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ICT in the Educational Process: Teachers' Perceptions based on their Age and Years of Service

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Abstract

Contemporary education has been greatly influenced by the advancements of Information and Communication Technologies (ICTs). The provided ICT solutions enhance learning environments and offer teachers numerous opportunities. However, although ICT can enhance education quality, there are several factors that impact on the ICT adaptation into the educational process. This study explores the degree of ICT use in the teaching process. The purpose of this research paper is to investigate whether teachers' age and their years of service influence their perceptions of educational technology in Greek public schools. Three hundred and thirty-three teachers, who work in public schools of Western Macedonia, participated in the study. Results are expected to provide tangible insights to help both education community and academia.

Keywords: ICT, education, teachers' ICT perceptions, age, years of service

1. Introduction

The rapid development of Information and Communication Technology (ICT) has brought about notable changes and has influenced modern societies. ICT has evolved into a significant part of our daily lives, of our workplace and our educational system. Consequently, it is important that ICT should be integrated into schools and that teacher provide their students with ICT skills (Cakir & Yildirim, 2013).

Valuing the impact of ICT in many aspects of people's life, governments are investing in the implementation of ICT in educational institutions. Consisting a remarkable reform, the application of ICT into the learning environment has plenty to offer. Among others, it motivates learning, enhances the quality of education, equips students with the necessary digital skills and promotes interactive learning methods (Komis, 2000; Makrakis, 2000; Pagge, 2016; Raptis & Rapti, 2017; Srivastava, 2016; Suryani, 2010).

The integration of ICT into education is not an easy process. The results of various surveys show that more and more countries are equipping their schools with new technologies. However, as Kladi-Kokkinou (2011) argues the issue of using communication and information technology in education is not as simple as financing the purchase of some computers. Indeed, there is often a large mismatch between schools' access to ICT and their final application and use for pedagogical purposes in the classroom. This proves that the application of educational technology and the integration of ICT into the lesson involve much more than simply integrating ICT and their equipment into schools (European Schoolnet & University of Liege, 2013; Mueller & Wood, 2012; OECD, 2016).

Therefore, in order to successfully implement ICT into the educational process and provide students with ICT skills and knowledge, there is a requirement of an effective adoption of technologies in the existing environment (Tomei, 2005). There are many inhibitory factors that contradict with ICT adaptation into the educational system. Teachers' negative perceptions regarding educational technology accompanied with their lack of training on ICT have been revealed as major problems that have caused failure in ICT adaptation into the classroom (Hew & Brush, 2007; Gilakjani, 2013; Kollia et al., 2019). Furthermore, unavailability of ICT resources, limited teaching time or teachers' perceptions of the pedagogical benefits of new technologies seem to hinder them as well (Becta, 2003; Buabeng-Andoh, 2012; Player-Koro, 2012). Finally, teachers' age and their years of service seem to crucially affect their attitude towards ICT and, consequently, their usage of technology into their lessons (Bingimals, 2009; Inan & Lowther, 2010; Robinson, 2003; Snoeyink & Ertmer, 2001). Based on the aforementioned factors, and more specifically on teachers' age and their years of service, this paper aims to investigate the impact of ICT on the educational process based on their perceptions and use of the technology in education focusing on Greece. In particular, the study explores whether differences on the age and the years of service influence teachers' beliefs and ICT utilization for educational purposes. The results are expected to provide tangible insights to help both education community and academia.

2. Literature Review

ICT implementation into schools is a necessity, yet a challenging process. There are many hindrances, both related to school and to teachers, others easier to overcome, while others more demanding and need time and skills. More particularly, some of the factors that prevent ICT from being incorporated into education are all those problems that the school faces and ultimately fails either to integrate new technologies into the educational process or, by introducing appropriate infrastructures, to be able to integrate them into the curriculum and highlight their pedagogical utility. The obstacles facing the school are in their majority related to lack of the appropriate infrastructure (BECTA, 2003).

However, research shows that the provision of high-quality ICT infrastructure and equipment is not associated with high levels of confidence, frequency of use, and positive attitudes by students and teachers. Therefore, the existence of appropriate infrastructures does not necessarily imply their exploitation (European Schoolnet & University of Liege, 2012, 2013).

