EVALUATING THE IMPACT OF INFORMATION AND COMMUNICATIONS TECHNOLOGY (ICT) ON THE CULTURE OF SCHOOL: STRATEGIES AND IMPLICATIONS FOR TEACHER EDUCATION

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ABSTRACT

This study aims to give some insights about challenging issues in coping with the rapidly changing world, and outlines the main issues in the educational change process and the role of Information and Communications Technology (ICT) within this process. The other aim of this study is to seek answers for questions such as: does ICT really affect the culture of schools? If so, in which direction and which part of a school feels its impact most? Does ICT really change the school or ICT just contributes to change? And finally, what are the most challenging implications for teacher education? The study based on the literature review, in which contemporary research on the discussion of educational change and the role of IC T in this process is reflected in the article. The study analyses and important the critical place of ICT in today's schools and draws conclusions about some issues which are crucial for teacher professional development. The article ends with some practical suggestions for Initial Teacher Education (ITE) institutions for overcoming the difficulty of change through ICT.

Key Words: *Educational Change, Information and Communications Technology (ICT), School Culture, Teacher Education.*

BİLGİ VE İLETİŞİM TEKNOLOJİLERİNİN (BİT) OKUL KÜLTÜRÜNE ETKİSİNİN DEĞERLENDİRİLMESİ: ÖĞRETMEN EĞİTİMİ İÇİN STRATEJİLER VE ÖNERİLER

ÖZET

Bu çalışma değişen dünyada karşılaşılan problemlerle nasıl başa çıkılacağı konusunda bir bakış açısı sunmakla beraber, eğitimde değişme süreci ve bu süreçte Bilgi ve İletişim Teknolojilerinin (BİT) rolünü açıklamayı amaçlamaktadır.Çalışmanın diğer amacı ise şu sorulara cevap aramaktır: BİT okulu ve okul kültürünü etkiler mi? Eğer etkilerse bir okul bu etkiyi en çok hangi yönde hisseder? BİT gerçekten bir okulu değiştirir mi, yoksa BİT bir okulun değişimine katkıda mı bulunur? Ve son olarak bu değişim sürecinin öğretmen eğitimine yansımaları nelerdir? Bu çalışma literatür taramasına dayalı olarak, eğitimde değişim ve BİT nin rolü üzerinde son yıllarda yapılan çalışmalara ve kaynaklara dayalı olarak bir tartışmayı ortaya koymaktadır. Çalışma BİT'in okullar açısından önemli yerini analiz etmekte ve öğretmenlerin profesyonel gelişimleri için önemli sonuçlar ortaya koymaktadır. Çalışma öğretmen yetiştirme programlarına yönelik eğitimde değişim ve BİT ile ilgili bazı uygulanabilir öneriler sunmaktadır.

Anahtar Kelimeler: *Eğitimde değişme, Bilgi ve İletişim Teknolojileri, Okul Kültürü, Öğretmen Eğitimi*

1. INTRODUCTION

Over the last half-century, there have been a number of attempts at changing the education systems and its components in many countries. The necessity of these efforts derives from the changes in social and technological climate of our societies. Perhaps, education is the most affected and most worked part of the system of a country. The aim is clear: raise the standards of schools and their outcomes with the goal of improving the quality of education for all and consequently strengthen the education system in terms of both structure and quality. Hence, the main purpose of educational change is, as Fullan (1991:15) states;

> *"… to help schools accomplish their goals more effectively by replacing some structures, programs and/or practices with better ones"*

However, there are a number of either internal or external effects that make educational change rather complex and difficult. For instance, Somekh and Davis (1997) assert that 'all three components of education – curriculum, practice and institutional management - are challenged by the introduction of Information and Communications Technology (ICT) and effective use requires the challenges to be met together' (p: 4).

There are also a number of other issues in educational change and in the influences of new technologies on to educational change (Altun, 2002). This paper considers some of the problems schools facing in the educational change process and the difficulty of educational change and its reasons and briefly indicates the links between the implementation of ICT and school culture and tries to evaluate the impact of ICT on the culture of schools in the educational change process.

Another issue is that today's innovations mostly affect individual schools. Dalin *et al* (1994:251) report that the school is the centre of change. Schools determine the degree of success; they can also block implementation'. However, this fact should have direct or indirect implications for educating teachers both in pre-service and in-service. Because as Stenhouse (1984) claims that teachers' willingness and enthusiasm towards change, rather than pressure from others, should be taken as a starting point. Stenhouse means that teachers' professional development leads towards a kind of professional satisfaction that brings enhancement of self and that this development must be clear and open to teachers (p.75).

Teachers cannot avoid from external pressures and the consequent need for change. Here the term 'pressure' means the

latest improvements and rapid developments in ICT.

Similarly, Cohen (1996) asserts that as information technology has brought a revolution in knowledge and its acquisition, it will also bring new horizons and approaches into the teaching and learning with its extended use.

Within this vein, the present study simply aims to give some insights about challenging issues in coping with the rapidly changing world, and outlines the main issues in the educational change process and the role of ICT within this process. The other aim of this study is to seek answers for questions such as: does ICT really affect the culture of schools? If so, in which direction and which part of a school feels its impact most? Does ICT really change the school or ICT just contributes to change? And finally, what are the most challenging implications for teacher education?

