

APP Tutoring

Didactic guideline for professionals in the field of ECEC

How to use APPs

Lead Partner Pedagogo represented by Rita Brito (PT)



Co-funded by the
Erasmus+ Programme
of the European Union

Lets try ICT has been funded with support from the European Commission. This publication reflects the views only of the author, and the Commission cannot be held responsible for any use which may be made of the information contained therein

CONTENTS

1. Introduction	3
2. Information Society	3
3. Impact in education: technologies advantages	4
4. Teachers training	5
5. Added value of technology use by children	5
6. Software quality	5
7. Mobile devices and Special Needs Children	8
8. The added value of the tablet for SEN children	8
9. FAQ's about the use of technologies by SEN.....	10
10. Risks and myths	16
11. References	20

1. Introduction

Our society is in a changing process and new technologies have a huge part in that. Some authors identify a new paradigm of society based on a precious commodity, *information*, giving it several names, including the *Information Society* (Naisbitt, 1988; Drucker, 1993; Toffler, 1984; Santos, 2004, p.255-268).

Given that this society lives through the power of information, based on new technologies, it can be very discriminatory between countries and even within a nation, between companies and between people.

We know that technologies are an integral part of our private and professional lives. With the domestic use of information technology, personal computers, the Internet and the mobile phone, a citizen's life is facilitated.

The potential of information and communication technologies is increasing, promoting a new society paradigm, which could facilitate the integration of people with disabilities into working life. On one hand, technologies can facilitate communication that is limited by a physical condition. On the other hand, the space barriers can blur themselves.

Nowadays we have access to research on the use of mobile applications for people with special needs, mostly children. I will present here some of these applications and their benefits for children.

2. Information Society

The Information Society uses Information and Communication Technologies as a resource. New technologies available in everyday society and at the workplace led to profound changes in the social and individual field to dramatically influence human life, time and space (Gouveia & Gaio, 2004, p.257). Society will tend to be increasingly competitive, creating more wealth and hence quality of life, becoming a freer society, avoiding the exclusion of citizens, inviting them to participate. But to make this possible and not create larger social asymmetries, educational policies play a key role. Considering information is the new social

paradigm, and also as a main resource, research, storage and processing of information, citizens have to learn to deal with this reality.

3. Impact in education: technologies advantages

According to the International Commission on Education for the twenty-first century, in its report to UNESCO, ICT is considered a valuable tool for education, "the use of computer and multimedia systems allow to define individualized routes in which each student can progress in accordance with their rhythm".

The use of new technologies is a mean to fight against school failure. It is often observed that "students with difficulties in the traditional system are more motivated when they have opportunity to use technologies and can thus better reveal their talents" (UNESCO, 1998).

Computer and Internet access has been increasing, facilitating remote learning for a continued education, an essential part of the Information Society. Virtual learning environments represent a completely new form of educational technology, offering institutions around the world a complex set of opportunities and challenges, consisting in a computer program of interactive education equipped with integrated communications capabilities, a program that intends to support, with a scientific real simulation as a learning environment.

There are many learning processes improvements offered by technology. The Internet is emerging as an instrument increasingly important for learning and entertainment. The introduction of the Internet and computer media led to a change in teaching methods, offering the teacher a range of ways that stimulate learning, mainly with the Internet and electronic means. Given this context, the school environment has important challenges it must meet. Those who do not follow the changes will be imposed with negative effects. Training on technologies still needs much improvement be it for educational actors or just ordinary citizens. Digital literacy must be developed and it is necessary to carefully analyse this issue. ICT's are no longer ordinary tools or work resources, they involve a complicated dynamic process of information.

4. Teachers training

Teacher training is a very important issue for the success of correct integration of technology and support provided to students with disabilities or learning difficulties. Initial teacher training is needed because there is still lack of teachers trained in special education. The difficulties experienced by professionals who have students of this kind are numerous, from lack of training, lack of adequate material conditions, lack of auxiliary staff prepared to provide support, architectural barriers to overcome.

5. Added value of technology use by children

Several authors had established the concept of assistive technologies, whose purpose is to increase the capabilities of these individuals who, for several circumstances, have an average level of executing tasks according to their age (Alcantud, 2000).

