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ICT Impact on the Education System

Abstract

This paper presents the results of case studies about innovative ICT supported pedagogical practices in different educational systems. Analysis will be based on the results of those survey countries (PISA) choosing countries that rank at the top of this assessment and in countries that do not have high achievements in this survey. During this study the focus will be on how important the implementation of ICT is to enhance and improve learning outcomes and teaching methods. On the other hand, the aims to use ICT in the school are different between countries that are at the top of the classification and the ones positioned below. In this perspective, the aim of this paper will be the study of the impact of ICT on pedagogical practices in different education systems. Firstly, we will analyze the impact of ICT on student achievements in school. Secondly, our question is: what are the changes in the curriculum during the implementation of ICT in the education system?

Keywords: *ICT in education, curriculum, pedagogy, change, students.*

1-ntroduction

A series of reforms have been performed in Albania since 2005 to enhance the quality and efficiency of the education system. These reforms are related to changes in educational programs, teacher professional development, implementation of interactive methods in schools, specific programs for students in need, and development of creative thinking skills in school curricula. One of the key reforms is the integration of ICT in basic education, starting from 2005. The aims of these changes are related to the development of society, and the primary objective was setting up computer laboratories in every school. After this primary initiative it was important to develop teacher training programs to use ICT in school and outside it is.

Based on numerous changes to our education system in the implementation of ICT in school curricula, it was considered important to study the factors that have had a positive impact as well as factors that have hindered the implementation of ICT in developing countries. A comparative analysis will also show the impact that education policies have on the successful development of ICT in school. To realize this paper we will be based on international exams such as PISA (Program for International Student Assessment) of the Organization for the Economic Co-operation and Development (OECD), which compares the academic achievements of students in specific academic areas. According to PISA (2003) Hong Kong and Finland have the highest achievements in the four fields (literature, mathematics, science, and problem solving situations) (OECD; 79). On the other hand, studies related to the integration of ICT in education (Module 1& SITEMS M1;54) will also be considered. These studies conduct research on how ICT is used by teachers and by students in school, analyzing also the school infrastructure and pedagogical practices (Pelgrum & Anderson; 86).

In this study will be highlighted the importance of ICT in both teacher professional development and student development. In today's digital society ICT competencies are among the most required competences in the labor market, while the development of these competencies within the school environment, enables students to be practical and capable for the labor market (OECD, 2004, p.80). By pointing out these differences, according to Voogt (Voogt & Odenthal; 25), today we can talk about a transition from a former industrial society into a digital society.

Changes in society often bring about pedagogical changes in the school system. Teachers are the first actors to change teaching forms and methodologies depending on social demands. But students as well change the learning methods because they have more choices to information and even more opportunities to learn from each other or with each other. The following table is based on these conceptions, according to:

Table 1. *Overview of pedagogy in the industrial versus the information society (Voogt & Odenthal; 270)*

Aspects	Less (pedagogy in an industrial society)	More (pedagogy in the information society)
Active	Activities prescribed by teachers. Whole class instruction. Little variation in activities. Pace determined by the program.	Activities determined by learners. Small groups. Many different activities. Pace determined by learners.
Collaborative	Individualist Homogeneous groups Everyone for him/herself	Working in teams Heterogeneous groups Supporting each other
Creative	Reproductive learning Apply known solutions to problems	Productive learning Find new solutions to the problem
Integrative	No link between theory and practice Separate subjects Discipline based Individual teachers	Integrating theory and practice Relation between subjects Thematic Teams of teachers
Evaluative	Teacher directed	Student directed

According to Voogt & Pelgrum (Voogt & Pelgrum; 286) pedagogical changes are associated with changes in curriculum, as the curriculum must be updated with information. Changes in school curricula should be adjusted depending on the context in which they take place. An important factor is the context of the school culture which plays the primary role in a successful implementation of ICT in the curriculum, and the implementation of innovative pedagogies in educational systems (Fullan; 25).