2. EDUCATIONAL CHANGE and ICT

In order to understand and gain more insights about the relationship between educational change and ICT, this issue needs to be examined in two ways:

a. The existing literature about educational change: *research about difficulty of change*

b. The educational change process itself: *The links between change and ICT, problematic issues, challenges*.

2.1. Difficulty of Change

As discussed earlier, the idea of changing education and creating better conditions for all has became an increasing focus in educational reform policies. As a result of this, the focus of educational research has also moved to educational change approaches with the goal of helping and supporting the raising of school performances. However, in practice, such expectations and governments' policies have often proved counterproductive to innovation and change (Harris, 1998), because of reasons such as lack of commitment in the implementation of innovation, the impracticality of more theoretically based innovation in the real world, lack of resources and instruction, and resistance towards change.

Yet, within the educational change literature, much has been written about the complexity and difficulty of educational change and of the implementation of innovations. There are many reasons why educational change is so difficult. The reasons are varied and depend upon the country's political, social, economic and cultural structure. Hargreaves (1998) outlines some factors such as; lack of understanding of educational change and its underpinnings, poor conceptualisation of

change, broad expectations from people who are involved in change (particularly teachers), the length of the change process, insufficient resources and money, lack of commitment of people to carry out long term change, exclusion of students and parents in change planning, resistance and resentment towards unpredictable change outcomes, leaders that are too controlled by either politicians or academic institutions, and political factors that shape the purposes and processes of educational change, and emotional aspects of learning and teaching.

These factors are the most problematic issues in a change agenda. Beside these factors, when the societies technological change and peoples' belief that need of changing schools added to educational change, it turns into a 'chaos'. In this frame 'how schools cope with a world of change', clearly becomes an issue of fundamental importance (Levin and Riffel, 1997). Of course it is obvious that schools cannot achieve this alone. Levin and Riffel (1997:5) assert that:

> *"Real and lasting changes in education have been driven much more by external factors of this kind than they have by the planned change efforts of educators or policy-makers".*

As a consequence of that matter, today the majority of educational research focuses on this issue with the aim of finding a pathway for schools to cope with the world of change (UNESCO, 2005). As mentioned earlier, schools cannot keep up with today's rapidly changing world by themselves. However, every school has its own capacity for development and understanding the school's capacity for development should be the main focus of any effort to change or to improve any school (Hopkins, *et al* 1997).

Now, educational research is more concerned with school culture in order to understand the capacity for development of schools, and educators are trying to produce new change approaches that take the culture of individual school into account. For instance, in their article Hopkins *et. al* (1997) stress that educational change and improvement need to be understood at a deep organisational and cultural level. 'Internal conditions' or 'capacity for development' play essential role in educational change as well as the strategies for school development.

2.2. School Cultures, Educational Change Process and The Role of ICT

For nearly a couple of decades, outsiders - governments, educators, educational technologists - have been trying to introduce new technologies into school classrooms, with remarkably consistent results. Through a number of educational innovations, attempts have been made to improve the quality of pupils' learning experiences (Desforges, 1988) and to

persuade teachers to use new tools (Hodas, 1993). Some of them have been successful some of them have failed. As Sarason (1982) points out, it is important to understand the role of the different elements within the school culture that have a substantial role in exploiting the innovation by people in school. Sarason claims that more power should have been given to parents and the community but to me, most power should be given to the teachers.

Culture here 'plays a significant role as determinant of change' (Dalin, 1993, p:99). But what is the place of school culture within the educational change process?

Every **school** has its own **culture**. Schools as organisations differ from other organisations (like factories, hospitals, etc.), and 'what is also recognised is that schools differ among themselves, although schools are also similar in many important ways' (Dalin, 1993). The ethos of schools may also differ widely. As an organisational issue, the idea of replacing or integrating new technologies in every school at the same level is almost impossible, but there is no way to ignore the effects of information communication technologies within these organisations. This new revolution stimulates us to look forward, to take advantage of a new opening (Monteith, 1998). Therefore, in this changing world, many people will need to demonstrate that they have flexibility, creativity, problem-solving skills, confidence with information technology and the ability to co-operate in the work place for future employment (Fink and Stoll, 1998). Schools are the only places that can educate our future citizens and enable them to have those required skills and abilities. But, schools need appropriate support, help and clear instructions to achieve this. This assistance would either be externals or internal, but it should not be forgotten that, unless involvement of parents, school governors, teachers and students, in short without the community involvement in this process, change efforts will fail (Fink and Stoll, 1998). For example, the resistance of communities towards change has been played a 'brake' role in past attempts.

Another neglected issue in educational change efforts was the '*context'* (Fink and Stoll, 1998). In early 1980s Jane David (1982) mentioned:

> *"One assumption is that change does not occur unless the particulars of a school and its context are taken into account."* (quoted in Hopkins and Wideen, 1984, p.17)

All change applications on schools have different outcomes to those expected. Application of theory to practice does not always have the same outcome. The uniqueness of school contexts plays a substantial role in this process. That issue is

recently increasingly recognised in the educational change platform and much is written about the power of school culture and context in the literature. As (Fink and Stoll, 1998:304) noted:

> *"Schools have unique cultures, contexts, macro and micro-politics. Schools are perceived differently by students, teachers, principals, parents and communities."*

Torrington and Weightmen (1993:53) also assert that 'the culture of school needs to be understood because a mismatch of action and culture can produce ineffective action'. As organisational institutions, schools have their own working conditions for teachers and capacity for development and **culture.** It is to be expected that present school culture should be able to meet the challenges of modern society.