The advantages of ICT for this group are several (Perez de la Maza, 2000):

- They stimulate the senses, especially the visual, because people with special needs have mainly cognitive visual processing;
- They promote an active learning, with features like versatility, flexibility and adaptability, allowing them to customize and individualize the different applications and programs adapting to the characteristics and rates of learning of each person;
- They promote and make autonomous work possible;
- They are a great source of motivation and reinforcement, thus enabling an individual to focus better and reduce frustration when errors occur;
- They provide a controllable environment, with predictable responses.

6. Software quality

It is important to select quality software. Quality relates to a greater or lesser effectiveness of the strategy adopted in an educational context. Nowadays a school teacher is faced with an

increasing abundance of resources that are available online and there is a need to select the right resources according to specific set of goals. The abundance and credibility are some of the reasons that hinder and limit the rapid and efficient access to resources, it is also important to notice that many teachers express difficulty in searching for resources.

“What are the most adjusted resources to my group of students? How and where to find these resources?” are two of the many issues faced by educational professionals on a day-to-day basis.

The quality issues and evaluation software, digital educational resources and online educational content are a very debated issues by authors such as Pinto (2007), Costa (2007) and Ramos (2008).

According to Ramos (2008, 11-12) quality is “a property assigned to a product according to a pre-established set of dimensions and criteria”. We focused on the criteria definition that seemed the most relevant due usability of educational software, including accessibility; intuitive navigation interface; interactivity; flexibility; attractiveness; the scope; reliability; and educational value.

- **Accessibility**

According to Nielsen accessibility “is a quality attribute that assesses how easy the interface is to use”, allowing an easy learning system. The system must be accessible to perform basic tasks from the first operation.

Digital accessibility is documented by the World Wide Web Consortium (W3C) as the objective of allowing the largest number of people to surf the Web. The Universal Design for Learning (UDL) has at the core of its manifest the need to include all users and to develop resources that allows to satisfy specific user needs.

- **Intuitive interfaces**

Fineman (2004) considers that using a computer should relate to life experiences, user interfaces should be organized in a familiar and intuitive way making sure that the flow of continuity is always present when accessed by the user. According to this author, the user interfaces are the binding factor between a user and his computer and guarantee interaction and functionality.

- ***Interactivity***

Computer applications should provide activities and objectives according to desired learning paths, based on different resources and according to specific learning methods. Applications should also consider the Save, Export and Print features (Pinto, 2007).

- ***Flexibility***

Flexibility is tied to the ease of browsing, there should always be available a menu function as to help the user to quickly navigate thru sections of content. Ideally a user should be able to find and navigate to a specific content with the least amount of clicks.

- ***Appealing Design***

Software developers should take into consideration a sober and visually pleasing graphical layout of their applications, with the resource of multimedia artefacts such as diagrams, static images, animations, videos and interactive content.

- ***Scope***

The ability contents have in covering a wide audience. On one hand the scope should be characterized by the different levels of difficulty, on the other hand it should allow for in-depth and drill down content and also users to explore certain topics (for example: using external links, subscription to feeds, podcasts, etc.).

- ***Reliability***

All content should be identified and justified as to their origins and corresponding authors.

- ***Educational value (pedagogic potential)***

Educational value is judged on how much interaction it attracts with students, measured by the level of participation, collaborative work, educational context and quality of the learning process. This metric tends to optimize the effective learning experience.

Although fulfilling all the quality criteria described above, a software application might still is not be synonymous with obtaining quality in education. Even though it may be a decisive element in providing a differentiated education experience, it should be mentioned that an adequate software application mustn't necessarily be labelled as "educational", as mentioned by Papert (1997), what really counts is that it meets the learning objectives. The great advantage of this diversity of resources is linked to the availability of "alternative forms of

access to enriched information, appealing and motivating and above all, multisensory allowing richer engagement processes".

