



RESEARCH PAPER

Analysis of the Integration of ICT in Second Language Learning in Preschool in Colombia

Paola Harris Bonet

Universitat Politècnica de València, Spain

paolaharrisbonet@gmail.com

How to cite this article:

Harris Bonet, P. (2021). **Analysis of the integration of ICT in second language learning in preschool in Colombia.** *The EuroCALL Review*, 29(1), 50-59. <https://doi.org/10.4995/eurocall.2021.13138>

Abstract

The introduction of Information and Communications Technologies (ICT) in the educational sphere is becoming more and more essential due to its potential as a pedagogical tool. This study aims to evaluate some factors that facilitate and hinder the pedagogical use of ICT in the context of learning English as a second language (L2) at preschool education levels. Through the methodology of Design Thinking, it is possible to structure the characteristics that a playful interface should have in order to support this educational process and, especially, to satisfy the needs of an environment that intends to make the most of the technological resources it has. To this end, this methodology takes into account the experience of direct users (children), indirect users (teachers) and the socio-economic dimension of educational centres, headed by managers. In this sense, two *ad hoc* questionnaires were completed by the school executives and teachers, respectively, in a specific educational context of Barranquilla, Colombia. The questionnaires were administered to 25 schools. Data analysis showed the importance of ICT in improving the teaching and assessment process. At the same time, it shows the levels of frustration of some teachers who use technologies with low levels of training or with self-generated content that limit the use of ICT in an appropriate way. These results will outline a number of characteristics that should be considered when implementing actions to improve the teaching of English in the classroom using digital tools.

Keywords

Information and Communications Technologies; Early Childhood Education; English as a Second Language; Preschool education.

1. Introduction

There is a lot of data currently available about the impact of Information and Communications Technologies (ICT) on different aspects of the life structure of human beings. Education is undoubtedly one of them (Briones & Martinez, 1998). The transformation has occurred in recent decades and has marked profound changes in terms of the transfer, processing and storage of information within learning processes. Its impact has been so huge that the presence or absence of ICT demarcates a fundamental gap in educational systems and at the same time it has become a focus of interest for many governments in order to set strategies that to diminish this gap (Briones, 2001, p. 8).

The integration of ICT into educational settings has proven to have significant benefits in terms of learning and has become increasingly interesting in recent decades in different sectors of education. Magazines such as the NMC Horizon Report are a great reference in this subject. Year after year, this magazine studies the trends and challenges of education in terms of technological advances and its impact on learning, teaching and educational research, it analyses the dynamics of insertion and technological advances that demand much more educational staff who are up-to-date in the use of new technologies and who are capable of integrating digital pedagogies in a more profound way (Arribas, Gutiérrez, Gil, & Santos, 2014) so that the learning experiences in the classroom are truly significant.

This ongoing research work frames the factors associated with the use of ICT in the classroom, within the Colombian educational context. It is also in line with government training plans such as the National Bilingualism Programme (2004-2019), which aims to develop competent individuals prepared for the globalised world, with the learning of English as a second language (L2) as its key topic, and by doing so it can strengthen the development of language skills as a key factor that will represent a competitive advantage at the social and professional level in the future.

Based on the assumption that establishes a high (economic and social) profitability in education for early childhood development (Heckman, 2016), we will first evaluate teaching methodologies around the use of ICT and characterise the population to develop a user profile with potential for the use of emerging technological tools such as Augmented Reality (AR), all within the framework of socio-economic variables of schools.

After that, we will review the context that circumscribes the population of our sample, as well as the background that corroborates the relevance and the need to evaluate the environment where the insertion of new ICT is intended to be generated.

2. The present study

This study aims to assess the academic context of preschools so one can identify the factors that facilitate or hinder the pedagogical processes of teaching the L2, and also to review what role ICT plays in this endeavour.

At the same time, it characterises the population based on the socio-economic variables that permeate each educational centre. This first phase of the study seeks to measure the degree of importance of the use of ICT and its impact on education in schools.

