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Teaching Reading through ICTs: Computer-Based Applications and Software for Reading

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ABSTRACT

The emergence of Information and Communication Technology (ICT) has revolutionized the way language skills are taught and learned. ICTs help learners, pre-school and advanced ones, improve their reading skills by offering comprehensive and evident reading materials together with voice modifications and picture integration. Furthermore, reading comprehension can be facilitated by the integration of computer technology because the latter offers tremendous options for both parents and learners that would help them make the reading process funnier and fruitful. Reading programs, computer based applications and software are among the options provided by the integration of ICTs in language teaching and that can alter the way the reading skill is taught and learned.

Keywords: ICTs, reading skill; computer-based reading applications.

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Introduction

Reading plays a pivotal role in students' process of language learning. In fact it is a part and parcel of it; learning cannot take place without this skill. Reading is one of the two receptive skills which provide the linguistic input to those learning English as a foreign language. In his book "Developing Reading Skills", Watkins (2017) highlighted the social position of reading as a mandatory source of knowledge in any individual's life. He, therefore, stated that:

> **Reading and writing are incredible human achievements, allowing us to communicate across both space and time. Amongst other things, the magic of reading allows us to witness history as it was being made, be transported to magical worlds, gain new knowledge and stay in touch with loved ones when we are thousands of miles apart . (2017, p.14)**

In addition to the great role reading plays in shaping one's knowledge of his world, it plays an undeniable role in determining his academic level. Levine et al. (2000, p. 1) said, ''The ability to read academic texts is considered one of the most important skills that university students of English as a Second Language (ESL) and English as a Foreign Language (EFL) need to acquire''. It is considered as the foundation of instruction in all the facets of language: grammar acquisition, vocabulary development, reading, revising and using computer assisted language learning programs (Mikulecky, 2008). Jarvis and Pastuzka (2008) also pointed out that reading ability plays a crucial role in student's academic achievement. One of the so many payoffs a foreign language learners could benefit from reading in a foreign language is an increase in its vocabulary.

However, despite their awareness of the immense potential of reading, learners are most of the time less motivated to read. In fact, a number of recent studies in the field of educational technologies claimed the positive role played by ICTs in solving that kind of problems. Computers, for instance, can improve learners' reading ability by raising their interest in the material they are about to read and provide them with the proper feedback on their work (Green, 2005, p.57).

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1. Reading as a Process

For many, reading is a simple task and it does not require too much to be performed. However, if reading is that easy, how, then, can we explain the bulk of reading difficulties addressed in the set of researches especially with foreign language learners? To get started, reading is a sophisticated task. Watkins (2017) mentioned that: "there is a tendency to think of reading as a single skill. However, reading is complex, made up of a whole range of different processes." This implies that reading is the result of series of actions taking place in the mind. Davies (1995, p.1) defined reading as: "a mental, or cognitive, process" in which a reader tries to understand, decode or interpret a message written by a give, writer. Goodman (1967, p.113) illustrated this process as follows: graphic code → decoding → meaning. That is to say, reading is a matter of deciphering written symbols to understand a text.

Al-Mutawa and Kailani (1989) explained reading by stating that it is an operation that includes a group of "subsidiary skills" like: the identification of the letters (the alphabetic system), the association of written symbols with the linguistic elements, in addition to the cognitive understanding and eye movement.

Therefore, Birch (2007, p.1) suggested three models in order to explain the process of reading. He noted that these three metaphors demonstrate in a graphical manner all that is related to reading as a process. In doing this, he stated that it is better to think of reading as an "information processor" and as a type of "expert decision maker". The first of these models was called by Birch (2007) "the interaction information processing metaphor". (Figure 1)

