

## MOBILE AND MULTIMEDIA LEARNING IN PRESCHOOL EDUCATION

ATHANASIOS DRIGAS  
*NCSR DEMOKRITOS, Greece*  
*dr@iit.demokritos.gr*

GEORGIA KOKKALIA  
*NCSR DEMOKRITOS, Greece*  
*gioulina@hotmail.com*

MILTADIS D. LYTRAS  
*The American College of Greece – Deree College, Greece*  
*mlytras@acg.edu*

The growing use of mobile and multimedia learning in our day lives has affected different domains of education. Nowadays, recent development in the role of kindergarten –preschool education in children’s progress includes the use of Information and Communication Technologies (ICTs) and especially the support of mobile and multimedia tools. Mobile and multimedia are recognized as the tools that can foster the knowledge and the experiences for this crucial age and the support of specific areas in kindergarten according to the educational perspective is thought significant. In this paper we present an overview of the most representative studies of the last decade (2003-2014) which concentrates on the skills that are examined in kindergarten (early literacy, early mathematics, cognitive, social-emotional, motor) and are supported by mobile and multimedia educational tools. The effectiveness of them in special education is also examined.

*Key words:* mobile learning, multimedia learning, pre-school education, new technology

### 1 Introduction

The growing use of new technology in offices, factories, homes and schools is often cited as a reason for introducing it to children at an early age. Information and communication technologies (ICT) are valuable tools for learning and playing [1]. Children are becoming exposed to computers and technology at an increasingly early age, besides most of this technology has not been fully integrated in making child–computer and child–child interaction optimal [2]. While there were earlier concerns that new technology is too abstract and difficult for young children, many educators now believe that computers can promote learning and development in early childhood education if it is used appropriately. However, it is generally accepted that children need to be engaged with the uses of computers in order to meet the challenges presented by the present and future technological society [3].

Multimedia is an interactive computer-based environment that provides active engagement with multi-presentations such as texts, voices, pictures and animations. Multimedia provides the opportunity to be actively engaged in real world contexts, as well as in formal and informal mathematical contexts

[4]. According to Mayer [5], multimedia learning occurs when students build mental representations from words, pictures and voices that are presented to them. The promise of multimedia learning is that students can learn more deeply from well-designed multimedia messages consisting of words and pictures than from more traditional modes of communication involving words alone. Moreover, there is a growing research showing that children learn more deeply from well-designed multimedia presentations than from traditional learning [5].

Recently, there has been an increasing emphasis on educating kindergarten children with the support of mobile multimedia and thus this fact has reinforced the use of technology as a mean of overcoming barriers to their learning. There is now a general agreement amongst different specialists that mobile multimedia can support a child's skills as well as can create a developmental appropriate learning environment depending on their needs and the curriculum requirements [6]. According to existing studies, mobile devices are one of the most successful technologies for learning as they are considered attainable and easy to use especially by children. Mobile device which is also referred to as a handheld, handheld device or handheld computer, is a pint-sized computing device and usually come with a touch or non-touch display screen and sometimes, even a mini keyboard. There are many types of mobile devices, the commonest among them being, mobile phones, smart phones, PDAs, pagers and Personal Navigation Devices. PDAs and smart phones are among the most preferred mobile devices, which offer all the conveniences of a personal computer, along with a very small form factor. Additionally, their use provides greater feedback for educators and has a supportive role for learner as the provision of necessary basis like telecommunication equipment and perfect training content are thought significant for attaining the educational goals[7].

Many studies have supported the view that multimedia can foster the literature, early mathematics, cognitive, emotional-social, motor skills and enhance the creativity of kindergarten children [8]. Games are the most popular digital activity for children from age two, especially on mobile devices [9]. In the USA, on a given day, approximately 40% of all preschoolers play video games on consoles or mobile devices [10]. One of the most important advantages of educational digital games for children is their potential to positively affect their attitudes toward learning. Existing studies on the introduction of technology in kindergarten education argue that can provide children with additional opportunities for rich learning activities that are relevant to their growth characteristics and have positive results in regard to the learning of different subjects [11]. As a result, multimedia can play an essential role in achieving the goals of the kindergarten curriculum in all areas and subjects [12] if the provided developmentally appropriate software applications are embedded in appropriate educational scenarios [13].