Based on the previous objective, research questions were drawn up to help outline the requirements that would facilitate the application of teaching methods using ICT to promote learning the L2 in infant education. These were:

1. What factors facilitate and/or hinder the pedagogical processes in the use of ICT.
2. How the gap accessing bilingual education is evidenced according to socioeconomic strata.

3. ICT findings in second language learning

3.1. Technological integration

When we review the data published by the government in its statistical information systems that gather relevant and detailed information from agencies such as DANE (National Administrative Department of Statistics), the Ministry of ICT and the Ministry of Education about the conditions concerning the use of ICT in education, the only factors we can find are those related to connectivity and the number of computers per student: Computers for education (CPE). However, if we want to review in detail the effectiveness of the use of ICT resources, beyond the possession of these, we do not need concrete information and it is necessary to delve into formal and non-formal sources in order to obtain some data; many with important biases.

In relation to technological resources, the Ministry of ICT in Colombia praises its work with the CPEs as the programme with the greatest social impact through ICT. Colombia went from having 24 children per computer in 2010 to 4 children per computer in 2018 (MinTIC, 2018). In Barranquilla, the figure went from 40 children per computer in 2010 to 8 children in 2017 (President, 2016). This is one of the many indicators we have, but there is no information in figures from other important resources. For this reason, it is necessary to review the usefulness given to them and how many of them support the learning of the second language in order to align with government programmes such as the GNP.

3.2. Second language (L2)

According to the report developed by the Education Program of the Inter-American Dialogue and Pearson, called "Learning English in Latin America", there are several causes that hinder significant progress in the aspects that concern second language acquisition, however, above all it highlights the deficit of prepared teachers with a minimum level of English required. Colombia currently has a shortage of 3,200 teachers to cover its student population.

Other sources of information, such as the English Proficiency Index published by Education First (<https://www.ef.com/wwen/epi/>), position Colombia as No. 17 out of 18 Latin American countries evaluated, that is, with a "very low" level of competence.

These results made the Colombian Government reconsider its English language learning policy and consequently become more committed toward implementing more proactive strategies. A major national education project was executed whereby public children could start learning English at a very young age, as explained by Rosa Maria Cely, manager of the *Colombia Bilingüe* programme developed at the Ministry of Education. Her proposal reinforces the **Government's** intention to change the low levels of performance achieved by public schools, as exemplified by the fact that only 5.6% of the students reached a pre-intermediate or B1 level of English in 2016 (Cely, 2017).

4. Methodology

For the present study, the strategy used was to collect mixed information: quantitative and qualitative. The design of the research method was structured with a descriptive correlational character.

4.1. Data collection tool

An ad hoc questionnaire was carried out with teachers and preschool directors for the educational context of Barranquilla, Colombia. The data collection instrument was developed using the above-mentioned research questions and all the protocols that would make it possible to assess the validity, reliability and practical usefulness (Albert, 2007)

of the data collection process. The design of the instrument, in its first stage, was submitted to expert judgement to be later applied in a pilot test and to corroborate the levels of reliability of the test.

The reliability validation was carried out on 36 of its 53 items, which corresponded to independent variables whose task was to provide answers to the questions posed, using a Likert rating scale (Always=4, Frequently=3, Sometimes=2, Never=1). The remaining 17 items corresponded to exogenous identification variables (sex, age, educational institution, years of existence, technological resources available, English level of the teaching staff, school typology and socioeconomic stratum).

Those items of an independent nature were subjected to Cronbach's Alpha test, where a weighting of 0.851 was obtained. This score, according to psychometric analysis, is considered to be highly reliable (Cronbach, 1951).

4.2. Sample characterization

The sample of preschool teachers was taken from preschools in different socioeconomic sectors of the city of Barranquilla. With a total sample of N=25, 8.7% were male and 91.3% were female.

