



THE INTEGRATION OF NEW TECHNOLOGIES AND VIDEO GAMES IN PRESCHOOL EDUCATION

Alexandra Nousia

Adjunct Lecturer,
Department of Early Years Learning and Care,
University of Ioannina,
Greece

Abstract:

Our society which constantly evolves technologically, in connection with the use and presence of technological means in almost every home, has given rise to the need for inclusion and use of new technological means even in preschool education. Children from a very young age come into contact with electronic means of Information and Communication Technologies (ICT), resulting in them acquiring empirically numerous skills and knowledge, even before entering preschool settings. Inevitably education has followed this social progress and development because of the great relationship that exists between them. Thus, the inclusion of ICT in education is a very important subject that constantly is put into a new perspective with constantly evolving research fields. In the present study, reference is made to the inclusion and educational use of ICT in preschool education. Evidence is presented after a literature review, which mainly concerns the effects and learning outcomes of preschool children's engagement with modern electronic media and video games.

Keywords: Information and Communication Technologies (ICT), preschool education, learning, video games

1. Introduction

Children learn through interaction with their environment. Their experiences in the home, community, and preschool classroom develop and shape their knowledge of the functions and purposes of written language and other modules. Children's experiences in the modern age, and therefore their learning, are definitely affected by the increasing importance of technology in everyone's daily life. Children's interest in technological media begins at preschool age with watching cartoons and movies on TV as well as playing with electronic media and the Internet. Three- and four-year-old children often see their family members or their teachers using modern technological means for various purposes. Therefore, they observe that we use technology to read, write and

communicate. This observation and the use of technology to read, write, and communicate affect young children's perceptions of learning. The impact of digital technologies and the internet on literacy practices today can affect the types and ways of literacy and learning that young children use to read, write and communicate. All of this inevitably affects children's perceptions of what literacy is and how it is used today (Beschoner & Hutchison, 2013). In addition, the use of rapidly changing technology for reading, writing, and communication is also changing the nature of the entire concept of education. Thus, in order for children to be fully literate in the 21st century, they should be proficient in the use, understanding, and corresponding writing required by the use of new technologies.

2. Pedagogical approach

School is inextricably linked with society. The micro-society that constitutes a school is directly or indirectly affected by the closer but also the wider social environment. One of its main goals is the transmission of information (knowledge) but certainly also the smooth socialization of children. The individual's socialization is directly connected to and strongly influenced by social changes. Thus, schools must adapt, incorporating specific changes into their daily curriculum. In modern society, which as previously emphasized is characterized by rapid technological development, the school curriculum could not but keep up with these developments. School is obliged to continuously evaluate the ongoing social changes and structures and the inclusion of their elements in the educational process. The use of ICT in education is a basic condition for improving the educational process, which aims to prepare the new generation for the society of information and technology (Hatzis, 2006).

Over the past three decades, experts have been studying the influence of modern electronic media on the learning process of preschool children. The results of various relevant studies (Kirkorian, Wartella & Anderson, 2008); (Schmidt & Vandewater, 2008); (Izumi-Taylor, Ito & Gibbons, 2010), converge on the fact that educational software, websites, and video games, successfully support and promote young children's cognitive development and thus their early education in reading, writing, and arithmetic (Daniel, Anderson & Subrahmanyam, 2017). The findings of these studies, regarding the influence of electronic media, were endorsed by educational curricula in various countries around the world, where special software was created both for in-school and out-of-school use by preschool children (Schmitt et al., 2018). As a result of this, students are motivated, by the inclusion of new teaching methods that contribute to more effective and creative learning. Characteristically, the use of ICT cultivates new skills and promotes critical and creative learning. In addition, it promotes cooperation between children and the wider school environment. As far as teaching is concerned, new technologies contribute to maintaining the interest and attention of students, while also favoring cooperation between them (Mikropoulos 2006). At the level of organization and management of the school, they contribute to the more systematic organization and classification of the material, as well as to the organization of teaching time. Information and Communication

Technologies (ICT) combine a great part of the available technologies and are considered the most powerful tool to support the teaching practice and the learning process. They provide the possibility of qualitative improvement of the learning process and results, through the new learning environments they form (Hatzis, 2006). Their contribution comes mainly from the technological features they possess. These initially concern the management of a large amount of data and information in a short time. They are also concerned with the ways in which they record, represent, manage, transfer and present the information, through dynamic multiple representations using an image, sound, and other graphics (Mikropoulos, 2006).