Our scoping study drew upon national and international publications as well as the research findings of the most representative studies of the last decade which focus on the use of mobile multimedia in the regular kindergarten. According to the Department of Early Years Foundation Stage [14], technology can contribute to three main areas of learning in kindergarten education: (a) develop dispositions to learning that thread through social and emotional development (b) extend knowledge and understanding of the world in the broadest sense of literacy-communication and language-problem solving, reasoning and numeracy and creative development and (c) acquire motor/ operational skills.

Taking into account these specific areas that underlined above and are based on the educational perspective, our study is concentrated on the support of mobile multimedia of the most important skills that are thought significant for the development in the kindergarten class[14]; literature(language, communication, vocabulary), early mathematics (numbers, arithmetic problem solving ,spatial syllogism along with general geometrical knowledge, concepts),cognitive (problem solving, memory, perception, inhibition, thinking),social-emotional (cooperation, collaboration, emotions) and motor (visual, kinaesthetic). Lastly, the support of multimedia in children who face special needs is also presented.

## **2 Supporting early literacy skills**

In kindergarten education, there have been conducted several studies that claim that properly designed digital educational activities can become an important educational tool for efficient and effective learning especially in the field of the early literacy skills [15]. A wide variety of mobile multimedia applications have become increasingly accepted as developmentally appropriate education resources for children's spoken and written language development requiring teacher assistance at some cases [16].Research has consistently shown that children who do not already have an adequate start in literacy development by the time they reach school rarely learn to read on schedule [17], and continue to have difficulty throughout elementary school, as almost 90 percent of children identified as poor readers at the end of first grade are still identified as poor readers at the end of fourth grade [18]. Thus, early intervention during the preschool years is critical not only for children who are at risk of facing learning difficulties.

In addition to viewing these devices as mechanisms to encourage the development of technology skills, supporters have seen the integration of handheld computers as a way to enhance student learning and achievement. Evidence of kindergarten classes handhelds use in such curriculum areas as reading, mathematics, social studies and science prove promising practices in this domain [7]. As PDA's, cell phones and mp3 players have converged and altered into more sophisticated mobile devices, the iPod Touch has emerged as a pocket computer with multiple kindergarten classroom possibilities. The iPod Touch (and the iPhone) is equipped to perform a multitude of complex tasks, many of which can be ordained to fill many of educational objectives. These devices are inexpensive, compared to classroom laptop carts or computer labs, and their portability and durability provide students with potential learning tools that meet the classroom and the home [19].

While sceptics may find the premise of young children benefitting from the use of mobile devices to be mannered, children are showing that they can understand and interact with Web Apps such as the Pre-School Adventures, At the Zoo, the ABC Letters, and the iDoodle. These applications are according to the needs of early childhood education and technology use, as articulated by the National Association for the Education of Young Children (NAEYC) while children are encouraged to play and discover with their engagement to these applications [20].

More specifically, Pre-School Adventures provides an interface for exploring concepts of colours, shapes, sounds, and body parts. Children may select a topic represented with visual and auditory signs,

and continue to receive feedback in this way as they make selections. At the Zoo provides children with images of about 20 animals that they will encounter in many zoos. Using these fingertip-sized images, users may choose to hear the sounds that each animal makes, or hear and see the spellings of the animal names. Finally, the ABC Letter quizzes little children with blocks of letters asks them to select a particular letter, and provides feedback after the response. Students can hear the letter name again, even when they provide a correct answer, reinforcing the letter name with the visual image of the letter[19].

Moreover digital audio books such as *The Little Pine Tree*, present images and text, one page at a time, with audio, allowing young learners to hear and see the story, and flip through the pages with a flick of a finger. *Shadows Never Sleep* is a “Zoom Narrative” which entices readers to explore the story by using the multi-touch zoom feature to discover the story line. Applications like *iDoodle2* provide a way for children to draw with their fingertips selecting a variety of colours, lines, fills and thicknesses. Double-clicking to zoom in and out of these sketches provides young ones with choices of how to view their creations. Each of these Web Apps could potentially be integrated into the curricular content of the early childhood classroom, providing teachers and children resources to support learning and achievement [21].

