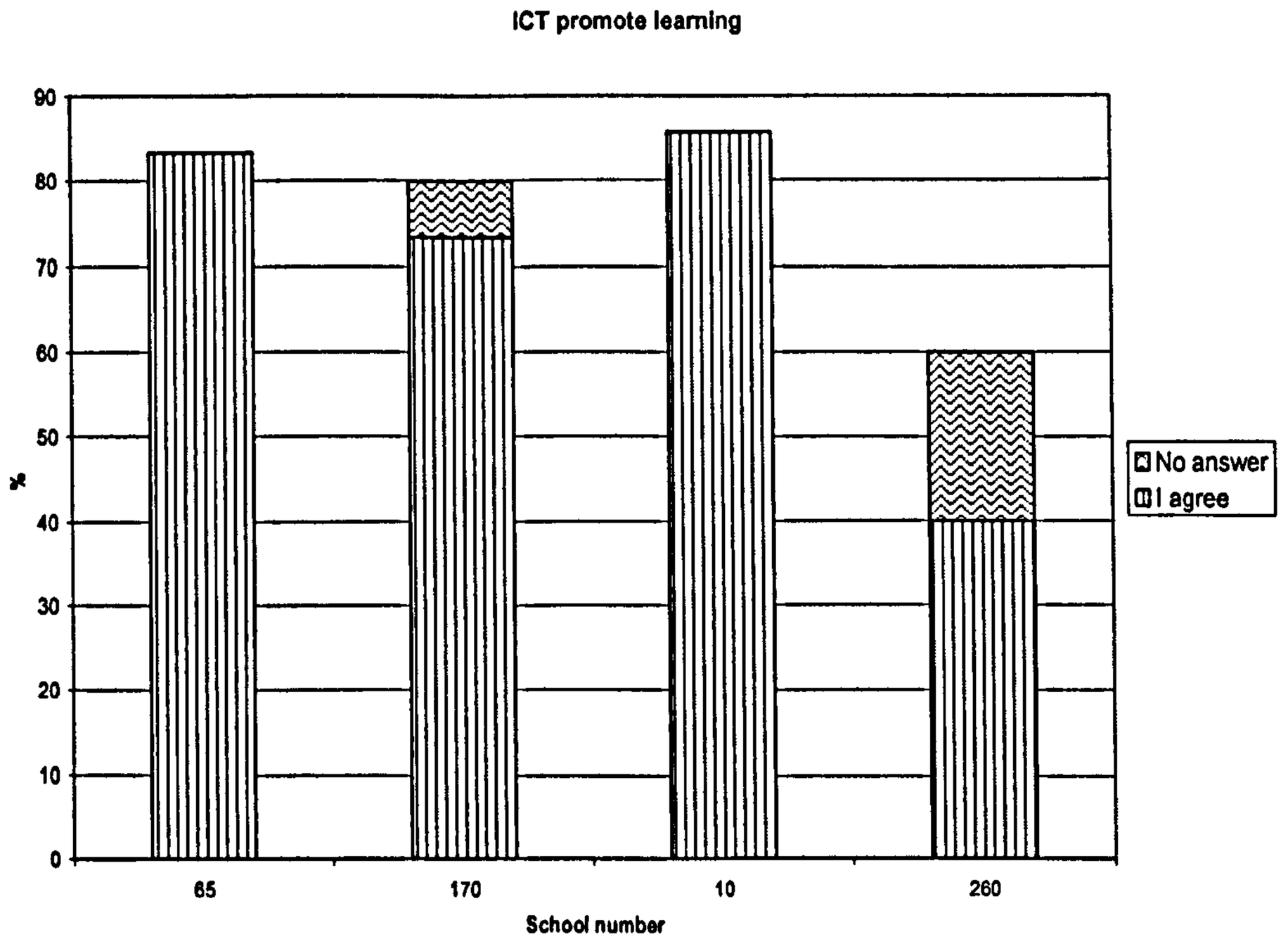
Graph 17. Attitudes towards integrating ICT - a



