

Dimitra I. Koniari
Teacher of Greek Philology



Digital Competence

Larisa, 2022

Dimitra I. Koniari

Digital Competence

Self Publisher

©Dimitra I. Koniari

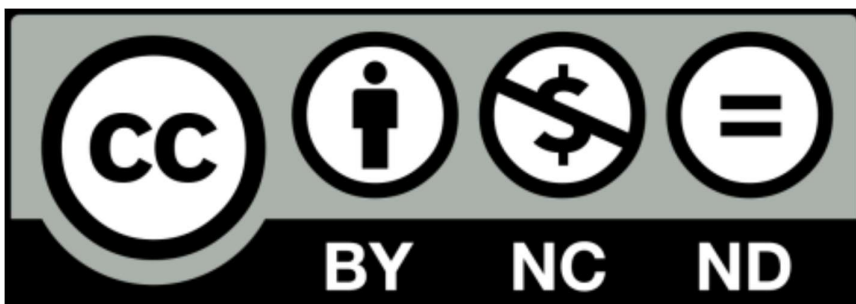
Kanari 38 Giannouli Larisas

Phone: +306942651800

E mail: demyapr81@gmail.com

Εικονογράφηση εξωφύλλου: Βασιλική Ραφτούλη

ISBN 978-618-00-3787-6



Αναφορά Δημιουργού-Μη Εμπορική Χρήση-Όχι Παράγωγα Έργα 3.0
Ελλάδα

(CC BY-NC-ND 3.0 GR)

Το διαδίκτυο γίνεται η κεντρική πλατεία για το παγκόσμιο χωριό του αύριο

Bill Gates,

Contents

Introduction.....	6
1.1. The introduction of ICT in the education	8
1.2. ICT and special education	11
1.3. The European framework of ICT in special education	16
1.4. ICT and multicultural education	20
1.5. The use of ICT in the school management	22
1.6. Presentation of the theoretical studies and research approaches for the role of the principal about the use of ICT in school	27
2.1. The training of teachers as a key for further development of their digital competences	34
2.2.. The European framework for the digital competence	37
2.2.1. Digital learning and ICT in education.....	39
2.2.2. European digital competence in education	42
2.2.3. DigCompEdu framework	44
2.2.4. The role of school principal in promoting digital competences	46
3.1. The case of Greece about its digitalization in schools.....	47
References	49

Introduction

The digital world is a reality, nowadays, as it consists the world that we live, work, communicate. The right administration of every educational structure, and especially of school, drives to better function of school. In this existing conditions of the technological explosion of information and communications, and the on-going redefinition, education could not be an observer, but it must integrate and exploit Information and Communication Technologies (ICT from now on) in the daily practice. ICT in education are in fact an important view of technology and society.

The European Union supports and promotes the introduction and use of ICT in the teaching and management of the school units for their more efficient operation. The integration of ICT in educational administration assists in the efficient organization and processing of administrative information. Nowadays the educational system generates a huge amount of digital information, and in order to obtain immediate processing it is necessary to use the ICT. The ultimate goal is alertness, simplification, and flexibility of day-to-day administrative functions, the minimization of processing times, the modernization of the education administration and the achievement of communication. At the same time, the traditional school, which is based on bureaucratic and managerial integration of administrative work, is now transformed into a "digital" school, flexible, adapted to modern "digital" environments.

The digital society is part of our life. The rapid development of technology requires flexibility and adaptability of employees to new conditions. The new skills that are now required involve the assimilation of Information and Communication Technologies in the daily processes of all of us, both in personal and professional life.

1.1. The introduction of ICT in the education

Information and Communication Technology (ICT from now on) has entranced in a large part of our daily actions, as technology has increasingly integrated into our lives (Berea et al., 2019). In the education, ICT plays a certain role, which has influenced the methodological approaches in the classroom as well as the administrative approaches (Area-Moreira et al., 2016). ICT has caused a change in the way students learn (Li et al., 2019). ICT is in the service of education (Rojas et al., 2018).

The improvements in educational technology have placed education in a phase of transformation, seeing the inclusion of technological resources from a pedagogical perspective (Pereira et al., 2019). These changes have led to a modification and an improvement in the learning procedure, which has as a result the digital training of teachers in order to be able to develop their work. In addition, these technological advances promote better access to information and content by students. Students show a positive opinion of the use of ICT in teaching and learning processes (López-Quintero et al., 2019).

The development of educational technology has made it an essential mean of teaching (Escobar & Sánchez, 2018). This has been caused by new learning spaces generated by the various resources and digital platforms that have caused an emergence of new training experiences for students and teachers, improving the quality of characteristic instruction in a technological era. Due to the demands of students of the digital age, the teaching practice must be welcomed to use effectively the educational technology.

UNESCO introduces the term of ICT, Information, and Communication Technologies, because of a combination of two sciences: The Computer of Science and the Information of Technology. The first includes the design, the implementation, the evaluation, the use, but also the maintenance of information processing systems, hardware of computers but also software. The second includes

the computers systems and the technological applications of information technology within the society (Anderson & Van Weert, 2002).

The American Information Technology Society designates Information and Communication Technologies as "study, design, development, implementation, support or management of information systems based on computer technology and specifically in software applications and hardware of computers" Kyridis, Drossos and Dina (2005) present the ICT as "the technology used for communication and information purposes ". The information is a system of codification of a message "or as "anything that can activate a person's cognitive system"

The evolution of technology in the latest years has been rapid, both in the field of technology and in the field of information. The appearance of the telegraph, telephone and radio seems to be the beginning of the achievements, while little by little there was appeared the creation of computer. Next technological revolution is considered the appearance of the internet. The internet gave accessibility to material, people, and learning environments.

This development has also affected the sector of education. ICT offer modernization of all actors, and services, and schools, provide technological tools and applications. ICT begin to be integrated into educational process and be a tool for teaching, research, learning, and knowledge.

Strong evidence for the alleged benefits of ICT and for their impacts on a wide variety of student learning outcomes remains elusive. Data supports the claim that the use of technologies in class increases motivation and curiosity for learning and improvement in the use of technologies. Further reviews have shown that integration of ICT not only significantly improves practical knowledge of applications and programmes, but also contributes to developing skills and fosters an active and autonomous role of the student. Nevertheless, there is an increasing awareness among experts that, for potential attainment outcomes to be fully realised, ICT needs to be used to support subject learning and to impact on pupils' subject-specific learning processes, and that ICT has only a limited effect on learning and

teaching when teachers limit themselves to small enhancements, without appreciating that interactivity requires a new approach to pedagogy and the curriculum.

There are four phases or stages related to its introduction and integration Information Technology and Information and Communication Technologies in Primary and Secondary Education. Stages that with small differences followed in to some extent all education systems when they decided to integrate them ICT in school reality. The phases are as follows:

- The educational technology and teaching machines (before 1970). It is made an attempt to involve various media and technologies such as radio, television, and video in education. It is used general-purpose devices and technologies and new special devices that are created (known as teaching machines) to achieve the objectives of the curriculum program.
- The ICT approach (1970-1980): The Informatics is an independent subject registered in the curriculum. In several developed countries, it is mainly included in the Lyceum course or Informatics courses. It is given emphasis on the “IT approach” having as a main purpose of teaching the planning and the development of systems computer assisted teaching.

Computer science as a subject and as an educational tool in other subjects (1980-1990): Informatics and technologies in general in this phase are introduced globally at all levels of education. It is now an independent subject but also an educational tool for other cognitions objects. Impetus for this direction was given by the great development of PC technology and falling of prices as it was now possible to - produce mass computers for schools, but before it was prohibitive due to cost. This evolution in technology affected every human activity and inevitably and the education that tried to take advantage in order to improve its work.

- Information and Communication Technologies: as a medium of teaching and learning (after 1990): This phase has been in progress since the early 1990s, with several forms. The degradation of Informatics as a cognitive object and the efforts to integrate ICT throughout the educational process are the two

main features. An example is France in which while for several years Informatics was a separate course was abolished. This does not apply in Greece where the course exists in both Gymnasiums and High school and is a separate field of study in Secondary Technological Direction (Komis, 2004).

In this logic, the evolution of introduction and integration of ICT in school reality is divided into two different ways of approaching. The one way wants New Technologies to be as a separate subject. The other way thinks that ICT is a tool for knowledge, research, and learning. The ICT are perceived as a social one phenomenon and element of a more general culture. These approaches add each other and have three different trends as to their use in educational reality: a) the technocratic model b) the integrated or holistic model and c) the factual model (Panagiotakopoulos et al., 2012). In the technocratic model, the purpose is the acquisition of knowledge of computer operation and of its planning. The emphasis is on ICT literacy and at a high level of knowledge and skills of informatics

In the integrated or holistic model, ICT become part of all school subjects. In other words, it is taught the characteristics of ICT in general through all cognitions objects without being a separate subject. It is considered that by this way it is achieved meaningful and creative collaboration between teacher and students during the learning process.