The concerns arising from the integration and use of ICT in the educational process are the design and production of appropriate educational software. Today, significant numbers of educational software titles have been produced internationally, as well as a variety of systems intended for educational use. However, the quality of educational software is still not what is required and is in great demand. The problem that exists is "What constitutes educational software". The designation of a software title as educational does not necessarily ensure its quality or suitability for use in the educational process. This is usually referred to as educational, but most of the time it does not meet the criteria to be characterized as such. Educational software is considered the software that sets or indicates teaching goals and is characterized by:

- a) **Interaction**: it is the ability of the user to interact with the medium and the environment it creates, as well as the degree & type of responsiveness of the software,
- b) **Interactivity**: the user's ability to interact with the medium, and
- c) **Autonomy**, which refers to the user's autonomy. Of course, the main and of primary importance goal is to bring about mainly positive learning results. It should also provide flexibility for the teacher and the student to develop learning activities. Thus, for the pedagogical use of ICT, different approaches are sought so that they directly and substantially involve the student in the learning process and at the same time can be applied directly in the teaching practice. The types of educational software that can be used in education are:
 - Electronic books (electronic books),
 - Drill-and-practice programs, which rely exclusively on formulating the correct answer and do not take advantage of the student's mistake.
 - Electronic educational games (electronic games),
 - Simulation programs (simulations) that simulate using animations or drawings e.g., representation of physical, chemical, and other phenomena.
 - Training programs or personalized instruction (tutorials) that simulate a training method in the form of questions of increasing difficulty. They present the exercises, explain the task to be performed, check the results, measure the user's performance, evaluate his/her progress and give him/her advice.
 - Virtual reality programs (virtual reality programs) and
 - Creation and expression programs, such as animation production, artistic creation assistance, or something of the sort (Nousia, 2010).

In preschool education, the most widespread form of software is the “logo” software which mainly concerns the development of writing, reading and mathematics skills (Hatzis, 2006). The use of electronic dictionaries and encyclopedias is also recommended for use by both students and teachers as a supporting tool for daily activities in kindergarten or for finding pedagogic material. It is worth emphasizing at this point, an essential recommendation regarding the choice of technology applications in preschool education. Software suitable for educational use is that which allows children to discover, make choices and realize the impact of those choices, as well as explore, imagine and solve problems. Programs should support the child's thoughts, feelings, and physical well-being (Beschorner & Hutchison, 2013).

3. The use of video games and computers in preschool education

The computer as a modern means of teaching offers teachers many educational opportunities. By using the electronic tools it offers, it is possible to implement in the classroom a variety of organized activities, which would not be easily implemented using traditional teaching methods. Working with the computer seems to exceed the standards that traditional methods achieve. The computer with its media and graphics makes the learning process more charming and interesting for young children, providing them with learning through play. With the use of appropriate software and the technical capabilities of the computer, children are not just passive observers, but co-participants in the lesson. Studies in the field of preschool education have shown that the developmentally appropriate use of forms of technology supports both cognitive and social learning in young children. The use of electronic media supports group work, enabling students to use many different applications for differentiated literacy practice, with limited help from teachers (Beschorner & Hutchison, 2013). The learning process is enhanced, with the use of the computer contributing positively to the development of children's creative thinking and imagination, further encouraging their initiative. Multimedia that greatly influences children's imagination is extremely useful, improving reading skills and enriching vocabulary, in a way that is comprehensible to children's developmental level. A computer is widely used for teaching a foreign language, as well as many historical events and difficult concepts, which are translated into interesting games and applications. With the use of multimedia, the computer can also develop musical memory, hearing, and a sense of rhythm. It allows young children to become familiar with the sound of different instruments and create their own melodies (Hoffman, 2014). Electronic games, on the other hand, which are usually one of the first contacts of children with the computer, are considered the most suitable means to support the cognitive development of young children. Researchers agree that electronic educational games encourage active learning (learning by doing) and, in addition, enable children to learn through challenging experiences that expand their existing knowledge. In this way, the children learn constructively, a premise that comes in line with Vygotsky's theory of the “*zone of imminent development*”. Ideal educational video games that support a constructive learning process should start by presenting the child with content that is slightly more

difficult than they can handle without help and then become more challenging or levels up automatically. This process makes the game more fun and interesting for young children (Schmitt et al., 2018).