What we will go in depth in his study is the impact that ICT has had on teaching practices and student achievement as well as curriculum changes in countries ranked first in the PISA exam. To answer these questions we will rely on curricular developments that have taken place in the Albanian education system.

2-Impact of ICT on the Curriculum and Student Achievement in Education

To analyze changes in the curriculum during the implementation of ICT in school we will rely on the three phases that relate to the way how the changes occur in the implementation of ICT in the education system.

1. Curriculum development: changes in content and goals of the school curriculum.
2. Implementation of ICT in schools: the changing role of teachers and 21st century student requirements, in countries ranked in the first places in the PISA exams.

3. High student achievements in the implementation of ICT in school.

In the following paragraphs we will explain each stage based on the above mentioned studies and analysis of the curricula in the Albanian education system.

a. Developing the curriculum

ICT initially started to be considered important being studied as a separate subject, so that every student was skilled in core competencies of Office package use. With these core competencies students would gain good knowledge on computer and Internet use in daily life. However, the rapid development of technology made new demands arise for teachers as well as new requirements of the labor market. To respond to these changes, more economically developed countries began to make first changes in school curricula (OECD; 25). According to Voogt, countries such as Hong Kong, Finland, the Philippines, began to integrate ICT into teaching curriculum so that each student was able to use ICT to find information, to develop information, and to analyze it according to the requirements of the particular subject.

According to Voogt "an interactive guide on mathematics is used by the 9th grade students to realize geometric analysis. Through this electronic portal students create simple geometric figures, create equations, and solve equations seeking online help from their peers. The main purpose of this portal was that students develop critical thinking through activities that develop them individually. In this way students learn in more depth, and try to find solutions autonomously "(Voogt ;165).

Given these changes, the first step for the development of ICT would be the change of the purpose of the educational system, as well as the change of the curriculum content, a curriculum based merely on books vs. a curriculum based on digital information, of digital content to provide school information in any place and at any time. It is important to note that these changes do not alter any curriculum information but enable deeper information to assist in the development of innovative capabilities and development of skills in the 21st Century (UNESCO; 31).

These skills relate to the need for lifelong learning and acquiring practical skills. In the new curriculum reform of basic education, subject integration, integration of ICT in each subject of basic education, and development of critical and creative thinking and problem solving are given priority. The aim of this reform is to prepare new students with practical and scientific competence needed for learning within the school but also outside it. The curriculum aims to a) change the quality of student thinking focusing on creative and problem-solving thinking, b) support the students to learn more about themselves and the world around them, c) know how to receive and give information depending on the audience surrounding them, d) select and manage digital information in the most accurate way, f) include digital literacy in primary school and start learning ICT from the primary cycle, e) learn to work independently and in groups on specific tasks, f) support students in learning how to learn, g) use student experiences to explain academic concepts. At this stage ICT s not seen as a skill that is acquired separately but as a skill which develops more when it is used as a teaching method by teachers of all subjects.

In the following paragraphs we will explain how curriculum changes and extensive integration of ICT in the curriculum have brought changes in the work and role of the teacher.

b.ICT implementation in school: change of the teachers' role and requirements of the 21st century.

As the focus of this paper is on ICT in education and changes its implementation brings across all the links of education, in this paragraph we will continue to explain the implications that it might have for teachers and students. Digital literacy, e-literacy, new literacy, screen literacy, multimedia literacy, ICT literacy are all terms that describe clusters of skills that students (and their teachers) need in the digital age of the 21st century. Because of ICT, literacy concepts have extended well beyond traditional notions of print-based literacy. To be literate today requires the ability to interpret and write various codes "such as icons, symbols, visuals, graphics, animations, audio and video" (Nallaya; 48).

Whichever term one chooses to describe the skills students of today need, it should embrace basic literacy, that is, ICT enabled reading and writing, as well as many new related skills identified by Nallaya (Nallaya; 30). For this reason, it is preferable to use a plural term, and hence the term we adopt in this document is digital literacy. At the core of digital literacy are reading and writing, not only page reading and writing on paper, but also their electronic extensions on the one hand, screen reading and internet surfing [reading], and on the other hand, texting, keyboarding, and mailing.