Finally, in the factual model, it is made a combination of the two previous models. In other words, ICT is included in the educational process and it is supported that all cognitive subjects as the computer will be a tool for all them. In other words, there is an autonomous course of informatics and the computer is a mean for support other courses. Consequently, ICT contributes to pedagogical way of learning combined with other courses.

1.2. ICT and special education

Although there are a lot of surveys about the necessity of ICT for students of a general school (Ghaleb, 2014) there is not enough for students with SEN (Wallace & Georgina, 2014). Through all these surveys it is proven the use and importance of ICT

for students: Patton and Roschelle (2008) make surveys about the importance of ICT in students with mental disabilities. Bouck et al. (2010) have made surveys for students with writing improvements while Shih et al. (2011) for students with hearing problems. It is mentioned that there is no the appropriate training of teachers for the teaching students with SEN (Liu, 2011; Altinay & Altinay, 2015; Vladimirovna & Sergeevna, 2015). In Spanish studies it is mentioned that the teachers feel insecure when they are going to use ICT for teaching despite the fact that they have positive attitude towards ICT (Prendes & Gutierrez, 2013). It is explained by the low variability of technological materials that are used by teachers in their learning procedure (Ferrandis, et al., 2010).

Although there is less surveys about the training in ICT of teachers who are engaged with students with SEN (Ortiz, et al., 2014) it is, also, proven that those teachers have no any knowledge and relevant training on how to use different types of technologies in their teaching with students with SEN (Tello & Cascales, 2015). This gap affects negatively the education of special students being obstacle in their education.

In the benefits of ICT for students are included the possibility of autonomy that students have as ICT can be adapted to the special needs of each student. Students have immediate feedback, giving them the opportunity to attend a program via synchronous or asynchronous way. Furthermore, students have the opportunity to save time and to be educated through a personal program adapted to the needs of each one. Students follow their own rhythm in their reading. In addition, it is given to students the possibility of a model of a multi-sensory training. Furthermore, it is given to students the ability of repetition in order to obtain extra skills (Toledo, 2013).

In special education, the use of ICT initially responds to the need of providing equal educational opportunities to all students. The inability of use and exploitation of ICT by children with special educational needs, leads to their exclusion and increases the digital divide between groups population.

The use of ICT helps in the multi-sensory approach of educational courses, in developing problem-solving skills and social skills and at the same time it increases the communication and interaction of students with disabilities with their students and their teachers. In addition, ICT offer greater autonomy to students with special needs in order to make them able to make daily activities on their own (Fernandez-Lopez et al., 2013).

The pedagogical role of ICT in the teaching of special educational students is the following (Fitro, 2005):

- The education of students to ICT having as aim the development of skills those are useful for the gain of pre-professional skills.
- The use of ICT as a mean of Correlation with places that the students with special educational needs cannot visit.
- The use of ICT as mean that gives us the ability to evaluate and control the didactical targets and goals.
- The use of ICT as cognitive mean that will help to the deeply investigation of cognitive objects.
- The use of ICT as tool that give these students the ability to play, relax and entertain.

The tools of ICT in order to help students with special educational needs to their integration are the following (Nabil, 2013):

- The distance learning that allows these students to have access to the knowledge from their house.
- In the internet, several libraries have digital books. There are books that are designed for the needs of special educational students.
- The Internet gives the opportunity to students with special educational needs to become in contact with other students and be interacted with other students and their teacher.

There are several advantages for the students. Especially, the occupation with the computer influences positively students' cognitive development. This is very

important for special students with learning disabilities and mental retardation who have a reduced motivation to learn because of negative emotions and repeated failures. ICT can reduce their negative self-esteem that these students have and increase their motivation for learning (Aggelopoulou, 2011). Initially, through the computer students who have not developed the skill of writing, can write, and express themselves.

In Williams's study (2005) is seen that students with very serious learning disabilities through the power point were able to make very good presentations. In addition, students with delicate mobility difficulties and in particular manipulation of scissors, glue etc. using appropriate programs, and software on the computer were able to overcome these obstacles.

Furthermore, the use of ICT in the classroom helps many students with special educational needs who have communication problems as through computer usage can express preferences and opinions (Williams, 2005) and at the same time communicate in many ways, through the tools offered by the internet (e-mail, blog, etc.) (Forzani & Leu, 2012).

In addition, the student can and participate actively through it computer in various activities with the main aim of integrating it into the general class (Paraskevopoulos, 2002).

In Bratitsis & Kandroudi's research (2011), two students with significant learning and social difficulties, through computer, they were able to participate equally in the general classroom and to develop their communication and social skills.

For students with learning disabilities, the computer functions as one external human memory that can reduce the workload on memory of these students (Kumar & Wilson, 1997). It also helps them to keep their interest, their motivations for learning (Hennessy et al., 2005) and their attention in the lesson, areas where students with learning disabilities have significant problems (Kumar & Wilson, 1997).

ICT offers significant advantages to students with physical disabilities as well as to students with speech problems. Students with physical disabilities who were isolated from their classmates, have improved their communication skills after using ICT, and be accepted by their classmates. In addition, new technologies help students with speech problems to improve their communication skills in order to interact and communicate effectively in the classroom (Hasselbring & Williams Glaser, 2000).

ICTs are especially useful for students with visual and hearing problems. Certain devices and special software help these students to learn, communicate, and participate equally in the educational process (Hasselbring et al., 2000).

At the same time, there are many benefits from the use of ICT for students with autism. Often these students seem to enjoy interacting with the computer because the latter function in a certain way and because the stimuli these students receive are constant, predictable and controlled. Furthermore, computers can provide a coherent environment, something that children with autism want because of predictable reactions (Mauropoulou, 2011).

Liasidou (2010) emphasis that special needs are a public issue and schools have to uses ICT for upgrading the quality and equality of the special needs education. ICT integration needs the teacher education for ICT, the change of context, ICT curriculum. This research aims to analyze ICT integration and facilities in special education schools in North Cyprus in order to set ICT policy in education.

A teacher of special education can organize each student's individual folder and program (Paraskeuopoulos, 2002). The internet offers easily accessible and free of charge material about the tools, methods of teaching and evaluation of people with special needs as well as information about the cooperation of specialist's educators with parents and with other experts. At the same time, the computer functions as an evaluation tool as the works of the students on the computer are an electronic portfolio of each student (Williams, 2005). ICT can also be used to identify learning difficulties or difficulties in social skills, as there are several tests that have been manufactured electronically to evaluate various difficulties.

There are many benefits from the use of ICT to the schools themselves. Isolated schools in highlands or islands can also communicate with other schools in the rest of Greece independently geographical location (Tzimopoulos, 2001). However, it should be emphasized that the existence of new technologies in school class is not enough even for the benefits outlined above or for their effective integration into education (Postholm, 2007).

1.3. The European framework of ICT in special education

The European countries have adopted common policies about ICT that are not related to the Special Education. National policies for ICT have set targets for education systems that identify the immediate provision of infrastructure to both teachers and students. The policies affect the access of teachers in areas such as training, support, and ICT information.

However, for the integration of ICT in Special Education the European countries have not yet adopt a specific national policy that introduces the equality in education through ICT. Finally, the existence of the same rights is promoted by the national educational policy provided for Special Education students in relationship with all other students including and the access to new technologies (Sam-Anlas & Stable-Rodriguez, 2016).

The European Union has a long history in developing policies for including digital technologies in primary and secondary education. In our days, the access to education and learning for students with special educational needs differ among the European countries. In spite of this, all European Union countries have adopted the opinion that the satisfaction of the educational needs of each student is an important element for the quality of the life of all Europeans citizens.

In a European Union program, the so-called European Electronic Operational Program (2000) "it is mentioned that the education is the pillar of the Society of Information and has significant effects in the daily lives of many citizens". Also, in a study "Learning how to change: ICT in Schools" (OECD, 2001) it is pointed out that ICT is capable to change the school experiences of many students around the world.

The data that have emerged from the Eurydice network it is reported that all European countries have at their disposal a national policy that allows the integration of ICT in the education (Lum et al., 2016).

