Mobile Multimedia Education for Language Disorders

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Abstract—In this article we present an overview of studies of the most recent years which describes the importance of new multimedia tools that provide multisensory education for language learning, especially for students who need special education. These contemporary appliances stimulate senses, enter the motivation and reinforce the memory and concentration .Also, these devices produce scaffolding methods which assist the students with language disorders. In particular, these tools advance language skills such as comprehension, oral language and vocabulary, speaking expressions and dialogues, reading capacities and writing abilities. In general, the evaluation for students with language disorders lies on cognitive and meta-cognitive capabilities, being created by these interactive media devices.

Keywords—Language disorders, multimedia, multisensory education, mobile applications, scaffolding methods.

1 Introduction

1.1 Background and the time of technology

In this study e-learning education refers mobile applications which support and assist language disorders. Mobile applications work with screen, formulas and software and include mobile learning, e-books, graphic novels and comics which are embodied in mobile devices.

Massaro reports that multimodal learning as learning situation includes a variety of sensory information: visual, auditory, tactile and motor. Multimodal learning can be benefited certainly from the interactive multimedia environment such as an application called "Animated Speech Corporation". This tool assists the students in the spoken and written language since it includes audiovisual material as well as test exercises which are fundamental for learning and retention. The researcher refers the importance of Montessori's principles for the beginning of the multisensory system [1].

Rathore evaluates the importance of new digital technologies, as interactive media and multisensory tools in developing all the four skills of language learning, namely reading, speaking, listening and writing. According to investigations using a storyboard tool, Computer Assisted Instruction (CAI), Computer Assisted Learning (CAL)

and computers with speech synthesizers the reading skills, decoding and comprehension of students with or non-learning difficulties are improved [2].

Di Fuccio et al., describe an educational tool for digital and multisensory Storytelling with smell, taste and touch, called STTory. It indicates the involvement of all the senses for comprehension and learning and not only hearing and sight. The researchers are guided by Montessori's pedagogy who applied in the classroom. They accomplished learners' understanding, motivation and recall, using the RFID technology with active table, software, tangible objects, smelling and tasting jars [3].

Ciampa refers to electronic devices and how these redesign the education system. The research explores why motivations created by using a mobile phone. These motivations separated into internal and external ones and regulate the behavior of the student. Internal motivation is challenge, curiosity and control. The challenge is stimulated when a variety of difficulty levels (easy, moderate, and difficult) are used. The curiosity is one of the most important motivations that lead to learning. It is subdivided into aesthetic and cognitive curiosity. Sensory curiosity is developed since the possibility of creating multidimensional and pluralistic environments (visual, acoustic, kinesthetic) is created. This first one is mobilized by sensory stimuli, light and sound. Cognitive curiosity on the other hand grows after the mobile phone has access to recent and updated information. Multimedia effects have sound, music, animations and require a sense of touch. The third motivation is control. Self-control and self-determination improve internal motivation and external motivation. Cooperation has also been strengthened as tablets and mobiles eliminate individuality and join students to solve exercises and proceed to the next level [4].

Glackin makes a general overview on the subject of electronic multimedia and applications using a scientific discourse specializing in technology. The article specializes in how mobile electronics have impact on learning. In particular, it states that "mobile devices" provide access not only to electronic books but also to electronic tools and materials that can support the curriculum (e.g. online database, streaming media, e-journals). One advantage of the mobile is that it goes "everywhere". Another advantage is the virtual reality which creates energy in the classroom and makes the events seem realistic while at the same time the pupils acquire realistic experiences. In addition, it's speed. The article, through researches concludes that the most important contribution of mobile devices to education is that someone could find information quickly and directly [5].

Martin concerned whether the new mobile phone technology contribute to knowledge. The answer to that hides in phone's flexibility, accessibility and several of applications. The article focuses on some mobile devices such as GIS data, GPS chips, RFID chips, Bluetooth, 2D and 3D bar codes, sensors, NFC / near-field communication through radio technologies, mobile and visual search, camera use for image capturing and social networking. Furthermore, research analyzes in what ways these devices could help children with their learning. For example, students could access information related to what they are seeing and experiencing at the same time through multisensory ways. Each class was randomly selected in the study to have an electronic device such as iPod, iPads, and computer that would interfere with a subject related to artworks. The results show that students earn a lot of things when they

use iPods and iPads at the time they see artworks. The other team that processed the information in the classroom on computers afterwards seems more confused. So, direct use of electronic devices has a positive effect when it comes to the training topic [6].