The role of the teachers in integrating ICT into education is very important. According to Newby et al. (2009), it is the educator's duty to understand the different types of new technologies, the advantages and limitations of each type, and choose the most appropriate one for their lesson. This is a process that requires time, while training and practice are needed to acquire the necessary skills to use technology to the desired degree of effectiveness and reliability.

Indeed, the success of integration and the frequency with which ICTs are used, depend on the obstacles the teachers encounter as well as their willingness to overcome them in order to exploit ICTs in their lesson (Buabeng-Andoh, 2012; Levin & Wadmay, 2008; Player-Koro, 2012; Vitanova et al., 2014). Thus, besides the barriers to school-based ICT integration, there are important factors that make it difficult for teachers to use ICT in their lesson. More specifically, some of the obstacles that teachers are called upon to overcome are:

- lack of time for ICT training,
- lack of time to prepare the course,
- lack of confidence,
- lack of technical knowledge to solve any problems,
- the power of habit and the fear of change,
- negative perceptions about the pedagogical application of ICT,
- lack of motivation,
- the difficulty of using ICT in their classroom
  (BECTA, 2003; Hew & Brush, 2007; Gilakjani, 2013; Kollia et al., 2019; Levin & Wadmay, 2008; Player-Koro, 2012).

Exploring the characteristics of a teacher reluctant to change, age and years of service in schools are revealed as major inhibitory factors. Older people are presumed to be less familiar with the use of technology, which leads to lack of confidence when using technology and therefore, limited usage of ICTs (Robinson, 2003; Snoeyink & Ertmer, 2001).

In addition, digital readiness is very important in the 21st century and teachers should be capable of promoting digital literacy. According to the European Commission, (2018, p.5) digital readiness "requires knowhow and involves adaptation and change". Inan & Lowther (2010) argues that teachers' age and their years of teaching experience have attributed to the lack of teachers' readiness to exploit new technologies for educational purposes. ICT usage requires teachers' training and specialization and age is a factor that seems to have a significant impact on teachers' willingness to take part in training programs. As a result, as Bingimals (2009)

supports, older educators use technology less frequently due to their lack of training and their limited computer skills.

Moreover, technology as it enters the educational practice is accompanied by enormous changes in the teachers' role and practices. Teachers' have not welcomed these reformations to the same extent. On the contrary, failure in ICT adaptation into education is mainly caused by teachers' resistance to adapt to the new learning environment and their negative attitude towards technology that leads to lack of usage into their lessons. Older educators often view the introduction of ICTs in schools as an invasion that contradicts their teaching methods. Teachers refuse to incorporate new practices when they do not agree with their personal educational philosophy (Newby et al., 2009, p. 345).

Older teachers that count many years of service are used to more traditional methods. In the traditional lesson, the teacher is the key to education. However, this ceases to apply to ICT-imposed learning. With technology placing the student in the center of the learning process, the teachers do not consist the most important element of the learning process. Raptis & Rapti (2017) argue that older educators tend to have higher levels of distress, experience less self-esteem and feel the need to maintain a sense of control, compared to their younger colleagues.

In modern schools, the teacher is not the only source of information. Computers and the Internet are coming to improve the learning experience. Makrakis (2000) states that teachers are no longer the transmitters and controllers of knowledge, but the creators of a different experience and producers of a creative learning environment. The integration of ICT into schools calls for transformation of the teachers' practices and teaching methods. The transfer of important teaching functions from the teacher to the computer also involves the transfer of "authority" from the teacher to the computer (Kollias, 1999). Many teachers feel that their role is downgraded and feel that they have been replaced by new technologies (Raptis & Rapti, 2017).

Considering the above, ICT usage and its effective application are intensively affected by teachers' age and their teaching experience. According to studies, the older and more experienced the teachers are, the less frequent their exploitation and usage of new technology is (Bebell et al., 2004, Van Braak et al., 2004). Older educators oppose to the integration of technology because they view it as something new and different. Effective adaptation of ICT requires a lot of effort, training, time and a change of beliefs which older teachers are less willing to offer compared to their young colleagues.