Their influence on a wider range of cognitive skills such as more accurate attention and concentration increased speed and reflexes, as well as higher spatial resolution and visual processing is equally important. Empirical evidence shows that video games can be an effective tool for improving understanding during teaching and learning. Positive effects are further reported in terms of problem-solving ability, goal attainment, communication as well as motivation and interest in learning (Subrahmanyam et al, 2000; Corbeil, 1999; Danowski & Krupinska, 2007 in Hoffman, 2014). They are based on matching, have a positive effect on hypothetical thinking, and additionally enhance hand-eye coordination. Additionally, it is argued that computer games can encourage cooperation and interaction among students. The fact that they allow immediate reward in the form of evaluating one's performance player is also important (Ahmad & Jaafar 2012; Mahmoudi et al., 2015; Salceanu, 2014). Research on the use of electronic games in the educational process reveals that computer games stimulate the intellectual process, since they constantly challenge the child to think. The statistical analysis of the results of Quaiser et al. (2006), showed major differences in the mental development of children. The children who belonged to the category of "non-gamers" performed much lower on tests assessing cognitive abilities than those who belonged to the category of "gamers". Subrahmanyam & Greenfield (2014) found that frequent involvement in video games improved children's mental performance in spatiotemporal concepts. With features such as interest, emotional stimulation of students, and considering the enjoyable way in which learning concepts are acquired, video games can be quite effective in increasing the level of motivation and the learning process. Therefore, it can be considered that computer games are useful for educational purposes, but there are also opposing views of educators and researchers, who argue that electronic media and video games are ineffective in the learning process and cannot serve learning purposes. The continuous and more frequent engagement and preference of children for electronic media, as well as the addiction observed by these media, caused strong reactions to their use and effects, both in adults and in children. There have been concerns from scientists of various disciplines, educators, and parents that these new media have harmful effects, cause alienation, increase violence and decrease the learning ability of children. Among the disadvantages of children's involvement with electronic games is the lack of physical exercise, stimulation, and visual disturbances (Salceanu, 2014). Another point of view, however, has to do with the claims of expert scientists, that the harmful effects that electronic means of communication can have on children do not necessarily coexist with the means, but come from and depend on the ways in which they are used. It is further argued that electronic media, when used judiciously, have a great positive potential for learning and development. These media can support learning, since they favor the transmission of certain types of information, as a result, offering children mental abilities, such as for example separating the imaginary from the real, which are different from those developed by reading and writing (Greenfield, 2014).

As we can see from the aforementioned, modern technological means have a great impact on children's development, communication, and learning. It is therefore desirable that children use these media for certain educational and developmental goals and activities. But both parents and school teachers need to pay attention to what kinds of software and activities children engage in on the computer, and how much time they spend on it. The purpose of this is to avoid as much as possible the harmful effects of these on children's health and learning, as reported by the research. In this way, we can realize the potential benefits, minimizing the potential losses (Salceanu, 2014). In conclusion, it is not possible to exclude these media from our daily life and moreover, their prevalence, which is getting notably heavier, makes it imperative to investigate the best possible ways of using them, or rethinking what the use of these media means for children themselves.

4. Conclusions

Given the importance of new forms of learning for children to become fully literate and the potential impact of technology on children's emerging perceptions of literacy, exploring the integration of technology for literacy learning in preschool is valuable. This fact, in connection with the ever-increasing interest of young children in the engagement and use of various technological means, makes the need for inclusion and educational utilization of new technologies in preschool education imperative.

At the early school age, there is a great need for fun combined with a creative activity which is an important component of children's mental development. The use of electronic means is therefore a necessary element of teaching and learning in a modern school.

Conflict of Interest Statement

The author declares no conflicts of interest.

About the Author

Alexandra Nousia is an Adjunct Lecturer at the Department of Early Years Learning and Care, University of Ioannina, Greece. Graduate of Preschool Education Department. Master's degree in Pedagogical Play and Pedagogical Materials in Early Childhood Education. PhD degree in the Department of Early Childhood Education, School of Education Sciences, University of Ioannina, Greece.

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