However, do schools really change? Through innovations, schools do something new but it not necessarily true that the school as an organisation is changing. Dalin (1993:96) points out that: *"For the school to change in the way it functions, it has to change its **culture***". But how can school culture be changed? School culture is a complex phenomenon. Changing school culture produces some problematic issues such as resistance to change, difficulty of changing traditional beliefs and unpredictable influences of innovations on teachers' practice on different levels in individual schools. Dalin (1993) comments that:

> *"Values and norms appear at the individual level, the group level (e.g. classroom), the organisational level (i.e. school level), the subculture level (i.e. schools versus other organisations), and the society level."* (p.97)

Today's innovations are aimed at changing teaching practices and improving the quality of education through the changing the practice. First, innovations come to teachers, then teachers are expected to change their classroom practice, and then when classrooms reach the expected level, the school starts to change and produce the good quality of educational outcomes (students) for modern society. However, bottom-up processes needs top-down instruction and material supplies - then they meet at the heart of the schools' cultural change point. However, it is not an easy task to change the practice through some innovations. Change occurs in different levels within a process. As Fullan (1991:16) asserts:

> *"In understanding and in coping with educational change it is essential to find out what is happening at the classroom, school and local levels of education as well as at the regional and national levels".*

In view of this statement, the change phenomenon needs to be examined more deeply within the school and classroom level in relation to the influences of ICT on schools and classrooms.

3. SCHOOL – TECHNOLOGY RELATIONSHIP

As mentioned previously, schools are social organisations and, as such, schools are work places for adults as well as places for learners to come to learn. Schools are social systems but this does not means that schools are simply places where individuals act in totally free and disconnected ways but, instead, they work interdependently and predictably. Although individuals come together in schools to promote purposeful and effective learning opportunities, each person does not do his or her own course work alone, they also depend upon some external help and support which aims to accelerate students' learning. Besides, schools have individual histories and cultures whose norms, values and roles influence school goals and the way people organise and communicate in regard to those goals (Arends, 1984, Dalin,1993). Arends (1984:442-443) claims;

> *"The history a school provides traditions and a multitude of routines (some good some not so good) that are taken for granted by organisational members. The culture of school provides the organisational arrangements that hold it together and give it power as a social entity."*

Here, 'culture of school' refers to a school's own beliefs, goals and values, norms and roles, teacher-student interaction and 'climate' (Schmuck, 1984) of the school. Williamson and Galton (1998:121) refer to school culture as 'interplay between ideas and structure which creates the life of the school and its classrooms'. Schmuck (1984) also talks about one of the most important norm of school, i.e., *'autonomy'*. Schools differ from one another and an 'autonomous school' has some key characteristics, such as productive interdependence among teachers and students, self-analytic diagnoses of the school's performance by the staff, a proactive reaching out for information and resources, an ability to bring staff and students together for problem solving, and a continuous self-reflective monitoring of all of the above.' (p:31). Arends (1984) looks at school from the organisational perspective and he argues that despite schools having common features with other organisations, which are characterised by goals and control structures, schools also have special features such as goal ambiguity, compulsory attendance, political visibility, and limited resources.

However, an autonomous school possesses a supportive effective climate in

which educators and students work together to adopt or to reject educational innovations (Schmuck, 1984:31). Every school system tries to respond to educational change and take actions in light of their understanding of innovation (Levin and Riffel, 1997). However, studies (West and Hopkins, 1995) show that "most of the schools are unprepared to exercise control over their own future. They usually do not have structures, the experience, or the strategies necessary to move the school systemically in a given direction…" (quoted in Levin and Riffel,1997). Therefore, schools take different action strategies towards the impact of an innovation according to its capacity of development and resource availability.

The term "innovation" means the new openings by ICT for learners, teachers and schools. Because, ICT or computing as an innovation has great impact on school systems, on teaching and learning. Levin and Riffel (1997) comment that schools respond to change in different ways. For example, for the effects and implementations of social change, issues such as responses to labour market change, technology, and poverty and strategies to coping with them vary. In regard to technology for example, "the focus has been on the acquisition of hardware and software to be used within conventional approach to school organisation, teaching and learning" (p.65). As it can be understood, the ICT revolution in school systems has had a mixed impact on with different schools.

3.1. Schools Coping with the Impact of ICT

During the last few years, ICT has been widely recognised as a change in society to which schools must respond, and a development that has tremendous implications for education (Levin and Riffel, 1997). In the literature, the impact of technological change in education is now commonly argued. In order to realise the potential of ICT to improve schools, how the social organisation of school and classroom influences the use of ICT, particularly computers, and how computer use in turn affects the functioning of classrooms in terms of teaching and learning needs to be understood clearly. First of all there are many potential benefits to using ICT in teaching and learning:

• ICT provides new ways for teachers to teach

• ICT enables teachers to be more creative in their lesson planning, to pool ideas and develop skills with others within the school – as well as through collaboration with other schools.