The average age of teachers was 36. Twenty percent were between 20 and 30 years of age, while 24% were between 30 and 40.

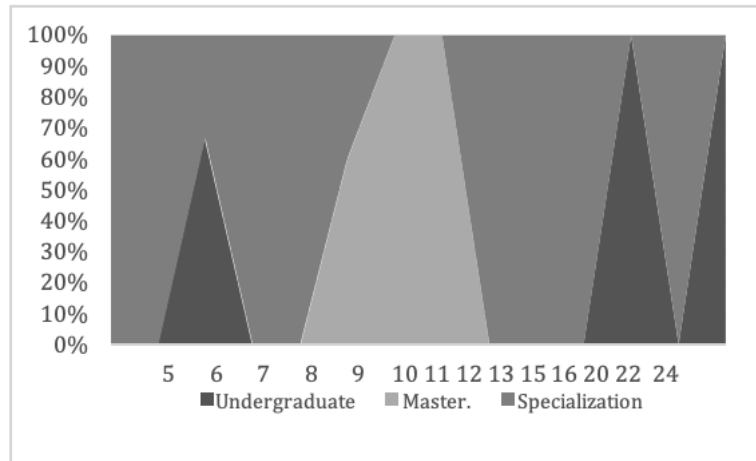
Table 1
Teachers' ages

TEACHER'S AGE	
Number of Teachers	25
Average Age	36,17
Standard Deviation	6,95
Minimum Age	22
Maximum Age	50

According to the information provided by the teachers themselves regarding their training, 61% have only been trained at the undergraduate level. Seventeen per cent have specialized training and 22% have a **master's** degree.

The years of experience that teachers had in preschool education were also observed. In this way, a correlation study was made between the factor of Professional Training and years of experience, so that it is possible to evaluate how this influences the degree of pedagogical innovation that teachers may have in the area related to ICT. Thus, we found **an average of 11.26 years of experience, with a standard deviation of $\sigma = 5.06$. With a minimum of 5 years and a maximum of 24 years.** While the highest professional degree of **master's** is concentrated in the middle of the range of years of experience, the level of undergraduate professional training is similarly distributed throughout the range.

Figure 1
Correlation of educational level and years of experience



4.3. English proficiency levels: Teacher and educational institutions typology

Bearing in mind that language proficiency in the second language is a key factor and that reports in Colombia show a significant deficit in terms of teachers trained to the minimum required levels (B1 - B2), this section will show the situation of the sample selected in different preschools in Barranquilla. We will see how socio-economic factors affect the educational level of teachers in the second language through a correlation analysis of these factors. In the results, we can see that the level of English in relation to social stratification (in Colombia it is classified from 1 to 6, with 1 being the lowest and 6 the highest), concentrates its population in the lowest levels A1, A2 and B1 in strata 2 and 3 (E-2, E-3). Stratum 4 still shows important deficiencies, with a third (33.4%) of its population between levels A1 and A2, although it advances a step forward, placing (66.7%) in level B2. Finally, the preschools that present teachers with a more advanced level of English are in stratum 5, with teachers of level B-2 (75%) and C2 (25%) and stratum 6, with 50% of teachers between B2 and C2 level respectively.

