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Technology-supported language immersion in the first cycle of early childhood education (0-3 years)

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Abstract: This paper presents an educational experience of linguistic immersion with technologies carried out in the first cycle of infant education with children aged 0-3 years. Starting to work with a second foreign language in the first cycle of infant education generates numerous benefits, specifically, improving communicative competence and facilitating a globalized education. In addition to these benefits, it is also necessary to add technologies that are not only motivating but also very useful for the learning of a second language in the first stage of infant education. The experience has been carried out in a Nursery School, with students from 0 to 3 years of age, using the Humanistic TPR method for linguistic immersion. The objective of the study is to know the impact of technologies as a support resource for second language learning. In order to know this impact, information was collected from the different subjects involved in this process: children from 0-3 years of age in a nursery school, their families and their teachers, making up a total of 154 subjects. An observation scale was elaborated for the children and two surveys, one for the families and the other for the teachers. The results obtained indicate that children aged 0-1 years do not suffer significant changes with the use of technology in their learning, while for students aged 1-2 and 2-3 years there are significant differences. The research results indicate that using a second language and technology in the first cycle of infancy provides a novel and motivating approach for children in the first cycle of infancy, resulting in significant improvements in their learning performance and benefits in their teaching process. We can say that the digital game provides these children with operational skills, and broadens their knowledge about the world in addition to developing their dispositions to learn and understand the role of technologies in everyday life.

Key words: early childhood education; linguistic immersion; technologies; learning method; L2

1 Background

It is important to clarify what we mean by a bilingual center and a language immersion center. The bilingual center is one that has a series of hours in which it carries out its activities in English, while the linguistic immersion center has native personnel immersed in the classroom during the entire school day. Therefore, for this second group, the students live with these two languages throughout their entire time at the center.

There are many experts who consider it relevant to learn a second language at a very young age, since we have a moldable and susceptible brain for new learning. From this perspective, Diaz (2010) points out that in the first years of life, the brain is structuring the different links between its neurons. If children start new learning at this time, they will benefit

greatly for several reasons. "The first reason is that the brain will continue to increase its neural connections, and the second reason is that this will make him learn at a faster pace and more easily, so it would be justified that the best age to start studying a foreign language is at 2/3 years" (p.257).

On the other hand, Masachuetts (2007) emphasizes that learning an L2 at an early age greatly favors various skills such as critical thinking, flexibility of mind and creativity. It shows that studying foreign languages at an early age increases the development of mathematical skills, especially in the field of problem solving.

Both authors also support the theory that children who study an L2 obtain better results in learning mathematics. And Diez (2010) adds that learning foreign languages at an early age "improves academic performance in general since children are being offered greater cognitive flexibility and creative thinking skills, providing them with intellectual challenges that they will be able to address more easily both in their academic life and in their personal development" (p.252).

Rodriguez (2006) points out that in language learning, repetition and the use of an ascending progression of grammatical structures from the simplest to the most complex is of vital importance (p.136), with the teacher becoming the model to imitate and the predominance of oral and aural skills becoming evident.

Learning is not the same as acquiring; in order to acquire, prolonged exposure time and a purposeful use are needed, so in early childhood education it is important to create the ideal conditions through play. Therefore, we must not forget the playful component when programming our activities. Playing favors both repetition and vocabulary review, which is very positive because children forget easily.

On the other hand, educational material is any element that both teacher and students use as an instrument or resource to favor the learning process. In the words of Titone (1996), "play is the deepest spiritual activity of the child and it leads to the conquering of personality, training and formation" (p.4).

Therefore, the quality of the materials will be measured in how well they encourage children to express themselves orally. That is why, as well as the topics chosen for the didactic units, they must be close to the children's world and their immediate environment. Materials that children can see, touch, smell, taste and feel are the most appropriate at this stage. Therefore, we can assure that the infant classroom is the ideal place to start learning an L2 (second language), since it contains everything necessary to support the teaching work of the specialist.

Since the beginning of the new millennium there has been a rapid increase in the amount of digital game materials, as well as children's interest in playing with them, creating the emerging phenomenon called "digital play".

Although defining digital play can be challenging (Stephen and Plowman 2014), it generally refers to the use of technologies in a game-based manner (Marsh et al. 2016). Playing with a digital game is positioned in opposition to traditional play (Mustola et al. 2016). This perception gives rise to various concerns about digital play (Berge et al. 2016; Ernest et al. 2014; Stephen and Plowman 2014), asserting that children need "free play" rather than looking at and interacting with screens (Levin 2015).

