International Journal of Science and Research (IJSR)
ISSN: 2319-7064
SJIF (2022): 7.942

Investigating Obstacles to the Adoption and Use of Computer Technology in Teaching and Learning

Ioannis Novakos

Aristotle University of Thessaloniki, Thessaloniki, Greece

Abstract: ***This research investigates the obstacles to adopting and using computer technology in educational processes. The method used for this specific research is qualitative, while semi - structured interviews are the main tool for conducting it. Regarding the processing and interpretation of the data, it was carried out using content analysis. The result of the empirical qualitative research demonstrate that despite the challenges –the disposition of the teachers– plays a decisive role in the application of technology in the teaching practice.***

Keywords: computing technology, obstacles to its use, teaching practice, teachers

1. Introduction

Everyone recognizes that the interweaving of various learning theories (Komis, 2015) with the pedagogical - teaching status of teachers, constitute the most basic variable/obstacle to the use and application of computing technology as a co - auxiliary tool and means in the learning process. In addition, it appears that the insufficient logistical infrastructure and the absence of targeted training and information about the effective use of computer technology in practice are decisive factors for the avoidance of its use by teachers (Bozdogan, 2014). The existence, in other words, of barriers affects the diffusion of computing technology and at the same time changes the teaching outcomes for the better and/or at hand. Given this, it can be seen that the integration and use of computer technology in the educational process, works as a supporting basis for the diverse education of students (McCarrick & Xiaoming, 2007).

In more detail, it is noted that computing technology can be used during school activities as a tool for searching for data, information and communication, as a supervisory teaching tool and as a cognitive - research tool (Unal & Ozturk, 2012). However, the need emerges as never before for the pedagogical - scientific introduction and utilization of computing technology in teaching practice. Nevertheless, it is observed that while most teachers are theoretically willing to use computer technology in teaching, on the contrary, they avoid its application and utilization in the educational process and practice (Roussomanis, 2007). Therefore, it is found that they use computer technology for purely personal reasons and purposes and not for the pedagogical - teaching and scientific support and promotion of the educational processes that take place during the delivery of the knowledge objects (Charalambous & Ioannou, 2008).

In general, questions are raised regarding the factors - expressed and implied - that discourage the adoption and use of computer technology in teaching, although there are only positive opinions and reports from teachers about its essential integration in all phases and stages of learning act (Judge, 2013). Consequently, some obstacles are recognized that act as malfunctions and barriers preventing and avoiding the use of computing technology by teachers in their teaching work. Its implementation, nevertheless, may bring changes and modifications to the needs and obligations of both students and teachers. Henceforth, it is considered very precarious to completely embed computing technology in the educational system, since the role of teachers is not non - negotiable, but on the contrary, it is catalytically determined by obstacles that act as brakes for its daily use in the teaching context (Hermans et al., 2008).

In particular, the educational needs and changes, force the activity of teachers towards the adoption and use of computing technology as a means of knowledge and communication in teaching and learning. However, it is noticeable that in order to have even a small benefit from its use in teaching practice, the various obstacles that exist and/or are created during its application in the classroom must be overcome (Allsop & Jessel, 2015). Therefore, it is considered necessary to have teachers who think and act creatively and effectively in relation to the complementary and different use of computing technology in teaching. Nevertheless, it is considered that they need to master digital skills in order to turn the use of this specific tool into a force for innovative change during the educational process (Cheng et al., 2013). Obviously, it is pointed out that in order to achieve the above statutory conditions and conditions, the educators must be techno - visionaries and transform the various obstacles that arise during its use, into a positive methodological process and action (Johnson et al., 2012). Now, the information literacy of teachers is a requirement of the modern school, in order to achieve the full and successful integration of computer technology as a co - supportive tool and means in the teaching of cognitive subjects (Adams, 2011).

The function of obstacles as a deterrent to the use of computing technology by teachers in teaching and learning

Certainly with the different models of teaching and learning provided through computer technology, teachers are facilitated and freed as much as possible during their daily work. Nevertheless, obstacles are raised when they are asked to adopt and utilize this technology in their daily living practice (Barakos, 2008). The main obstacle, of course, is their inherent fear and perennial refusal to change the classical form of teaching the knowledge subjects and to use

an auxiliary medium which will change the way of their own operation in terms of the presentation of the teaching material and presentation of the content of the diverse learning activities (De Witte & Rogge, 2014). Consequently, they usually cite insufficient technological equipment, inappropriate infrastructure, lack of digital skills and the absence of sufficient teaching time to not integrate computing technology into their teaching (Dagdilelis, 2018).