Table 2

Level of English

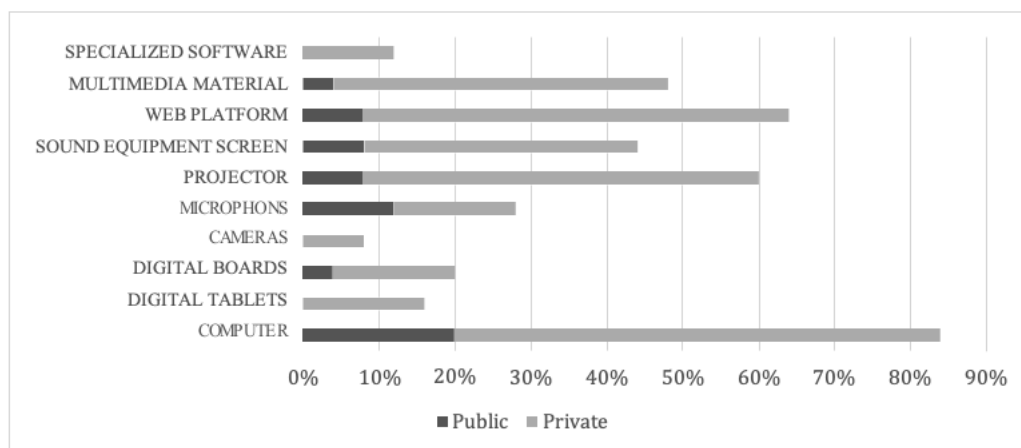
Socio-Economic Stratum	A1		A2		B1		B2		C1		C2	
	f.	%	f.	%	f.	%	f.	%	f.	%	f.	%
E-2	3	50,0	1	16,7	2	33,3	0,0	0,0	0,0	0,0	0,0	0,0
E-3	2	40,0	1	20,0	2	40,0	0,0	0,0	0,0	0,0	0,0	0,0
E-4	1	16,7	1	16,7	0,0	0,0	4	66,7	0,0	0,0	0,0	0,0
E-5	0,0	0,0	0,0	0,0	0,0	0,0	3	75,0	0,0	0,0	1	25,0
E-6	0,0	0,0	0,0	0,0	0,0	0,0	2	50,0	2	50,0	0,0	0,0

Descriptive study: Correlation between the variable English level and Socioeconomic Stratum Absolute and Relative Frequency.

4.4. Technology resources

To understand the use of ICT in the teaching process, teachers were asked to recognize what types of technological resources their school had and which they could access. The results of this analysis were compared with the category of school: Public or Private. Graph 1 shows how 84% of these preschools have computers. Of this percentage, 64% (f.16) correspond to private schools and 20% (f.5) to public schools. Sixty-four percent (f.2) of these preschools have a web page, of which 8% (f.2) are in public schools and 56% (f.9) are in private institutions. 60% have screen projectors. Of this portion, 8% (f.2) is part of public schools and 52% (f.13) corresponds to private schools. Forty-eight per cent 48% claim to have and use multimedia material, they 4% (f.1) belong to public schools and 44% (f.11) belong to private schools. 44% claim to have sound equipment in their classrooms, of which 8% (f.2) belong to public schools and 56% (f.9) belong to private schools. The resources below begin to be scarcer: Twenty-eight percent have microphones, of which 12% (f.3) correspond to public schools and 16% (f.4) to private schools. Twenty percent said they had digital panels, of which 4% (f.1) belonged to public schools and 16% (f.4) to private schools. Resources such as tablets 16% (f.4), specialized software 12% (f.3) and cameras 8% (f.2) correspond only to the sector of private institutions.

Figure 2
Technological resources available to teachers



5. Results

5.1. Independent variables and their correlation

Twenty questionnaire items were used as a reference to determine the independent qualitative variables that measure the ideal conditions of a preschool, on a Likert rating scale (4=Always, 3=Frequently, 2=Sometimes, 1=Never) taking into account the following categories: (1) the use of teaching materials and their characteristics; (2) ICT resources and their implementation in L2; (3) the importance of using the senses to promote an inclusive environment, and (4) the curricular structure of the L2. Accordingly, each variable was described as follows:

1. Item1 (I-1) Considers the use of teaching materials to be indispensable within the teaching process. Item 2 (I-2) Uses teaching materials in the teaching of the second language. Item 3 (I-3), Learners perform better when they use additional learning resources (learning materials or digital resources - ICT). Item 4 (I-4) has resources that enable it to assess learners when they make use of didactic and/or support materials, in the teaching process.
2. Item 5 (I-5) has technological resources for teaching the second language. Item 6 (I-6) uses technological resources for teaching the second language. Item 7 (I-7) considers tools that support the L2 teaching process by means of digital or