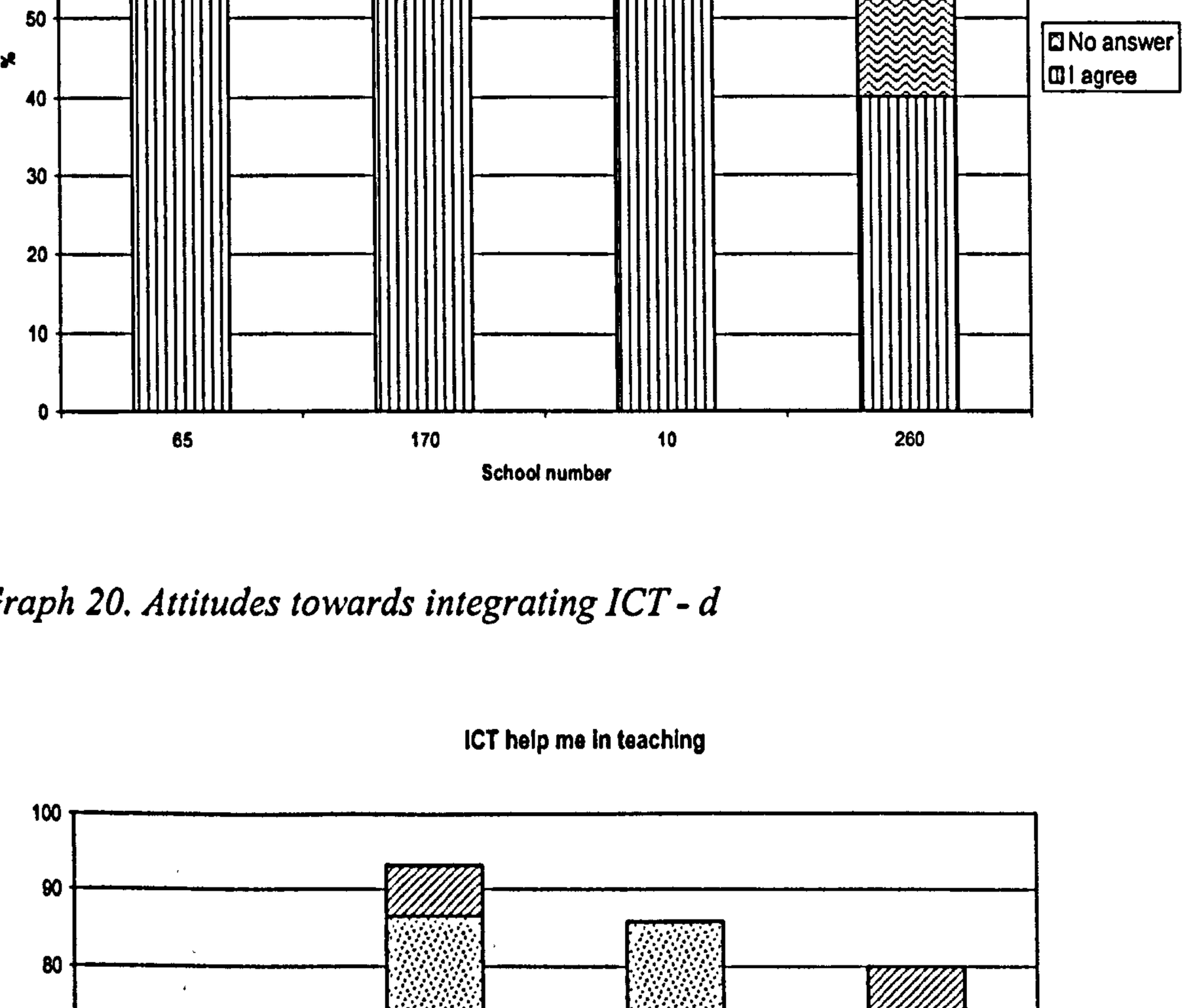
Graph 18. Attitudes towards integrating ICT - b