On the other hand, the implementation of this idea so that all students in European countries have easy access to all electronic programs and technology is far from the current situation. In a study of OECD, it is indirectly noted that the installation of ICT through different ways is not enough to be implemented by students and teachers to have the full exploitation of the information of society (Humblet et al., 2016).

In addition, the use of ICT in education has increased as it is now included in the program of the most European countries, and it is taught as a regular lesson. It is worth noting that, the training and learning of teachers can be offered as a possibility of choice without having the support of a trained and qualified staff that exists only in the secondary education (Yaokumah et al., 2016).

ICT does not introduce radical changes in the education systems of European countries only unless their possibilities are developed as a learning tool. Of course, many countries are still in the process of integrating technology in areas of their education systems as well as the issue of how technology will be able to really influence their educational methods (Ntaliani et al., 2016).

In addition, the adoption of ICT in the analytical program that it is common to all students as well as to those students with special educational needs is a way of educational policy of some countries. Therefore, in all countries, the advantage for the realization of these policies is derived from actions both from national and local level as well as from the school itself.

In countries where there is the centralized organization, the integration of ICT in special education is tested as a decision that are introduced in the school or even as a personal endeavour of a teacher. Finally, in most states the characteristic is the prevalence of some form of evaluation for general ICT policies.

It is known that, for the use of ICT is made a number of functions as it is used as a key tool for learning process for students and teachers. It is integrated in an extended learning environment and it functions as a way that helps students and teachers in their communication (Sam-Anlas & Stable-Rodriguez, 2016).

Table 1 EU countries' policies regarding the integration of ICT in Special Education
(Source: European Agency, 2003)

Policies that are followed	Countries
General ICT policies - and not specific to Special Education with specific objectives	Austria, Belgium, Cyprus (in progress), Czech Republic, Denmark, Finland, France, Germany, Greece, Iceland, Ireland, Italy, Luxembourg, Netherlands, Norway, Poland, Portugal, Spain, Sweden, United Kingdom
Equal educational opportunities regarding access to and use of ICT	Equal educational opportunities regarding access to and use of ICT
Integration of ICT in school curriculum (including Special Education)	Austria, Belgium (Flemish Community), Cyprus (secondary and secondary schools only), Czech Republic, France, Iceland, Ireland, Norway, Poland, Sweden, United Kingdom
Involvement of different bodies in the implementation of the programs	Austria, Belgium, Denmark, Finland, France, Germany, Greece, Ireland, Netherlands, Norway, Portugal, Spain (at regional level), Sweden, Switzerland, United Kingdom
ICT is a specific element of national policies and legislation for people with disabilities ICT Cyprus, Portugal, Slovakia	Cyprus, Portugal, Slovakia
Implementation and evaluation of policy positions by specialized projects at national level	Czech Republic, Lithuania, Norway
Policies have a direct impact on teachers' access to ICT training, support and information	Austria, Belgium, Cyprus, Czech Republic, Denmark, Finland, France, Germany, Greece, Iceland, Ireland, Italy, Luxembourg, The Netherlands, Norway, Portugal, Spain, Sweden, Switzerland, United Kingdom

The above Table 1 shows the absence of specialized policies for the integration of ICT in Special Education in Greece as well as their legal institutionalization, which makes it difficult to evaluate their implementation at national level. In addition, the involvement of different actors in the implementation of general ICT policies leads to overlapping responsibilities with similar implications. Finally, it is noted that in Greece, as in most European countries, ICT integration policies directly concern teachers' access to ICT training, support and information. This is a point of particular interest, as the training of teachers in ICT is a key factor for their effective implementation in the learning process (UNESCO IITE, 2011)

At the same time, the information that has gathered in Europe about use of ICT in students with special educational needs is quite limited in many countries. Of course, it is emerged that students with special needs have dealt none of the above countries with the use of ICT.

1.4. ICT and multicultural education

In the recent years, there have been a rapid development and use of ICT in the field of multicultural education.

The ICT can achieve the goals of multicultural education and serve as a modern and effective mean of decreasing the school failure and social exclusion of the foreign students. They can also help students to overcome many of their obstacles and become an important tool in multicultural pedagogy, creating opportunities for communication and interaction between culturally diverse students.

The use of computers in classrooms with immigrant students has very positive results: the promotion of collaborative learning, the opening of school to the community. In other words, new technologies help the learning process of foreign students, especially in obtaining the reading and writing mechanisms of a second or foreign language.

Using the new technologies, such as audio, video, and text, as well as the internet, it increases the learning opportunities and minimizes the space-time (Katz et al., 2002). In addition, it facilitates the development of collaborative work among students from different parts of the world and with different cultural, social, or economic backgrounds, which positively promotes the intercultural understanding and cooperation.

ICT can be used in order to provide an interactive learning environment with multiple and flexible representations of knowledge and information, a simulation modelling, a Correlation with multimedia communication-work plans, networking, as well as Correlation to chat rooms.

The use of ICT gives foreign students the opportunity to be active, autonomous, and creative in a multicultural environment that involves genuine collaboration between participants. The changes must be in the following areas:

- Network infrastructure with the right equipment and change of relevant legislation.
- Creation of appropriate educational material with technological environments and their maintenance.
- Consolidate the use of ICT in the curriculum of teachers
- Training of teachers and executives.
- Adaptation of administrative structures to the requirements of digital media.
- Change of a more general 'culture'.

The use of internet, which provides immediate access to geographically limited sources of cultural-educational material, such as specialized libraries, national/world databases, cultural institutions and organizations, museums, and others. ICT broaden the opportunities for the promotion of intercultural education and increase the learning opportunities for all members of the school community.

Zaxos (2007) refers that the virtual reality helps students from different backgrounds to understand better the existence of objects and spaces that students cannot visit or they can interact with real people who are far away or in fantastic places. The magic of the image and the interaction the goals of intercultural education.

The creation of online chat groups helps foreign students to develop oral skills and limit face-to-face hesitation (Euangelou, 2007).

By using the development of telematics learning applications, it can be achieved the understanding of the diverse ethnic and linguistic differences and of the similarities that the historical and cultural environment of different peoples may have (Makrakis, 1996).

The teachers can visit virtual content and make lesson through lesson plans, virtual museums, cultural videos, and audio-visuals, taking sources from different countries with other linguistic and linguistic data. In addition, they can make use of some educational software in understanding difficult and abstract concepts, the development of the ability of problem-solving, in transferring knowledge and in general in achieving higher learning objectives.

Girod & Cavanaugh (2001) refers that the School textbooks must be changed, in order to be modified and enhanced the curriculum contents and objectives. The innovative potential of ICT in intercultural education presupposes the integration of a range of activities with their application in the classes.

The introduction and use of ICT is necessary in order to be compatible with tomorrow's digitally organized society. The many possibilities of ICT will increase the quality of education and the effectiveness of educational practice to improve the school performance of foreign students. Computers have penetrated into the Greek educational system and with the proper use of teachers can significantly improve the learning outcomes

1.5. The use of ICT in the school management

In our digitalized world of 21st century school leaders calls to be the leaders of technology in order to provide competence to all students in relation to the needs of the society. The students should not only be taught to have knowledge of digital competence but, also teachers must try to change their way of thinking and act. Consequently, principals are the main motivation for the integration of ICT in any classroom (Thannimalai & Raman, 2018).

Surveys that have been made in secondary schools highlight the main role that principals play according to entrance of ICT to any classroom. Despite the above statement, other studies such as by Badri et al. (2016), Richardson & McLeod (2011), Wang (2010), and Evers, Van der Heijden, and Kreijns (2016) consider very important the professional development of principals. Other surveys, focused on the

technological literacy of principals on the impact and role of school leaders as well as the leadership style and teacher's digital competence.

A study of Bredeson (2000) highlight the role of professional development while Bizzell (2011) mentions that even if the principals have attended lessons about their professional development, they rarely use applications of digital technology. It is impressive that all principals have been mentioned to their further training about the use of ICT so in teaching as in the administration. Grissom and Harrington (2010) point that the surveys about the professional development of principals are less compared to those of teachers.

The technological leadership is related to all organizational decisions, policies and use of technology in schools, according to Anderson & Dexter (2005) and Dexter (2011). In this point it is worth mentioning that there are five models about the technology leadership:

- The visionary leadership,
- The digital age learning culture,
- The excellence in professional practice,
- The systemic improvement, and
- The digital citizenship

The empirical survey of Anderson & Dexter (2005) is fundamental as the technology leadership is based on it. According to them the concept of technology leadership includes all these activities that are related to the technology in the school unit including, also and the decisions about the actions of applying technology. In order students use ICT in their daily school life, they must be affected by the principal who functions as model to them in what it has done with the ICT application (Thannimalai & Raman, 2018).