In particular, it is observed that the reduced educational time acts as an obstacle and a counterweight to the essential integration and use of computing technology in the teaching processes as a co - remedial learning tool (Christopoulos & Sprangers, 2021). Based on the above and beyond the others, it is noted that the graded digital skills of the students acts as a hindrance for the teachers, as they do not have the opportunity in terms of time to experiment in order to integrate computer technology effectively and efficiently into the educational process and practice in school classes. The lack of teaching time, therefore, acts as a catalytic deterrent and negative for teachers in relation to the utilization of this technology in teaching activities, as they are obliged under the pressure of legislation to cover the basic curriculum (Flores, 2020). In addition, it must be emphasized and pointed out that the lack of permanent specialized teaching staff in each school in relation to the subject of ICT in order to receive the required support, acts as a deterrent for most teachers. Also, it is judged that their non - existent and false education is a key discouraging factor, so that they do not use computer technology intensively in their daily work (Tzimogiannis & Komis, 2006).

However, even today –in many ways and in many ways– the occasional use of computing technology in relation to the design and implementation of student - centered teaching and learning environments with the appropriate digital tool and medium is still evident, even though it is a central pillar of the orders that draw up educational policy, the complete and forward - looking encapsulation and use of computing technology in school everyday reality and practice (Karanikola & Panagiotopoulos, 2019). In this way, it becomes clear that the integration and use of ICT in general in the learning process depends exclusively on the context of perceptions, knowledge, skills, ideologies and, especially, the school culture developed and cultivated by each teacher, for the way of utilization of the specific tool in practice. In addition to others, it can be seen that accessibility, interaction with students and many other pedagogical difficulties, (a) - force most teachers to be cautious about the adoption and use of computing technology −as a facilitating and auxiliary tool− in their methodological and strategic teaching quivers (Kispeter, 2018; Panagiotakopoulos, 2020).

Necessity of research

Purpose of the research

The analytical performance and interpretation of the perceptions and opinions of the interviewees, about the obstacles raised and corrected by the adoption and utilization of computing technology in teaching and learning, constitutes the main purpose of the research.

Research questions

The research questions under consideration for the role of barriers are:

- In what way does the culture of each teacher act as an inhibiting factor for the integration of ICT in the learning process?
- In what way does the existing technological equipment discourage the application of ICT in the educational process?
- How does the lack of specialized staff support shape the philosophy for meaningful use of ICT in teaching?
- To what extent do teachers' knowledge of new technologies act as a brake for the integration of ICT in teaching and learning?
- To what extent have the trainings contributed to the teachers' decision to integrate ICT in the learning process?

2. Research Methodology

Sample survey

The sample of the research consists of forty - five (45) teachers, who during the specific period are members of a Master's Program, where as part of their academic obligations they must participate in this research, in order to successfully complete the subject "Soft Digital Skills in Education".

Research data collection tool

Semi - structured interviews were used as a tool to conduct this research. It has been proven that the researcher has the possibility and depending on the conditions prevailing in the research −if he deems it necessary− to change the way, the format and the order of the questions with the specific tool (Schostak, 2006).

Research data analysis method

With the qualitative method of content analysis, the research material and data were processed and interpreted. Each researcher, with this particular method, has the possibility to base himself on the assumptions and opinions of the research participants and to draw valid and reliable results and conclusions (Creswell, 2011).

Presentation of research results

The data obtained from the survey interviewees are as follows:

Interviewees' views on the influence of culture in relation to the integration of ICT in the learning process

The culture of teachers, according to the interviewees' opinions, may have a front - loading catalytic role −either positive or negative− regarding the integration of ICT in the learning process. This implies that the mode of operation of teachers is inextricably intertwined with the form of utilization and/or not of computing technology in teaching.

"*If my educational culture has been formed in a certain way, it is very difficult to accept anything new in my daily school life*".

"*The way we see things in general, determines our everyday life at school. . . that is, we consider technology to be an obstacle to our work*".

