Memory, Motivation and Language Learning

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When applying information and communication technologies (ICT) in language learning, learners' motivation and the retention of both short and long-term memory were proved to be improved.

Keywords: interactive digital whiteboard ; memory ; motivation ; language learning ; ICT

1. Introduction

The application of information and communication technologies (ICT) for foreign language learning started as a great novelty and has great promise. Over the years, this situation has been normalized [1][2]. That is to say, the use of these technologies has allowed a new way of seeing and managing teaching–learning processes. Today, even though certain barriers exist, the use of these fundamentally computer-based processes has become more and more natural and even necessary.

There are many tools that have been used since the beginning of the technologicalization of teaching and learning. The advent of information technology is bringing about a real transformation in this area. One of these instruments is the interactive digital whiteboard (IDW), a touch interface connected to a computer, which allows not only writing or drawing as on a traditional blackboard, but also inserting and dragging images, navigating or highlighting on the screen. Gradually, the IDW has become one of the most comprehensive and innovative resources for teaching [3].

On the other hand, along with the fact that the main problem, which affects language learning, can be related to the use of an obsolete and inadequate methodology, other aspects, such as the lack of interest and motivation of students, are being put forth as the key to the development of the teaching–learning process. Thus, these aspects are pivotal for teaching staff [4][5].

In this sense, from the beginning of the inclusion of computer technologies, the use of hardware and software allowed the development of different strategies in the foreign language classroom to improve levels of motivation and interest [6], such as explanations supported by images, animations, the use of websites and specialized applications, the viewing of films, documentaries, etc. [7] as well as the use of a text processor offline and online, among others. All of these aspects have helped to more successfully tackle the problem of the interest and motivation of students [8].

In other words, digital resources have been acquiring importance in education insofar as they help the integral development of students, through interactive digital materials that generate motivation and also learning [9].

The COVID-19 disease, caused by the SARS-CoV-2 coronavirus, has been a differential factor in the inclusion of digital technologies in educational institutions during this time. In Spain, a state of alert was established wherein non-attendance education has jumped exponentially. In this scenario the suspension of classes has not adversely affected student training for the time being. The effect, however, is full of unknowns [10].

In this situation, the fundamental elements that will be affected in educational institutions are varied: firstly, the technological and administrative aspects, and, on the other hand, the pedagogical and the communicative ones, generating a totally new situation in the midst of accelerated measures towards virtual forms of teaching–learning [11][12][13].

Naturally, this situation will imply managing teaching–learning processes with the assistance of digital technologies, many of which will break the hegemony of the in-person method until the establishment of more hybrid or totally remote models.

2. ICT and IDW in Education

2.1. Advantages and Disadvantages of ICT Inclusion in Education

Despite the fact that the inclusion of digital resources in education has not stopped growing and envisioning a future that is not only promising but even unthinkable without their use [1], doubts about the capacity to improve learning have not stopped accumulating [14].

Specifically in the area of the IDW, Barrantes Mestas [15] lists some of the disadvantages associated with its use, such as inappropriate practices, inadequate digital information selection, logistical problems, maintenance problems, etc.

Ambivalence in the use of technologies is a reality that has been evident in studies over the last few years. In 2002, the US government published a study in which no significant differences were found in tests of mathematical and social knowledge in groups using the Internet as a methodological basis and other traditional ones [16]. However, while current research findings affirm that ICT skills are related to academic success and affect learning differently [17], they depend on how pedagogical approaches consider their use and training [18].

In spite of all this, the consideration of the learning process as something very complex leads us to contemplate multiple aspects, some of which have been described as disadvantages or inconveniences in relation to the inclusion of ICT within educational spaces. Among them are the teachers' lack of knowledge of the pedagogical bases of the use of ICT or the exclusive use of the computer to the detriment of other instrumental and methodological options.

In the case of the IDW, the advantages of its use have also been studied, and there is abundant literature on its positive effects on the teaching–learning process, students and teachers [3][15][19][20].

However, the potential benefits depend on the use of the IDW, a key aspect for research [15], i.e., interaction with students may be affected, so that they do not really play an active role in their learning, but are merely passive recipients of certain visual and auditory stimuli. Or, on the other hand, in the case of students with a kinesthetic learning style (those who perceive information better when they make movements and their emotions are activated), the use of the IDW would not improve the learning processes and would minimize the didactic possibilities of its use [21].

In this sense, the IDW has, as well as some studied disadvantages, advantages that should not be seen only in the visual and auditory field. Among them would be those related to the educational relationship between teachers and students. In other words, the pedagogical use of this tool produces a positive impact on teacher–student interaction, as well as an impact on the different forms of memory. Each time teachers run software through the IDW, the potential teaching functionality is expanded, and the exploitation of resources is maximized [3].

Not only are perceptive learning styles are favored, but coding processes, memory retention and metacognitive processes are also preferred. In this way, students retain the fruit of classroom interactions more easily, due to the fact that the different memory channels (semantic, procedural, emotional, episodic and automatic) can be processed [22][23].