2 Mobile Application

2.1 Mobile learning language

Takacs underlines the importance of the visualizing of story events congruent with the narration helps students especially those at risk. They could develop through this procedure, comprehension skills and code-related skills such as phonological awareness or concepts of print. This study makes a step forward in our research as long as focuses on interactive features of multimedia such as questions, zooming, sounds which are activated by clicking on or touching a spot in an illustration that often indicated as hotspots. According to the dual coding theory verbal and nonverbal information are processed in two separate but interconnected channels in the brain so that the one could help the other and further the learning. Results from researches which compare children's comprehension and memory of the details of animated (television) to audio-only (radio) stories show some evidence that dynamic visualizations enhance knowledge. For children with dyslexia or other educational disorders who do not fully understand narration, because of lack of the language and comprehension skills that are necessary for learning, animation and sound effects can fill in the gaps. This appealing technological environment strengthens vocabulary and communication with the text during the reading and literacy skills [7].

FernáNdez-LóPez et al., design and propose an electronic platform, called Picaa which support children with special educational needs. In the beginning, the bibliographic review shows that children with special learning difficulties are characterized by heterogeneity as there are different syndromes, pathologies and disorders. The difficulties are subdivided into cognitive, aesthetic, physical difficulties in their behavior, difficulty in concentration, memorizing, attention, and readiness in work rates. "Mobile learning" provides exercises, practices, simulations, exploratory communication activities, also stimulates interest and creates incentives. More detailed accessibility and flexibility, hearing and imagination that are mobilized alternatively. Picca platform specializes in personalized activities such as puzzles, data association, searching, classification and memory games. Visual skills are developed on the platform through the design of images, pictograms and subtitles [8].

Daud emphasizes on how dyslexic children could benefit from a mobile application known as "Dyslexia Baca". The application's format is based on alphabet recognition on a different multisensory approach for suitable learning and on an ecosystem especially formulated for dyslexic children. More specifically, "Dyslexia Baca" uses visual graphics and games which help recognition of the alphabet, motivate learning ability and the ability to recall information. The most interesting part is the Ecosystem. The Ecosystem is a variety of circumstances which taken into consideration to pro-

duce this application/formula, for instance the learner's style, learner's needs and the learner's capacity of receiving information. The Ecosystem also includes all of ICTS, tools/devices/software that is appropriate and recommended for the specific difficulty. The pedagogy personalized and these elements ensure the knowledge [9].

Sarrab and Elgamel underline that e-learning generation need mobile devices inside the educational environments. Mobile phones have several educational usages such language teaching with the use of short messages, looking up for words and vocabulary in foreign language classes, the use of mobile cameras to photograph blackboards, PowerPoint displays or any other important document, and much more. After a review, authors find out that students use mobile phones more than computers and desktops. That element contributes to the fact that mobile devices are expected to be a part of every class and activity both inside and outside lecture classrooms and not be prohibited, as it happens, in some universities and schools. Authors also enumerate some of applications for mobile phones that could be used inside the classroom. "Alykko" is an intelligent mobile tutoring tool for teachers that support interaction and educating dialogue using mobile technologies. "Active campus" is also a context aware organizer that supports some classroom activities. Moreover, a context-aware mobile and collaborative learning scenario is a context-aware mobile application for university that supports many universities campus requirements. The definition of m-Learning and the advantages could be summarized in three words "Anywhere, Anytime Knowledge" [10].

2.2 E-Books

This research [11] is related to e-books and how they can help children with developmental difficulties that may also present special learning difficulties. The children who participated in the research were presented some e-books and activities on them. E-books are in a photocopied form, in order to compare e-books with traditional books. The results showed that the children had considerable academic improvement, especially in terms of phonological awareness and vocabulary when e-books were in front of them. In the bibliographic review it was observed that children with special educational needs are delayed in perception and memory due to some neurobiological disorder. In particular, they have low response rates, phonological awareness disorder, short long-term and short-term memory, problems in perception and automatic processing. The presence of these conditions requires the integration of multisensory learning and the focus on alternative activities within each educational process. This reality motivates teachers to look for new tools. Such tools are E-books, storybooks, CD-ROMs, living-books. These tools cover the gap between learning difficulties and the acquisition of vocabulary, comprehension, reading and phonetic awareness.

Tosun investigates the preferences between printed books and e-books. In his article he summarizes the advantages of e-books. For example, using less paper, less space, it is easy to carry and searching information is much easier. Note taking is more comfortable and the size of the pages could be changed according to the learning style of the reader. On the other hand, there is a list of devices and tools which help to read an e-book. Such kind of tools are Iriver eBook Reader, Oblio E-Book

Plus, Kindle, ReederLITE, reed PAD2, eInk as well as desktops, tablet computers, iPhones and iPads, Blackberry's, mobile phones and navigation devices. Although, the main question of this study is in which circumstances students show preference in e-book reading. The results show that if their divisions and their studies are related with technologies and science they need to read e-books. Despite this category of students there is still a preference for reading printed books instead of e-books. The most important factor students prefer printed books is the cost. Moreover, some students and teachers do not have sufficient knowledge and skills to read e-books. There is a need on keep up with the digital generation [12].