7. Mobile devices and Special Needs Children

Some research has highlighted the potential of technology in education, promoting their applicability in different learning environments (Crompton 2013; Jeng et al. 2010; Jones, Scanlon & Clough, 2013). As well as research on mobile technology, notebooks, smartphones, tablets, computers in regards to SEN children is considered by most as a reference (Burden et al. 2012; Kagohara, et al., 2013).

In the context of SEN, tablets have been subject of research (Campigotto et al., 2012; Dionne 2013; Flewitt, Kurcikova & Messer, 2014; Pellerin 2012), distinguishing several features in these devices which enhance its use in inclusive environments, including: touch screen capabilities, an intuitive interface, portability, integration tools such as camera and microphone, flexibility in presentation of text and image, simplified Internet connection, and a variety of free apps directed to SEN (Dunn, 2012). Among the most commonly used tablets, the iPad has been touted as a potentially useful pedagogical tool in the field of special education, since its use may increase or improve the functional capacity of students with special needs (Valstad & Rydland 2010). According to Melhuish & Falloon (2010), it may even establish itself as the tool of choice for these students, given the comfortable weight, size and features immersed in these devices, such as VoiceOver, voice control, mono audio, zoom, among other features.

In the context of non-formal and informal learning directed to SEN, research is still very limited (Ayres, Mechling & Sansosti, 2013).

8. The added value of the tablet for SEN children

Children with SEN have much to gain by using a tablet.

Flores *et al.* (2012) intended to perceive the tablet's usefulness in communication compared to the card system by children with autism and other disabilities such as multiple disabilities.

A communication strategy was held during a specific period of the day, the moment when children had their daily snack.

This research did not take into consideration the communication systems that children had used in school and family contexts. In the first phase each child had his own set of card symbols and in the second phase each child had his own tablet. The children showed behaviors that allowed researchers to conclude that they preferred to use the tablet for communication, throwing the card symbols to the ground and looking around for the tablet. At the end of the first phase one of the child's used the speech, repeating the verbal reinforcement heard through the tablet.

The team of professionals who applied this strategy said that communication took place more quickly and they felt that children manipulate the tablet with ease. It was also easier for teachers to prepare these sessions with the tablet and also required less educational elements. Despite the introduction of new images and a different strategy to use the tablet to communicate, children's skills were not diminished. They demonstrated to have developed a new functional learning, without showing regression in learning with cards.

The research conducted with autistic children presented by Hourcade & Hansen (2012), also studied the social skills and ability to externalize emotions. It consisted in the development of apps to be used on multi touch mobile devices for children with autism spectrum, and children considered with normal development.

The study revealed that technology can promote quality interactions, reducing the anxiety of children with autism spectrum. Interaction situations were carried out as a collaborative storytelling, where every drew an element which which he created a story. During this process direct interactions occurred, like waiting for their turn, passing the device into the hands of a colleague, and indirect interactions, such as the collective construction of a story through the design of each child. The researchers found that this research allowed to realize how the mind of a child within the autism spectrum works and even better understand his feelings.

Researchers concluded that the introduction of this technology in the education of children, especially children with autism spectrum, is promising in the development of socialization, creativity, understanding and expression of emotions and ability to exteriorize. They concluded that success is beyond technology, it is not enough to just introduce the latest technology but know how to tailor intervention strategies.

9. FAQ's about the use of technologies by SEN

In this topic we will tackle some doubts and issues that may come up when using mobile devices with special needs children.

Technical Questions

● **What is a tablet?**

A tablet is an Internet capable battery powered device whose most noticeable feature is a large touchscreen.

You can use it to go online, check e-mail, watch video clips, hear music, play games and read books, among other things. They can sometimes be considerably cheaper than a computer, even though there is a huge range of prices, mostly depending on the tablet specifications, like memory, processor capacity or manufacturer.

● **What kind of tablets are there?**

Different kinds of tablets are available on the market, so when you want to buy one the choice becomes difficult.

- **Operating systems**

The operating system has the function of support all the applications you want to run on the machine. There are several operating systems running on tablets but we will focus only on the popular ones that dominate the vast majority of the current market.

- **iOS**

This is a proprietary operating system developed and owned by Apple for its smartphones and tablets. You can find it running solely on Apple devices. Only Apple approved third party applications may run on these devices, therefore guaranteeing a streamlined user experience.