As far as coding is concerned, which Schacter [24] (p. 69) defines as "the processing of transformation into memory that people see, hear, think or feel", the more elaborate such processing is, the better it will leave a trace of memory in the learner [25].

This is why, in particular in the case of the IDW and other future possibilities offered by research, such as the use of "near field communications" within the framework of the "smart classroom" [26], they not only contribute to an improvement in motivation, but also more efficient learning [2].

2.2. The IDW in Language Teaching

In the case of language teaching, the inclusion of ICT in educational institutions has shown, according to studies [27], that they can improve the results of teaching and learning processes. Thus, it is suggested that the use of educational technology allows for greater effectiveness in the methods of teaching and learning foreign languages.

These technologies offer many possibilities. One of them is related to IDW. These are tools that provide added value for the improvement of teaching and learning processes [3][19]. Specifically, in language teaching, they generate an active and interactive process that has been studied since their introduction in schools [28]. With the use of the Internet, the IDW accesses multiple pages for free, which allows teachers to approach a new language in a more dynamic and attractive way, and in a more playful and interactive way [29][30].

For Dudáková [31], IDWs are related to the possibility of understanding concepts and developing certain skills. In the case of the teaching–learning of languages, they allow for an adequate understanding of information and the creative practice of the necessary skills of language learning.

The evaluation of this tool is related to the use of the IDW and, on the other hand, to the fact that students strive to work on the tasks assigned in a motivated manner [32]. Moreover, this issue usually reinforces their self-esteem and positive attitude towards the subject [33], beyond the 'novelty effect' that these same authors described. This situation, on the other hand, allows the students who use the IDW to make use of it by demonstrating their use skills in front of their classmates [34].

3. Conclusions

This experience allows us to conclude that the inclusion of ICT, which are especially useful in language learning, should be called upon to play a fundamental and growing role in the teaching–learning processes, either in person or, predictably, after a change in the trend caused by the COVID-19 pandemic, online. These are the bases of the new educational paradigms, which are more focused on the person, where functions such as memory and processes such as motivation are very important in the consolidation of learning within the framework of the commonly named "smart classroom".

The IDW has gradually become one of the most comprehensive and innovative resources for teaching, thanks to its touch interface connected to a computer. Part of its versatility is due to the possibility of bringing together other valuable components to generate dynamism in the classroom, such as software and peripheral devices, whether on site or remotely.

The AM application allows for the development of more optimal levels of motivation thanks to its characteristics, functionality and, consequently, its possibilities, which are related to a positive impact on the behavior, interests and attitudes of students, which are, in turn, fundamental for the development of teaching and learning processes in the context of foreign language teaching.

Motivation in AM is determined by several factors that facilitate its activation: the use of ICT, images and sounds that are striking or appealing, non-routine activity, competition by groups and objectives to be met (to get the greatest number of pairs).

The effectiveness of ICT, and in particular of IDW and AM, depends on the conditions and the pedagogical approach that the main actors are able to carry out. Despite this, their potential in the development of different forms of memory is significant, as has been pointed out.

Responding to the objectives set out in this research, we have verified how AM's didactic functioning is optimal, allowing students to learn new English language vocabulary in an entertaining way (gamification), making their learning more effective.

On the other hand, regarding the objectives related to the analysis of AM's effectiveness in terms of motivation and short-term and long-term memory retention, we concluded that the vast majority of participants (70.88%) enjoyed working with AM, which is a fundamental motivation for learning. This is also related to the low distraction of the participants during the AM activity—70.25% of the respondents said that they were not distracted at all.

Finally, in relation to memory retention, we conclude that AM contributes significantly to improving memorization, as shown by the 20-percentage point increase after 45 days. In short, we are facing the possibility of improving motivation, attention (and the avoidance of distraction) and memorization skills of students through AM (in a gamified environment) in a very important way.

The application of strategies supported by ICT, such as in the case of Action Manager, in which a high degree of involvement by students (who participate in the activity from the perspective of play) has been detected, and seems to favor language learning. This fact can be generalized to education at home, as a consequence of the confinement derived from COVID-19, since it also incorporates elements of the Universal Design for Learning. The principles of the Universal Design for Instruction are also easily applicable, allowing for the special educational needs of students, including those derived from a disability.

The latter elements are among of the keys to achieving the objectives of Agenda 2030, in line with the Sustainable Development Goals. They make it possible to attend to human development and provide an education that is both inclusive and of high quality. It cannot be forgotten that sustainability, and particularly sustainable development, following

the United Nations, depends to a great extent on education and that the objectives of development cannot be achieved without it.

At a time of international crisis such as the COVID-19 pandemic, with a great impact on access to the educational system for millions of schoolchildren, the use of tools such as the one analyzed in this article (which demonstrate the acquisition of learning from the perspective of neuro-education) is essential in post-pandemic society, not only for the strength of learning (as has been seen in the follow-up analysis of the participants), but also for assuming a work model that deepens in the equity and in the equality of opportunities for access to education.

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