Furthermore, the goal of a current study was to develop a mobile-phone based intervention that would encourage parents to engage their children in daily literacy-learning activities. The intervention content included text messages for parents, audio messages for parents and children, and Sesame Street letter videos for children [22]. According to the developers, this study reports the design and implementation of an intervention using Sesame Street content intended to encourage parents to engage their preschool children in literacy learning. The intervention reported here was designed to deliver Sesame Street educational materials focused on learning letters via mobile phone to parents and preschool children from lower and middle income families. This intervention applied the elements of Fogg’s “functional triad” model [23] of persuasive technologies in the context of using mobile phones to encourage and persuade parents to engage their young children in activities that are known to lead to growth in literacy skills. In addition, the findings of the study indicate that this mobile technology-based literacy intervention served as a highly effective use of persuasive technology. Participants reported that the use of mobile phones is considered very helpful for them as they had access to it while they were at home, in the car, waiting in line or in another location. Moreover, parents in this study indicated that the ready access provided by mobile delivery made it extremely easy for them to fit literacy activities into their normal daily routines with their children. Finally, the technology-based persuasive messages inspired participants to engage in behaviours that would lead to increased literacy skills in their children.

### **3 Supporting early math skills**

According to standards in the area of mathematical education, using technology is an integral part of fostering mathematics from an early age in the kindergarten (National Council of Teachers of Mathematics [NCTM], 1989)[24]. At this age children develop many mathematical concepts, at least in their intuitive beginnings, even before they reach school age. Infants spontaneously recognize and

discriminate among small numbers of objects, and many preschool children possess a substantial body of informal mathematical knowledge. Besides, it is widely accepted that being engaged in multimedia embedded with mathematics from the youngest age can provide opportunities for thinking and exploring [25].

However, it is already known that early years are the important years to develop children concepts and also critical and creative scientific thought [25]. A kindergarten child also needs the opportunity to apply its skills in a variety of learning environments, and is strongly recommended that the digital learning media can contribute to the learning of mathematical skills. Many aspects of early informal learning of mathematical concepts, such as numbers, arithmetic problem solving, and spatial syllogism along with general geometrical knowledge, are developed during the kindergarten age [26].

In recent years, with the appearance of smart applications and programmes several researchers have proposed the use of many devices such as tablets and mobiles [26]. Particularly in the subject of mathematics, Zaranis [27] made a comparison between the learning outcomes of computer based teaching and mathematical thematic teaching, aiming the teaching of “Realistic Mathematics” for kindergarten children. Compared to the traditional teaching method, results showed that mobile learning enhance the development of mathematical skills and the cultivation of a deeper perceptual ability for the pupils.

Additionally, in the area of mathematics education it is believed that Web Apps for the iPod Touch provide many ways for students to practice and explore mathematical problems [28]. Firstly, Flash Math is a basic drill program that presents the child with a set of timed problems. Settings for addition, subtraction, multiplication, and division, as well as choices for the number of place values to include in problems the number of problems to present, the time for each problem and progressive time adjustments makes this application friendly for the student. As a result, teachers could certainly use this application to provide individual students with the types of arithmetic practice that they need in order to become more proficient in their mathematics classroom. In addition, Math Quiz expands this type of work to include squares and square roots and includes controls for presenting problems in random or sequential order. The problems are answer via a type spin wheel with audio clicks, which could be entertaining for the students using the app. Math Quiz continues to provide problems to the user for the duration of the experience nevertheless the lack of a stopping point could be a frustration for some students, but others could find that they enjoy the continual challenge [28].