• ICT can make subjects more accessible to children, broadening their horizons and allowing them to achieve

• ICT is adaptable to different learning styles

• ICT can help children think in a different way and be more creative in their problem solving

• ICT can bring lessons to life! (BECTA, 2006).

Secondly, what is also needed to be understood that is the meaning of 'computers in education' rather than 'computer studies in education.' Computer studies are just related to computer literacy and awareness. That is not necessarily essential in educational practice. On the other hand, computer education is, asserted by Romeo (1998) to be:

> *"Computers in education,…, is about exploiting machine's power versatility, flexibility and uniqueness to help the teacher establish powerful learning environments"* (p.178)

For the teachers' professional development, teacher-training programmes - either initial or INSET - should provide teachers with computer literacy and awareness and hence with the knowledge and ability to use computers for learning and teaching purposes. Therefore, these two concepts can be used as a part of an integrated curriculum programme.

Underwood and Underwood (1990) believe that computers can be successfully integrated into the classroom and some of the potential opportunities can be offered by this innovation. However, Romeo (1998) outlines four major issues facing schools with this innovation today and the over the next few years. These are:

• The role of computers in enhancing *students' learning*,

• *Teachers' Professional development* for computer usage,

• *Resource availability* and management to implement computer enhanced learning,

• *Equity and access* to ICT resources.

3.2. Computers and Learning

In all phases of education, the child is central to her or his own learning whatever model of teaching and learning is applied (Monteith, 1998, p.79). Although there are a number of learning models in existence, a child is independent in choosing a learning model. The teacher's role here is to present learning models to the child, then the child exploits a model which is appropriate. In their book: *Models of learning – tools for teaching* (Joyce, *et al* 1997), they present a number of learning models and they explore the model *Learning through simulations'* which is in the category of Computer Aided Instruction (CAI) (Castle, 1984). *Drill and practice*, tutorials and simulations are the other categories of CAI. One of the strengths of drill and practice is

that it includes immediate feedback, ease of use and efficiency in skill learning. Through the *tutorials* children can obtain the situations in which a set of concepts and information must be learned. *Computer simulations* promote critical and higher-levels of thinking (Castle, 1984). Simulations allow students to experience situations that they could not realistically experience directly or that would be difficult to observe in the classroom, such as mixing chemicals, creating three-dimensional graphs or international decision making or urban redevelopment (Castle, 1984, Joyce *et al.* 1997).

In addition to that, British NCET (1995) stress that the use of ICT in teaching environments increases the motivation of learner, which enables learners to become more confident and more productive.

As it is seen computer technology promotes new learning opportunities for learners, and it may change the definition of learning. Twigg (1994) claims that driven by the information and knowledge explosion, our expectation of a child's learning is changing. Twigg (1994:28) comments:

> *"Instead, we recognise that graduates need to have acquired skills, such as critical thinking, quantitative reasoning, and effective communication, along with abilities, such as the ability to find needed information and the ability to work well with others"*

Today's education is grounded on interaction: either the pupil interacts with a source of learning (a book, a computer) or with social reality, acquiring information and experience through that interaction. Computer interaction therefore can provide excellent means for simulation situations and access to needed information when required by the learner through multimedia devices within the classroom. Therefore it can be said that computer based technologies have a substantial role and the capacity to reflect real world contexts into the classroom climate.

3.3. Teacher Professional Development

The explosions of new technologies for educational purposes push teachers to upgrade their skills and knowledge in order to demonstrate the quality of their professional development. Hence, as Hopkins *et al* (1994) point out, teachers acquire new knowledge and new skills, such as working with information technology if positive change is expected in their profession.

There is a general consensus in the literature that information and communication technology can help create better learning environments. However, this potential depends upon the teacher's ability

and willingness to integrate the technology into everyday classroom teaching activities (Pisapia, 1994). Besides, teachers adopt innovations in the light of their own goals, priorities, values, accustomed practice, culture of their community and school, and their own interpretations of the instruction they receive about new approaches. Day (1989) also claims that 'teachers gain new perspectives, increase their knowledge and skills as a natural part of their working lives' (p.6).

In addition to that, Harvey and Purnell (1995) argue that technology should be used to advance a new kind of school culture supporting a new kind of professional development. They argue that technology, as a tool needs to be integrated into every aspect of school life. This requires a new staff development model that encourages bottom-up energy rather than top-down change. This model would be provided by building human networks in an infrastructure that includes teachers, parents, principals, school board, and district personnel' (p.4).

Carter (1997) mentions *"particularly beginning teachers with the advent of national curriculum initiatives need to access, interpret and use information directly associated with routinely occurring pedagogical processes, as their pupils progress toward the achievement of socially valued outcomes."* (p.294). The necessity of this acquisition firstly comes from the realisation of societal expectations from schools and secondly, acquisition of teachers' knowledge, skills and commitment to appropriate translation of information and communication technologies into a repertoire of endurable teaching practices. Therefore, there is a need of a "teacher type" who can provide understanding of the web of temporal and contextual relationships existing between curriculum, teaching/learning and assessment and examining (Carter, 1997).