Digital literacy includes abilities such as:

- Searching, sifting, scanning and sorting information
- Navigating through screens of information
- Using ICT to create and share information
- Using ICT to research and solve problems
- Locating and evaluating information
- Retrieving, organizing, managing and creating information
- Sending and receiving messages
- Preparing multimedia presentations
- Reading the screen, surfing the internet and sending messages, using the keyboard and sending emails. (UNESCO; 36).

Based on the above paragraph, a number of related skills, which other authors refer to as information literacy, media literacy or visual literacy, comes out. These skills are part of related digital illiteracies (UNESCO; 37):

- Using ICT skills to create and share information;
- Searching, sifting, and selecting information;
- Navigating through screens of information;
- Finding the location and evaluating the information;
- Using ICT for research and problem solving;
- Preparing multimedia presentations;
- Retrieving, organizing, managing and creating information
- Sending and receiving messages.

Furthermore, the types of texts that students today interact with are part of students' life worlds. These texts comprise the various codes identified by Nallaya above: icons, symbols, visuals, graphics, animation, audio and video (Nallaya; 45). Nallaya continues: Teachers who do not acknowledge these texts as part of the repertoire of textual materials in the classroom can make the learning process less authentic, as well as disengage learners 'real life experiences from every day classroom learning and teaching" (Nallaya; 48).

Thus, the use of multi-modal texts in the classroom, along with presenting skills ought to assist teachers in separating the widened range of skills now required of students. If the teacher has previously been the master of power of information, today students come to school already equipped with this large capacity information. The teacher's role will be to help students to develop further information, information analysis, and its precise meaning. To assist in the development of innovative pedagogies such countries as Hong Kong, Finland, Australia, have a school calendar where they develop innovative practices in school. These practices are not related to how students are trained in scientific aspects of the subjects but to the development of practical skills, such as development of problem-solving skills, use of ICT for curricular projects, presentation and publication of tasks, evaluation forms of group cooperation.

The evaluation of these activities is primarily conducted through a formative assessment, where students are explained the achievements or errors that they can correct, and in a second phase the students are evaluated by grade for activities conducted. These practices help students to progress quickly in the forms and techniques of learning, teach them to work autonomously within a preset time, and require students to work in pairs and to solve difficult problems. These forms of learning, and the possibility of getting information and analysis of expanded information using multiple sources, not just the book, prepares these students to cope better during tests of international exams. These techniques also help students be more successful and more prepared to the requirements of the labor market (Chow; Kankaanranta; Law; 59).

c.High student achievement during the implementation of ICT

Most economically developed countries and countries ranked first in the PISA exam, Hong Kong included, stated that the international criteria for the rapid development of education meets the needs of the local society. On the other hand, there are countries that have established national bodies to further specify the international criteria to better respond to their local needs. Studies show that when school starts from social needs to realize specific changes, then school is very close to the labor market. It should be noted that all the countries located at the top list of the PISA survey, pay great importance to research competence, organization, analysis of information, communication and publication through various media forms. These powers increase the capacity of thinking and searching for more accurate solutions to the problem presented.

The Finnish educational system shows clearly the weight of the curricular projects organization in the school curriculum. According to Finland innovative classes involve students to participate in educational projects related to complex problems of the real world that surrounds them. Schools also organize open meetings, which allow students to participate in meetings with businessmen, scientists, personalities so that they have the opportunity to get accurate answers to their questions but also be sure for the choices they will make for the desired profession (Chow; Kankaanranta; Law; 96).