- **Android**

A Linux based operating system developed and supported by Google. It is based on an open

source platform which implies that anyone can freely access it and modify it. It has been adapted by several manufacturers for use on devices like cameras, TVs, game consoles, and watches given the accessible and competitiveness of its licensing scheme, the end result is an almost market dominance with a vast offer of hardware devices built by a growing number of manufacturers.

- *Windows*

With a significantly smaller market share, due to being a late entry, Microsoft has also developed a tablet operating system that runs on its very own Surface hardware as well as other manufacturers devices.

- *Weight and size*

Most tablets are small and fairly light. For example, an 11” inch iPad Air weighs 437 grams. The 7” inch tablets are much lighter: the Nexus 7”, Google, weighs 290 grams; Samsung Galaxy Tab 4, 7”, 276 grams. To give you an idea, the weight of a notebook is, on average 2.5 kg. What is the ideal weight and size? Despite being heavier, larger tablets have a clear advantage over smaller tablets: the screen size. You will feel the difference when you need to enter text or hit your finger to access a command in the browser. In a 10” inch tablet these tasks become easier and with less eyestrain.

- *Accessories*

One of the biggest differences between a tablet and a desktop is the inexistence of a keyboard or a mouse. However, nowadays there are a lot of accessories as to surpass these inherent difficulties: there are attached keyboards, you may plugin or remove at any time or you can just use an external keyboard via Bluetooth; you can have a virtual keyboard popup on the screen itself; and if you want to have an almost real life experience of writing, you can use a digital pen.

There are also other accessories that can be used by children. For those who cannot click with the mouse there is software that acts as a mouse replacement (Figure 1).

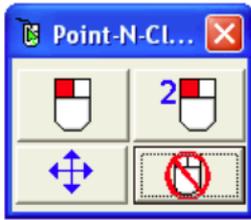


Figure 1: An example of a software that can act as a mouse replacement.

Head pointers like the Smart-Nav hardware (Figure 2), an infrared pointer hands-free device, can also replace the mouse. It allows the use of the computer by people with tetraplegia or any other limitation that would prevent the use of the hands. This pointer allows controlling the computer only with head movements or, in extreme cases of muscular dystrophy, with the bottom lip movements.



Figure 2: Head pointer Smart-Nav.

The virtual keyboard (Figure 3) allows you to replace the physical keyboard with a keyboard on the screen, designed for those who are unable to use a physical keyboard. It can be used by anyone who can control a computer mouse, trackball or other pointing device that can be connected to a computer.



Figure 3: An example of a virtual keyboard.

A single access switch (Figure 4) is used by people who have very limited mobility but are able to use this type of device. If a person can only move his head, for example, an option would be to place the switch next to the users head, which would allow the person to click on it with the movement of the head. This action is usually performed by a software running on

the computer, allowing the user to navigate through the operating system, on web pages and other software applications. There are software solutions that facilitate the typing of words, using an autocomplete feature that that efficiently suggests what the user may be typing.



Figure 4: An example of a single switch.

For instance, children with hand tremors can use this type of mouse (Figure 5), since it is easier to control, there is less risk of accidentally moving the cursor when trying to click on the mouse button. It can also be used with a foot.



Figure 5: An alternative mouse.

There are also tablet supports to fit in wheelchairs (Figure 6).



Figure 6: An example of a tablet support for wheelchairs.

- ***What tablet should I buy?***

There are lot of different tablets available on the market. The price depends on the technical specifications and on the company.

Before purchasing, you must analyse your needs. Do you need any specific settings or apps (some apps are just available on a specific operating system like Apple's iOs or device with an Android system)? Do you need a lot of space for data storage? Is a screen with more pixels and resolution is crucial for you? List item by item and then make your choice.

- ***Is it possible to adjust a tablet and it's applications to the specific needs of children?***

All tablets have inbuilt accessibility features. There are special settings for people with visual impairments, like increase the size of icons and text or dictate a text and read a text aloud, activate the spoken feedback, dictate text input and modify the way the tablet responds to touch, among other things. There are also other features such as VoiceOver (voice synthesizer), Zoom, Invert Colors and other accessibility features.