Consequently, in terms of teachers' professionalism, teachers need basic computer literacy skills - at the same time they need to learn and practice the pedagogy of using computers in the classroom (Romeo 1998). Romeo also stresses that more attention needs to be paid on the issue of 'how professional development is delivered, as well as to its content' (p.190). Teachers need to know how to use the potential of technology effectively in order to maintain their new roles in the classroom. Additionally, Schofield (1995:225) states:

> *"Professional development experiences that not only provide teachers with the technical knowledge they need, but also assist them with preparing to use the software as an integrated part of their curriculum are vital."*

Therefore, teacher training before entering the practice is gaining a crucial role so that teachers always need to be familiar with the research literature, and have the opportunity to develop appropriate instructional strategies and encounter circumstances where they can practice and reflect on the pedagogy of using computers in the classroom (Romeo, 1998).

The UK government eventually realised that fact and put new requirements for pre-service teachers as an Initial Teacher Training National Curriculum for the use of ICT in subject teaching. The new curriculum came into effect from September 1998 and briefly aims to equip every newly qualified teacher with the knowledge, skills and understanding to make sound decisions about **when, when not and how to use ICT effectively in teaching particular subjects** (DFEE, Circular 04/98).

It seems that in order to understand and evaluate the of pre-service teachers' and supervisors' challenges with this new curriculum, there is a need for further research about obtaining profiles of how the performance of students is changing. This can be done by monitoring them and setting records over the course of daily operations or observing them in school experience. This needs to be done due to the limited number of studies in the literature concerning both professional development and technology as a teaching tool.

3.4. Resource Availability

Many surveys and researches show that today many classrooms and schools do not have sufficient resources in terms of ICT resources. For instance Altun (1997) illustrated that the majority of primary school teachers (65%) believe that they do not have enough ICT resources, software and hardware provision in their classrooms and Robertson (1996) argued that lack of ICT resources is often blamed for the failure of teachers to fit ICT into their teaching activities. The insufficient conditions in terms of ICT still in place in many schools today (UNESCO, 2005; Altun, 2002). However, investment in technology is expensive, and there are continuous developments in computer technology. New, more powerful and more sophisticated machines are needed to take maximum benefits from new technologies such as multimedia and the Internet (Romeo, 1998). Today for the central authorities, ensuring that schools spend their budget appropriately is a real dilemma. Ironically, every school has its own policy-making decisions. Hargreaves (1998) also comments that one of the difficulties of educational change for schools is that there is 'not enough money for materials or time for teachers to plan' (p.281).

Due to the rate of change in education during recent years, all teachers have had to update their knowledge and develop their skills to survive in the classroom (Crompton, and Mann, 1996, Altun, 2002). Providing quality professional-development programmes which offer innovative and creative delivery methods to teachers is also an expensive exercise (Romeo, 1998). However, there has been a wide acceptance of the substantial importance of Staff Development plans in providing a foundation for an individual school's management. An autonomous school needs to ensure that its finance is relevant and feasible for the professional-development activities. Besides, a school's policy should include practical resource management statements and it should offer equal access and opportunities both to staff and students.

3.5. Access and equity

The issue of the use of the ICT resources for teaching is only one part of the picture. Taylor (1997) contends that 'if the use of IT resources is to be effective, students will require access to the facilities to undertake work in their own time' (p.234). However, it is not an easy task to provide equal and flexible access opportunities to all students. As Romeo (1998:191) asserts:

> *"Some students in some schools have access to superior hardware and software, including access to multimedia, are able to connect to the Internet and use its resources for an authentic purpose, and have access to teachers who have superior training and knowledge in the area; yet some students struggle even to lay a finger on a keyboard."*

The role of the teacher here is gaining a crucial role, as they are the only facilitators for students in terms of giving them equal opportunity to study on computers during classroom activities. Loveless (1995) notes that children should be encouraged to develop the skills of discussion, negotiation and collaboration. This means that the teacher should decide on the children's style of working on computers according to task such as individual or group working. However, this generally depends upon the availability of resources in the classroom or in the school.

4. IMPLICATIONS FOR INITIAL TEACHER EDUCATION (ITE)

Whereas there is a vast literature on educational change and its consequence impacts on schools (e.g., Sarason, 1982, Fullan, 1991, Stoll and Fink, 1996, Hargreaves, 1998), as some reviewed in this study, there are relatively few accounts on underpinnings of the management of change in initial teacher education. If process of educational change goes through

four stages (initiation, implementation, continuation and outcomes, Fullan, 1991) on schools, the preparation of teachers and their initial courses should follow the same procedure. Teachers should be aware of such innovations in educational change and they should be ready for either predictable or unpredictable problems, which they would face in their real teaching. Main concern here is whether new teachers are being adequately trained in the right way for success in the school. Otherwise, inconsistency between Initial Teacher Education (ITE) courses and reality of school would be inevitable phenomenon that may leads success to failure.

In his article Husbands (1994) explores the nature of change process in initial teacher education through the perspective of Fullan's change model. He gives the innovation of increasing school practice for student teachers as an example for this. At the ***initiation*** stage of change model, as it is discussed earlier sections of this study, teachers both in pre-service or in-service are under pressure of imposed change attempts that causes resistance to it. The reason for this resistance in ITE practice as Husbands (1994) argues that is the opportunity does not exists for a through-going exploration with all stakeholders in ITE of the meaning of central concepts in imposed change innovation. That means "theory" of educational change in ITE should be related and should be practised in schools in order to see how it works and also stakeholders for change should be involved in this process.