- technological resources to be useful. Item 8 (I-8), the curricular structure of second language teaching programmes uses new information technologies as a means of promoting meaningful learning of the second language. The contents of the L2 programme include graphic representations to facilitate understanding and application of the new language. Item 10 (I-10) has mechanisms to prevent possible learning difficulties for its learners. Item 11 (I-11), the technological platforms on which teachers must generate their own learning content appear to be frustrating. Item 12 (I-12) prefers platforms that have content that can be updated. Item 13 (I-13), technology resources promote teamwork.
3. Item 14 (I-14) considers it important that learning support tools (didactic or digital materials) involve different senses: touch-to-sight, ear-to-touch, ear-to-sight. Item 15 (I-15), the bilingual teaching model promotes recognition of context and cultural diversity. Item 16 (I-16), the curriculum structure of second language programmes provides for flexible strategies for students with disabilities. Item 17 (I-17) considers it useful that teaching materials, whether physical or digital, used in the learning process should be inclusive.
 4. Item 18 (I-18) the contents of the second language teaching programme are aligned with Colombia's National Bilingualism Plan (PNB). Item 19 (I-19), the contents of second language teaching programmes are updated annually. Finally, item 20 (I-20), the sequence of contents taught in the classroom are distributed coherently in their units and themes.

Table 2
Descriptive study: Absolute frequency and percentage

Category	ITEM	f/%	4	3	2	1
1. The use of teaching materials and their characteristics	I-1	f.	21	2		
		%	84	8		
	I-2	f.	17	1	5	
		%	68	4	20	
	I-3	f.	15	8		
		%	60	32		
	I-4	f.	8	9	5	1
		%	32	36	20	4
2. ICT resources and their implementation in L2	I-5	f.	9	4	6	4
		%	36	16	24	16
	I-6	f.	9	5	4	5
		%	36	20	16	20
	I-7	f.	21	2		
		%	84	8		
	I-8	f.	12	8	1	2
		%	48	32	4	8
	I-9	f.	5	12	5	1
		%	20	48	20	4
	I-10	f.	3	11	9	
		%	12	44	36	
I-11	f.	3	11	8	1	

		%	32	44	12	4
	I-12	f.	12	8	3	
		%	48	32	12	
	I-13	f.	9	7	5	2
		%	36	28	20	8
3.	I-14	f.	20	3		
The importance of using the senses to promote an inclusive environment		%	80	12		
	I-15	f.	16	7		
		%	64	28	24	16
	I-16	f.	7	6	9	1
		%	28	24	36	4
	I-17	f.	19	3	1	
		%	76	12	4	
4.	I-18	f.	11	4	5	3
The curriculum structure of the L2		%	44	16	20	12
	I-19	f.	11	7	2	3
		%	44	28	8	12
	I-20	f.	10	10	3	
		%	40	40	12	

The maximum rating scale of this test corresponded to a score of 144, with this compliance indicator of an educational environment that met the ideal conditions for the implementation of new ICT for education. Based on this score, the maximum scores (Q3) and the minimum scores (Q1) were analysed to assess the characteristics of the educational institutions with regard to the socio-economic conditions. From the sample of 25, the teachers were assigned identifiers (D) accompanied by the corresponding number. The relationship found, showed that those preschools with the most favourable conditions were among the top and had the category of Bilingual Schools, while the public ones, despite the government's efforts to provide resources, were placed in the last positions and socioeconomic strata.

Table 3.
Correlation between ideal environment and social stratification

Q3		E		Q1		E
D4	P	4		D18	P	3
D23	P	5	B	D9	O	3
D3	P	4	B	D20	P	2
D8	P	5	B	D7	P	3
D13	P	5	B	D15	O	2
D14	P	6	B	D21	O	3

P= Private, O= Public, B= Bilingual E= Socioeconomic stratum (2,3,4,5,6)

5. Conclusions

In addition to the fact that socio-economic conditions directly affect the quality of teaching, they also determine the use and implementation of ICT resources as a tool to facilitate the teaching-learning process.