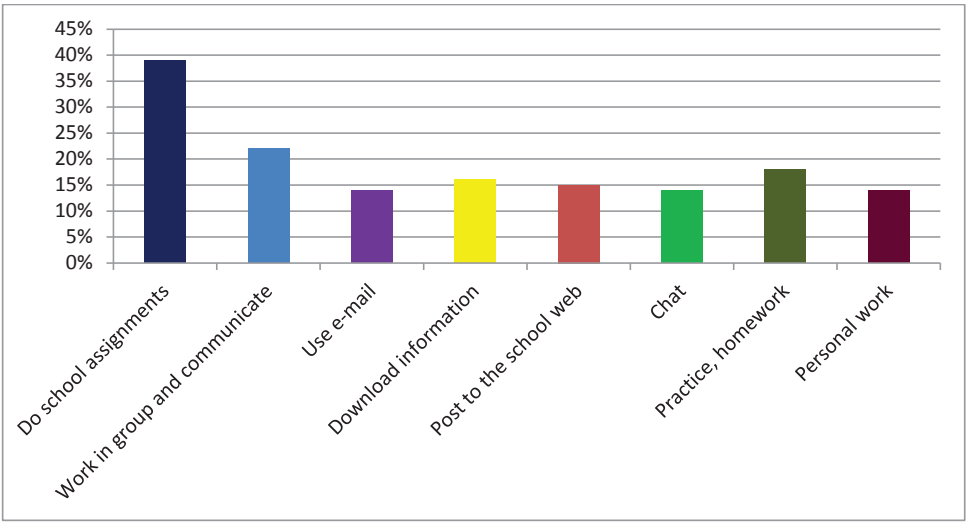
Same practices are found in the education system of Wisconsin while reading the summary of ICT standards in basic education. By analyzing the expectations of the community and employers about what they think the students need to know to be successful, they indicate broad areas of application of knowledge such as communication, thinking, problem solving, decision making and practical use of ICT. These fields are related or go beyond vocational fields of individual subjects.

When students apply their knowledge within and across different curricular areas, they develop concepts and complex thinking. Community members need these skills as responsible citizens. Employers require employees to evaluate and demonstrate these skills because they are people who can continue learning and connect what they have learned with job requirements. College and university faculties recognize the need for these skills as a means of developing a level of understanding that separates the expert from the novice. Teachers in every class should expect and encourage development of these applications separately, both to promote the learning of course content as well as to extend learning along the entire curriculum.

Based on this review one can clearly see the weight that is given to innovative skills in the school system, and the importance of these skills to have successful students. According to studies conducted in the PISA survey, it is clear that a large part of students in Finland and Hong Kong use Internet to accomplish tasks, while teachers to publish exercises for students, but also as student tasks assessment. It should be noted that 90% of the population of these countries own personal computers and have access to Internet due to the high economic development. Students are required to systematically perform some tasks using computer.

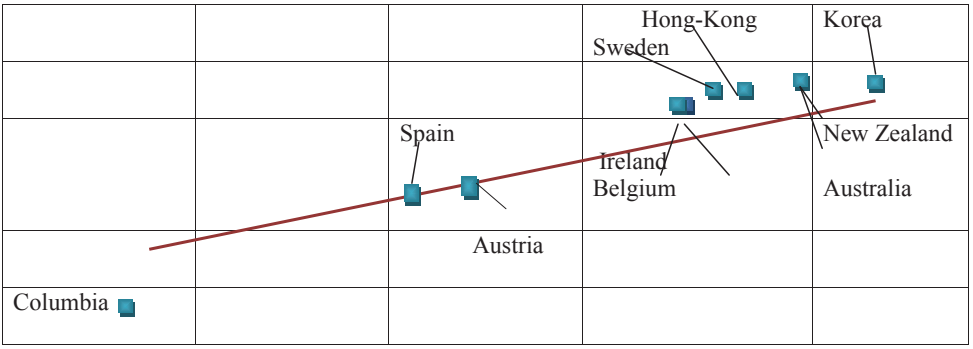
The following table will provide examples of exercises that students must realize once a week via computer to meet the teachers' requirements. From selected OECD countries, 39% of students report that they use Internet to do school assignments, 22% use the computer to work together and to communicate with other students. It is also reported that 14% use email, 18% do homework individually, 15% chat, and 14% use the computer for other personal work. Some of the students (15%) report that they use the computer to post materials on the school Web.