At the ***implementation*** stage schools need to be critically involved in developing responses to policy changes in ITE as well as teachers. Steanhouse (1984) noted that teachers' enthusiasm and willingness towards change, rather than pressure from others, should be taken as a starting point in any change attempts. Yet, if a change strategy urged to be located in schools as change agents outside the university, at the same time it needs to be stimulating the work within the university as well.

At ***continuation*** (dissemination) stage of change, issues of perceptions of roles and understandings of change are essential. The Curriculum of an ITE program should allow different groups and individuals to give meanings of change process within the context of their own practice.

Husbands (1994) also found that managing change across the large number of schools implicated some difficulties at the level of implementation and continuation. The reasons for this fact that he believes that *"…some mistakes were made, particularly in dissemination of information and thinking about planning group's work."* (p.20). He also comments that *"…it is clear that it is difficult to identify clearly distinctions between change*

initiation and change implementation in the development of school-based teacher education as an initiated change." (p.20). Clear balance and distinctions should be made with a careful planning for a change in any institution in order to develop understandings and meanings of change. Then consequent stages of change process would automatically follow the flow of change.

However, managing change in educational institutions is rather complex and difficult task. Coveney (1997, in Somekh and davis) suggests that the following factors may contribute to the creation of optimum conditions for change in educational institutions:

> *"… effective communications within and between all parts of an institution; building quality assurance strategies as far as possible into institutional structures and processes; and providing colleagues with the maximum freedom to realise their professionalism within institutional structures."* (p.226)

All written here can apply for the initiating and implementing of ICT as an innovation for change in initial teacher education institutions. For instance, the UK Government has announced new **Initial Teacher training National Curriculum for the Use of ICT in subject teaching** which came into effect from September 1998 (DfEE, Circular 04/98, Annex B). From now on, ICT is not another teaching tool but it is an integral aspect of all teaching and learning subjects in initial teacher training curriculum. The curriculum simple came up with the aim of equipping every newly qualified teacher with the knowledge, skills and understanding to make sound decisions about when, when not, and how to use ICT effectively in teaching particular subjects. This is a significant shift or change requirement for teacher training institutions. Although this curriculum applies to all trainees, the knowledge, understanding and skills required will often differ between subject or phases, and now governments hand-over the responsibility to teacher training institutes in stating:

> *"…it is the responsibility of the Initial Teacher Training provider to ensure that the ways trainees are thought to use ICT are firmly rooted within the relevant subject and phase, rather than teaching how to use ICT generically or as an end in itself."* (DfEE, Annex B, p.1)

As it can be seen making decision is government's responsibility but the application choice is left to the institution. Teacher training institution needs to be very careful about applying these ICT requirements for its trainees in order to meet the requirements of this new ICT curriculum otherwise the trainees would not

be qualified as teacher status. Although government's intention - to equip her future teachers with the new skills and knowledge in order to cope with and catch up with the rapidly and technologically changing world which our kids are going to live in - can be taken seriously beneficial but change process is a complex and rather difficult for individuals as well as for institutions. Now each teacher training institution required to integrate this new curriculum to their teacher training programme. So, trainees and their trainers should have been involved in decision making process then implementation of change would be more appreciated and more practical suggestions should be given to pre-service courses.

4.1. Some Practical Suggestions to ITE Institutions

So far written about Impact of ICT on schools and implications for teacher education would be seen theoretical, but all these change initiatives were made very recently and after implementation of these changes in institutions and training programmes practical outcomes of it can be seen. Meanwhile, some practical suggestions about integrating ICT into pre-service and in-service teacher training courses can be given. Crompton and Mann's (1996) suggestions seem to be very practical and useful for pre-service courses. They suggest:

- Agreed and coherent policy for ICT needs to be published
- Which course will address particular aspects of ICT should be determined
- A systematic monitoring procedure can be created
- A co-ordinator should be appointed
- Access to a variety of hardware including that typically found in school should be ensured (p.129-132).

Whereas these suggestions seems very practical but it does not gives any clue to how to deliver professional development of teachers as well as its content. In terms of teachers' professionalism, this new ICT curriculum provides some objectives and required skills, knowledge and understanding of use of ICT, but at the same time pre-service teachers need to learn and practice the pedagogy of effective use of ICT in the classroom (Altun, 2002). A practical policy and practical planning needs to be established with the partnership schools of training institution. Skills and knowledge of ICT can be delivered to trainees within the university but understanding of ICT starts with the real teaching practice of ICT and use of it in school classroom. Therefore continuation of change can be maintained with the carefully designed assessment and monitoring devices.

To conclude, professional competence of pre-service teachers is essential part of training. In terms of delivering the effective use of ICT to trainees, there are number of issues that need to be taken into account: **First** trainees should have the understanding the relevance of ICT in education. **Second** trainees should have the understanding the importance of ICT in teaching and learning. **Third** should have the understanding how to plan ICT for teaching and learning across the curriculum, and **finally** trainees should have ability of managing ICT in the classroom (Altun, 1997). Understanding of logic of any change attempt means implementing of half of it. So these issues are seems crucial and should be included in teacher education programmes in order to train student teachers effectively under light of the new curriculum initiation.