The contribution of ICT for the improvement of administrative work is considered important, as they are an essential component of a successful management education. About their contribution to the administration of education, it aims to the

reorganization of school, improvement of its performance and achievement of the desired goals within the educational organization.

According to Dagdileli (2005), ICT applications in school management are categorized into the following (most important) groups according to the type of service they offer. The school manager has to face the following challenges with the use of ICT:

- The plan of the work.
- Secretarial work (protocol, correspondence, etc.).
- Management of students and teachers data.
- Design, implementation, and maintenance of an internal technology infrastructure.
- The use of technology for the enhancement of communication and exchange of opinions with the wider community.
- Cultural events (holidays, school publications, etc.).
- Information.
- Supporting and integrating ICT in teaching and practicing education in general.
- Seeking resources for the enhancement of educational technology.
- Ensure safe access for students and teachers to the Internet.
- Planning of training programs for teachers and other staff, as well as organizing and supporting distance learning (self-training).
- Creation of appropriate conditions in order to encourage teachers to be trained in the use of new technologies.

In addition, in the study of Albirini (2006) it is emerged that pre-service principal education can play a significant role in providing opportunities for experimentation with ICT before using it in the school administration. In the cases that there is not any effective training about ICT and educational technology, principals will not be able to use ICT in management. The success of ICT integration in school management depends on the support given by the school principal. Consequently, principals who

have positive attitudes towards ICT can support the use of technology in their planning process, despite the challenges.

According to Ogachi (2015) about the factors, that influence principals' integration of ICT in administration of public secondary schools in Isinyasub-county, Kenya mentions that most of principals have masters of education, while most of deputy principals have bachelors of education. In this study it is seemed that the ICT literacy among the principals influence the integration of ICT in their administrative. Therefore, principals who have integrated ICT in their administrative work have participated, initially, in ICT training programs.

Razak and Zohara, (2012) made a study about how the use of computers to facilitate school management processes has been neglected. In this study took part 66 managers from 11 secondary schools in the Romp in District, Pahang, and has as its aim to determine the level of use of computer and attitudes of school principals toward ICT for school management. Furthermore, it examined differences in the level of use of computer among school principals in relation to demographic elements such as position, gender, and age. There is not any significant difference about the use of computer in relation to gender and age.

According to Wozney, Venkatesh and Abrami (2006) male teachers use more ICT in their teaching and learning processes than their female counterparts. Similarly, Markauskaite (2006) notes significant differences between males and females in technical ICT capabilities. It has emerged that male's principal's use computers for more hours per week than females. Gender also remained a significant predictor of some trainee teachers scores, related to their technical ICT capabilities.

According to Chepkonga (2015), there is no significant relationship between the principals' gender and ICT integration in management of public secondary schools in Kenya.

According to Papaioannou and Kyriacos (2011) Cyprus primary school principals, generally, hold positive attitudes towards ICT. However, considerably statistically significant differences were observed across gender. Cyprus male principals hold

more positive attitudes towards ICT, without this meaning that female principals have negative attitudes.

According to Edward (2015), age affects teachers' perceptions of ICT and its usage on management. Young principals integrate ICT more compared to elderly principals. The study recommends that the Ministry of Education should construct computer laboratories and equip them with ICT tools to facilitate training of teachers and administrators in all areas of management.

Mogeni (2013) observes that principal's age affected integration of ICT in schools where principals aged between 30 and 49 years showed higher percentage of ICT integration than those aged between 50 and 60 years who are heading to retire. Teachers should change attitude towards the use and integration of ICT in the schools to create information technology in all aspects of teaching and learning institutions

In modern, school the management of school unit's takes on new organizational and leadership roles. Management is a systematic activity that includes the functions of planning, organizing, managing and controlling activities (Longenecker, 1973), using and utilizing all the school's productive resources to achieve its goals (Hersey & Blanchard, 1988).

Consequently, the modern principal must be familiar with the use of computers and the support that is provided by the information systems in support of the administrative task. We should have in mind that the Greek educational system is centralized and in order to be achieved the use of ICT is necessary the change of mind and the change of institutional framework.

Managers can use ICT in order to handle a significant number of organizational task works, only with the preposition that managers are able to store personal information of the school's human resources with the purpose that they will maintain the confidentiality of the information. They also contribute to the distribution of documents during seminars through power point, in preparation of lesson plans, in providing the opportunity to the teachers to be trained in real-time

(via videoconferencing). Generally, the use of ICT contributes to the detailed imprint of the school unit having as aim the simplification of educational administrative activity and its diversification communication of the educational community with the external environment affecting all aspects of it.

1.6. Presentation of the theoretical studies and research approaches for the role of the principal about the use of ICT in school

In recent years, in the European education system, significant investments have been made about the use of ICT in the learning process at various levels such as teacher training and the equipment. Therefore, in modern reality most schools have the appropriate equipment such as computers and internet access in the classrooms. However, the way of utilizing this equipment and its benefits differs from country to country but also in the same country between the school units. Undoubtedly, the provision of logistics equipment for information and communication technologies does not in itself guarantee the effective use of this equipment and the impact it will have on the learning process. Even in countries where large sums of money have been invested in order to obtain a large number of ICT equipment devices, the way it is used in the classroom varies greatly and in many cases the possibilities provided by this equipment are not used (Oldfield , 2010).

In order to use ICT in the educational process, the role of the director is important, as it is the main factor that inspires a common vision, influences the partners by gaining their voluntary and willing participation in achieving the set goals. At the same time, the principal utilizes the modern technological means of the school and motivates in every way the colleagues to do the same.

The key in order to be effective a school unit is its educational leadership. A principal to be effective must be innovative and create the right conditions for new technologies to become a suitable tool in the hands of teachers.

According to the research conducted by Pelgrum (1993), the principals of the schools who were distinguished by very positive attitudes towards the use of

computers influenced the teaching staff of the school by pointing out the importance of the inclusion of ICT in the learning process.

Respectively, Pasiardis (2004) argues that school leadership is the main body for introducing and promoting change and innovation and that the success of their integration is linked to his personal interest and ability to influence all members involved in the educational process.

In addition, Merkley, MBozik and Oakland (1997) argued that teacher training on ICT inclusion alone in teaching practice does not ensure the efficient use of school equipment in the context of meeting the objectives of the curriculum, if teachers do not have in this effort the support of Principals (Akbaba-Altun, 2004; Anderson & Dexter, 2005; Creighton, 2003). As Akbaba-Altun (2004, p.13) pointed out: "In order to achieve any sign of innovation at school level, the active role of leadership is required, including technological changes in the learning process... Therefore, as the use of ICT growing in schools, school principals are called upon to play a new role."

Specifically, the principals of the school units are invited to participate in the planning and support of the teachers, who attempt the integration of ICT in their teaching through the organization of specific activities, which focus more on the general utilization of ICT in the teaching of all the courses of the Curriculum and not only in the acquisition of computer skills (Mulkeen, 2003). Similar are the findings of Pelgrum (1993), who argued that there is a positive correlation between attending training seminars by claiming IT teachers regarding the use and pedagogical utilization of ICT and the attitudes they have formed about the impact of computers on education.

The relevant training about the use of ICT which is organized by school principals is a very important factor in order ICT be integrated and used in learning process. For this purpose school principals must have in their mind the duration and the context of this training.

In a report by the National Learning of Network (NGfL) (2000) in the UK, it was stated that in order ICT be integrated in a school system, principals play an

important role. The way that they will approach the new technologies directly affects the use and by the other teachers.

Otto & Albion (2002) point out that the personal beliefs of Managers regarding the integration of ICT in education are an obstacle to the support of teachers and in general to the utilization of ICT in educational practice.

For this reason, Serhan (2007) argued that the positive attitudes of Managers in the integration of ICT in schools could be developed through the training initially of themselves in matters concerning the management of ICT in the classroom. Therefore, when Principals gain confidence in using technology in the school environment and realize the potential it provides, they will be able to promote their integration into the Serhan (2007) learning process. Understandably, the participation of the Directors in Level B training programs, which will contribute to the development of positive attitudes towards the integration of ICT, is an urgent need in the educational process as well as in strengthening the role as an animator of teachers in the utilization of ICT in the class. The positive attitudes of the Principals will contribute to the cultivation of positive attitudes on the part of the teachers and then the students of the school towards the integration of ICT in the learning process.

Therefore, the training of principals plays a key role so that they know how to use them and feel confident about the application of this way in order to adopt a didactic approach, which considers ICT as a complementary part of the courses of the Curriculum (Serhan, 2007).