- ***What is an app?***

The word "app" is an abbreviation for "software application". Applications are installed and run on smartphones or tablets. An apps purpose is to tackle a specific task and make life easier for its users, providing them direct access to news services, weather info, games, maps services with geo-location via GPS etc., there is a never ending amount of apps for all types of purposes.

One of the major strong point of an app is its price. An average application costs less than 2 €, some apps are even cheaper and yet manage to be good choices in comparison. There currently available a large number of apps, of which about 35% are free, with some limited functions albeit, usually with the purpose of giving a user the chance to try out some of its most compelling features as to entice the user in buying complete version. In some cases applications might come with all of its features available for free (Cutlack, 2013), however, these applications usually rely on a user profiling and ad delivery business model and will probably interrupt the user experience with embedded ads.

Apps are impressively easy to download and install, completely eliminating the need of advanced computer skills to perform such a task. The most novice of users can intuitively

access a tablet, search for an app, download and install it, and get straight to using it in a very short amount of time.

- ***Do I need an Internet connection to use an app?***

There are several apps that not require an internet connection. As an example, you may take pictures, notes and play games offline. Most apps will require an internet connection to function properly for sharing or accessing content. However, there are several apps nowadays that even though they were initially conceived with the Internet as their main focus, manage to have many offline capabilities, such as file sharing apps (i.e. Dropbox, Microsoft OneDrive), TripAdvisor (a travel guide app) and Google Keep (a notebook and organizer application).

Educational Questions

- ***How can I connect apps to my curricular educational plan?***

The use of mobile devices, such as a tablet, has proven to develop and enhance motor skills, emotional intelligence, creativity, cognitive skills, and child's emotional and social development. Visual and auditory apps also engage the senses and stimulate creativity. Nowadays all devices have an "App Store" built-in with the Operating System, this makes it easy to search for specific apps that match your needs based on simple keywords (i.e. "geography maps", "maps", "English story telling"). For a more detailed research, there are currently some websites that offer a detailed educational perspective review, rating and catalogue of apps.

- ***How can I switch from an app to real life?***

It is easy to transfer activities carried out digitally for real life ones and vice-versa. For example, a child can draw something on a piece of paper, afterwards you can take a photo of it on your tablet, edit and enhance that photo (i.e. adding text or special effects) with an appropriate app and share it with other children and their parents.

- ***Should parents have training in order to use apps with children?***

Parents should have at least some kind of basic training, priority given to the topic of online

security and how to configure a smartphone or tablet for safe use by a child. Fortunately there is plenty of information in regards to this subject, be it documents or videos on YouTube, explaining the precautions and best practices parents should have before handing a device over to a child.

Usage/practice doubts

- ***When to use it?***

There is no predefined rule of when an app should be used or not, it depends on how the situation is perceived and if the adequate app can be found to be helpful or added value in regards to the current educational content.

- ***For how long?***

The American Academy of Pediatrics advise parents to avoid screen time before age two because it is thought to interfere with learning and language development media. They also recommend no more than 2 hours per day of screen time for preschool children (American Academy of Pediatrics, 2013).

- ***Should children use a tablet on their own, with peers or with adult supervision?***

Preferably, children should use tablets or any other digital device that has Internet access with an adult supervision. Operating systems can be configured to limit or completely block internet access to a specific app or browser, thus creating a more dedicated and protected learning environment for a child using this device.

10.Risks and myths

- ***Apps reduce social contacts between peers?***

The idea that computers isolate children, cause the decrease of interactions between peers and adults, and thus reduce opportunities for the development of basic social skills is actually a myth and is probably one of the aspects that research has shown agreement of results. Computers have shown that they do not isolate children as they seem to be catalysts of interaction and collaborative work thus creating additional opportunities for the development

of social skills.

- ***APPS reduce active exploration behaviour of preschool children?***

Apps can be a supplement to the active exploration of children.