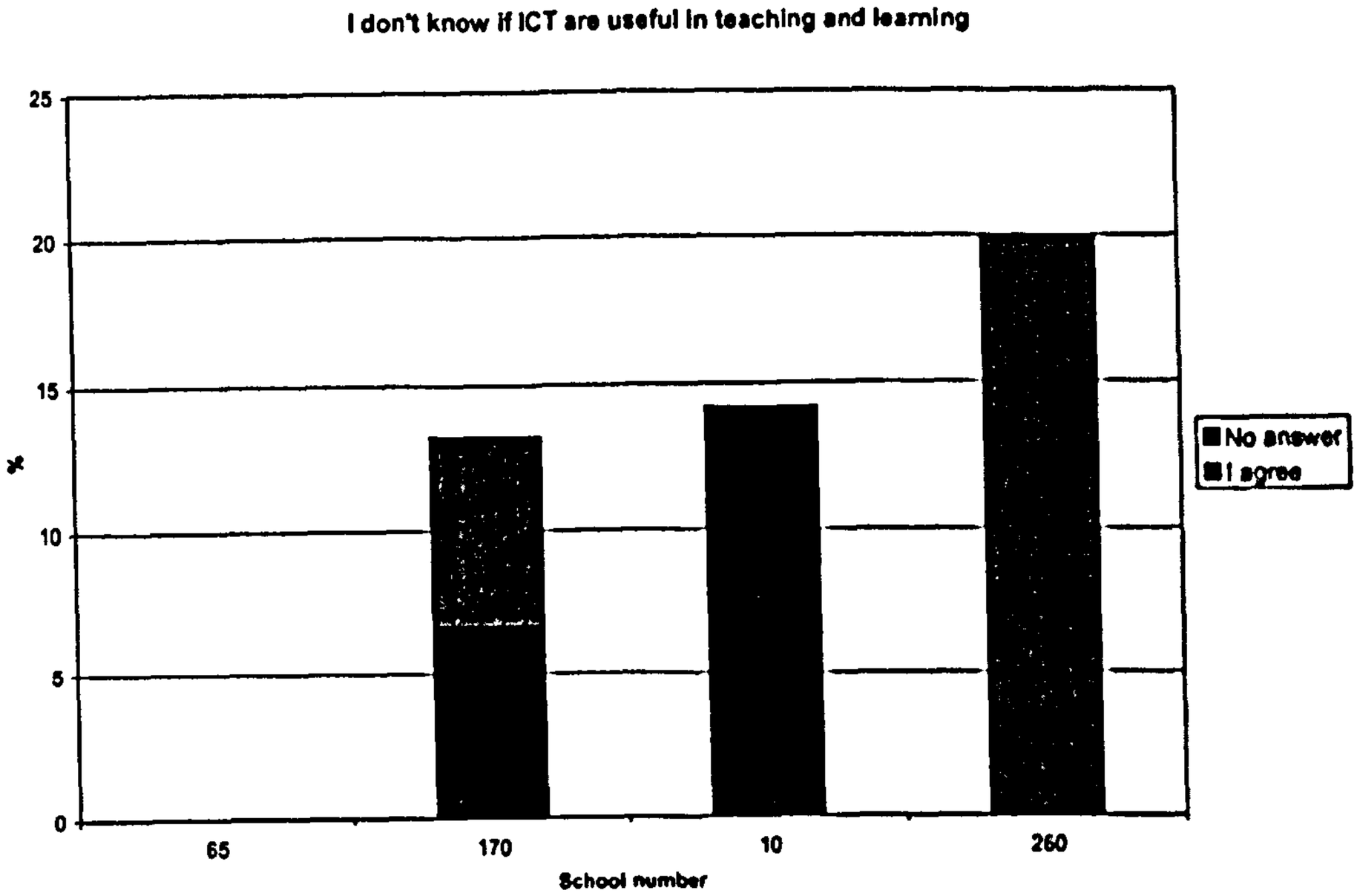
Graph 19. Attitudes towards integrating ICT - c