Certainly, the available equipment that teachers have also plays an important role as Mulkeen (2003) found that there was a correlation in the research between the number of equipment and the frequency of its use by teachers of different subjects. Consequently, as Principals take care of the purchase of more and more ICT equipment, they can indirectly promote the use of these devices by schoolteachers (Mulkeen, 2003).

In effective schools, the principals adopt innovations by taking risks, taking care of the necessary logistical infrastructure, for the correct operation of the school and seek the development and training of teachers with who work together. In addition, the principals themselves try to be innovative and provide new conditions for the school by overseeing the way in which the ICT are integrated into everyday life.

As Dinham (2005) states, it is important for the Principal to guide teachers and encourage them to use ICT shaping a culture within the school that favours the use of ICT (Dinham, 2005). Persaud (2006) highlighted the importance of changing the way managers think. This change presupposes the understanding by the Directors of the need to play an active role, so that the teachers are digitally functional and to be their own role models, pointing out to the educational ways of utilizing ICT. In general, however, not much research has been conducted on the attitudes of Managers and their readiness on issues related to the integration of ICT in the learning process.

As Schiller (2003) states, school principals have a responsibility to promote and implement innovative practices through the use of computers by making important decisions by upgrading the level of learning and teaching. It is understood, then, that the vision of a school ready to keep pace with modern technological achievements regarding the use of ICT in the classroom cannot be implemented without the commitment, willingness, and readiness of principals. Walsch (2002) emphasizes that the integration of ICT in the learning process can be achieved in schools, only if principals commit for a long time to support teachers in this endeavour. Principals who take relevant initiatives and are positive about innovative teaching practices can create an environment that provides significant benefits to students and staff. Any other effort will not succeed unless the active role of the directors is ensured.

In a research that took place in Ohaio on teachers who worked in public schools it is showed that, the principal's attitude towards the integration of ICT influence the attitude of the schoolteachers. Those who consider the school leadership style to be democratic, show a positive attitude towards ICT. On the contrary, those who felt that the leadership was authoritarian had a negative attitude towards ICT.

Research has shown that the integration of ICT in education is influenced by the vision of educational leaders and by their sense of their pedagogical utility. Therefore, although the infrastructure is a key element in the use of technology, the attitude of principals is even more decisive for the change of the school culture.

In 1997, Schiller made a research in Australia about the role of principals regarding to the integration of technology in teaching reality. Many principals have stated that the use of technology is a complex process with many difficulties. They have anxious about the access and maintenance of the required hardware and software. In addition, they themselves felt insecure about using the computer and feel unable to promote the appropriate training programs for their teachers of school. Last and most important, was the fact that principal was not able to design a program for the integration of ICT in teaching and in the administration. The same researcher in a similar study, 6 years later, identified discrepancies in principals' perceptions of how they should use computers and what are their capabilities.

In 2003, a Greek survey was made in its high schools and lyceums of Northern Greece, within the framework of the in-school training program for ICT. The trainers stated that the role of each school principal was very important for the successful implementation of the program. Those who had a positive attitude, become direct intermediaries, giving solutions to problems but also encourage teachers in their training. However, others had difficulties in managing school resources, especially the computer labs. Those who had experience from innovative programs seemed more willing and supportive of the trainers. Finally, the principals of the high school s expressed their anxious about the disruption of the school program that prepares students for national exams .

Later in 2008, in a research, Koutromanos identified a positive attitude of primary school principals to integrate new technologies into their schools. Unfortunately, the research of Dadamogia, Oikonomou and Sachinidis, a year later presents evidence that it has not become substantial integration of ICT in school and do not take full advantage of them, neither in teaching nor in the administration of school units.

Another survey in principals of primary school in Cyprus it reveals that Managers do not feel able to use the computer even for organizational purposes and administrative duties, not even for their own personal use. The researcher attributes this finding to the fact that these directors, in the majority have not attended a training seminar.

A survey of 2009 by the Observatory of Information Society shows lack of skills by the principals in the use of ICT. They recognize the necessity and the benefits of their use both in the classroom and for the arrangement of their administrative duties. In fact, their knowledge appears to be inferior in relation to those that have their subordinates. Manitaras (2009) adds that managers with such kind of ignorance towards computers have need and they are dependent on others teachers who have the necessary computer skills. Unfortunately, this is a deterrent to the progress of school as teachers feel that their offer is coming just to cover up the manager's weaknesses.

It is noticeable the conclusion from Papaioannou's research (2009) which showed that principals who have obtained an additional degree, such as a master or doctorate, have a more positive attitude towards ICT and feel more capable when they use ICT. In fact, it is increased the frequency of their use.

In addition, it is a fact that in the multidimensional role of the Director, among others, he/she undertakes to perform multiple responsibilities of a secretarial nature, alienating him/her from his/her fellow-companions as well as from the object, he/she was assigned to serve, the provision of quality education. However, the results of a study by Papathanassiou (2007), which conducted a survey of twelve principals of secondary schools in the prefecture of Magnesia, show that all principals attach particular importance to the role of the teacher of informatics, to whom they entrust the entire secretarial and administrative support use of ICT. This result in him/her being significantly burdened with a large workload and disproportionately many responsibilities. On the other hand, computer science teachers argue that the division of labour should be done to all members of the

teachers' association, as it is a fact that a large number of teachers have been trained in ICT.

As Schiller (2003) states, school principals have a responsibility to promote and implement innovative practices through the use of computers by making important decisions by upgrading the level of learning and teaching. It is understood, then, that the vision of a school ready to keep pace with modern technological achievements regarding the use of ICT in the classroom cannot be implemented without the commitment, willingness, and readiness of principals. Walsch (2002) emphasizes that the integration of ICT in the learning process can be achieved in schools, only if principals commit for a long time to support teachers in this endeavour. Principals who take relevant initiatives and are positive about innovative teaching practices can create an environment that provides significant benefits to students and staff. Any other effort will not succeed unless the active role of the directors is ensured.

Finally it is worth mentioning that the digital competence were not a necessary qualification for a principal to take this position of responsibility and to be an education executive. However, in Georgiou research (2009), an overwhelming majority of teachers said they considered digital competences an important qualification in order to become someone a manager. They even asked for points of their knowledge about computers. This willingness of the teachers appeared to have taken place with the law 3848/10 (2010) (Government Gazette 71 / t.A ' / 2010), for the upgrade of the role of the teacher and the introduction of rules of evaluation and meritocracy in education and others provisions "gives one extra grade the principals and other executives education (school counsellors, education directors, principals offices, etc.) who have been certified in level I and three credits principals and other training staff who have been certified on ICT level two (article 13 & 14, Law 3848/10, 2010). In the crises that held in 2007 for the selection of principals, the grade for ICT knowledge was 0.75 points for school counsellors and 0.25 for the rest of staff education (Law 3467/06, (2006) - Government Gazette 128 / v.a' / 2006). In the crises of the latter years ago, this changed.

2.1. The training of teachers as a key for further development of their digital competences

The continuing education becomes necessary as societies change rapidly (multiculturalism, new knowledge, new ways of teaching, introduction of ICT in teaching and administration). For this reason, the teachers must be adapt to the modern reality, in order to meet their pedagogical and social role, shaping the citizens of tomorrow and at the same time maintaining as a basis the humanitarian values. The majority of teachers, who want to correspond to the modern requirements by enriching their knowledge and reviewing, when necessary, ways and teaching practices expresses this need for continuous training and development of their digital competence.

In the report for the Eurydice network (2015) it is supported the continuous professional development of teachers as a key element of their effectiveness in the modern educational reality. According to the above report, the education and training is an important factor for teachers to acquire the necessary skills that will help them to harmonize their continuous professional development with new teaching methods which will have in the centre the student- approach, as well as the cooperation, the use of open educational resources and the improvement of their digital competences (European Commission EACEA Eurydice, 2019).

However, the training in ICT is not enough to use digital tools in the educational process. It must be supported by the appropriate technological equipment, the appropriate digital material and taken into account the specific environment of each school unit.

On the other hand, the technological equipment of the educational units is not enough to motivate the teachers and principals to integrate ICT in the teaching practice in order to achieve better results, motivating the students to participate actively in the educational process. The change of the culture of teachers should be

in line with the traditional form of teaching, with the support of new technologies and with the formation of a new culture according to new technologies in education.

The training of teachers to acquire digital competences in the use of ICT will facilitate them in improving their effectiveness. Modern teachers need to be able to design and implement appropriate activities for students in order students participate in learning environments. Teachers, who have the necessary skills, can respond to new teaching practices for the use of digital education infrastructure, have more confidence, but also intend to use ICT positively. The level of their training also shapes the degree of their use of new technologies. Trained teachers use ICT more often.