As a recent phenomenon, defining digital gaming is challenging, as it can range from games with predefined rules to the use of simulated technology in an imaginative gaming environment (Stephen and Plowman 2014).

Image 1. Activity with light table

Plowman et al. (2012) note that playing with digital devices can help children acquire operational skills and expand their knowledge about the world, as well as develop dispositions to learn and understand the role of technology in everyday life.

Therefore, we will understand digital games from the broadest perspective, defining it as the use of technologies in a game-based way, being this the way to use them for linguistic immersion in the first cycle of early childhood education.

Like supporters of digital games, it is assumed that digital play offers children many of the same learning opportunities as traditional toys at home and at school, and even offer new possibilities (Fleer 2014; Miller et al. 2012; Stephen and Plowman 2014; Wohlwend 2015).

2 Methodology of the study

The intervention proposal we present here has been carried out with the aim of working on linguistic immersion with technologies in a nursery school with children aged 0/3 years (first cycle of early childhood education). This intervention has followed the humanistic method (Rodriguez, 2006, p. 137), which offers the following learning principles: Humanistic Method TPR

. Learning L2 as L1

. Transmission of meanings through body movements

. Oral rather than written skills

. Initial teacher control

. Introduction of language by oral commands

. Relaxed learning environment

. Exchange of roles

. All types of interaction

. Assessment through observation

Image 2. Augmented reality activity

Specifically, in this experience we wanted the students to approach the learning of the L2 as L1, that is, just like the learning of their mother tongue, learning L2 through oral skills, in a relaxed environment and through all kinds of interactions. Learning by means of oral commands and with the initial control of the teacher, has allowed to obtain satisfactory results from the first moment and to propitiate that the teaching-learning process takes place in a safe and favorable environment for the student.

The collection of information from this classroom experience was carried out through various instruments based on direct observation and recordings of what happened in the classroom, in addition to using an observation scale to delimit the observations that were of most interest.

These records of direct observation of the classroom, together with the surveys conducted with parents and teachers, have allowed us to obtain a triangulation of information sufficiently enriching to obtain coherent results according to the perspectives of all the agents involved in this learning process.

2.1 Subjects

It is not easy to choose subjects, with whom the intervention was carried out. Initially, the intervention was planned only for the 2-3 year-old classroom, but after analyzing the observation scales, it was considered interesting to extend it to the entire first cycle of kindergarten. Thus, following Eisenhardt's (1991) proposal, we were forced to take into account that the appropriate number of respondents depended on the existing knowledge of the topic and the information that could be obtained through the incorporation of additional case studies.

Table 1. Choice of subjects

0/1 year	1/2 years	2/3 years	Teaching staff
8 families	26 families	40 families	6 professionals

2.2 Intervention methodology

This experience has been carried out during February and March (8 weeks) being the main thread to work on the different areas of the early childhood education curriculum (Annex I). The activities (Fig. 1) that made up the intervention program were carried out after the assembly and lasted about 15 to 20 minutes. The initial motivational activity was the carnival party to be held on February 9, after which all the children would arrive to find the center decorated as the seabed and the teachers dressed up as animals from the bottom of the sea.