The emphasis on multimedia learning has several implications as there is a need to design various multimedia environments focusing on mathematical tasks with different cognitive level demands and various contexts. According to a recently conducted research, the results showed that it seems reasonable and promising to apply a multimedia environment in kindergarten[29]. The authors also support that such tasks will challenge young students to be engaged in mathematics and will lead them to communicate in relation to the task. The study strengthens other research conclusions that there is a need to structure learning in small groups and that features of communication such as providing/receiving elaborated explanations must be practiced and reinforced. Specifically, in this study participated 116 students who studied in kindergarten classes. All of them had PCs at home, used

for different purposes such as playing, practicing and writing. The students were randomly assigned to either an experimental group or the control group. The experimental group included students that were exposed to the multimedia environment 'I study math' using one of two learning styles. One group was exposed to multimedia embedded in cooperative learning, the second group to multimedia embedded in individual learning while the control group was not exposed to multimedia. The multimedia was designed by the Centre of Educational Technology in Israel according to the kindergarten curriculum. The main purpose of the multimedia is to foster young students' mathematical concepts and skills about numbers and operations and to engage them in self-regulated learning. The study concludes, indicating that being engaged with multimedia in kindergarten affects students' mathematical skills. These findings were found for all three levels of mathematical skills and were remarkable for the high order skills [29].

Furthermore, Goodwin [30] conducted a research and the results showed that the impact of interactive multimedia on kindergarten students, who have difficulties in representations of fractions, is significant. More specifically, the study states that the use of instructive tools (cds such as the Galaxy Kids Maths), constructive multimedia tools (such as Shape Fractions, developed by the Learning Federation) and constructive tools (such as Kidpix, Kidispiration and Create A Story) can aid children's performance. After the intervention, the kindergarteners seemed to be skilled at using symbol notation and at recognising quarters whereas some of them depicted mathematical concepts. Additionally, the researcher claimed that the immediacy of the feedback provided by the multimedia tools allowed for a quicker pace of learning than traditional inert representations and may account for the differences in the post-intervention responses between the two experimental groups.

Last but not least, Tomi and Rambli [31] in their research present the development of an interactive mobile augmented reality magical playbook for preschool children in learning numbers using an old folklore literature, The Thirsty Crow, via mobile augmented reality application and interactive physical book interface design. According to the authors, Augmented Reality (AR) refers to a technology that gives the ability to the user the sense of the real world while interacting with the virtual and physical object. Additionally, mobile AR application has gaining popularity nowadays due to mobile technology advancement. Mobile refers to portability usefulness of the application itself, thus mobile AR application can be referred as a portable AR application. By applying this concept to AR storybook, the physical book will be enhanced by augmenting the virtual object (3D models, animations, and sounds) viewed over a mobile device. This study specifically highlights an innovative development of the interfaces for providing an AR storybook that enhances story reading and learning experience for preschool children via mobile AR application and highly interactive physical book interface design of the AR book. The findings of the study suggest that AR concept of the book successfully grabs children's attention while this application with the book is easy to use especially for young children. Furthermore, the children would likely to interact with the 3D character on the book besides their excitement of interacting with the book's character using their finger on their reaction. Finally, in math section, students were excited to count together with the 3D character while interacting with the book. Thus, it shows the users were fully engaged with learning process in a joyful learning environment [31].

#### 4 Supporting cognitive skills

Knowledge can become meaningful and purposeful if it is related to children's daily life and experiences. Through computer – based tasks children cope with a simulation of the real-world, make use of cognitive mechanisms and gradually construct knowledge because technology provides situational and visual cues that allow children to think, work out, interact, collaborate, create and finally learn [32]. Nowadays, touch screen devices allow for a much easier interaction for preschoolers than any other technology. According to a very recent study which was carried out in 2012, media tablets experienced the highest increase in usage among kids ages 4-14 years old with usage highest among younger children [33].

Researchers have examined children's cognitive skill development with digital media and have found that well-designed mobile -based learning activities and games can improve skills of abstract thinking, reflective thinking, and analyzing and evaluating information planning and scientific reasoning. Eye-hand coordination has improved with the use of computers at home and at school [34]. Also, young children have improved in problem-solving skills, spatial cognition, spatial representation, iconic skills, and visual attention skills when using computers, mobile and video games in school and for entertainment during leisure time at home. Use of digital media has been compared to traditional methods for teaching cognitive skills, and the research has found that digital media were more effective in specific cases. Besides, there is a general belief that kindergarten children developed stronger increases in memory when they used computers for learning compared to learning without new technology and multimedia [35].