Finally, to motivate teachers to use technology regardless of their age and years of service it is important to establish positive attitudes about the relationship between computer use and existing pedagogical teaching methods (Mueller & Wood, 2012). In the end, teachers who use new technologies creatively in the classroom, are those who no matter how old and experienced they are, adopt more constructive perceptions of

learning and teaching and want to enhance their teaching methods (Raptis & Rapti, 2017).

3. Methodology

An electronic questionnaire was developed and distributed to the public school teachers from the primary and secondary educational stage in the prefecture of Western Macedonia, Greece. The distribution took place via e-mailing listing from January to March 2019. Except for demographic-related questions, five-point Likert scale (1: strongly disagree to 5: strongly agree) was applied to the measurement items. All of them were designed based on literature review and previous empirical studies approved for their validity and reliability. Furthermore, the questionnaire was pretested from two academicians to content validity and a pilot test of fifteen teachers helped to detect possible problems in terms of clarity and accuracy.

Concerning research's data analysis, this empirical study is descriptive in nature. Consequently, apart from descriptive statistics only simply statistics was applied. In specific, the Kruskal-Wallis non-parametric test was used to examine in order to reveal possible differences on teachers' ICT perceptions based on their age and the years of their service.

3.1 Demographic characteristics

Table 1 presents the demographics of the sample. In the study a total of 333 school teachers comprised the sample. Most respondents were female (205 – 61.6%) and over the age of 40 (68.4%). Regarding their years of service, more than half of the respondents (55.9%) were highly experienced with more than 15 years of school teaching, followed by 73 teachers (21.9%) who have 11-15 years of service in schools.

Table 1: Demographic characteristics of the sample (n = 333)

Demographics		Frequency	Percent (%)
Gender	Male	128	38.4
	Female	205	61.6
Age	<=30	16	4.8
	31-40	89	26.7
	41-50	119	35.7
	>50	109	32.7
Years of Service	<=5	37	11.1
	6-10	37	11.1
	11-15	73	21.9
	>15	186	55.9

3.2 Teachers' ICT perceptions based on their age

As it is clearly depicted in Table 2, about half of the measurement items did reveal statistically significant differences between examined groups. In particular, the results show that younger teachers perceived that ICT integration in education is necessary for the improvement in the quality of the learning outcome. Furthermore, younger teachers believed that ICT help their students better understand modules' syllabus and enhance their students' active role in the learning process. Regarding the rest of the examined questions, they did not reveal statistically significant differences; however, the mean ranks confirmed that the younger the school teacher is the more positive perceptions he/ she has towards the importance of ICT on the educational process.

Table 2: Teachers' ICT perceptions based on their age

Questions	Chi-Square df Asymp. Sig.	Mean rank
I am fully aware of the possibilities offered by ICT in teaching	2.135 3 0.545	137.75 173.65 166.11 166.83
I think that ICT integration in education is necessary for the improvement in the quality of the learning outcome	12.688 3 0.005*	223.50 183.06 152.43 161.50
I believe that when integrating ICT into my lesson, my students have a better understanding of the syllabus	15.917 3 0.001*	220.28 188.74 148.41 161.73
I believe that the use of ICT in class enhances the students' active role in the learning process	17.103 3 0.001*	242.41 180.25 150.06 163.61
I believe that the computer can substitute for traditional method of teaching	4.743 3 0.192	182.75 181.20 150.06 163.61
I feel that the use of ICT leads to a gradual transition to more cooperative teaching and learning methods	0.787 3 0.853	179.50 171.92 164.97 163.36
I think that ICT adapts learning to the individual needs of each student	7.246 3 0.064	189.00 185.61 162.58 153.39

3.3 Teachers' ICT perceptions based on their year of service

Concerning the measurement items that relate teachers' ICT perceptions to their years of service, four out of the seven questions revealed statistically differences (Table 3). Actually, teachers with less years of service perceived the importance of ICT to a much greater extent compared to more experienced colleagues. This result

came as no surprise; and it is highly connected with the age of the sample. To be more specific, less experienced teachers are mostly younger ones; therefore, the vital role which ICT can play in the modern education is greatly appreciated by less experienced teachers. As a result, teachers with fewer years of service perceived the necessity of ICT in the improvement of learning quality and its ability to adapt the individual needs of each student in the educational process. Furthermore, they believed that ICT could help their students better understand modules' syllabus, as well as enhance students' active role in the learning process.