Table 3. *Percentage of computer use in school (once a week)* **.**



It is clear that ICT takes a wide space in school curricula of these countries. A second point in order to further advance and prepare practice driven students is the accomplishment of tasks through practicing ICT. This form also encourages students to develop cross-curricular competencies; one of them is digital reading. If we look at the statistics of Pisa 2009 report we find a close relationship between the ability to search for digital information and digital reading (see Table 3).

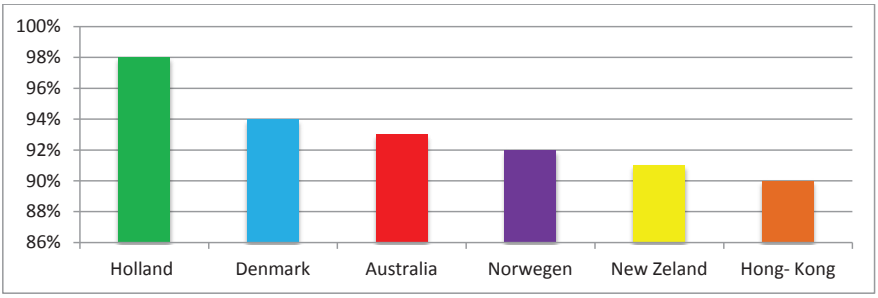
Table 4. *Correlation between research on the Internet and high achievements in digital reading.*



The table provides the correlation between research ability and digital reading performance; it is clear that in countries where students are more in contact with the computer there are highest achievements of digital reading, and it is seen that Korea is in the first place followed by New Zealand and Australia. It should be taken into consideration that the number of computers connected to Internet is very high. 93% of students in developed countries classified by OECD report to have access to school computers. More than 98% of students (Netherlands, Denmark, Australia, Norway, New Zealand, Canada, Sweden, Hong Kong and part of Thailand) report

having access to school computers. The same percentage of students also has Internet access to further develop their competences. This percentage refers to a part of the countries shown in Table 5 (PISA 2009).

Table 5: ***Percentage of Students Who Use Internet and Computer in School***



In order to bring our students closer to the above mentioned developed systems these skills occupy a major part of the curriculum reform in our educational system. The reform starts from primary education. In primary education it should be taken into account that students should not be overloaded during ICT classes, but rather learn through playing and practicing. Learning time should be based on a theme tailored to each age. Computer is used as a tool to play with programs, whether learning fun games, writing programs, cuts, presentations, searching the internet or communication. In this way creativity is stimulated, motorist development is encouraged and thinking about problem solving is driven. The success of this lesson is reflected especially in the freedom gained by the students in using ICT tools, in the cooperation with classmates, in building autonomy in decision-making and responsibility to the community.

3-Conclusions

This paper analyzed changes occurring in educational curricula during ICT implementation in the school system. During this analysis we tried to highlight that during the integration of ICT it is not necessary that every curriculum be created from the beginning. The Curriculum changes taking into account the skills needed by students in the 21st century. Many innovative practices are intended to guide curriculum towards a curriculum that promotes lifelong learning and development of practical skills needed for the job market.

During the transition from an industrial society to a digital society, more importance is given to forms of findings, analysis and communication of information depending on media forms. On the other hand it is clear that ICT is not an acquired skill in itself, but it helps and is influenced by collaborative skills, communication skills, and problem solving. Given this view it is important that the ICT subject is developed as a cross curricular subject that permeates all curriculum subjects. During this analysis it also results that the teachers and students use ICT skills in

various forms. Students are often driven by curiosity in search of innovations in the field of technology, making them advance rapidly in this direction.

On the other hand we see that systems that regularly use ICT for performing analysis and assignments mark highest achievements in PISA survey, but these achievements are also related to the assistance that school gives to every student to realize complex projects. Reflecting on curricular changes in Albania, ICT curriculum aims to develop students' innovative skills, and innovation management skills, skills that every student needs in his/her further studies. In this analysis we clearly saw that the curriculum needs constant changes, but these changes should be planned in accordance with the context in which they are conducted and in accordance with the school culture. Students are successful when education is successful, provides answers to students' questions and runs parallel to their needs.

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