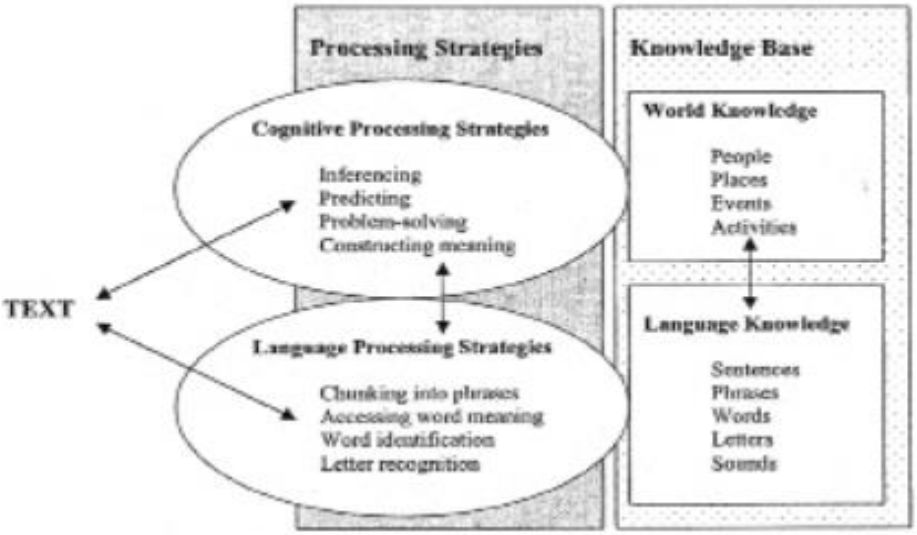

Figure 1: A hypothetical model of the reading process with some sample processing strategies and types of knowledge. (Birch 2007, p.3)

As it is exhibited in the above figure, this model of reading is made up of two sides; one is called the knowledge base while the other is called the processing strategies. According to Birch, text comprehension has to go through some processing mechanisms to the knowledge base because this latter cannot be enough for the reader to be able to understand the text. Moreover, Birch (2007) adds that in order for the reader to apprehend the meaning of any written language; be is a text, a sentence or any form of written language, the reader has to make use of the processing strategies he acquired or learned together with the knowledge base.

Furthermore, Birch (2007) stated that for a reader to be able to form a general understanding of a given text, he needs to make use of the top and the bottom of the model in a parallel way. That is to say, the processor or the reader can guess what the text is about and also the intentions of characters in addition to the relation of the events using the top of the model; cognitive processing strategies and world knowledge. The bottom of the model; however, allows the reader to transform "squiggles" from a page into meaningful signs with the use of language knowledge and language processing strategies. Birch (2007) concluded that for the reading process to be effective, information has to be flowing in the two directions; downward (from the top to the bottom) and upward (from the bottom to the top).

2. Difficulties in Reading Comprehension for Foreign Language Learners

Apropos the above definitions and explanations of the reading process, it is clear that this skill is not as simple as one may think. Learners of English as a foreign language and especially Arab ones find it hard to reach the level comprehension and fluency in reading texts. Al-Mutawa and attributed these Arab learners' difficulties with reading to the absence of one-to-one correlation between the sound and the written symbol. Examples include:

- the sound of 'c' in words like car, core or city;
- the different sounds of the grapheme (gh) in enough, tough, night and hiccough,
- the final silent (e) which signals a change in vowel sound in mad/made, not/note, bit/bite, cut/cute, etc.

Vocabulary knowledge can either facilitate or impede the comprehension of an L2 text. Laufer (1997, p. 31), one of the pioneers in the field of vocabulary research, noted that, "By far the greatest lexical obstacle to good reading is insufficient number of words in learners' lexicon .Lexis was found to be the best predictor of success in reading, better than syntax or general reading ability". A good vocabulary size facilitates text comprehension and when someone misses the proper lexical knowledge about a given topic, he subsequently fails in attaining the signification of the text.

Scholars such as Chall (1987) and Nation (2001) talked about the fact that the relationship between vocabulary size and reading comprehension is not "one sided" (Nation, p.238). They are necessary for each other's development and enhancement; a rich vocabulary is mandatory for a successful reading and the latter is a contributing factor in enriching one's vocabulary knowledge. Chall (1987) and Nation (2001) have also mentioned that when the text contains words that do not exist in one's lexicon, that may stand in the way of understanding the text.

Researchers have also talked about the role reading plays in maximizing somebody's vocabulary size; the more one reads the greater his vocabulary stock will be. Reading is the first thing to be recommended for those who are willing to learn a foreign language and use its vocabulary. According to Nation (2001), learners incidentally acquire small portions of words while reading. He believes that as they increase the number of intelligible texts, the more these amounts will increase. That is to say, one of the effective ways for increasing vocabulary size and knowledge is reading; the more a learner reads, the larger is his vocabulary stock.