- ***APPS create dependency, they are the new DRUGS?***

Just like everything else, the use of technology must be moderate. Naturally, most apps are games that are developed to be attractive and addictive to children, parents should be aware of such behaviour just as if they do in regards to the amount of TV children watch or how many hours of gaming they are allowed on consoles.

- ***Using APPS in preschool creates ego-shooter-player in school age?***

Usually that kind of game is for children under 10 years old.

- ***APPS reduce creative processes***

Another belief that sometimes arises associated with the idea of using computers is that they turn children into "automatons", in apathetic children who behave like a machine, interfering negatively in their affection and their creativity development. A research carried out by Susan Haugland (1992) with kindergarten children showed that computers reduce creativity of children when they are limited to use it to explore drill and practice software, but results also show that the same does not happen when children use open-ended software suitable for its development. That is, children may or may not use computers creatively, but it does not depend on computers, depends on user experiences that are provided, are those that facilitate or not development. They will enable children to be active users and creative, and not merely passive consumers of what is presented to them.

- ***Early usage of APPS does not increase digital competence.***

Usually children adopt technologies very easily, especially the mobile ones, such as tablets.

By using them, they are developing their digital skills.

But more important than knowing how to handle digital devices (increasingly intuitive and accessible) it is important that children develop digital literacy and information skills. Digital Literacy is the ability to perform tasks in digital environments - including the ability to read and interpret media, reproduce data and images through digital manipulation, and evaluate

and apply new knowledge in digital environments.

- ***Technology should not be used in preschool***

Some authors condemn the use of technology before children have seven, whereas children before this age are not yet able to operate with abstract systems and emphasizing the fundamental need of direct experiences with the surrounding world (Elkind, 1987; Healy, 1998). The computer is indeed a symbolic medium, but are not children, precisely in this stage, and according to Piagetian theory, preoperative stage is characterized, first, by deepening the symbolic function? Are they not, therefore, to develop their capacity to represent and mentally think about objects, people and events, from words, symbols, or images? To find, among other things, relations of cause and effect? (Sprintall & Sprintall, 1993) Wouldn't that be the reason of the fascination and attraction that most children feel by using the computer? Maybe kids are interested in the computer because it combine all these "ingredients" along with the feeling of control over what happens. The child is not limited to watch, she know's she can act and realizes that it's her actions which determines the events.

- ***APPS replace the pedagogical interaction between teacher or kindergarten teacher and child?***

Common sense says that technology will replace the teacher. This idea is wrong because the teacher's role remains essential in the classroom. But he has to stop being the center of the whole learning process. It is necessary to show openness and encourage student-teacher working together, making learning a breakthrough experience.

- ***APPS reduce active learning processes (e.g. memory training..) ?***

The use of technologies can enhance various areas of children's learning.

Regarding cognitive development, through technology children have the possibility to associate direct manipulative experiences to the use of a computer program. This experiences have shown greater skill in classification operations and logical thinking than those who only had access to the concrete manipulative experience. Also learning concepts such as symmetry, patterns and spatial order seems to be favored by the use of software using geometric shapes.

The games enable a more complex and fluent speech, as children are encouraged to use

language, especially when they use open programs that encourage exploration and fantasy, as in drawing software, making descriptions while drawing, moving objects or "write" and telling more elaborate stories about the drawings made on digital devices. Interaction with technology enhances verbal communication and collaboration among children and stimulates vocalizations in children with speech problems.

The use of electronic storybooks and mainly its creation by children increases their reading and writing. It is important for children to have contact with reading and writing practices and engage in activities of this nature that make sense to them, like how to make a shopping list, writing a letter or a message, listen to read, invent and dictate stories, etc.

The technology provides children with opportunities to engage in exploration, co-construction of knowledge on symbolic representation, development of literacy and related concepts such as writing directionality, sequential, etc. Thus it is possible to explore letters and words, copy names and phrases, using the keyboard and surpass the motor difficulties that arise to some children due to handwriting.

Technologies have shown increase the first mathematical concepts of children, as shape recognition, counting and classification. But the computer's main contribution seems to be in the development of geometric and spatial thinking, favoring the development of concepts of symmetry, patterns, spatial organization, among others.