The educational reality, however, raises a number of issues that need to be taken into account. In the trainings, it is developed interested and ideal learning scenarios, which in realistic classroom conditions it may be impossible to apply, as a series of inhibiting factors such as the limited time, the curriculum, and classroom discipline, are obstacles and require a more comprehensive approach.

In addition, according to Chatzigeorgiou et al. (2012), one of the most important reasons for the delay in the use of ICT in teaching practice is the low adequacy of digital competences and knowledge of teachers (Chatzigeorgiou et al., 2012).

The technological and pedagogical training should be done in such a way as to provide flexibility and adaptability to teachers according to their needs. According to the content of the training, must be taken into account both the acquisition of digital and technological skills as well as the interdisciplinary knowledge. In addition, the special social and administrative characteristics of the educational units are elements that must complete the training material.

The training of the teachers is divided into three categories: informal, non-formal and formal. The non-formal usually takes place outside of school and school unit with specific goals and audience and it is optional. The formal is the training that responds to specific needs of educational work support while the informal arises

through the teacher's continuous daily interaction with the school environment in which it is located.

A training model that seems to have positive results is when it takes place within the school environment. The teachers who participate are more positive in applying in the classroom what they have been taught and tell the other teachers the innovations they have encountered. This type of peer learning seems to have particularly positive results and lasts over time (Eurydice, 2011).

The same positive results seem to exist when teachers collaborate online as they are likely to understand better the current needs and adopt new practices they have learned from other teachers (European Commission, 2013).

In recent years, the model of blended learning /hybrid courses is often applied, which combines the lifelong meetings that focus more on experiential activities with a parallel study of the material offered through the internet. It is served training needs positive, as it seems results.

In Greece, a series of training programs has taken place in order teachers be able to use ICT and use it in teaching practice.

The Regional Training centres started this effort in the early 1990s and it was about a small number of newly appointed teachers. Several institutions undertook training programs co-financed by the European Union since the mid-1990s, public and private, but mainly the systematic training that took place through the Business Education and Initial Vocational Training Program. Through this, a number of actions were funded, such as the European Programs of Education Multimedia, the TRENDS, and the Web for Schools and the "ODYSSEY" with which teachers could be adapted and suggest ways to use ICT in teaching practice.

At the beginning of the last decade, a large number of teachers were trained and certified about their ICT skills for (A Level-Basic ICT skills). It was the first generalized ICT training activity. The certification of this training continues to our day and is a

basic condition for attending the next program " Training of Teachers for the use and application of ICT in the teaching practice" (Second Level), which began in 2008.

The B Level training program is in progress and is addressed to teachers of any specialty, to utilize ICT in teaching practice with emphasis on the pedagogical side (B-Level Training). In addition, there is the possibility for information and training in various ways such as through interaction by participating in blogs, networks, conferences with similar content and teachers on their own initiative try to exchange ideas and suggestions for more efficient use of ICT.

An important issue is the evaluation of the training programs in terms of their effectiveness and their impact on teachers for the implementation in educational policies related to the use of ICT in practice. The opinions on whether they meet the real needs of teachers and on how much the content is related to modern reality are controversial and is the subject of several studies.

2.2.. The European framework for the digital competence

The changes that took place the last decade has woken up the interest about the digital competence. In Europe this term is referred to competences that are necessary in our modern digitalized society (Hatlevik & Christophersen, 2013).

It is an undoubtedly true that the digital revolution has changed the way every child and active citizen is thinking, communicate, learn and interact with others. Child even from the age of 8 years of age knows how to be connected with other friends.

In this environment all teachers have to reorganize their competences and, especially, this competence that are related to digital world. According to Janssen et al.: digital competence doesn't include the knowledge of how to use devices and applications but it refers to legal knowledge of the role of ICT.

The current European Framework for Cooperation in Education and Training 2020 (European Commission, 2015a) mentions the importance of developing skills and competences about the digital competence. Specific actions have been made in

order to develop the skill levels of students and improve the work force through the education systems. Under the umbrella of the ET2020 cooperation framework, thematic working groups have been established, including a group on digital competences and competences, in which experts from national administrations in EU member states benefit from mutual discussion on the policy level and in situ peer learning activities on relevant issues. The EUN is a network of 30 European Ministries of Education that aim to bring innovation to teaching and learning across schools, teachers, researchers, industry partners, and the ministries themselves.

The Recommendation of the European Parliament and of the Council of 18 December 2006 on key competences for lifelong learning was intended to provide a common European reference framework on these key competences for policymakers, education and training providers, social partners, and learners themselves, and support other related policies, such as employment and social policies and other policies affecting youth. The recommendation identified a set of eight competencies that all individuals need for personal fulfilment and development, active citizenship, social inclusion, and employment.

One of these eight competences was digital competence, defined as the creative, critical, and safe use of information and communication technologies (ICT) to reach goals related to work, employability, learning, leisure, inclusion, and social participation. According to the DIGCOMP project—the project on Digital Competence, launched by the European Commission to the better understanding and development of Digital Competence in Europe—, digital competence involves not only basic technical mastery, but also the development of abilities to (1) browse, evaluate, and manage information; (2) communicate and collaborate; (3) create digital contents; (4) preserve safety; and (5) solve problems, both in formal, non-formal, and informal learning contexts. The acquisition of this competence also requires attitudes and values that allow the user to adapt to the new needs established by technologies, their appropriation, and adaptation to their own purposes, and the ability to interact socially around them. Digital competence allows individuals to take advantage of the wealth of new possibilities associated with digital technologies and the challenges they pose; it is also increasingly necessary to

participate meaningfully in the new knowledge society and economy of the 21st century. Media literacy enables the literate person to fully develop as an active and free member of a society surrounded by innumerable media.

As a result of all the above changes every member state has made changes and took initiatives in order to introduce ICT to reinforce digital literacy. As the governments as every family make efforts in order every child has access to internet.

In this effort vital factor is the role of teachers who are called to introduce ICT in their learning process understanding the benefits that are emerged from the connection between the pedagogy, and technology In other words, “Digital competence is the teacher’s proficiency in using ICT in a professional context with good pedagogic-didactic judgment and his or her awareness of its implications for learning strategies and the digital building of pupils” (p. 252). Therefore, teachers have an important role to play in order to guarantee the satisfactory use of ICT by children.

In our days it happens something irrational, with other words, nowadays, young people have better knowledge about the ICT than their teachers and parents. Garrido-Lora et al. (2016) call this phenomenon the “generational digital divide,” which is revealed by “the existence of evident differences between generations both in knowledge and in the use of ICT and social networks” (p. 52). Teachers are, sometimes simply observers in this changes while young people have to obtain competences that will allow them to overcome the digital divide as “it is of key importance that everyone—parents and guardians, teachers, institutions, and governments—work together to create safe and accessible environments for children and young people wherever they are: At home, at school, or in public facilities, such as libraries or Internet cafés” (p. 2). In order to be found a solution, school and family have to reduce this gap (Fraile et al., 2018).

2.2.1. Digital learning and ICT in education

The European Commission adopted a Communication on the Digital Education Action Plan in 2018. The Action Plan outlines how the EU can help individuals,

educational institutions, and education systems to better adapt for life and work in an age of rapid digital change by:

- Making better use of digital technology for teaching and learning
- Developing relevant digital competences and skills for the digital transformation
- Improving education through better data analysis and foresight
- Strengthening European identity through education and culture

Two more points were added in the communication Digital Education Action Plan (2021-2027) - Resetting education and training for the digital age:

- Fostering the development of a high-performing digital education ecosystem.
- Enhancing digital competences and competences for the digital transformation.

The European Commission has also adopted a Communication on Strengthening European identity through education and culture. This Communication was the Commission's contribution to the Leaders' meeting on education and culture at the Gothenburg summit.

The European broadband targets foresee that by 2025 all schools have access to Gigabit Internet Connectivity. In fact, being connected to the Internet is a prerequisite for schools to, for example, access up-to-date resources or access online learning platforms. In addition, schools are increasingly requesting bandwidth-demanding applications such as video streaming or video conferencing.

Continuous professional development is key for teachers to integrate digital technologies into their teaching practices. In fact, the results of the 2nd Survey of Schools show that teachers that engage in professional development activities about ICT in their own time teach more than 6 out of 10 European students. In contrast, participation in a compulsory ICT training is less common. In short, as teacher training in ICT is rarely compulsory, most teachers end up devoting their spare time to develop these skills.