3. Information and Communication Technology in Education

Education has always been taken as the corner stone necessary for the development of any nation. Therefore, specialists in the field have put on too much endeavor to come up with the most effective tools to improve its quality which led to the appearance of technology in the scene. Subsequently, the integration of technology in education has come to be known as "instructional technology". Technology is defined as the feasible implementation of knowledge especially that related to a specific area (Merriam-Webster, 2018). Hence, by combining technology with instruction, instructional technology would refer to the practical application of knowledge of instruction.

Therefore, using technology or ICTs in education can contribute significantly to increasing its quality. According to UNESCO (2006, p.1), "It is instrumental in increasing productivity, efficiency, competitiveness and growth in all spheres of human activity". As far as the implementation of ICTs in education is concerned, UNESCO stated that it: "can implement, enrich and transform education for the better". The use of ICTs in education implies the use of any technological means in instruction including phones, TVs, videos, CDs and the like. Computer has always been considered an important tool in teaching especially in foreign language teaching. Computers, with the abundant resources and applications it brought dominated the field of foreign language teaching and paved the way to extra changes to be made at the level of the practice.

4. Computer Assisted Language Learning

As technology in general was being embraced by the field of education for its advantages, computers have been adapted as a significant and a musty educational tool considering its various features. In his article "A History of Instructional Media and Technology", Reiser (2001) stated that computers have come to replace any form of audiovisual techniques and became a popular tool ever since. The application of computers in the different fields has led to positive and satisfying results. As far as education is concerned, Underwood (1984, p.33) stated that the merging up of technology with instruction and more particularly foreign language teaching would bring up fresh variations.

Therefore, the term used to refer to the branch of study which deals with the integration of computer technology in the field of language teaching is "CALL"; Computer Assisted Language Learning. The well-accepted broad definition was proposed by Levy (1997, p.1) which states that CALL is: " the search for and study of applications of computer in language teaching and learning". This definition refers to the fact that CALL is a multidisciplinary field that receives contributions from areas such as; psychology, applied linguistics, instructional technology, artificial technology and others. Yet, the acronym CALL was not a permanent one; change of focus and the development of new technologies called for some adjustments at the level of labeling. The adaptation of mobiles as instructional tools added the term MALL to the list (Mobile Assisted Language Learning). Since that the use of technology is not only limited to computer, web-enhanced learning through computers was also suggested (Thomas, Reinders and Warschauer, 2013, p.20).

5. Computer Assisted Language Learning and the Reading Skill

Reading as a language skill plays a pivotal role in the process of foreign language learning as it is a key source of language input in addition to listening. Levine et al. (2000, p. 1) said, ‘‘The ability to read academic texts is considered one of the most important skills that university students of English as a Second Language (ESL) and English as a Foreign Language (EFL) need to acquire’’. It is considered as the foundation of instruction in all the facets of language: grammar acquisition, vocabulary development, reading, revising and using computer assisted language learning programs (Mikulecky, 2008). Jarvis and Pastuzka (2008) also pointed out that reading ability plays a crucial role in student’s academic achievement. One of the so many payoffs a foreign language learners could benefit from reading in a foreign language is an increase in its vocabulary.

However, despite their awareness of the immense potential of reading, learners are most of the time less motivated to read. In fact, a number of recent studies in the field of educational technologies claimed the positive role played by ICTs in solving that kind of problems. Computers, for instance, can improve learners’ reading ability by raising their interest in the material they are about to read and provide them with the proper feedback on their work (Green, 2005, p.57). Additionally, educators such as Altman (1972) stated that individualized instruction is one of the advantages offered by computer technology. As opposed to differentiated instruction, individualized instruction is a system where the choice of objectives, materials, and all aspects of the classroom is based on the features and needs of learners (Altman, 1972). That is to say, using the 21th century technology, teachers are going to focus on the abilities and interests of each individual learner.