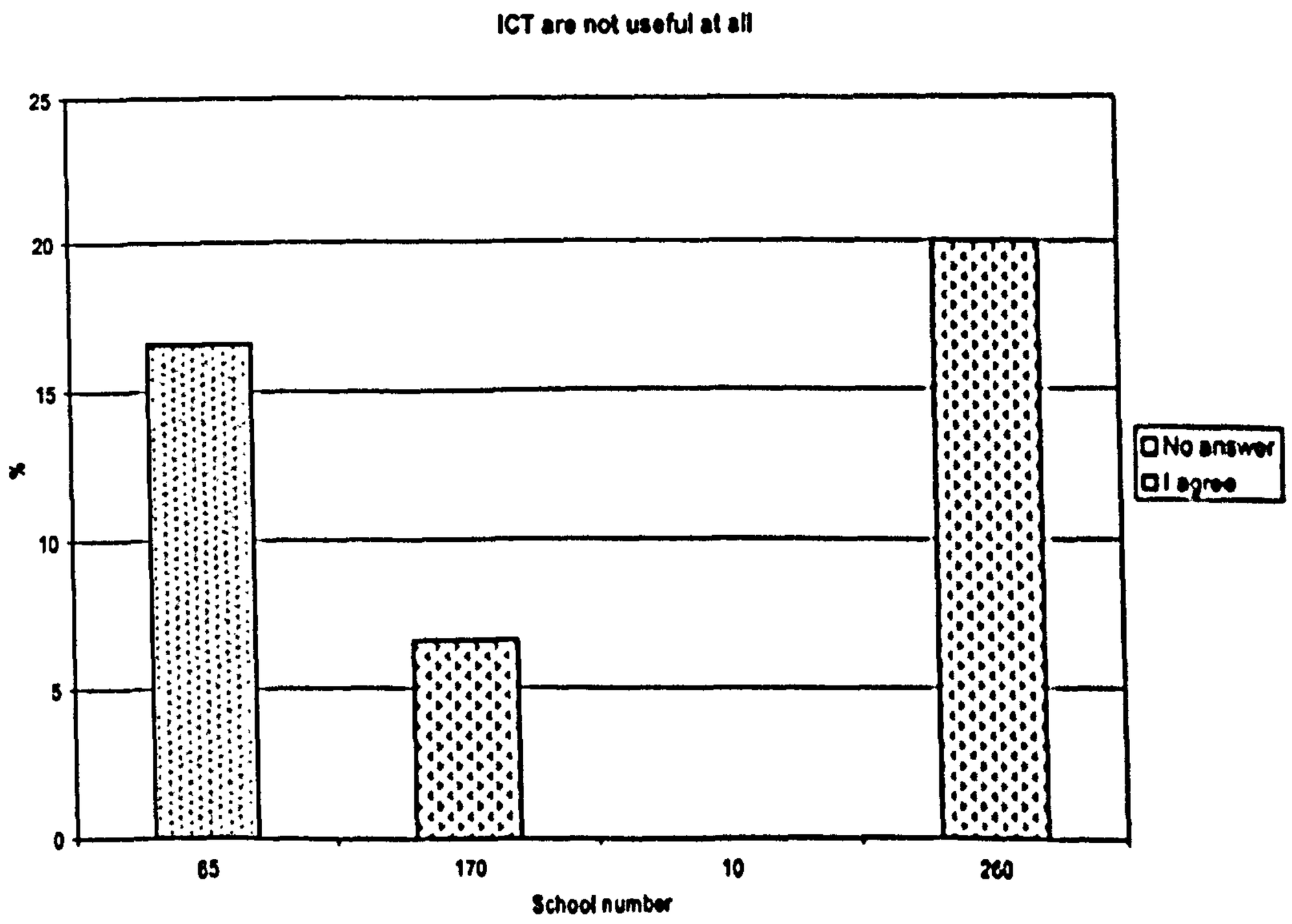
Graph 20. Attitudes towards integrating ICT - d



Graph 21. Attitudes towards integrating ICT - e



Graph 22. Attitudes towards integrating ICT - f



Appendix 10: Observation notes of a classroom lesson with computers (School B)

'At the beginning of the lesson the teacher did some routine work with the students (reading from their textbooks and spelling test). At the same time, she came at the back of the class and started the computer. She was then, walking around and looking in the students' notebooks where they were writing. She returned to the computer and inputted a diskette (floppy) from a box of diskettes that she was holding, and when the spelling test finished, she asked one of the students to collect the notebooks and put them on her desk in the front of the classroom. Then she asked the students to open their reading books, cover the title and text (of that day's lesson) and to imagine a story based on the picture they could see in their books. They were raising their hands, and when given the permission by the teacher, they were telling their stories; 'I think that there were some children who went to the camping, and in the tent there was no light so they lit a candle' 'I think that there were five children and they got a letter that there would be no electricity'. She asks them to tell their own experiences, when something similar happened to them, and they were getting excited about this, everybody wanted to talk and say their experiences. Then the teacher asked, under which circumstances does it happen not to have electricity, and they mentioned things like, bad weather 'when it rains a lot', 'when there are many lights on'. The teacher completes their sentences. One of them suggests 'work of DEI' (DEI is the electricity provider in Greece). Then she asks if they know the relevant electricity provider in Cyprus and she writes it on the board 'Αρχή Ηλεκτρισμού Κύπρου' 'Cypriot Authority for Electricity'. She asks them, 'how can we say this briefly?' 'AHK' one answers, taking the first capital letters of each word in the phrase given on the board. (This was one of the learning goals of the lesson, to learn how to write abbreviations).