Table 3: Teachers' ICT perceptions based on their years of service

Questions	**Chi-Square df Asymp. Sig.**	**Mean rank**
I am fully aware of the possibilities offered by ICT in teaching	4.492 3 0.213	140.39 183.80 169.51 167.97
I think that ICT integration in education is necessary for the improvement in the quality of the learning outcome	8.225 3 0.042*	197.99 168.09 178.25 156.20
I believe that when integrating ICT into my lesson, my students have a better understanding of the syllabus	9.165 3 0.027*	195.73 163.04 183.65 155.54
I believe that the use of ICT in class enhances the students' active role in the learning process	7.943 3 0.047*	199.24 164.76 177.60 156.87
I believe that the computer can substitute for traditional method of teaching	7.290 3 0.063	200.91 178.03 160.32 160.69
I feel that the use of ICT leads to a gradual transition to more cooperative teaching and learning methods	0.437 3 0.932	165.72 166.34 173.20 164.95
I think that ICT adapts learning to the individual needs of each student	13.072 3 0.004*	196.38 198.57 172.92 152.55

***** $p<0.05$

4 Discussion and Implications

The introduction of ICT into the educational system was sudden and not always welcomed by all educators. The teachers have to change their pedagogical philosophies and practices in order to adjust to the new educational environment that technology has created (Kolias, 1999; Makrakis, 2000). According to the literature teachers' age accompanied with their years of service are factors that affect teachers' attitude towards technology and, consequently, ICT exploitation in the classroom (Bingimals, 2009; Inan & Lowther, 2010; Robinson, 2003; Snoeyink & Ertmer, 2001). This study confirms this view by revealing significant differences in teachers' perception depending on their age and experience.

The study found that younger educators, who have fewer years of service in schools, accept the integration of ICT in the education easier, compared to their older colleagues. Young teachers recognise the importance of new technologies and realise their necessity for the improvement of learning quality. They believe that ICT integration is very advantageous and has plenty to offer.

More specifically, young educators state that ICT enriches the educational environment, caters for the individual needs of the students, motivates them to become more active and makes learning easier as students understand better the syllabus. This findings are in line with earlier studies arguing that ICT implementation is a remarkable educational reform that enhances the learning process in various ways, but, because it requires adaptation to the changes and familiarization with ICT usage, ICTs are more frequently used by young teachers' (Bingimals, 2009; European Commission, 2018; Inan & Lowther, 2010; Pagge, 2016; Srivastava, 2016).

According to the results of the study, older and more experienced educators are less willing to use ICT into their lesson due to negative perceptions and resistance to change. It has been claimed throughout the literature that older teachers often view ICT integration as an invasion. It is harder for them to change their methods and beliefs as on the one hand, they do not perceive the importance of educational technology, and on the other, they feel that technology has replaced them and that their role has been downgraded (Bebell et al., 2004; Mueller & Wood, 2012; Raptis & Rapti, 2017).

However, despite the fact that the aforementioned results can derive meaningful implications, further research should focus on overtaking four limitations. First, the comparison of the results of the prefecture of Western Macedonia with results from other Greek prefectures might provide tangible differences and/ or similarities between each other. Second, similar cross-cultural studies focusing on the impact of age and years of service on teachers' perceptions regarding the use of ICT in the

educational process could also be made in other countries, with a view to provide comparative data, which could be highly beneficial for the better understanding of the topic. Third, considering a larger sample of the total population of the teachers in the prefecture of Western Macedonia, Greece, could definitely give a much more accurate view; and increase the validity of the study. Forth, a comparison between teachers that work in public versus private schools might provide meaningful insights as well.

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