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# The Use of ICT and the Mother Tongue in the Academic Performance of Immigrant Students in Secondary Education within a Vulnerable Context

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# Abstract

This study analyzes the influence of ICT and the mother tongue at home in the academic performance of immigrant students in secondary education within a vulnerable context in the subjects of language and mathematics. Using an ad hoc questionnaire several indicators were collected and analyzed to meet the aims established. The statistical tests used to analyze the data of the study were Mann-Whitney U test and Wilcoxon Z test. Among the conclusions it is important to highlight that there are no significant differences regarding linguistic, mathematical and general competences, between the students that do not use Spanish as their main language at home and the students that use this language in that way, but, on the other hand, it can the deducted from the study that there are significant differences in the academic performance of the students that do use ICT at home to do their homework.

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Keywords: academic performance; ICT; mother tongue; immigrant students; vulnerability; exclusion

# 1. Introduction

We are witnessing historical times in which the acceleration of social and technological changes, in all its manifestations, gives rise to new challenges for the educational systems as a whole. Just when the mandatory education process for children and teenagers seemed to have been concluded and the improvement of the inclusive education systems started to be established as an objective, it appears necessary to pay special attention and offer quality

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education to all the students from different cultures. This includes, naturally, the national students of foreign origin, and of course the ones that present some kind of necessity that requires specific educational support.

In that regard, it is important to remember that the attention towards diversity must be understood as a principle that has to rule the whole teaching process, aiming to provide the students education based on their characteristics and needs. It is, basically, to address the students needs, considering their particular characteristics, and favouring equity, which will contribute to a better social and educational cohesion. Therefore, it appears clear "the necessity of revitalizing the ideal of an inclusive education, once this has started to become part of the school language that is politically correct" (Susinos & Rodríguez, 2011, p. 15).

Furthermore, education faces another challenge: the search for educational excellence; the improvement of the students academic performance and the need to offer education that is coherent with the current hectic times and technological changes; and this search is only possible if it takes place in a context of maximum quality and equity, as stated by Echeita (2008, p. 11), "educational inclusion is not just a feeling of belonging that involves emotional and relational welfare that can be reached from the periphery of the educational action. Educational inclusion must be understood with the same intensity as the concern for a quality learning process and performance that is demanding with the capacities of each student".

On the other hand, in the last decades new forms of poverty, scarcity and vulnerability has arisen making society move inexorably from inclusion to exclusion (Ibáñez, 2002). In fact, social exclusion is an authentic sword of Damocles hanging over all (Núñez, 2000). Regarding Spain, the foundations Foessa and Cáritas, presented the study Analysis and Perspectives 2014, in which it is revealed that five million Spaniards are in a situation of extreme social exclusion, a figure that almost doubles the one in 2008. The most extreme cases are the ones of families affected by unemployment and difficulties to have access to social rights: education, housing, social participation...The situation is so serious, points out the report of the mentioned organizations, that the number of families with no exclusion problems is already the minority. And the Living Conditions Survey by the Spanish Statistical Office (INE, by its acronym in Spanish) (2015), about 2013 figures, concludes that the Spanish population in risk of poverty and social exclusion has increased by 29%. This is the main indicator of Eurostat (2013) to study the socioeconomic situation of European families, in its measure Arope (At Risk of Poverty or Social Exclusion), that has three variables: severe material scarcity, unemployment or precarious employment, and risk of poverty.

Likewise, the Living Conditions Survey, released on the 27th of May 2014 about data from 2013 (INE 2014), evidences a population in Spain that has been impoverished over time: 27.3% of residents in Spain live in danger of poverty. Moreover, the survey concludes that when the lower is the level of education, the highest is the level of poverty. The education level appears as a key factor to avoid poverty. The rate of poverty risk is 25.1% for people with primary education, 25.2% for whom finished the first cycle of secondary education, and 8.5% for people with university studies. Nationality is also a factor of difference: the Spanish population has a rate of poverty of 16.5%, a figure that is doubled in the case of residents that are of foreign origin from the European Union and that gets worse in the case of non-communitarian residents (rate 47.8%). Regarding the Region of Murcia, the Report Children, the most vulnerable in all autonomous communities (Educo, 2014), with data from 2012, concludes that the minors of Murcia (42%), Andalucía (40%) & Canarias (38%), in this order, are the ones in the highest risk of suffering child poverty.