The teaching of the second language still proves to be exclusive. Those with the greatest purchasing power are those who have access to educational environments with the ideal conditions for learning an L2. However, possessing ICT resources is not always directly related to the usefulness or good management of these resources. This can be observed in the item results for the independent variables related to category 2: ICT resources and their implementation in L2, where 84% of respondents considered ICT tools useful for teaching an L2 (I-7), but only 48% (I-8) have these resources. It is also important to contrast the use of ICT for L2 teaching with the mechanisms for evaluating learning processes (I-4). This item was highly valued by 36% of teachers, which shows that there is a need to integrate not only ICT tools into the school curriculum for L2 teaching, but also to incorporate mechanisms to monitor how they help to improve knowledge and language skills.

The results open up the debate about what requirements ICT resources should have in view of the socio-economic needs of school environments. In order to characterise some aspects that hinder their use in school environments, the questionnaire was designed to assess the typology of ICT that have educational content for teaching. While 76% of respondents find technological resources that require teachers to generate their own content frustrating (I-11), 80% prefer that the content be updateable. This variable is directly related to the levels of technological training and teacher training.

Acknowledgement

This research work has been supported by the Universidad del Norte in Barranquilla, Colombia, within the framework of the teacher training programme.

References

- Albert, M. (2007). *La investigación educativa: Claves teóricas*. Madrid: Mc Graw Hill.
- Arribas, J. C., Gutiérrez, S. M., Gil, M. C., & Santos, A. C. (2014). Recursos digitales autónomos mediante realidad aumentada. *Revista Iberoamericana de Educación a Distancia*, 241-274.
- Briones, S. (2001). Las tecnologías de la información y la comunicación: su impacto en la educación. *Pixel-Bit. Revista de Medios y Educación*, 67-78.
- Briones, S., & Martínez, M. (1998). La Educación a Distancia: Hacia Un Encuentro De sentidos. III Seminario Internacional de Educación a Distancia. Córdoba: Universidad Nacional de Córdoba.
- Cely, R. M. (4 de octubre de 2017). Ministerio de Educación de Colombia. "Como país estamos mejorando en el nivel de inglés: Rosa Cely, gerente Colombia Bilingüe". Available from <https://www.mineducacion.gov.co/1759/w3-article-363158.html? noredirect=1>
- Cronbach, L. (1951). Coefficient alpha and the internal structure of tests. Illinois: P. Sychometrik. <https://doi.org/10.1007/BF02310555>
- Heckman, J.J. (2016). **There's more to gain by taking a comprehensive approach to early childhood development.** The economics of human potential.

Ministerio de Tecnologías de la Información y las Comunicaciones de Colombia. (6 de Julio de 2018). "Brecha digital en educación se redujo en 83% en el país durante Gobierno Santos". Available from <https://www.mintic.gov.co/portal/inicio/Sala-de-prensa/MinTIC-en-los-medios/75719:Brecha-digital-en-educacion-se-redujo-en-83-en-el-pais-durante-Gobierno-Santos>

Presidencia de la República de Colombia (18 de jueves de 2016). "Gobierno Nacional entrega 4.330 computadores para estudiantes en Barranquilla". Available from <http://es.presidencia.gov.co/noticia/Gobierno-Nacional-entrega-4330-computadores-para-estudiantes-en-Barranquilla>

Ethical statement

This research was carried out within the framework of anonymous ethnographic and educational data collection. Each of the persons surveyed voluntarily submitted information related to their development as teachers, as well as their personal and occupational information. Each educational institution and each teacher were given a letter in advance which explained the context and the research purposes of the questionnaire.