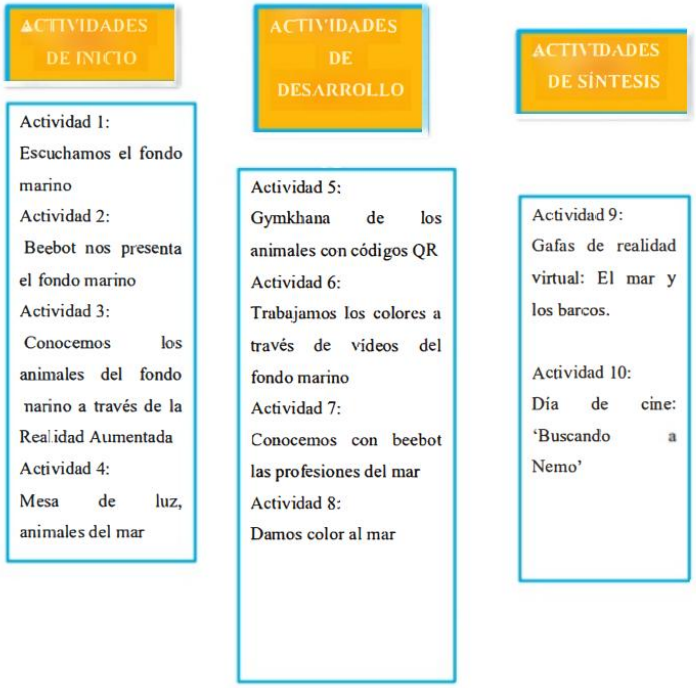


Fig. 1. Activities carried out

3 Intervention results

Next, we show the results obtained in the evaluation of the intervention program carried out. First of all, in order to carry out the evaluation, we started with data from direct observation and classroom recordings. Through direct observation, we were able to detect how the children were interested in the new technological resources; 90% of the children observed were motivated to use them during the activities proposed within the project. With respect to the second language, in the 0-1 and 1-2 year old classes they were beginning to reproduce words and songs in the second language and were beginning to understand simple orders in English, while in the 2-3 year old classrooms we started from a higher level, since the songs were fully introduced in their routines and they were already beginning to understand orders and to indicate them themselves.

Image 3. Activity with QR codes

Using the direct observation scale (before and after the experience), we were able to detect how the children had significantly increased their knowledge. To obtain statistical evidence of the evolution of the children after the use of the technological tools, the Chi-square statistical test was applied, assuming the initial observations as the expected

frequencies and the final observations as the observed frequencies. Table 1 shows that children aged 0-1 years do not suffer significant changes in the criteria observed after the use of technologies, while for students aged 1-2 and 2-3 years there are statistically significant differences. These differences are due to the increase in the number of students who go from having a high to a very high evaluation in the four indicators used (see Table 1).

Table 2. Chi-square differences between groups after observations

	Edad		
Observaciones	0-1	1-2	2-3
Interés por las TICs	2,67	16,25**	14,42***
Comprende órdenes sencillas	5,00	176,00***	573,31***
Motivación con Recursos TICs	4,80	18,62***	32,48***
Reproducción de canciones y palabras	6,20	15,50***	573,21***

Grados de libertad 3. *p>0.05, **p>0.01,***p>0.001

The data show us that the program carried out has had its results, the students have learned new learning tools and the linguistic immersion through them has been feasible. The interest in the technologies and the motivation that these resources have provided to the students have boosted the data, obtaining a large number of very high ratings in the second direct observation carried out.

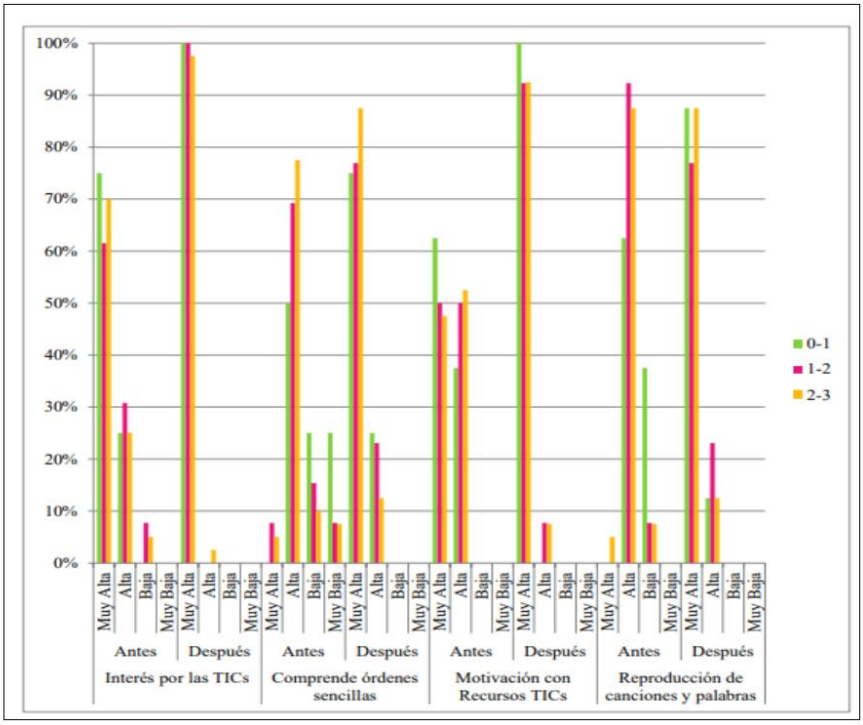
In this way, the reproduction of songs and words, especially in the 1-2 and 2-3 classes, has grown significantly, with the values going from very high to 20 and from 2 to 35, in the 1-2 and 2-3 classes respectively. In the area of understanding simple orders, we can see that no student is in a very low or low position, but everyone has a high or very high score. Thus, in the 0-1 year class, 6 out of 8 students understand simple orders in English perfectly. While in the 2-3 year old class, 35 out of 40 students understand 100% of simple orders in English. For the item of reproducing songs and words, we also see great achievements. In the 0-1 year class, 7 out of 8 students, on the second scale of direct observation, reproduce songs and words with total fluency, while, on the first scale of direct observation, only 5 out of 8 are in a high valuation with respect to this item. To continue demonstrating the effectiveness of this intervention, I would like to focus on the 1-2 year old classroom, where 20 out of 26 students would rate very high on this occasion, and in the 2-3 year old classroom 35 out of 40 would rate very high (Table 2).