She reads the text once, and then she stops and says that they will read it the 2nd time and after that she would like them to answer to a question 'how did they know that there would be an electricity cut? And why?' After that, she instructs them to have a look at the letter (in their books) and discuss with the student next to them about the important information given in that letter 'I am giving you 2 minutes and then I will ask you' she said. Some of them looked at their pair, and they smiled happily, and not long after I could hear them talking with each other. The teacher allows them 1 minute and then she listens to their answers and writes the correct ones on the boards; When, Why, How long it lasts, Service provider? Then she asks them to open their notebooks immediately and she asks them to copy the instructions from the board; 'One night without electricity. I am writing a letter to inform about the cut to the water supply.' She asks then, which company the water supplier in Cyprus is, but students don't know, so she gives them the answer. Their exercise will be to write a letter about the cut to the water supply similar to the one they have in their books. One of them says 'Mrs... I don't know how to write a letter' and she replies 'you have the things you need in your book'. 'First, however, we will all go back to the computer and I will show you something'. They gather all together, the teacher, sitting in the

front of the computer and the students standing around her. Three of them were still sitting at their desks and she asked them to come. Then she asked some of them to sit on their knees so that everybody could see the screen. She opened a Word document, and showed them the exercise; a letter, which they had to read in order to find and erase the words that are not needed (in terms of structure and meaning of the text). She explained to them by showing them what to do. 'You take the small mouse, you show the word and you use the little arrow to erase'. She then wrote back the word she erases, and told them that the little face would smile if they got it correct, or it would look miserable if they did the exercise wrong. 'Ok, go back to your desks. The first team will now come to the computer.' A group of students goes back, two of them, girls, walk quickly and sit first at the two chairs, and the others stand, one boy on the one side the other girl on the other side. The one, who is sitting close to the mouse, uses the mouse, and she used her finger for typing. She talks more than the others, but the rest of them talk a bit as well around the computer, suggesting things to do. When they finish, the same girl who is sitting, is saving the document, and rolls down the document to find the letter for the 2nd team (it is the same letter, but copied many times, for each of the 5 teams, and above each letter the number of the team is written as a title). Meanwhile, the rest of the children in the classroom, work in their notebooks, and the teacher goes from one desk to the other, helping them out with the work they have to do (to write a letter about a cut in water supply). She comes from time to time to the computer, and she asks them to work on the document of their team. When she asked the 2nd team to follow up, one boy sat and was holding the mouse, and the other girl who sat was using the keyboard. The boy, who was standing next to them, was making suggestions, and the boy who was sitting was reading loudly the text of the letter, and stopping where he thought he should erase a word. (Unfortunately I couldn't hear much of their conversation even though I was sitting close to them, because the other students, who were working at the desks, were talking with each other and the teacher. I didn't want to go closer to the computer because that may distract the students.) *The 2nd team stays more time at the computer, and the teacher says 'the 2nd team has 1 minute'. The girl who is standing is not giving much attention to the screen, and does not participate in the discussion. She looks at my notebook and me, and I realize that, so I stopped writing notes, and started just looking at the computer. The other 3 students, read again, and the girl is wondering why the face does not change, and the boy says 'it is the teacher who will change it' and then he turns to the teacher 'Mrs. Isn't it you who is going to change the face?' she says 'yes' and comes close to them, and I ask her, 'is it about the face?' she says 'yes, I told them that if they get the exercise wrong it will look miserable' and we both smile. I ask her, is it one document for each team? And she explains 'yes, it is the same letter, but for each team... it's easier to have it like that. We do it like a competition for the teams'. The 2nd group finished, but they come back because the girl says they should save it. She shows the icon of the floppy at the toolbar, to the boy who is using the mouse and he saves it. Then the 3rd team comes to the computer, and again happens the same, the one who is sitting on the right of the computer is using the mouse. The girl who is*