Supporting the above view in a recently conducted study [36] is presented the effects of the Roamer Robot in children's cognitive development. The researchers indicate that the interaction with the robot, which is an autonomous, programmable toy, allow the child to study his ideas, construct a strategy and take decisions as well as improve problem solving answers.

Towards this direction, an exploratory study that was conducted [37] showed the advantages of a Logo-based environment on an Interactive White Board in children's cognitive skills and especially in the development of problem solving strategies and simple programs. The children followed for problem solving, either a planning strategy or a trial and error model, with teacher's guidance and developed a variety of cognitive strategies including attention and perception.

Despite the fact that not many studies have explored the role of new technology in working memory and inhibition, in kindergarten children, Thorel et al.,[38] report the role of a computerized training of visuo- spatial working memory and inhibition. The findings of their study suggest that children who trained on working memory improved significantly on trained tasks and children who trained on inhibition showed a significant improvement over time on two out of three trained task paradigms compared to the control group.

Additionally, digital manipulative often use context-sensitive sensors embedded within learning materials, according to Andrews and Catwell [39] in order to enhance children's problem solving, reasoning, and deeper understanding. Taking into account the findings of their research, it is obvious that digital media help young children to put forward thoughtful and justifiable theories.

## **5 Supporting social-emotional skills**

Collaborative learning and social-emotional skills can be enhanced with well designed digital technology. Existing studies [40] note, that young children who share the new technology, work in an equitable and cooperative manner showing a preference for working with peers cooperatively. Moreover, according to O'Hara [41], when young children use new technology are encouraged to discuss the stories, share their ideas and move characters around using the touch sensitive screen accompanied by much advice from their peers. The findings of the specific research claim that when settings include multimedia into imaginative and role play areas, the fact of social behaviour and communication is notably high when also teacher's guidance is present.

Additionally, the concept of children's play has changed considerably with the advent of new technologies in toys. Digital toys not only serve as catalysts for new forms of play, but also can influence the content of more traditional forms of play, particularly dramatic and constructive play. Technological advances in toy manufacture bring significant opportunities and challenges to early childhood education. Parents and teachers need to know how to use technology to promote learning, enrich children's play, and protect children from possible negative influences [28].

On the light of the above statement, Marsh [42] presented a study that electronic toys can have positive impact on children's play. Toys have always been social markers that reflect socio-cultural practices and the values of the society. Immersed in this multi-media world, children should experience diverse ways of learning and playing, including the use of media and electronic toys. Marsh also claims that it is hard to find studies that provide confirmation of the hypothesis that the use of electronic toys by young children produces any negative effects on play or development.

Bergen [43] recently conducted a study to investigate preschoolers' play with talking (computer-chip enhanced) and non-talking rescue heroes, either when alone or with a playmate. The research found that children who were presented with the talking toys used language narratives that were similar to those of the children with the non-talking toys. In addition, both groups of children did not differ from each other in the use of language and actions relevant to the themes of the pretend play. Bergen concluded that play was not stifled by the talking toys' special features. After repeating some novel phrases and sounds made by the talking toys, the children seemed to take control of the play and did not simply imitate.

Furthermore, multimedia environments by addressing both audio and visual senses tend to facilitate the procedure of new information and increase deduction. When a student learns, the new content when presented in both visually and non visually, meaningful learning occurs concluding that meaningful learning facilitates both the storage and recall of new information. Using a descriptive

research design, an existing study examined the implementation of an e-book shared reading in preschool classrooms. Observations focused on teachers' implementation of a vocabulary focused shared book routine, language strategies at the touch screen, mobile devices to extend the shared reading experience, and children's learning and entertainment. Participants included a diverse sample of 28 children that browsed or reread stories on a mobile device (iPad or iPod). Results suggest a relatively easy transition from traditional to e-book shared reading that may support children's word learning, but may not maximize the potential of e-books for instruction and independent reading. Moreover, the results point to the promise of e-books for supporting word learning in the preschool classroom as children seemed to enjoy and like to participate in this. Even with brief exposure to a set of target words, children made gains in both their receptive and expressive vocabularies showing their satisfaction using this kind of device. As the authors believe, the e-book, may extend the opportunities for word learning in the early literacy curriculum. Along with traditional shared book reading and read aloud activities, teachers can use e-books to further expose children to vocabulary words and make the learning environment more pleasant [44].