5. CONCLUDING REMARKS

This study has endeavoured to show that the introduction of ICT into classrooms has had a mixed impact within the educational change process. However, Levin and Riffel (1997) mentioned in their book that some of the researchers (Mjokowski, White, Warger, 1990) claim that the new technologies have very little impact on changing individual schools or traditional schools. They believe that there is little evidence about the effectiveness of technology in education. Olson (1990) goes further and he claims that teachers had computers before and all had experimented with various teaching innovations: simulations in geography; the use of film making in the classroom; analysis of student writing from a linguistics point of view. Then he asks the question *'why then move to computers?'* (p.74). To answer these views all needed is to realise the potential impact of everyday developed technologies in our everyday life. It is obvious; communities are not the same as they were two decades ago. Technology has affected people's life styles. Therefore, educational systems have been directly affected by ICT, either in a positive or negative way.

ICT has the potential to contribute to the improving of students' critical thinking, decision making, problem-solving skills and generating ideas with its integration into classroom activities. The teacher's role at this point is crucial. They need commitment, skills and knowledge to facilitate the learning materials such as computers to his or her students sometimes as a tool, some times as direct motivator in classroom activities. But teachers need to be confident and competent in their professions and they will also need to have on-going training programmes to cope with the impact of new technologies and integrate them into their classrooms appropriately. Initial Teacher Education

institutions have critical and crucial role in order to equip and prepare teachers to classroom with full of confidence and competent about quality teaching.

6. REFERENCES

Altun, T. (1997). Teachers' Confidence in Using Information Technology: Reflections to the Turkish Teachers Trainees. University of Newcastle Upon Tyne, (unpublished M.Ed. dissertation), UK

Altun, T. (2002). Factors Influencing Teachers' Change in Classroom Practice Due To Introduction of Information and Communications Technology (ICT) in Turkey. Unpublished EdD Thesis, University of Nottingham, UK.

Arends, R.I., (1984). 'Improving Classrooms and Schools', in Arends (ed) Learning to Teach. New York, Random House Press, pp:482-512

BECTA (British Educational Communications and Technology Agency) (1998). Information Sheet on Teacher Education and IT, Internet Resources. Online: http://www.becta.org.uk/info-sheet/teach-ed.html

BECTA (2006). Curriculum Online 2006: Supporting Learning And Teaching In Primary Schools. Internet Resource, Downloaded on 5th March 2006) http://www.becta.org.uk/corporate/publications/documents/Becta%20primary.pdf

Bigum, C. and, Kenway, J., (1998). New Information Technologies and the Ambiguous Future of Schooling – Some Possible Scenarios. Hargreaves et al (Eds.) International Handbook of Educational Change, Part One, London, Kluwer Academic Publishers. Pp.375-395

Bollentin, W.R. (1998) Can Information Technology Improve Education? Measuring Voices, Attitudes and Perceptions. Educom Internet Publications, Vol:33, No:1 Internet Location:http://www.educom.edu/web/pubs/review/reviewArticles/33150.html

Carter, D.S.G.(1997). Information and Communication Technology in the Professional Practice of Beginning Teachers. Journal of Education for Teaching: JET, vol:23 No:3 p:294-295

Castle, S.D.(1984). Using Computers in Classrooms' in Arends (ed) Learning to Teach. New York, Random House Press, pp:520-525

Cockborn, A.D. (1998). Teaching Under Pressure: Looking at Teachers. Stress', London, Falmer Press.

Cohen, L., Manion, L., Morrison, K., (1996). A Guide to Teaching Practice. 4th Edition, London, Routledge.

Crompton, R., Mann, P., (1996). Initial Training and Staff Development' in Crompton and Mann (eds). IT across the Curriculum, London, Cassel Pres, pp:128-141

Dagget,W. (1992). Address To Colorado School Administrators, In Dryden, G. And Vos, J. "The Learning Revoluation", Aylesbury. BUCKS, Accelerated Learning Systems Press, p:97.

Dalin, P., Biazen, A., Dibaba, B., Jahan, M., Miles, M.B. & Rojas, C. (1994). How Schools Improve: An International Report. London, Cassell Press.

Dalin, P. with Rolff, H-G. (1993). Changing the School Culture. London, Cassel Press.

Day, C. W. (1989). Issues in the Management of Appraisal for Professional Development. Westminster Studies in Education, Vol.12 pp. 3-15.

Desforges, C. (1988). Changing Primary School Practice through Information Technology: Notes for a Research Agenda. Levy. P. (ed) Learners' Concepts in Mathematics and Science. Occasional Paper ITE/29/88, pp. 19-22

DFEE (Department for Education and Employment) (1998) Initial Teacher Training National Curriculum for the use of Information and Communications Technology in Subject Teaching. DFEE Circular 04/98, Annex B.

Fink, D., Stoll, L. (1998). Educational Change: Easier Said than Done. Hargreaves et al (Eds.) International Handbook of Educational Change, Part One, London, Kluwer Academic Publishers, pp.297-322

Fullan, M.G., with Stiegelbauer (1991). The New Meaning of Educational Change. London, Cassel Press.

Gray, J. and Wilcox, A.B. (1998). The Quality of Schooling: Frameworks for Judgement. in Gray and Wilcox (eds.) Good School, Bad School' Evaluating performance and encouraging improvement, Buckingham, Open University Press.