standing is giving suggestions of which words to erase. At that time, the bell rang, and the children at the computer asked immediately the teacher; 'are we going to continue later?' and she replied positively. She explained me then showing the book, what they would do next: 'Basically, later we will correct each team's exercise and then one team will go, like every day to write the new words -vocabulary- in the dictionary, they go by turn. We do different exercises each day, sometimes to separate the syllables, other day to ...I don't remember other examples'. She said 'we tried after Christmas, initially, we were going all together around the computer, and I was showing to them. They could write something, but not sentences, only words, to write is the most difficult for them. So, at the beginning, I was always with them helping them. Then they started going with their teams. If they were noisy, or they argued who would use the mouse, I would ask them immediately to go back to their desks. Now they learned, and they go by turn, and they sit by turn using the mouse.' 'So, they got used it'. I asked her, if she thought that my presence in the classroom influenced the behavior of the students but she explained that 'no, they are used to it. We had before a student teacher who came, and she taught lessons as well, we had a student from the lyceum who came for the -working week-[116] *and we have teachers with whom we exchange, so that we can see each others lessons'.*

[116] During the 2nd grade at the higher secondary school the students are allowed one week during which through arrangements they go to different work places of where possibly they would like to work later in their life, to get experience that will guide them in their future career option.

Appendix 11: Background information on the principals' role in embedding ICT in schools

Some background information with regard to the role of the principals in the integration of ICT in schools was provided by the preliminary study through the interviews with ICT Advisors. The ICT Advisors, who were interviewed during the 2003-2004 academic year with regard to ICT implementation in schools, were asked about the reactions of the principals towards the embedding of ICT in schools. They reported that there were various reactions on behalf of the principals towards the integration of ICT: some who enabled implementation and others who were not willing to get involved. They acknowledged that principals especially the mature ones, do not have experience or the knowledge to use computers. However, ICT Advisors emphasized the role of the principal as a promoter of the use of ICT; 'But of course, I think that the Principal's role is to promote this innovation, even without knowing himself (how to use the computer), but they shall encourage the other teachers to use the computer in the classroom, to give them motives...' (Interview 3). According to ICT Advisors, principals are not required to know how to use technology, to act as promoters of the implementation, rather they should be aware about the rationale and the philosophy behind the embedding of ICT in primary education; 'It's not necessary for the principal who is 50 or 60 years old to learn how to use Word, but he may know what Word can offer in educational context, or to know that Word or Power Point or Internet can be used in the lesson. To know what is the potential of technology without having to use it himself. When this happens, the principal shall be able to ask from the teachers to use the computers in the lesson, when I say "to ask" ... not to demand from them...to give them motives... only in this way this can work, (the use of technology in the classroom) and also by the exchange of experience between the teachers' (Interview 2, Advisor No. 2).

In terms of how to manage computers and other ICT in schools, ICT Advisors, reported that principals face dilemmas, for example, not knowing the amount of money they should spend on consumables, such as printer ink, how to register computers in the property book and other issues they ask advise on, from the ICT Advisors.

Also important to note here, are the personal attitudes of principals on ICT integration. Previous research (Karagiorgi, 2000, Eteokleous, 2004) suggests that the attitudes of principals and their personal beliefs about ICT are important for integrating ICT in the schools. ICT Advisors stated that most of the principals have very positive attitudes, and the survey results as well as the visits to the school case-studies also indicated very positive attitudes towards the embedding of ICT in schools, and believed in the necessity for everyone to be computer literate nowadays. The survey findings regarding principals views on ICT were presented in chapter 5 (Table 16, 'Views on ICT' - principals). The principals in the four participating schools also

expressed the view that technological literacy is important for everyone nowadays, and therefore the embedding of ICT in schools is essential.[117]
As happenned with the training of the teachers, principals did not receive guidance as to their management responsibilities for the ICT in their schools although, they were expected to manage ICT in schools, like any other school property. As previously presented in Chapter 5, 67.9 % (N= 36) of participating principals received training in ICT, however, this did not equip them with the skills needed for successful management of ICT within the school.[118]