Member States have the important role to promote all forms of professional development, including incorporating digital competences in the curriculum of initial teacher training and in-service training of teachers. Their role also includes guiding schools in incorporating the goals on digital technologies in school policies, strategies and overall vision. To facilitate teachers' professional development and further integration of ICT in education, Erasmus+ offers many successfully established tools for exchanging best practices, peer learning and professional development of teachers at EU level (e.g. through tools as eTwinning, School Education Gateway, Teacher Academy, SELFIE) – more common efforts will be needed to further scale-up and promote them among schools, teachers and policy-makers. Furthermore, the recognition by Member States of those existing tools (e.g. by integrating eTwinning in the curriculum) and rewarding the use of those tools will be key.

The European framework for digital competence, also known as DigComp 2.0, was first published in 2013 (Ferrari, 2013) and has since been revised several times. The DIGCOMP2.0 describes digital competence in detail and divides the knowledge, skills, and attitudes that all citizens need in a rapidly evolving digital society into five areas (Table 2):

Table 2 The Digital Competence Framework for DigComp 2.0, Competence areas Competences (Source: Carretero et al., 2017)

Competence areas	Competences
1.Information & data literacy	1.1 Browsing, searching and filtering data, information and digital content
	1.2 Managing data, information and digital content
2.Communication & collaboration	2.1 Interacting through digital technologies
	2.2 Sharing through digital technologies
	2.3 Engaging in citizenship through digital technologies
	2.4 Collaborating through digital technologies
	2.5 Netiquette
	2.6 Managing digital identity
3.Digital content creation	3.1 Developing digital content
	3.2 Integrating and re-elaborating digital content
	3.3 Copyright and licences
	3.4 Programming
4.Safety	4.1 Protecting devices
	4.2 Protecting personal data and privacy

	4.3 Protecting health and well-being
	4.4 Protecting the environment
5.Problem solving	5.1 Solving technical problems
	5.2 Identifying needs and technological responses
	5.3 Creatively using digital technologies
	5.4 Identifying digital competence gaps

The above table 7 shows which of the eight competences are included at each education level in terms of explicit learning outcomes in the curricula of European education systems. It also shows which competences are the most or least frequently included.

Regarding the pedagogical use of digital technologies, the prime factor is teachers' digital competence, with particular emphasis on whether they see the use of digital technology as a benefit to their teaching and to their students' learning experience. At European level, this has been captured in a specific competence framework for educators, the European Framework for the Digital Competence of Educators (Redecker, 2017). Teachers' digital competences and related teaching and learning practices are also addressed in the European Framework for Digitally Competent Educational Organizations (DigCompOrg).

2.2.2. European digital competence in education

Digital competence is one of the eight key competence that is necessary in order every citizen has access to lifelong learning. The DigComp can be adapted to the needs and requirements of every citizen (Guitert et al., 2020).

The importance of lifelong learning was recognised by the European Commission and so, the Europe force their economies to be based on knowledge, adapting their educational systems in this new way in order young people take part in the lifelong learning

Calvani et al. (2008) propose a framework of digital competence which includes the area of technology, ethical and cognitive. Ng (2012) proposes the following digital model with technical cognitive and socio- emotional in order to make safety use of internet. Continuing Ng (2012) mentions the following ability to:

- Use of standard functions of computer and access to information for use daily.
- Search and evaluation of important information's for the goals of survey and learning
- Develop the ability in the use of the suitable technological tools for solving problems and the fulfilment of tasks and
- Having the suitable behaviour in online societies in order to be protected from the problems of digital environments.

Janssen et al. (2013) recognize twelve areas that are referred to digital competence including knowledge, skills, and attitudes.

Erstad (2015) refers to ten aspects of media literacy.

It is a reality that there is a difference dimensions in the term of digital competence. In a research about the curricula educational program of primary school in England, Norway, and Flanders, Aesaert et al. (2013) reach to the conclusion that there was similar topics in three countries while they use different terms. It includes critical use of educational technology, safety use of educational technology, reproduction of information, communication with technology and use of technology for learning.

Erstad (2015) notes that, "media literacy relates to broader aspects of living in a media saturated society, and not only skills in operating applications or information handling, which is the main focus of many international frameworks" (p. 87). In this framework the 'Digital Competence landscape for the 21st century' by Ala-Mutka (2011) is the most suitable model that fills this gap as it proposes the existence of information, digital and media literacies.

From the above analysis it seems that there are some different models about the digital competence and there are different interpretations about what every model consists. The majority of them are focused in technical competence, knowledge of issues about ICT, such as ethics in cyber net and behaviours.

2.2.3. DigCompEdu framework

The digital technology has penetrated to all aspects of our life affecting the way that we think, work, entertain, communicate as well as the way we collect and elaborate information. Although, young people are growing up having as main tool the digital technologies but it doesn't mean that they know how to use them effectively and safely.

The DigCompEdu framework has emerged after discussions of experts based on the literature and local, national and international components. The goal of all the above discussions was to conclude in field (Redecker, 2017). The DigCompEdu framework distinguishes six different areas in which educators' Digital Competence is expressed with 22 competences.

The six DigCompEdu areas focus on different aspects of educators' professional activities (Caena & Redecker, 2019, p. 9):

Applied to the context of school education:

- "Area 1 (Professional Engagement) describes teachers' efficient, appropriate use of technologies and digital learning opportunities for communication and collaboration with colleagues, students, parents and others. In addition, it emphasises the importance for teachers to individually and collectively reflect on their teaching practices, to critically assess the effectiveness and appropriateness of their digital teaching strategies and to actively develop them further.
- The core of the DigCompEdu framework is represented by areas 2 to 5 in which technologies are integrated into teaching in a pedagogically meaningful way. Area 2 (Digital Resources) focuses on the selection, creation, modification and management of digital educational resources. This includes the protection of personal data in accordance with data protection regulations and compliance with copyright laws when modifying and publishing digital resources.

- The third area (Teaching and Learning) deals with planning, designing, and orchestrating the use of digital technologies in teaching practice. It focuses on the integration of digital resources and methods to promote collaborative and self-regulated learning processes and on the need to accompany these learner-led processes with effective guidance and support measures.
- Area 4 (Assessment) addresses the concrete use of digital technologies for assessing student performance and learning needs to comprehensively analyse performance data and provide targeted, timely feedback to learners.
- Area 5, Empowering Learners, emphasises the importance of creating learning activities and experiences that address students' needs and allow them to actively develop their learning journey. Teachers are able to use digital technologies to foster differentiation and personalisation by allowing different levels and speeds, individual learning pathways and objectives. They encourage students' active engagement in digital activities, ensuring equal access to technologies.
- Area 6 (Facilitating Learners' Digital Competence) maintains that digitally-competent teachers should facilitate their students' digital competence, enabling them to manage risks and use digital technologies safely and responsibly. Teachers should be able to promote information and media literacy and integrate activities to enable digital problem solving, digital content creation, and digital technology use for communication and cooperation”.

The European Reference Framework of Digitally Competent Educational Organisation is an initiative of the European Commission, Directorate General for Education and Culture (DG EAC). The Joint Research Centre - Institute for Prospective Technological Studies (JRC-IPTS), carried out research and design of the Framework.

Representatives of the EU Member States supported the development of the Framework through the Working group on Digital and online learning (WG DOL). Experts involved in the development of existing frameworks and self-assessment questionnaires promoting the use of digital technologies in education and training systems provided contributed to the development of DigCompOrg.

2.2.4. The role of school principal in promoting digital competences

The role of the leader is vital as he/she introduce changes and innovations. They are in position to push the teachers to set high goals, to equip their school unit with the appropriate digital devices.

Under these conditions, the training of leaders and their participant in fundamental in order to facilitate the entrance of schools into digital education. In many countries, principals are those who have margins of initiative taking part in the design of curriculum and managing of resources. So, they must be equipped with the suitable digital competence in order to be able to control and coordinate the efforts that are made by the school in the field of digital competence. In order to be achieved all the above, the cooperation of all members that are involved in learning process is vital in order to be promoted the innovation. It is noticeable that school principals show more positive attitudes towards ICT than teachers (European Commission, 2019). Despite this the training of school [principals is not very frequently.

As teachers as school leaders are more likely to cope with new challenges using digital technology in their teaching (European Commission, 2019, p. 48). These digitalized challenges can affect their motivation and their confidence in order to use digital technologies in their learning process It has been proven that the lack of the appropriate technical and pedagogical support is an obstacle in the further use of digital technology. From the other hand, the digital coordinators have technical and pedagogical responsibilities (Devolder et al., 2010).