Table 3. Frequencies before and after using technologies in the different groups

		ANTES			DESPUES		
		0-1	1-2	2-3	0-1	1-2	2-3
Interés por las TICs	Muy Alta	6	16	28	8	26	39
	Alta	2	8	10	0	0	1
	Baja	0	2	2	0	0	0
	Muy Baja	0	0	0	0	0	0
Comprende órdenes sencillas	Muy Alta	0	2	2	6	20	35
	Alta	4	18	31	2	6	5
	Baja	2	4	4	0	0	0
	Muy Baja	2	2	3	0	0	0
Motivación con Recursos TICs	Muy Alta	5	13	19	8	24	37
	Alta	3	13	21	0	2	3
	Baja	0	0	0	0	0	0
	Muy Baja	0	0	0	0	0	0
Reproducción de canciones y palabras	Muy Alta	0	0	2	7	20	35
	Alta	5	24	35	1	6	5
	Baja	3	2	3	0	0	0
	Muy Baja	0	0	0	0	0	0

In order to see these data in a clearer way, it was considered relevant to make Graph 1, which shows the percentage improvements of the students in the center after the intervention in the classroom was carried out. It should be noted that

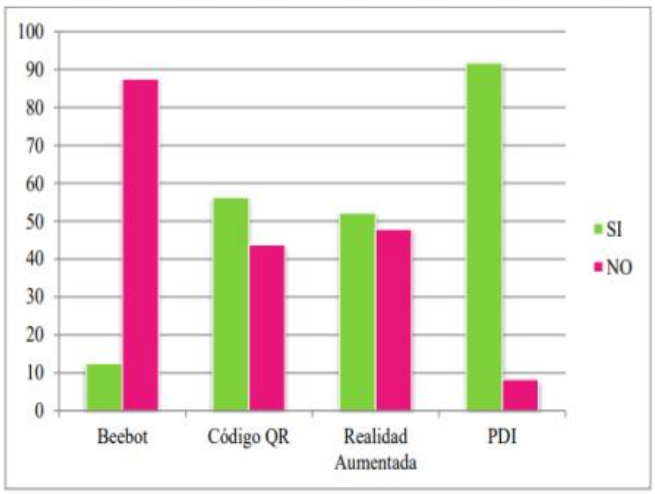
the fact of having a native speaker in the classroom for 3 months has helped a lot to make the results even more positive.



Graph 1. Percentages obtained before and after using technologies

From the semi-structured survey conducted with the teachers, we can say that they are quite satisfied with the results. They consider that the center should continue to invest in technological materials and that they should continue to receive training on the use of technical materials and contribute to improving children's learning through these material.

After having presented the children's data, we will now show the results of the comments made by parents and teachers after the end of the experience. Regarding the parents' survey, we can say that 87.5% of them considered the use of technologies in the first cycle of kindergarten to be interesting. It should be noted that they show a lack of knowledge about some of the technologies such as Beebot (robot), followed by Augmented Reality and QR Codes, which were the technologies used in the experience. Only 12.5% knew what Beebot was, 56.3% knew what QR codes were and 52.1% had heard of Augmented Reality. 91.7% knew about digital whiteboards and online videos as they are the most widely used technologies in early childhood schools.