Larson makes a step forward in the evolution of e-books. From now on, there is a variety of digital readers such us Kindle, Nook, Sony Reader, Cybook OPUS, iLiad and iPad that help both teachers and researchers. Teachers from one hand look closer to the actual needs of today readers and on the other side researchers address how digital and multimodal experience could produce different kinds of literacy skills. The study finds out that through e-book tools, reading text becomes more familiar to each individual. In the Midwestern United States seventeen second graders with a teacher, read online texts, and use digital readers. From the data that have been collected the author analyses the positive effects that make the "Kindle" tool on two girl-students. The skills called by two words "literature-response mechanism" and separate in categories. The first category is: understanding the story. Girls take notes while they are reading and notes reflect a sense of spontaneity and impulsiveness as they expressed the revealing of the emerging plot. Towards they expressed a desire for additional information or clarification of the text sometimes through personal commentary or retelling some parts of the story. The second category is personal meaning making. In this category, readers express thoughts and feelings about the reading experience as they related to plot and characters. The third category is questioning, the most of the notes that are being kept from girls, were questions about the text. The fourth and fifth skills are answering and text literacy. The results from this study appear promising in using digital reading devices. The literacy development due to digital readers is a revolution and offering a glimpse into the unique minds of individual readers [13].

Ciampa defines mobile e-books as an electronic reflection of a real book, on the computer screen. For this era, e-books appear to be a growing choice. The study investigates how e-books can help the reading process of beginning readers. The article's review supports that e-books contribute to make a self -regulated learner who will not need adults anymore. This is accomplished in several ways. For example, students could take control over learning goals and produce cognitive strategies, ownership, learning in contexts, and continuity between contexts predicting, summarizing, interfacing, asking and answering questions, monitoring, and making connections. Additionally, the affection is actually on behavioral engagement, especially students' attention and effort, cognitive engagement using high-level cognitive strategies to foster deep learning and emotional engagement enjoying reading tasks and expressing enthusiasm about reading. Other researchers trying to find out how interactive e-books could help students stay in the main idea as long as the interactive features with multimodal tools ''bring the book to life". The importance of integration of mobile educational technologies is also highlighted both in schools and families. The pilot

study focuses on how reading motivation created with mobile e-books and how student's cognitive strategy expands during mobile e-book reading. The sample consisted of six 7-year-old children lived in the same suburban school district and all of them were English-speakers. The tools were a questionnaire, behavior observation checklist, an e-book reading log and cognitive strategies rubric. The data analysis was dealt with descriptive statistics, such as frequencies, means, and percentages and show that e-books became the most preferred reading choice for more than half of the participants [14].

Lam introduces the usefulness of e-books on how they enhance learning and prepare students for college. E-books can extend learning spaces to places beyond traditional classrooms, libraries and homes. Moreover, some of the good aspects are portability, the modern design, which is economical, convenient and interesting. It could be read everywhere and have access to every possible information. About the features, the article highlights the page turning and scrolling of text, and accesses the Net Library, while transferring an e-Book. Furthermore e-books include a wide range of content related to academic and personal interests [15].

2.3 Graphic novels and comics

Smetana et al., define and separate the definitions between comics and graphic novels. Comics could spread in different kinds such us science fiction, superhero books, realistic fiction, biography, romance, adaptation of classics. On the other hand graphic novels have inside comics but with lengthy and complex stories. This research focuses on deaf students because they need to develop Basic Interpersonal Communication Skills (BICS). Graphic novels and comics make a new environment that could help deaf students broaden their vocabulary and conceive interpretation of concepts. Visual communication is so immediate and direct that helps them understand more quickly the concept. Graphic novels are like movies, like prose which give the chance of understanding and deriving intangible feelings through allusion and not through direct description [16].

Vassilikopoulou et al., make a step forward and claim that comic books can work more effectively through the web. The researchers have found that educators use cartoons to extend pedagogical strategies. They find out a range of Greek comic books such as Asterix, Aristophanes' comedies, or Sophocles' tragedies in comic format. They mention the benefits and strengths of comics such as motivating, visual, permanent, and intermediary popular, development of thinking skills. The variety of advantages is huge because e-comics combine not only electronic devices but also picture the world in an alternative relation. The research was about to explore comic books as an educational tool, the results focus on what teachers feel and how they face this new experience. They make a catalogue of good points and aspects of comics. They say that the approach was "easy to understand", "opportunity for meta-cognition", "visualizes the concepts", "retain in memory" and "learn through playing" [17].