Hargreaves, A. (1998). Pushing the Boundaries of Educational Change. Hargreaves et al (Eds.) International Handbook of Educational Change, Part One, London, Kluwer Academic Publishers, pp.281-295

Harris, A. (1998). What Works in School Improvements? Lessons from the Field and Future Directions. A paper for the International Workshop on "School Transformation", Max Planck Institute, Berlin, 26-28 February 1998.

Harvey, J. and Purnell, S. (1995). (eds), Technology and Teacher Professional Development. Report for the Office of Educational Technology, Washington, DC, U.S. Department of Education.

Hopkins, D. (1997). Powerful Learning, Powerful Teaching and Powerful Schools. An inaugural lecture given on 25 February 1997, The University of Nottingham, Occasional Paper Series.

Hopkins, D., Ainscow, M., and West, M. (1994). School Improvement in an Era of Change. London, Cassell Press.

Hopkins, D., West, M., and Ainscow, M. (1996). Improving the Quality of Education for All. London, David Fulton Publishers.

Hopkins, D., Harris, A., And Jackson, D. (1997). Understanding The School's Capacity For Development: Growth And Strategies. School Leadership and Management, Vol.17, No.3, pp.401-411

Joyce, B., Calhoun, E., and Hopkins, D. (1997). Models Of Learning – Tools For Teaching. Buckingham, Open University Press.

Levin, B., and Riffel, J. A. (1997). Schools and the Changing World – Struggling Toward the Future. London, Falmer Press.

Loveless, A. (1995). The Role of I.T. Practical Issues for the Primary Teacher. London, Cassell Press.

Monteith, M. (1998). A Golden Age? New Technologies And Learning. in Cashdan and Overall (eds) Teaching in Primary Schools, London, Cassel, pp.71-82

Monteith, M. (1998). The Place of Learning' in Monteith (ed) IT for Learning Enhancement. Exeter, Intellect Press. Pp.79-96

Mortimore, P., Sammons, P., Stoll, L., Lewis, D., and Ecob, R. (1993). Key Factors for Effective Junior

Schooling. Preedy (ed) Managing The Effective School, The Open University Press, pp.9-23

NCET (National Council for Educational Technology) (1995). Information Technology and Learning. Is it a Problem or Solution? National Commission Briefing Paper, Coventry, NCET

Olson, J. (1990). Information Technology in Schools: Institutional Rewards and Moral Dilemmas. Day, C., Pope, M. and Denicolo, P. (eds) Insight Into Teachers' Thinking and Practice, London, The Falmer Press.

O'Shea, T., and Self, J. (1983). Learning and Teaching with Computers: Artificial Intelligence in Education. Sussex, The Harvester Press.

Pisapia, J. (1994). Teaching with Technology: Exemplary Teachers. Research Brief, Metropolitan Educational Research Consortium, Richmond, VA, USA, May 1994.

Robertson, J. (1996). Promoting IT Competencies with Student Primary Teachers. Journal of Computer Assisted Learning. Vol.12 p.2-9

Romeo, G. (1998). The Impact of Computer Technology on Primary Education. Townsend, T (ed) The Primary School in Changing Times: The Australian Experience, London, Routledge, pp177-194

Sarason, S. B. (1982). The Culture of the School and the Problem of Change. 2nd Edition, London, Allyn and Bacon.

Schmuck, R. (1984). Characteristics of the Autonomous School. Hopkins and Wideen (eds) Alternative Perspectives on School Improvement, London, The Falmer Press pp:120-145.

Schofield, J. W. (1995). Computers and Classroom Culture. Cambridge University Press.

Somekh, B. and Davis, N. (1997) Using Information Technology Effectively in Teaching and Learning; Studies in Pre-service and In-service Teacher Education. London, Routledge Publications.

Stenhouse, L. (1984) Artistry and Teaching: the Teacher as Focus of Research and Development. Hopkins, D. and Wideen, M (eds) Alternative Perspectives on School Improvement, London, The Falmer Press, pp.67-77

Stoll, L. and Fink, D. (1996) Changing Our Schools. Open University Press, UK.

Taylor, C. (1997) Organising IT resources in Educational Institutions. Somekh and Davis (eds) 'Using Information Technology Effectively in Teaching and Learning; Studies in Pre-service and In-service Teacher Education', London, Routledge, pp.228-237

Torrington, D. and Weightman, J. (1993) The Culture and Ethos of the School. Preedy (ed) Managing The Effective School, The Open University Press, pp.44-59

Twigg, C. A. (1994) The Changing Definition of Learning. Educom Internet Publications, Vol 29, No. 4, URL: http://www.educom.edu/web/pubs/review/reviewArticles/29422.html

Underwood, J.D.M and Underwood, G. (1990) Computers And Learning: Helping Children Acquire Thinking Skills. Oxford, Blackwell.

UNESCO (2005) Integrating ICTs into the Curriculum: Analytical Catalogue of Key Publications, UNESCO Asia and Pacific Regional Bureau for Education. ICT in Education Unit Bangkok, Thailand. URL: http://www.unescobkk.org/education/ict

Williamson, J. and Galton, M. (1998) Building a School Culture. Townsend (ed) The Primary School in Changing Times: The Australian Experience, London, Routledge, pp.120-138