The reading skill can be facilitated by the integration of computer technology for these latter offers tremendous options for both teachers and students that would help them make the reading process more funny and enjoyable. Nuttal (2005) postulated that, “the aims of reading program are to enable students to enjoy (or at least feel comfortable with) reading in the foreign language, and to read without help unfamiliar texts, at appropriate speed, silently and with adequate understanding”. Reading with the aid of computer based applications does not only solve the various reading issues learners encounter it also makes it faster and funnier which is almost possible when reading takes place in traditional contexts. Also, Marzban (2011) compared the performance of the experimental group which was taught reading by means of computers with that of the control group. According to him, there

was a significant difference between the results reported by the two groups stating that computers are effective tools for teaching the reading skill.

In an attempt to evaluate the extent to which computer technologies can contribute in improving learners' reading skills, researchers such as Bateineh (2014), Auzar (2013) and many others conducted studies in which they probed the influence of multimedia and hypermedia technologies on students' reading achievements. The findings revealed that there was a progress in learners' reading achievements after they had been exposed to these technologies. Hypermedia annotations or glosses, compared with the usual glosses make the process of checking the meaning of unknown words easier and not time wasting. The same for multimedia; when a given text is backed with some pictures or an audio script related to the topic, reading will be very effective.

6. Computer-Based Reading Software Programs

Since the emergence of technology and its use for pedagogical reasons, many options kept appearing on the field including those designed for the facilitation of reading. Many studies discussed the effect of different computer based softwares for reading such as Hot Potatoes, ABC Mouse, Starfall and other educational tools.

6.1. Hot Potatoes

The Hot Potatoes program is an educational tool that comes with a variety of options for practices. The *Hot Potatoes* suite includes six applications, enabling you to create interactive multiple-choice, short-answer, jumbled-sentence, crossword, matching/ordering and gap-fill exercises for the World Wide Web. Hot Potatoes is freeware, and you may use it for any purpose or project you like. It is not open-source. Different studies have discussed the utility of Hot Potatoes in improving reading skills. A recent study published in 2018 by AbduAllah Farih probed the efficacy of this educational software in teaching reading. The researcher studied whether or not the software had a positive impact of 28 students' comprehension of descriptive texts. The sample of the study was divided into a control group and an experimental group. The findings; therefore, proved that using Hot Potatoes as a tool for improving the reading performance of students in the treatment group.

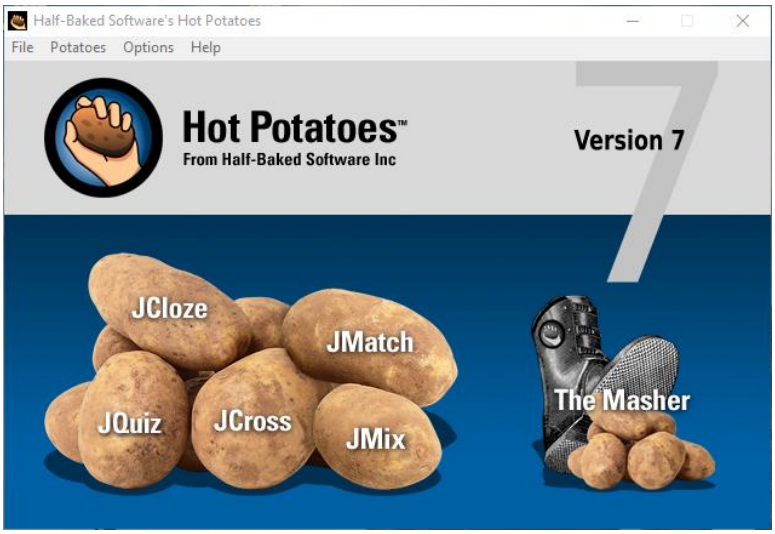

Figure 2: A Screen Shot of the Hot Potatoes Software.

Another study carried out by Herawati and Pariyanto in 2020 has also explored the benefits of using Hot Potatoes to enhance EFL secondary school students' reading. The given results also supported the use of this authoring tool to teach reading in an EFL class. Vargas and Monge (2014) investigated the role Hot Potatoes can play in designing didactic units to teach reading comprehension. They stated that the implication of this program has a lot of positives. They said that thanks to the varieties of exercises added to the program can be opened in HTML format which makes them editable and customized. Not only that, this tool can also be used to enhance students' listening skills by adding audio files and videos. Moreover, Vargas and Monge (2014) noted that Hot Potatoes boosts teachers' creativity by allowing them design and customize activities to what suits their students' needs. As far as reading is concerned, the authors said that this tool helps enhance students' reading comprehension thanks to the different activities which target the different levels of students' comprehensions.