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[117] Interview quotes that support this view: '(The) *e....familiarity with the use of the computer is necessary, in the new era we are coming in; without the use of new technologies, I think we will be illiterate*' (SA, 034)
'*E. it is the attempt to become... what we say, the Lisbon strategy, until 2010, that Europe has to become first, as a knowledge society worldwide; they have thus realized the importance of access to knowledge, the use of knowledge, in production of knowledge, and it is considered that technology is a source which really, covers distances in relation to this 'road', e... we have, I believe left from the notion of, we have one meaning of illiterate, the illiterate in reading and writing, and so on, now we have also the ... technologically illiterate human, and I believe that as we say, no child should leave the school without knowing how to read and write, like this I believe, no child should leave the school, as long as this has the responsibility of the state, not to leave, without knowing how to use and have access to this modern technology medium. So, it is necessary ... it is one of the... better ways now of self-learning but also of acceleration of your production, it is a qualification for your future; so who can enter in any sector of work, without having this thing?*' (SC, 286)
'*...because it is a need, it is a need of our days, whoever doesn't know the use of the PCs, is considered technologically illiterate...*' (SD, 414)
[118] Interview quote from a principal: '*I dare to say straightaway, that we have not received any support from the Ministry; I believe that the headmasters, and the vice-principals, who are candidates to take the position of the principal, they should have received serious training in the subject, and not that, of the rushed three or four lessons, that they are now doing so called, for the introduction*' (School C, 433).

Appendix 12: Background information on ICT Coordinators

Following is some background information on previous research regarding ICT Coordinators in the Cypriot schools.
ICT Advisors who were interviewed during the preliminary study on the ICT policy and implementation, refer to the informal appointment of ICT Coordinators, and indicate that the MOEC does not reward these individuals for their contribution in implementation within the school, although they appear to have responsibilities beyond than management:

ICT advisor: '*The problem was that the Coordinators are not given extra time; in the past they used to have 2-4 school periods as the Coordinators of the school, in order to help the other teachers and solve small technical problems. So* (this year) *the principals could tell someone that he/she would be the coordinator of the school, but that was just in theory, because they were not given time to work as Coordinators. So, we interfered and we asked for extra time to be given to the Coordinators, and they promised that next year, they will give this extra time to the Coordinators. Since now the computers are many, the technical problems are more and as a result, we have to go to the schools, to connect the printer, to install programs...*' (Interview 2)

ICT advisor: '*In a school, there may be no one who knows, but they let a teacher to be a coordinator because he/she knew one thing while the others didn't know anything, in some schools, there are two Coordinators, even if this is unofficial.*' (Interview 3)

ICT Advisors, although they acknowledge the help that ICT Coordinators offer to their colleagues, which supports implementation, they are sceptical as to whom is appointed as ICT coordinator. When ICT Advisors were interviewed, they were also asked what they think of the help by IT-Coordinators and they gave answers as follows:

ICT advisor: '*The role of the ICT school coordinator is very important; the teachers have to know that there is someone in the school from whom they can ask for help, since we* (the Advisors) *are not in the schools, they may call us when they need us. But if there is someone in the school that can give help, for example, when a teacher starts a lesson, he/she will not be afraid that something may go wrong because there is someone there to help, and this is important. The ICT school coordinator may also give ideas to the teacher, or he may observe the school coordinator while doing a lesson using the computer*' (Interview 3)

Sergiou (2005) addressed to school principals, ICT Advisors and ICT Coordinators asking them to rate specific given roles in relation to their role. ICT Coordinators, selected the following as the ones most related to their role; 'Be aware of current governmental ICT developments', 'ensuring that ICT policy is in place and working in the school', 'Monitoring the teaching of ICT in the school', 'Promoting teaching approaches with ICT to make

learning more effective', and 'coordinating the cross-curricular delivery of ICT in the school'. The same study Sergiou, 2005) indicated that 'the teachers seem to feel more comfortable in seeking advice from ICT Coordinators rather than from principals, ICT Advisors, private institutes or other bodies'. A reason given, to explain this relation between teachers and ICT Coordinators was that '... the ICT coordinator is in reality a colleague with the added responsibility of coordinating ICT implementation in his school too, it why he is more accessible to the other teachers might be justifiable. Personal contact creates a comfortable atmosphere and teachers may express enquiries and experienced difficulties more easily because they perceive the coordinator as a "friend" who offers advice, not as someone who evaluates their potentials. This interaction is different with the School Principal for instance, who in a centralized system represents the power in the school' (Sergiou, 2005, p. 47).

Other studies confirm the important role that ICT Coordinators play within the schools, in promoting ICT. SITESM1, (Pelgrum & Anderson, 2001) indicated that most schools have a 'computer coordinator' either a person, or a group of people, teachers who manage the equipment, and who supervise the ICT development in the school. A study of ICT policies in primary education in Belgium (Tondeur et al 2005) indicated that the role of ICT Coordinators was very important, as the majority of the participating principals answered to the question 'Which other actors play an important role in the development of an ICT policy?' that Coordinators firstly and teachers secondly, play an important role.