Furthermore, Horowitz et al. [45] examined the efficacy of video streaming lessons via cell phones as a means of increasing letter knowledge and motivation of preschool students. Participant families streamed two types of video clips to their cell phones: literacy tips for parents on integrating letter knowledge into daily activities, and Elmo "Letter of the Day" clips. Participant families were required to stream three sets of these videos, each set comprised of one literacy tip and one "Letter of the Day", weekly for a period of eight weeks. Participant report and observation indicated that the combination of literacy teaching tips and instructional alphabet clips showed great potential as a means of supplementing literacy instruction. In addition to resulting in increased alphabet knowledge of participants, the video streaming was reported to ease access to educational information for parents, provide a venue for easy everyday integration of literacy learning, and encourage enthusiasm and motivation.

Finally, in a recently conducted project in United Kingdom, project Interplay revealed that even young children (age 3 to 5) seem comfortable with mobile and other ICT equipment. The results showed that young children may learn ineffectively when using computers on their own and that adult guidance is the key to successful preschool learning with ICT and multimedia. The study included eight different preschools while the results showed that guided interaction can create opportunities for learning with new technology for children and concluded that computers are not suitable for activities by children of such a young age. They stated that technologies such as digital cameras, electronic keyboards and toys that simulate laptops provide better support for collaborative use, promote confidence, are more affordable and give children the opportunity to build on competences and knowledge that they may develop in the home setting [46].

## **6 Supporting motor skills**

With computers and other similar devices occupying an increasingly important place in early years education, it is perhaps not surprising to find concerns being raised about their impact on the young child's physical development, as well as health and safety issues[47]. According to several studies,

varying degrees of proficiency in individual manipulation of the mouse and keyboard are observed. Some children seem to be extremely adept at moving the cursor about the screen and mouse clicking on various objects, whereas others experience considerable difficulty in performing tasks that ask demands on their hand- eye coordination. It is agreed that becoming familiar with using the mouse and keyboard requires a good deal of practice [48], but observations from a relevant study would suggest that the young child's ability in letter (and number) recognition also has an important role to play in developing keyboard skills. It was widely felt by the teachers that computer and other devices use appear to enhance development of the young children's hand-eye coordination and fine motor skills [49].

On the other hand, in early childhood settings, mobile technology research has emphasized foundational motor skill development. The Learning Study, Rockman et al (REA), assessed the effectiveness of two research-based, educational literacy applications the Dog Party and the Super Why. Researchers gave 90 children (ages 3-7) an iPod touch on which to play the two applications over two weeks. Their parents completed observation logs, and the children were given a pre- and posttest to assess their ability in motoring skills and content areas covered in the applications. The results of the studies showed that children learn successfully when use such devices while children exercise their motor abilities and the eye-hand coordination [19].0)

## **7 Supporting children with special needs**

Many researchers support the views that students with special education needs face difficulties to develop cognitive abilities and acquire new knowledge. According to many studies, these students have to improve their behaviour, communication and relationships with their environment in order to gain quality in their learning and their daily life. The development of customizable and adaptable applications tailored to provide them with many benefits as it helps to improve the learning process to different cognitive, sensorial or mobility domain[50].

Taking the above into account, Fernandez- Lopez et al.[51] developed a platform called Picca, for users with educational special needs .The designers devised a mobile platform (based on iPad and iPod touch devices), in order to cover the main phases of the learning process: preparation, use and evaluation. The platform includes four kinds of educational activities (Exploration, Association, Puzzle and Sorting), which can be personalized by educators at content and user interface levels through a design mainly centred on student requirements. The results of their experiment shows that the use of the Picca is associated with positive effects in the development of learning skills for children who have special educational needs, observing that the basic skills (language, math, environmental awareness, autonomy and social) have been improved. Besides, in many cases children have the opportunity to perform activities that previously were not accessible to them, because of the interface and contents of the activities have been adapted specifically to them. The study also suggests that the repertoire of types of activities provided is suitable for learning purposes with students with impairments as well as the use of electronic devices and multimedia contents increases their interest in learning and attention.