6.2. Starfall

This free, computed-based application is not dedicated to teach reading to EFL students per se. It mainly targets emergent readers. This tool was launched in September 2020 and it was designed to teach children language arts and mathematics.

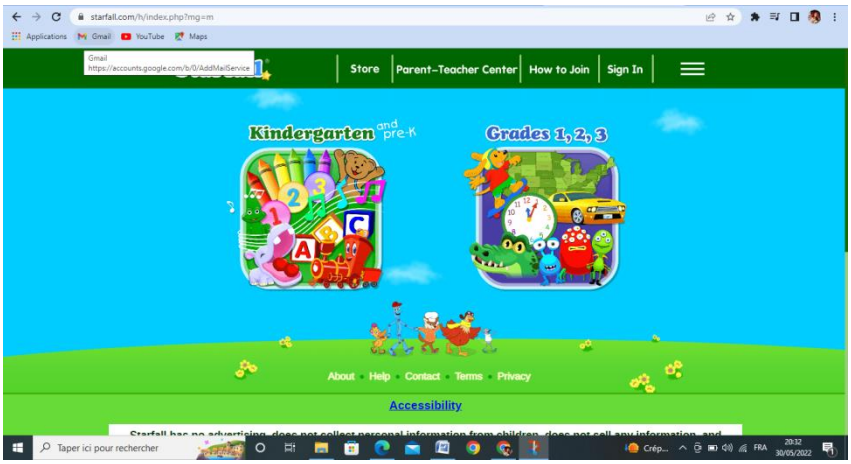

Figure 3: A Screen Shot of the Starfall Software.

Starfall offers reading practices for beginner readers starting from small units of words starting from alphabets, to phonics to whole short stories.

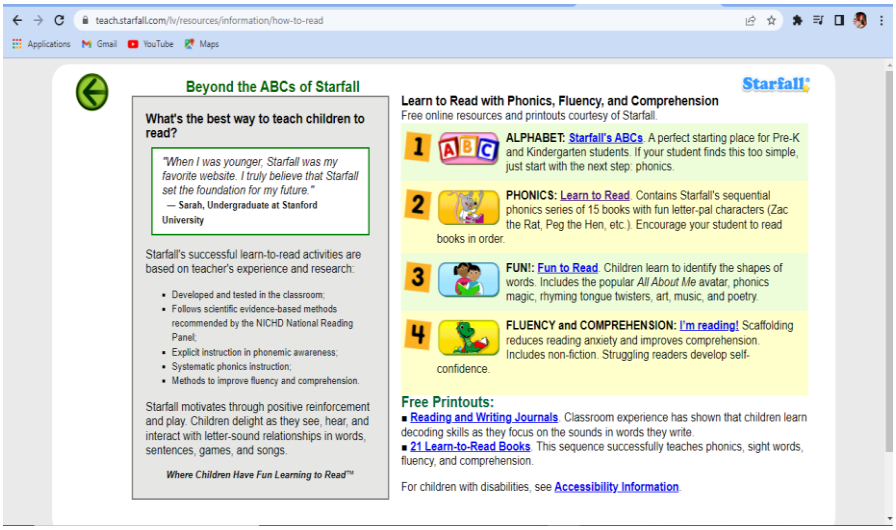

Figure 4: A Screen Shot from Starfall Sofware.

When choosing the fourth option, Fluency and Comprehension, users can access to a list of short plays which allow children to practice both reading and listening skills. The following screenshot shows how the process goes.

Figure 5: A Screen Shot from Starfall Software.

As we mentioned earlier, this program is primarily designed for children to train for reading and get used to it gradually. It does not require programming skills or high level of linguistic knowledge. Children can learn reading in a fun way and step by step.