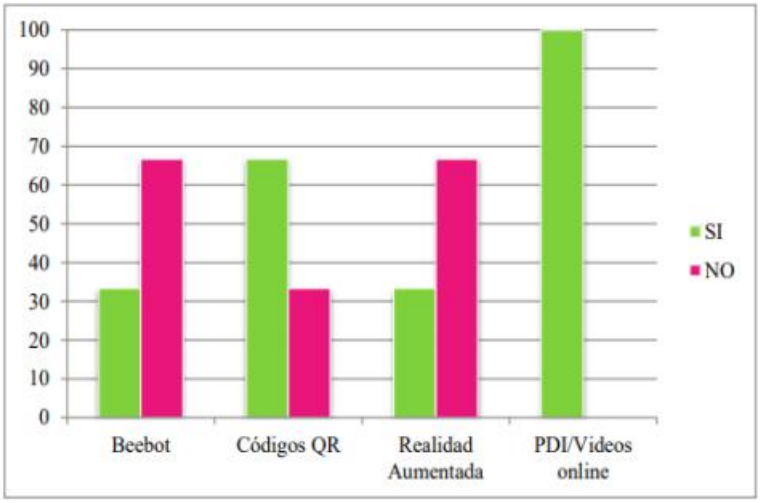


Graph 2. Change of vision on technologies

Curiously, despite not knowing these resources, when they were told about the experience and how it was going to be used in the classroom, there was some reluctance. But once it was carried out in the classroom, they changed their vision of technologies and gave them a high importance, valuing their use in the classroom. To the question of whether they consider them interesting for their children's learning, 95.8% of those surveyed answered affirmatively and in favor.

As for teachers, in their surveys on the field of technologies, they commented the following. In response to the first question asking if they made use of new technologies in their daily programming, 90% answered no, although they were convinced of their usefulness, arguing that they can develop imagination, expand vocabulary, enhance interest in activities that may be tedious, etc.

We can see how there is a certain lack of knowledge among the respondents (teachers) about some of the technologies used. The most unknown for more than 50% are Beebot (robot) and Augmented Reality, with the latter's educational methods accounting for 33.6%. However, PDI and online videos are known and used by 100% of the respondents. It was also considered important to ask about the difficulties encountered in working with technology in the classroom, and all the teachers commented, firstly, on the economic impossibility of the center to afford the purchase of technological resources due to their high cost. They also commented on the low level of training they had on these issues, as well as on training courses. On the other hand, they also talked about the over-stimulation that technologies offer to children and the need to educate the children to use the technologies responsibly. Finally, when asked if they considered these resources interesting to work with in the classroom, 100% answered in the affirmative.



Graph 3. Interest in resources to work in the classroom

4 Conclusion

In conclusion, the activities carried out have been adequate, the children have felt motivated and the learning has been positive. At the beginning, many families and teachers felt lost and disoriented. They did not understand how they could work with robotics, QR codes and other technological resources with children of those ages. Both groups had social prejudices that are detrimental to technologies (Berge et al. 2016; Ernest et al. 2014).

The lack of knowledge on the part of educators about the technological resources used in the classroom is quite high, as can be seen in the results. The causes of this lack of knowledge seem to be varied, on the one hand, the economic difficulties of the centers, highlighting the high price of technological resources and the few resources available to the educational centers. They also justify it by considering that technologies are negative for the development of children, thinking of them as something addictive or considering that they can lead to poor socialization among peers. Apart from

inadequate technical training for teachers, they have no knowledge of the proposed resources and require additional guidance to begin using them. Therefore, using these tools to schedule activities is considered impossible in advance.

Image 4. Activity with Beebot

With respect to linguistic immersion, we found few obstacles. On the one hand, families showed their satisfaction with their children's learning, which was added to the fact that this school had been working with immersion since the beginning of the school year. Some of them expressed their fear that the technologies would distract the children from their learning process, something that gradually dissipated when they saw that the achievements were greater than those obtained with the tools used previously. On the other hand, we have met with families who were open to the introduction of a new working method and who have congratulated us on seeing how their children have been motivated by this different intervention project. Finally, we would like to highlight how the respondents believe that it is possible to combine technologies and linguistic immersion (Stephen and Plowman 2014; Wohlwend 2015), taking into account the extra motivation they provide to the children and the learning possibilities they have offered to the students.

Conflicts of interest

The author declares no conflicts of interest regarding the publication of this paper.

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