Moreover, a current study compared the benefits of mobile phones as a management device for caring with lecture that is considered the traditional method for parent's education in this topic. In the quasi- experimental design of this survey 60 mothers who have a child with ADHD were randomly selected and divided in two peer groups. After running the pre-test that was based on knowledge and practice about ADHD and its management, one of the groups received educational comments from mobile phone and for the other group, lecture was held on. After 16 weeks, the investigators re-measured knowledge and level of applying of the trained techniques. The findings of the survey support the view that although both training methods had a positive effect on upgrade of knowledge and management techniques for mothers, the use of mobile phone as a learning supportive and assessment tool, seem to be more effective. Specifically, the mothers who joined the mobile learning group were successful to control the ADHD symptoms in their children than the mothers in lecture group [52].

Although most information about touch device use by people with disabilities may be in the popular media there is a research-base on the use of touch devices with people with developmental disabilities. Recent reviews have covered the use of iPods and iPads in teaching programs for people with developmental disabilities and more specifically, with autistic spectrum disorders [53]. This systematic review aimed to evaluate the use of iPods, iPads and related devices in educational programs for individuals with developmental disabilities. A systematic search identified 15 studies in which the results were largely positive, suggesting that such devices are important technological aids for individuals with developmental disabilities. The results of these studies also claim that individuals with developmental disabilities can be taught to use such devices for a variety of purposes, specifically for enhancement of academic, communication, leisure, employment skills, and transitioning skills. On the other hand, the authors state that some individuals showed difficulty in learning to operate such devices with sufficient motor control, suggesting that other solutions (adaptive microswitches, Bluetooth scanning switches e.t.c.) can be arranged [53].

## **8 Conclusion**

Mobile and multimedia's potential benefits in the educational settings are well documented at all educational levels from preschool to higher education. Precisely, mobile use in education can create new educational environments, provide new teaching methods, change the traditional teacher-student relationship and finally improve the quality of education. Hence, such technology can be considered as a very important tool in order to enhance innovation in education. Additionally, as technology market is rapidly developing, particularly the market of serving early childhood education, the availability and usage of technology for young children is widely spread and comes in to serve the youngsters much earlier[54]. Young children are growing up in a modern world, in which a wide range of new technologies are used, both at home and in preschool. As the researchers state, that nowadays even the youngest children live in a media-saturated world than the previous generations [55], there has been considerable international attention given to the use of mobile use in preschool education. Besides, adding new technology such as mobile applications into classroom children gain many benefits from such education as better conceptual understanding leads to better performance in learning.

The scope of this study was to present if and how new technology-mobile and multimedia learning environment can support specific skills in the kindergarten. The findings of the studies we examined, which are the most representative studies over the last decade, showed that kindergarteners can benefit of the use of new technology and can gain many advantages and profits using the appropriate educational tools. The use of mobile learning in special education is considered crucial in the early years however further research in this domain is thought necessary. Moreover, we consider that the field of kindergarten education and the interventions that mobile learning can contribute in many areas of child's development calls for more research hoping that the results of the current study are encouraging as there is the general consensus that new technologies do play a significant role in both ensuring and enhancing learning skills of kindergarten children.

Concluding it must be noted that, as our world changes every day children need peace and love to adapt better to markers of change, such as computers and mobiles, because children experience such changes early in their childhood. However, pedagogical views are deeply rooted in the functions of our basic understanding of early childhood learning. These roles also call for a new interpretation of children's use and learning. Therefore, learning and teaching cannot be considered separately and in the future, the teacher's task will be to understand the link between different types of learning and between different pedagogies and to choose which is the most appropriate for a given situation. With the emerging of new technologies, the criteria for assessing the quality of children's products need to be constantly updated to reflect their need [56].

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