6.3. ABC Mouse

ABC Mouse has long been the favorite learning app for many parents and children. It was created for kids between the ages of 2 to 8. A research study commissioned by the Early Age education experts investigated the effect the implication of ABC Mouse on kids reading performance. According to the Age of Learning website, ABC Mouse was designed to contain a curriculum that does not only teach reading but also mathematics, science, art and other topics. The learning resources available at ABC Mouse can be books, puzzles in addition to vocabulary tasks.

Zamora and Pittman (2018) published an article studying the effect of this app in addition to Starfall. They reported that the use of these programs helped increase kids' reading performance with 85%. According to the Age of Learning blog, a couple of studies were carried out in many USA schools on the efficacy of ABC Mouse in teaching school children the basic skills of reading. They summed up the findings in the following notes:

- ABCmouse.com accelerates learning, with children developing early literacy and math skills significantly faster as a result of using the curriculum.
- ABCmouse.com helps children make significant gains in phonics, vocabulary, literacy, and other reading skills, as well as numeracy and other key math skills.
- Children who regularly use ABCmouse.com at home score more than 50% higher on several reading and math skills—on some skills, more than 80% higher—than peers who have not yet used the curriculum.

6.4. Duolingo ABC

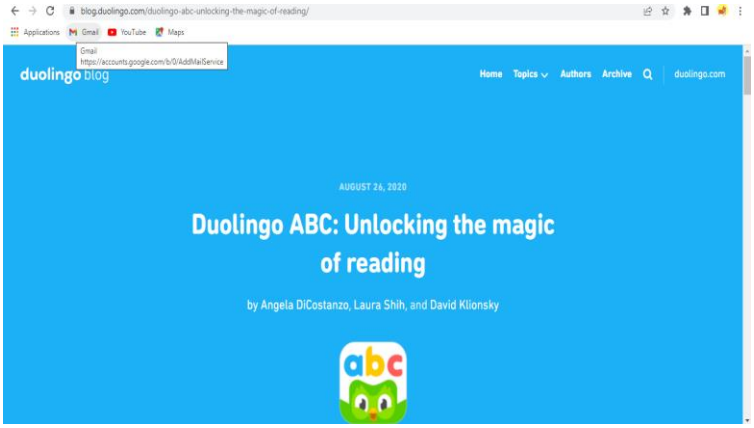

Figure 6: A Screen Shot from Duolingo ABC Software.

Duolingo is a famous learning app that is used by over 500 million users worldwide, according the Duolingo Language Report (2020). It was created in 2011 to help users of whatever language background to learn foreign languages from basics. Duolingo ABC was launched by the uolingo company in 2020 to teach kids to love reading and to polish their learning skills especially during the lockdown of schools during the Covid19 pandemic. According to their blog, Duolingo creators reported the findings of a survey carried out by National Assessment of Educational Progress concerning kids and students reading performance. The findings showed that children's motivation to read has dropped. That is how they came up with the idea of designing the Duolingo ABC app for reading.

A study conducted by the Education Development Center with the association of Duolingo revealed that this app helped a group of kids to increase their reading literacy by 28% within 9 weeks. DiCostanzo, Shih and Klionsky, the three producers of Duolingo ABC, reported that before the creation of this app, they questioned 100 parents about their kids reading challenges. The answers agreed on the fact that these parents lacked knowledge on how to teach reading to their kids who spend most of their time in screen. They reported that they wanted their children to use their screen time to have fun and learn at the same time.

Duolingo ABC provides children with the essentials of reading skill starting with the recognition of symbols making up the phonetic sounds and letters. Teaching kids the phonetics is just a means to an end. The aim is to make them ready for comprehension of texts. That is why, the designers of Duolingo ABC included mini-stories for the different units of Duolingo curriculum.

Conclusion

Implication ICTs can be difficult sometimes and requires some digital skills. However, the set of the self-learning applications we explored in this short paper are examples of educational tools which can be used by parents and their children without having to know much about programming. Reading as a skill is mandatory for effective learning especially of in a foreign language. Yet, EFL learners show some reluctance and fear when it comes to reading a text or answering its comprehension questions. That is why, it is quite important to start teaching this vital skill at early stages. Since the Algerian Ministry of Education is intending to add English to the primary school curriculum, parents need to know about the availability of such free programs and games which do not only teach children the ABCs of learning but also make the learning journey fun.

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