Considering the information above, it is not surprising that social vulnerability is understood as a condition of immediate risk, but much more of future risk for social groups affected in the satisfaction of their welfare due to the characteristics of their sociohistorical and cultural contexts (Escarbajal, Izquierdo & López, 2014). There is a considerable number of researchers (Escarbajal e Izquierdo, 2013; Hernández Pedreño, 2007; Jiménez, Luengo & Taberner, 2009; López de la Nieta, 2008; Solano, 2008...) concluding that the educational-training elements are of key importance when it comes to social exclusion. In fact, it is known that educational deficits become the main cause of social vulnerability. Therefore, the educational work can help ease the situation of the disadvantaged social groups.

#### 2. ICT, use of Spanish and academic performance

The challenge of providing education according to the digital culture sets new dares in the educational institutions where success is not guaranteed by providing each student with a computer in their classrooms (Kosma, 2011), but by the possibilities of information, communication, exchange and interaction in the activities carried out by students and

teachers through information and communication technologies ICT (Coll, 2004). In this regard, the use of ICT has achieved the reconsideration of didactics, methodology, curriculum and organization in all the different education stages, favouring the quality in the teaching-learning process both in primary and secondary education. (Prendes et al, 2013).

In a research about the implementation of blended programmes with the support of a virtual learning environment (VLE) in teaching mathematics in the second year of secondary education, 92% of the students noticed that the use of ICT in the development of that subject made it easier for them to develop their competences and skills through means that were different from the traditional used in face-to-face classes. In this way, they could appreciate the potential virtual environment represents to develop interactive and communicative competence to work on mathematics tasks related to the theoretical aspect (Arellano, 2014). Another research carried out at a high school in Murcia about the cooperative work through ICT reveals that more than 97% of the students that used Google Drive systematically as a tool to encourage this type of work consider it very effective and, therefore, recommend its use (Álvarez & Sánchez, 2014). Likewise, a research carried out in 27 high school educational centres in Catalonia confirms that the experimental students group that used systematically the didactic content of spelling exercises showed a significant improvement in their academic performance, of 20,4% on average; however, the control group achieved a non-relevant improvement , reaching 3,9% (Prats & Ojando, 2015).

In summary, the use of ICT in mandatory subjects of secondary education allows the construction of alternative teaching-learning processes that encourage motivation, interest, interactivity, initiative and creativity, stimulating in a systematic and positive way the development of school assignments and improves the students academic performance.

Regarding the mother tongue command, some authors (Navarro & Huguet, 2006) agree in declaring that it is a dominant factor for the success or failure at school, because "it is the base of linguistic development in the first school years" (Siqués, 2006, p. 87). Also Vila (2006ab) analyzed some research about the academic performance of foreign students during their childhood and adolescence, and concluded that the linguistic factor is an explicit indicator of such performance. However, another study (Gasperini, 2013) concluded that primary and secondary foreign students that are not competent in L2 obtain worse results in language, but not in mathematics and other subjects. This, makes researchers state that L2 is not really decisive, though it is necessary to achieve a successful performance. Therefore, the concept of bilingualism can be arguable if bilingual students do not acquire the same competences, but it is, at the same time, dynamic because the command of a language can vary through time regarding the active use that the bilingual person makes of one language or the other (De Rosa, 2012).

In that respect, García-Fernández (2012, p. 76) affirms that the inclusion of foreign students must not be conditional on the command of the language spoken in the classroom, and it is significant to be aware of the importance of keeping and developing the mother tongue, in order to realize that the existent multilingualism adds value and richness to the community. In fact, missing one's mother tongue has serious and negative consequences in the cognitive, academic and social development of the students, (Arnaiz & Escarbajal, 2011; Costa, Foucart, Arnon, Aparici & Apesteguía, 2014) reason why it should be preserved and used in educational processes. A study of the McGill University (Pierce, Chen, Delcenserie, Genesee & Klein, 2015) reveals the importance of the mother tongue acquisition, to an extent that, even if the student learns another language in the future, it will still be of vital importance for his/her development, although the mother tongue is never spoken again by the student; specially when the second language does not have the same root of the first.

#### 3. Methodology

## 3.1. Participants

A total of 117 immigrant students living in a vulnerable context participated in the study. Most of them are original from South America (49,6%), followed by students original from Africa (30.8%); and the remaining ones original from Europe, Central America and Asia (table 1). The distribution by academic school years is as follows: 13,7% from 1° year of the Compulsory Secondary Education, 13.7% from 2° year, 21.4% from 3° year, 17.1% from 4° year, 25.6% from 1° year of high school and 8.5% from 2° year of high school. Regarding the language used at home, 31% do not use Spanish and 69% do use Spanish. In regard to the gender, 45.3% are boys and 54.7% are girls.