3.1. The case of Greece about its digitalization in schools

In Greece, there is a highly percentage of highly digitally equipped and connected schools per number of students and a high broadband speed. On the other hand, compared to the European average there is less highly digitally equipped and connected schools at all ISCED.

In Greece the schools have and use digital technologies in learning as well as they promote the professional evolution of teachers. Strong policy, strong support: Lower share in Greece at all ISCED levels compared to the European average (European Commission, 2019c).

References

- Akbaba-Altun, S. (2004). Information Technology Classrooms and Elementary School Principals' Roles: Turkish Experience. *Education and Information Technologies*, 9(3), 255–270. DOI:10.1023/B:EAIT.0000042043.16538.7d
- Anderson, J. & Weert, T.V. (2002). *Information and Communication technology in education: a curriculum for schools and programme of teacher development*. UNESCO.
- Dagdilelis, B. (2005). The Informatics in Organization and Management of Education - Informatics and educational executives. In A. Kapsalis (2005) (ed.), *Organization and Administration of School Units*, 213-230. Thessaloniki: University of Macedonia Publications
- Devolder, A. (2010). Identifying multiple roles of ICT coordinators. *Computers & Education*, 55(4), 651-1655. <http://hdl.handle.net/1854/LU-1037097>
- European Agency for Development in Special Needs Education (2003). *Special Needs Education in Europe: Thematic publication*. Odense
- European Commission (2013). *Erasmus+*. http://ec.europa.eu/programmes/erasmus_plus/about_el.
- European Commission (2019c). *Digital learning and ICT in education—policy*. <https://ec.europa.eu/digital-single-market/en/policies/digital-learning-ict-education>.
- European Commission/ Eurydice (2019). *Digital Education at School in Europe. EurydiceReport*. Luxembourg: Eurydice. <https://tinyurl.com/fy32fj35>
- European Commission/EACEA/Eurydice (2019). *Integrating Students from Migrant Backgrounds into Schools in Europe: National Policies and Measures*. Eurydice Report. Luxembourg: Publications Office of the European Union.
- Ferrari, A. (2012). *Digital competence in practice: An analysis of frameworks*. Seville: European Commission Joint Research Centre Institute for Prospective Technological Studies.

- Fitros, K. (2005). *The ICT in Special Education*.
file:///C:/Users/User/Downloads/fytros_cor1.pdf
- Frailé, M. N., Penalva- Velez, A. & Lacambra Ana Maria Mendioroz (2018). Development of Digital Competence in Secondary education Teachers' Training. *Educ. Sci.* Doi:10.3390/educsci8030104
- Ghaleb, A. (2014). Assistive technology in special education and the universal design for learning. *TOJET: The Turkish Online Journal of Educational Technology*, 13(2), 18-23. <http://www.tojet.net>
- Guitert, M., Romeu, T. & Baztán, P. (2020). The digital competence framework for primary and secondary schools in Europe. *European Journal of education*. <https://doi.org/10.1111/ejed.12430>
- Hersey, P., & Blanchard, K. (1988). *Management of organizational behavior: utilizing human resources*. London: Prentice Hall.
- Humblet, M. F., Vandeputte, S., Mignot, C., Bellet, C., De Koeijer, A., Swanenburg, M. and Saegeman, C. (2016). How to Assess Data Availability, Accessibility and Format for Risk Analysis?. *Transboundary and emerging diseases*, 63(6), 173-186.
- Janssen, J., Stoyanov, S., Ferrari, A., Punie, Y., Pannekeet, K., & Sloep, P. (2013). Experts' views on digital competence: Commonalities and differences. *Computers & Education*, 68, 473–481. <https://doi.org/10.1016/j.compedu.2013.06.008>
- Liasidou, A. (2010). Special educational needs: a public issue. *International Studies in Sociology of Education*, 20(3).
- López-Quintero, José Luis, Alfonso Pontes-Pedrajas, and Marta Varo-Martínez (2019). Las TIC en la enseñanza científico-técnica hispanoamericana: Una revisión bibliográfica. *Digital Education Review*, 229–43. <https://doi.org/10.1344/der.2019.35.229-243>
- López-Quintero, José Luis, Alfonso Pontes-Pedrajas, and Marta Varo-Martínez (2019). Las TIC en la enseñanza científico-técnica hispanoamericana: Una

- revision bibliográfica. *Digital Education Review*, 229–43.
<https://doi.org/10.1344/der.2019.35.229-243>
- Lum, A.S.L., Chiew, T.K., Ng, C.J., Lee, P.Y., Teo, C.H. (2016). Development of a web-based insulin decision aid for the elderly: usability barriers and guidelines, *Universal Access in the Information Society*, 16(3), 775-791.
<https://doi.org/10.1007/s10209-016-0503-y>.
- Merkley, D. J., MBozik, M. and Oakland, K. (1997). Investigating Support for Teachers Using Distance Learning in Education: a Case Study. *Deonews*, 7(11).
http://www.ed.psu.edu/acsde/deos/deosnews/deosnews7_11.asp.
- Mogeni, N. M., (2013). *Influence of principals' characteristics on integration of Information Communication Technology in management of financial resources Masaba District, Kenya*(Master'sThesis) University of Nairobi. <http://hdl.handle.net/11295/62431>.
- Mulkeen, A. (2003). What Can Policy Makers Do to Encourage Integration of Information and Communications Technology? *Evidence from the Irish School System. Technology, Pedagogy and Education* 12(2), 277–293.
- Nabil, E. (2013). *Innovation and Technology for persons with disabilities*.
<http://www.un.org/esa/socdev/egms/docs/2013/ict/innovation> technology disability.
- Ntaliani, M., Costopoulou, C., Karetos, S., Molhanec, M. (2015). Citizen e-Empowerment in Greek and Czech municipalities. *International Conference on e-Democracy*, 124-133.
- Ogachi, N. M.(2014). *Factors Influencing Principals Integration of ICT in Administration of Public Secondary Schools* Master'sThesis, Unpublished: University of Nairobi.
- Oldfield. (2010). *A Summary of Teacher Attitudes to ICT Use in Schools*. Futurelab website

- Prendes, M.P. & Gutiérrez, I. (2013). Competencias tecnológicas del profesorado en las universidades españolas. *Revista de Educación*, 361, 196-222. http://www.revistaeducacion.mec.es/re342/re342_17.pdf
- Redecker, C., 2017. *European Framework for the Digital Competence of Educators: DigCompEdu*. Luxembourg: Publications Office of the European Union.
- Sam-Anlas, C.A., Stable-Rodriguez, Y. (2016). Evaluating accessibility in Peruvian Government websites, *Revista Española de Documentación Científica*, 39(1), 120. DOI:10.3989/redc.2016.1.1213.
- Serhan, D. (2007). School Principals' Attitudes Towards the Use of Technology: United Arab Emirates Technology Workshop. *The Turkish Online Journal of Educational Technology* 6(2), 42-46. <https://files.eric.ed.gov/fulltext/ED500047.pdf>
- Tello, I. & Cascales, A. (2015). Las TIC y las necesidades específicas de apoyo educativo: análisis de las competencias tic en los docentes. *RIED*, 18(2), 355-383. <https://doi.org/10.5944/ried.18.2.13536>
- Thannimalai, R. & Raman, A. (2018). The influence of principals' technology leadership and development on teachers' technology integration in secondary schools, *Malaysian Journal of learning and Instruction*, 15, 203-228. DOI:10.32890/mjli2018.15.1.8
- Toledo, P. (2013). *Las tecnologías de la información, la comunicación y la inclusión educativa, en Nuevos escenarios digitales. Las Tecnologías de la Información y la Comunicación aplicadas a la formación y desarrollo curricular*, 411-427. Madrid: Pirámide.
- UNESCO IITE (2011). ICTs in education for people with disabilities. <http://iite.unesco.org/pics/publications/en/files/3214682.pdf>.
- Wozney, L., Venkatesh, V., & Abrami, P.C., (2006). Implementing computer technologies: Teachers' perceptions and practices. *Journal of Technology and teacher education*, 14 (1) 173-207.

Some words about the writer...

Dimitra Koniari was born in Kranea Elassonas. She studied in Philosophy School of Aristotle university of Thessaloniki, in department of History and Archaeology. She has obtained two masters, the first one, in special education and psychology and the second in adult education. Now, she is working in a secondary special education school in Larisa where she lives. She has two daughters, Vasiliki and Eleni.

About this book...

In this book, everyone who is engaged in education practice can find important information about the role of ICT in special and multicultural education.

ISBN 978-618-00-3787-6