Internet access can provide unique opportunities for children to access people, images, sounds, sites of interest and diversified information otherwise hardly accessible, that can be powerful educational resources. You can search on whales and their habitats, "visit" a distant country from which the new colleague came, using an interactive encyclopedia to know what rockets are, or simply to see the work carried out in another kindergarten. In addition to accessing information, technology can be used to transform and produce new information. The Internet offers children the chance to edit on paper or online their work, like a school newspaper, a research project developed, or a story. The use of digital cameras allows documenting experiences of the children within their community or in other contexts.

- ***Computers are harmful for children's health***

Concerning the physical effects arises the possibility that using mobile devices can cause nervous tension in children, affect vision and promote a sedentary lifestyle. There is not enough research to understand if, and how, the use of technologies can affect the children's

physical health. However, this is not a specific problem of mobile because it also stands face to television and video. On the other hand, there is to consider the time factor of use, i.e., if the technology is used during prolonged periods of time, of course that this issue will arise with greater relevance.

11. References

- Alcantud, F., Ferrer, A. & Romero, R. (2000). Analysis of disabled users requirements for a web. In Vollmar, R. & Wagner, R (Eds.) *Computer Helping People with Special Needs*, pp. 571-578. Österreichische Computer Gesellschaft.
- American Academy of Pediatrics (2013). Children, adolescents, and the media. *Pediatrics*, 132(5), 958–961. Retrieved from <http://dx.doi.org/10.1542/peds>
- Ayres, K., Mechling, L., & Sansosti, F. (2013). The use of mobile technologies to assist with life skills/independence of students with moderate/severe intellectual disability and/or autism spectrum disorders: considerations for the future of school psychology. *Psychology in the Schools*, 50(3), Wiley Periodicals, Inc.
- Burden, K., Hopkins, P., Male, T., Martin, S., & Trala, C. (2012). *iPad Scotland Evaluation*. Hull, Humberside: University of Hull.
- Campigotto, R., McEwen, R., & Demmans Epp, C. (2012). Especially social: exploring the use of an iOS application in special needs classrooms. *Computers & Education*, 60, 74–86.
- Costa, F. A. (2007). A aprendizagem como critério de avaliação de conteúdos educativos on-line. *Cadernos SACAUSEF*, 2, 45-54.
- Crompton, H. (2013), A historical overview of m-learning. Toward learner-centered education. In Berge, Z. & Muilenburg, L., *Handbook of Mobile Learning*, p.3-14. Routledge. London.
- Cutlack, G. (2013). What are apps and how do they work with your smartphone? *Techradar, the home of technology*. Retrieved from <http://www.techradar.com/news/phone-and-communications/mobile-phones/what-are-apps-and-how-do-they-work-with-your-smartphone--1141429>
- Dionne, C. (2013). *An Introduction to Mobile Apps for K-12 Students with Special Needs: an Instructional Website for Educational Technology Students*. ETEC 690 Spring.
- Drucker, P. (1993). *Post-Capitalist Society*. New York: Harper Collins Publishers.
- Dunn, J. (2012). *The 200 Best Special Education Apps*. Edudemic. Retrieved from <http://www.edudemic.com/special-ed-apps/>
- Elkind, D. (1985). The child, yesterday, today and tomorrow. *Young Children*, 42(4), 6-11.
- Fineman, B. (2004). MetaMonitor: a system for patient monitoring in intensive care units. Masters Thesis Project, School of Design, Carnegie Mellon, University, Pittsburgh.
- Flewitt, R., Kucirkova, N., & Messer, D. (2014). Touching the virtual, touching the real:

- iPads and enabling literacy for students experiencing disability. *Australian Journal of Language and Literacy*, 37(2), 107-116. Retrieved from http://eprints.ncrm.ac.uk/3366/1/Flewitt_Kucirkova_and_Messer_2014_Touching_the_virtual_touching_the_real.pdf
- Flores, M., Musgrove, K., Renner, S., Hinton, V., Strozier, S., Franklin, S., & Hil, D. (2012). A comparison of communication using the Apple iPad and picture-based system. *Augmentative and Alternative Communication*, 28 (2), 74-84, doi: 10.3109/07434618.2011.644579
- Gouveia, L. & Gaio, S. (2004). *Sociedade da Informação – Balanço e Implicações*. Porto: Universidade Fernando Pessoa.
- Haugland, S. W. (1992). The Effect of Computer Software on Preschool Children's Developmental Gains. *Journal of Computing in Childhood Education*, 3(1), 15-30.
- Healy, J. (1998). *Failure to Connect: How Computers Affect Our Children's Minds – for Better and Worse*. New York: Simon & Schuster.
- Hourcade, J. P., & Hansen, N. E.-R. (2012). Multitouch tablet application and activities to enhance the social skills of children with autism spectrum disorders. *Pers Ubiquit Comput*, 16 (2), 157-168.
- Jeng, Y.-L., Wu, T.-T., Huang, Y.-M., Tan, Q., & Yang, S. J. H. (2010). The Add-on Impact of Mobile Applications in Learning Strategies: A Review Study. *Educational Technology & Society*, 13(3), 3–11.
- Jones, A., Scanlon, E., & Clough, G. (2013). Mobile learning: Two case studies of supporting inquiry learning in informal and semiformal settings. *Computers & Education*, 61, 21–32.
- Kagohara, D. M., Van der Meer, L., Ramdoss, S., O'Reilly, M.F., Lancioni, G. E., Davis, T. N., Rispoli, M., Lang, R., Marschik, P. B., Sutherland, D., Green, V. A., & Sigafos J. (2013). Using iPods(®) and iPads(®) in teaching programs for individuals with developmental disabilities: a systematic review. *Research in Developmental Disabilities*, 34, 47–156. Retrieved from <http://www.sciencedirect.com/science/article/pii/S0891422212001941>
- Melhuish, M., & Falloon, G. (2010). Looking to the future: M-learning with the iPad. *Computers in New Zealand Schools*, 22(3), 1-16.
- Naisbitt, J. (1988). *Macro tendências*. Lisboa: Editorial Presença.
- Papert, S. (1997). *A família em rede*. Lisboa: Relógio D'Água.
- Pellerin, M. (2012). E-Inclusion in Early French Immersion Classrooms: Using Digital Technologies to Support Inclusive Practices that Meet the Needs of All Learners. *Canadian Journal of Education*, 36, 44-70.
- Pérez de la Maza, L. (2000). Programa de Estructuración Ambiental Por Ordenador para personas con Trastornos del Espectro autista: PEAPO. In F.J. Soto Pérez & J. Rodríguez Vázquez (Coords.). *Las nuevas tecnologías en la respuesta educativa a la diversidad*, p. 255-258. Murcia: Selegráfica.
- Pinto, M. (2007). Evaluación de la calidad de recursos electrónicos educativos para el aprendizaje significativo. *Cadernos SACAUSEF*, 2, 25-43.

- Ramos, J. (2008). Avaliação e qualidade de recursos educativos digitais. In *Cadernos SACAUSEF V. Recursos educativos digitais de qualidade ao serviço das escolas*, pp. 79-87. Lisboa: Ministério da educação e Direção-Geral de Inovação e de Desenvolvimento Curricular.
- Santos, N. L. (2004). Sociedade da Informação: Mudanças e desafios psicossociais no contexto sócio-laboral. In Gouveia, L. B. & Gaio, S. (orgs.) et al. *Sociedade da Informação – Balanço e Implicações*, 255-270. Porto: Universidade Fernando Pessoa.
- Sprinthall, N. A. & Sprinthall, R. C. (1993). *Psicologia Educacional*. Lisboa: McGraw-Hill.
- Toffler, A. (1984). *A Terceira Vaga*. Lisboa: Liv. Do Brasil.
- UNESCO (1998). *Professores e ensino – num mundo em mudança. Relatório mundial de educação 1998*. Rio Tinto: Edições ASA.
- Valstad, H., & Rydland, T. (2010). *iPad as a pedagogical device. Program and Information Systems, Specialization Project*. Norwegian University of Science and Technology.