"*Culture is an internal process that leaves its mark in this area as well. . . that is, the integration of ICT in teaching*".

Interviewees' views on the role of technological equipment as an obstacle to the integration of ICT in the learning process

Obsolete and/or even a partial lack of technological equipment may constitute a key obstacle to the use and utilization of ICT by teachers. In more detail, they state that the age of the technological equipment, the malfunctioning of the internet and the absence of appropriate educational software and broadband connections, act as obstacles in terms of the utilization of ICT in teaching.

"*There is no technological equipment except for a few schools. . . we through Erasmus bought technological equipment and upgraded the old one*".

"*Certainly the basic technology structures play a role, but I don't think having a full technology lab would define my attitude towards ICT*".

"*In the schools of Greece there is diversity in terms of technological equipment as in other areas*".

Interviewees' views on teacher support from specialist ICT staff

The absence of a permanent IT from each school makes the work of teachers difficult in terms of the way and form of adoption and use of computing technology in practice, essentially determining their attitude regarding the specific technological tool and medium.

"*Yes, I consider it a big obstacle, as an IT knows more things and will help in this direction*".

"*In every school now, there's a computer science teacher. . . so it's helping to solve all these problems*".

"*Essentially, computer science teachers cover some hours of the program clock and nothing else*".

Interviewees' views on teachers' ICT knowledge

Unfortunately, it appears that teachers, who do not have some familiarity with computer technology and have insufficient technological knowledge, avoid using this tool in teaching and/or use it substandardly. Therefore, it is recognized that the digital technological knowledge of teachers plays an important role in their decision to use computing technology in teaching practice.

"*Yes, the knowledge we have can act as a barrier to our decision to implement ICT in practice*".

"*For me, knowledge doesn't matter if you're not willing to use technology in learning*".

"*The teaching population as a whole is older. . . this thing alienates them from the subject*".

Interviewees' views on the role of trainings in teachers' decision to integrate ICT in the learning process

The need for training, such as training in the use of computing technology, acquiring digital skills related to the effective use of the specific tool and updating their ICT knowledge, are key factors that teachers constantly seek for their training in the subject this. In this sense, it appears that the acquisition of skills by teachers for the most meaningful and effective use of computing technology in teaching requires the state to organize training programs that tend towards this goal.

"*Training as training, especially in recent years, has not motivated me to use ICT in teaching*".

"*I haven't participated in trainings because I'm a deputy. . . it's just that ICT is my passion*".

"*They have not offered the trainings at all. . . because I believe that these trainings are not done essentially but out of necessity*".

3. Conclusions

Most of the teachers consider that the culture of each one, the lack of technological equipment, the absence of specialized staff (IT) from each school, their incomplete digital knowledge and skills and fragmented and untargeted trainings, act as obstacles in their decisions to the essential integration and utilization of computing technology in the school classroom. Apart from the above, however, it emerges that the main factor in the pedagogical - teaching and/or non - use of computer technology in the learning process by teachers is solely their disposition. The main and dominant reason and cause for the reduced and/or minimal use of this tool/means in teaching and learning on the part of the teachers, is not as we mentioned in detail all of the above, but the sense of preference they have for whether they really want to use computer technology constructively and effectively in their daily teaching and learning routine in the classroom. In short, it is observed that even if all the objections of the teachers are covered for the obstacles that they consider acting as brakes for the integration and use of computing technology in the teaching practice, that variable that determines the positive success and/or failure of the specific innovation, is only their beliefs and attitudes.

References

[1] Adams, L. G. (2011). Engaging middle school students with technology: Using real - time data to test predictions in aquatic ecosystems. *Science Scope, 34* (9), 32 - 38.

[2] Allsop, Y., & Jessel, J. (2015). Teachers' experience and reflections on game - based learning in the primary classroom: Views from England and Italy. *International Journal of Game - Based Learning, 5* (1), 1 - 17.

[3] Barakos, K. (2008). *Attitudes and opinions of primary special education teachers on the role of ICT in special education*. Diploma thesis, University of Thessaly, Pedagogical Department of Primary Education. Thessaly: Volos.