Nationalities	Frequency	Percentage
Africa	36	30,8
South America	58	49,6
Europe	13	11,1
Central America	8	6,8
Asia	2	1,7
Total	117	100,0

Table 1.Frequency and Percentage of immigrant students by nationalities

#### 3.2. Procedure

The data was gathered through the assessment carried out on immigrant students by the end of the academic year 2014/2015, from year 1° of the Compulsory Secondary Education until year 2° of high school, in different secondary education centres in the Region of Murcia. Standardized tests were used to assess the instrumental areas of language and mathematics, as well as the general competence acquired by the immigrant students.

In order to reach the aim of this study, the data was analyzed with the statistical programme SPSS v.23. Considering that the participants did not comply with the basic assumptions for the use of parametric tests, the comparisons were made using the test U by Mann-Whitney, Z by Wilcoxon and the General Linear Model Univariate and Multivariate.

#### 4. Results

Comparing the scores obtained by the students in the areas of language and mathematics and the general mark, and based on the language used in the classroom, table 2 shows that the highest mark corresponds to the highest general mark reached by the students whose mother tongue is not Spanish, and the lowest mark corresponds to the students that do use Spanish as their main language.

Table 2. Average in linguistic, mathematical and general competence

	Language	Mathematics	General
Main language other than Spanish	4.71	4.21	5.61
Main language Spanish	4.19	3.70	5.18

Using the statistical tests U by Mann-Whitney and Z by Wilcoxon, the results reveal that there are no significant differences regarding linguistic, mathematical and general competences between the students that do not use Spanish as their main language at home and the students that use Spanish in that way. (table 3).

	U by Mann-Whitney	W by Wilcoxon	Z	Sig.
Language	1197.500	4357.500	-1.151	.250
Mathematics	1105.000	3880.000	786	.432
General	1217.000	4220.500	-1.067	.286

Table 3. Comparison of the competences regarding the language used in the classroom

Other variables were analyzed, such as the school year and gender, through the General Linear Model in order to consider multiple relations between assessed competences and such variables, to find out if there are causal relations. The results show that there are significant correlations between the studied areas in relation to the school year when obtaining values of .000 in language, .000 in mathematics and .018 in general mark. As for gender, the only correlation observed occurs in the general mark, when obtaining a value of .027.

Table 4 shows the average obtained in the assessed competences (linguistic, mathematical and general) and the use of ICT at home by the students. As shown below, the students that use ICT at home obtain the highest marks in the different competences.

	Language	Mathematics	General
Use of ICT at home	6.61	6.28	6.63
No use of ICT at home	3.46	2.92	4.82

Comparing both groups (table 5), it is observed that there are significant differences regarding linguistic, mathematical and general competences in favor of students that use ICT at home.

Table 5. Comparison of competences based on the use of ter				
	U by Mann-Whitney	W by Wilcoxon	Z	Sig.
Language	177.000	3747.500	-7.176	.000
Mathematics	272.000	3432.000	-6.111	.000
General	379.000	3949.500	-5.823	.000

Table 5. Comparison of competences based on the use of ICT

Likewise, through the analysis of the General Linear Model Multivariate, the relations between the main language used at home and the use of ICT have been analysed relative to the studied competences. In regard to the results, it is important to mention that there are significant differences in the use of ICT when obtaining a significance of .000 in all the competences. Equally, it is worth mentioning that there are no significant differences in the type of language used at home and the linguistic (.384), mathematical (.267) and general competences (.102).

## 5. Conclusions

The aim of this research has been to find an answer to the objective set above. The results obtained not only describe the reality in this regard, but also lays out the possibility of educational proposals and the design of good practices to facilitate classroom inclusion both of immigrant and national students. It is important to remember that it is a characteristic of democratic societies to strengthen social bonds by promoting reciprocity and solidarity values, favouring social inclusion, as a consequence.

In the general mark, and considering the average scores, the highest marks correspond to students that use their mother tongue, opposite to the students that use Spanish as L2. Likewise, it has also been observed that, regarding the use of the mother tongue, there are also significant differences in performance in language and mathematics if the language used at home is Spanish or the mother tongue. However, by applying the statistical tests U by Mann-Whitney and Z by Wilcoxon, it is verified that there are not significant differences in the acquisition of linguistic, mathematical and general competences among the students dependent on the language used.

Equally, it has been verified that the academic performance of the students in a vulnerable context improves if they use ICT at home to work on their assignments and exercises, which undoubtedly would contribute to their success at school.

As for gender, there are no significant differences in language and mathematics, and there is a slight difference in the general mark.

The aim of this study is to assess the results of linguistic and mathematical competences in immigrant students that use ICT at home when doing their assignments and confirm if the language spoken at home with the family affects their academic performance.

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