Umar et al., analyze the positive contribution of a comic application in mobile devices, based on the characteristics of dyslexic children. More specifically, they search

the possibilities of implementing a comic application and how could dyslexia motivation be improved. Firstly, the visual language is a social interactivity. Comic is a « holistic method ». It can combine spoken language, gestured language and drawn language which is the key of multisensory approach. The results of this research are that comics maintain attention and images are related to children's life in this era with pictures. Mobile phones are personal items, easier to use and do not create anxiety. The difficult part in the process is how the data could become information, information knowledge and then knowledge become wisdom. After the use of this comic application the results also saw that children express the need to have the application for all the other subjects [18].

Chun et al., investigate how the use of graphic novels promotes language pedagogy and learning in general. According to the article, graphic novels implement a multi-literacy approach that deepens in reading. Firstly, the article summarizes the positive aspects of graphic novels such as the overcome of social issues as long as graphic novels help their internalized literacy. Moreover, graphic novels could be close to their interests and their own life experiences. Also the need of define meanings, unfamiliar words or grammatical structure in language give the opportunity to graphic novels to include and develop not only the textual perception but also the visual, the spatial and the aural. The pilot research took place in a secondary high school. The article investigates how "Maus" (graphic novel) produces a critical glance in English language as a second language. "Maus" presents the history of the Holocaust with characters, emotions and ways that history textbooks often do not. This novel is characterized as a "scaffolding method'' or "critical tool in action" as it produces meta-cognitive and meta-linguistic abilities [19].

Downey et al., focus on the importance of graphic novels as they combine text and images and create a real book. Graphic novels are easy to read so educators could enhance reluctant students to read and illustrate social and cultural themes and topics. The authors said that teachers could connect the ideas to bigger topics and make the lesson more effective and interesting for everyone. Moreover, Graphic novels promote a visual literacy. Color affect, emotions, pictures can make stereotypes of people also could help visual learners and students with special educational needs or learning disabilities through this inventive method. Besides, in this day and age children are engaged with video games, television, internet, "they never get the word without an image" and could interact with graphic novels more effectively than traditional books. Moreover, graphic novels use "best practices" such us examining literary elements as plot, scenery, characters, premise, similarity, metaphor, exaggeration, colloquial phrases and slang terms developing deductive, reasoning abilities, an advanced thinking level [20].

3 Discussions

This review provides evidence for the efficiency of multimedia technologies for language disorders intervention. All studies confirm the usefulness and necessity of using modern technology with pictures to improve language capacities. After so many

years of searching and asking questions about the issue of language disorders, experts, teachers, therapists, psychologists and occupational therapists came to the fact that technological achievements and programs with specific design is the solution to the problem. Since then more and more schools all over the world, educational systems end multisensory teaching approaches discover the efficiency of technologies in so many different language disorders with unexpected positive results. The new aspect in this educational technological world is the combination of pictures with technology. Programs with all these new graphics, new adventure feelings, games and anxiety challenges with animations, creativity and fantasy stories, with novels, competition and music backgrounds are so appealing to this new generation. This entire new world is available for the new generation. But what if this new age face some problems with language management? This technological world offers some ideas and alternatives that actually help children in so many different ways. We have noticed positive effects as a result of the improvement of verbal communication and functional communication, receptive language and vocabulary, pronunciation and neuropsychological rehabilitation. Also, these devices offer confidence in the ability to communicate and articulation of sounds. Some advantages are easy understanding of text, visual mechanisms social skills, attention, processing and recognition of emotions understanding, motivation and engagement in learning activities to children with language disorders.

4 Conclusion

The article makes a list of names of mobile applications including e-books, mobile devices, graphic novels and comics. All of these applications are suitable for multisensory education that focuses on language learning, especially recommended for language disorders. Moreover, it is stimulated that technology motivates interest and design a path where students could find knowledge and discover new ways of learning. The multisensory education takes place from now on, in a different, this time, technological way, through all these applications. The significant part is that information is increased and so students who are at risk with more developed senses than those who have cognitive memory could benefit from these technological and alternative methods and learn equally. To be more specific, pictures could enhance the internal figurative images through comics and graphic novels, especially when they are included in new technological devices familiar to young students. From all the above, we could all understand that education is not anymore a privilege but a right for everyone. And that right could be the substance, through diversified teaching and a personalized program, adapted to the needs of the students. To make that a reality, teachers should be informed and educated about all these new educational methods and use them in an efficient way. Generally, the article presents applied research related to multimedia and language learning and help teachers discover efficient alternatives of learning through multimedia in education, a more interesting procedure for everyone.

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