[4] Bozdogan, D., & Özen, R. (2014). Use of ICT technologies and factors affecting pre - service ELT teachers' perceived ICT self - efficacy. *Turkish Online Journal of Educational Technology, 13* (2), 186 - 196.

[5] Cheng, Y. M., Lou, S. J., Kuo, S. H., & Shih, R. C. (2013). Investigating elementary school students' technology acceptance by applying digital game - based learning to environmental education. *Australasian Journal of Educational Technology, 29* (1), 96 - 110.

[6] Charalambous, K., & Ioannou, I. (2008). How close are we to the integration of ICT in teaching and learning processes in Primary Education? The case of the schools of the city of Nicosia. *Proceedings of the 6th Panhellenic conference "Information and Communication Technologies in Education"*, September 25 - 28, 2008. Limassol, Cyprus.

[7] Christopoulos, A., & Sprangers, P. (2021). Integration of educational technology during the Covid - 19 pandemic: An analysis of teacher and student receptions. *Cogent Education, 8* (1), 1 - 27.

[8] Creswell, J. (2011). *Research in education. Design, conduct and evaluation of quantitative and qualitative research*. Athens: Ion.

[9] Dagdilelis, V. (2018). Preparing teachers for the use of digitals technologies in their teaching practice. *Research in Social Sciences and Technology, 3* (1), 109 - 121.

[10] De Witte, K., & Rogge, N. (2014). Does ICT matter for effectiveness and efficiency in mathematics education? *Computers & Education, 75*, 173 - 184.

[11] Flores, M. A. (2020). Preparing teachers to teach in complex settings: Opportunities for professional learning and development. *European Journal of Teacher Education, 43* (3), 297 - 300.

[12] Hermans, R., Tondeur, J., van Braak, J., & Valcke, M. (2008). The impact of primary school teachers' educational beliefs on the classroom use of computers. *Computers & Education, 51*, 1499 - 1509.

[13] Johnson, L., Adams, S., & Cummins, M. (2012). *The NMC horizon report: 2012 higher education edition.* Austin, Texas: The New Media Consortium.

[14] Judge, M. (2013). Mapping out the ICT integration terrain in the school context: Identifying the challenges in an innovative project. *Irish Educational Studies, 32* (3), 309 - 333.

[15] Karanikola, Z., & Panagiotopoulos, G. (2019). Contemporary digital skills development policies and adult education. In A. Lionarakis, E. Manousou, S. Ioakeimidou, M. Niari, A. Angeli, K. Sfakiotaki & V. Koutzeklidou (Eds.), *Proceedings of the 10th International Conference on Open & Distance Education*, Volume 10' (pp.23 - 32). Athens: EAP.

[16] Kispeter, E. (2018). *What digital skills do adults need to succeed in the workplace now and in the next 10 years?* University of Warwick: Warwick Institute for Employment Research.

[17] Komis, B. (2015). *Learning theories and ICT: Cognitive psychology: Educational applications of artificial intelligence. Applications of Information and Communication Technologies in teaching and learning*. Unit 11. Patra: University of Patra Publications.

[18] McCarrick, K., & Xiaoming, X. (2007). Buried treasure: The impact of computer use on young children's social, cognitive, language development and motivation. *AACE Journal, 15* (1), 73 - 95.

[19] Panagiotakopoulos, X. (2020). *Introduction to computer science*. Patra: Gotsis.

[20] Roussomanis, K. (2007). Investigation of the educational needs of secondary school teachers regarding the application and utilization of Information and Communication Technologies (ICT) in the educational process. *Proceedings of the 4th Panhellenic Conference of ICT Educators "Use of Information and Communication Technologies in Teaching Practice"*, May 4 - 6, 2007, Syros.

[21] Schostak, J. (2006). *Interviewing and representation in qualitative research*. Buckingham: Open University Press.

[22] Tzimogiannis, A., & Komis, B. (2006). ICT in education: Exploring the views of secondary school teachers. *Proceedings of the 5th Panhellenic Conference with International Participation "Information and Communication Technologies in Education"*, October 5 - 8, 2006. Thessaloniki.

[23] Unal, S., & Ozturk, I. (2012). Barriers to ITC integration into teachers' classroom practices: Lessons from a case study on social studies teachers in Turkey. *World Applied Sciences Journal, 18* (7), 939 - 944.