

# Vocational Interests of Students in an International Network Learning Environment

## Intereses Vocacionales de Estudiantes en un Entorno Internacional de Aprendizaje en Red

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### KEYWORDS:

Interculturality  
Vocational interests  
Collaborative learning  
Virtual environment  
Primary education

### ABSTRACT:

Despite the fact that vocational interests constitute one of the main variables that influence decision-making, their study does not begin until ages that could require late hours, such as Secondary Education. In order to alleviate this deficit, a longitudinal study was carried out, whose main objective was to analyse to what extent a networked learning environment contributes to a better behaviour of primary school students towards their vocational interests. An educational program was developed and implemented based on the international R&D e-Cultures Project. Spain, Portugal and several Latin American countries participated in the research. The evaluation of the program was carried out using a quasi-experimental pretest-posttest design in which an ad hoc questionnaire was applied to collect the data. The results showed a stronger career decision in boys (as opposed to girls). On the other hand, vocational interests were less related to the country of residence. It is concluded that vocational guidance, working collaboratively in a networked learning environment with an intercultural perspective, enhances the decision-making process and definition of professional goals, contributing to the teaching of science in primary school students.

### DESCRIPTORES:

Interculturalidad  
Intereses vocacionales  
Aprendizaje colaborativo  
Ambiente virtual  
Educación primaria

### RESUMEN:

A pesar de que los intereses vocacionales constituyen una de las variables principales que influyen en la toma de decisiones, su estudio no se inicia hasta edades que podrían considerarse ya tardías, como es la Educación Secundaria. Con el fin de paliar este déficit, se realizó un estudio longitudinal, cuyo principal objetivo fue analizar en qué medida un entorno de aprendizaje en red contribuye a un mejor comportamiento de los alumnos de primaria hacia sus intereses vocacionales. Se desarrolló e implementó un programa educativo basado en el Proyecto internacional de I+D e-Culturas. España, Portugal y varios países latinoamericanos participaron en la investigación. La evaluación del programa se llevó a cabo mediante un diseño cuasiexperimental de pretest-posttest en el que se aplicó un cuestionario elaborado ad hoc para la recogida de los datos. Los resultados mostraron una decisión de carrera más firme en los niños (a diferencia de las niñas). Por otro lado, los intereses vocacionales estaban menos relacionados con el país de residencia. Se concluye que la orientación vocacional, trabajando colaborativamente en un ambiente de aprendizaje en red con perspectiva intercultural, potencia el proceso de toma de decisiones y definición de metas profesionales contribuyendo a la enseñanza de las ciencias en estudiantes de primaria.

### CÓMO CITAR:

Pantoja, A. y Berrios Aguayo, B. (2022). Vocational interests of students in an international network learning environment. *REICE. Revista Iberoamericana sobre Calidad, Eficacia y Cambio en Educación*, 20(3), 185-203.  
<https://doi.org/10.15366/reice2022.20.3.010>

## 1. Introduction

Vocational interests are an important aspect of the personality of students in training, as such interests have direct implications for students' professional decisions (Ashton, 2018). This author notes the use of vocational interest surveys, which usually ask the respondent to indicate their preference for various types of occupations and work activities, as well as—in some cases—leisure activities and school subjects. Responses to these items are used to predict which occupations and work activities would be most suitable for the respondent. In childhood, vocational interests are based on the idea of the external, of the professions closest to them and in activities that are linked to achieving ideals, as well as in heroic and satisfying situations (Sánchez & Valdés, 2003).

There have been few studies analysing the vocational guidance at the primary stage (6 to 12 years) of education. However, according to Espinosa Domínguez and others (2018), interests, qualities and basic abilities are developed in Primary Education which are essential for the vocational training of the individual. Teaching about professions must be considered not as a mere decision-making, but rather as a way of dealing with variations resulting from changes in society and the world of work. Authors such as Blackhurst and others (2003) report that by the age of 10 years, children are already forming vocational preferences, selecting some to learn more about and discarding those for which they feel they lack competence. In addition, studies such as those of Auger and Blackhurst (2005), Magnuson and Star (2000), and Trice and McClellan (1994) found that the acquisition of occupational aspirations is a process that begins in childhood and continues throughout the life span. In this sense, children's choices regarding their profession are influenced by factors such as their parents' educational level, their self-concept, and the family's socioeconomic status (Hou & Leung, 2011). According to Diaz Martínez and others (2008), these elements undoubtedly influence and relate to the occupational aspirations that develop throughout life. In a study conducted with adults (Trice & McClellan, 1994), it was found that only 23% of the sample had chosen, as a child, the profession they currently were pursuing. This leads us to pose the following questions: (a) which actions, learning trends, motivations and/or vocational concerns should be developed more extensively in students, in order to better prepare them to meet later professional demands, and (b) could these be provided to youngsters in primary schools (Pérez Alonso-Geta, 2005). Finally, According to Depesova (2016), the preparation for students in primary school and their following preparation for professional studies can have a considerable impact on their later success in the labour market. Bol and Van de Werfhorst (2013) have determined vocational guidance from the primary education stage to be one of the three fundamental dimensions that must be developed in any educational system. According to these authors, the development of this dimension, together with the timing and form of tracking of students and the extent to which an educational system is standardised nationwide, determine the quality of the educational system.

The type of environment where children's interests and vocations are worked on is very important for their proper definition. It is relevant to implement rich environments for learning and decision making. Boersma and others (2016) have shown that innovative learning environments that foster student communities are optimal settings for vocational guidance. In student communities, students experiment and learn in a shared, meaningful, reflective and transfer-oriented way. Virtual environments are a clear example of environments that can improve knowledge in a variety of content areas (Ferraro, 2018; Qahri-Saremi & Turel, 2016; Reid Chassiakos

et al., 2016; Schmid & Petko, 2019). Examples of this type of virtual environment in vocational guidance can be seen in the telematics tool for counsellors developed by Gómez and Cabero (2002). This computer-based program enables users to overcome barriers between personal knowledge and the environment, thus achieving a better vocational guidance. Hernando-Gómez (2009) developed Webquest to support the Professional Orientation and Vocational Guidance Plan (POVP) of the Baccalaureate for students' vocational decision-making. In presenting the online platform, the author concludes with the idea that ICT allows the optimisation and enrichment of psychopedagogical guidance (a benefit particularly useful during compulsory secondary education and high school. More recently, Bernardo and others (2017) analysed the effectiveness of the online E-guidance program. For its evaluation, students accessed questionnaires on virtual Google before and after implementation of the program. The E-guidance program is made up of five sessions focused on pre-university academic and vocational guidance content. It was shown that this type of virtual program can be highly effective for activities associated with pre-university guidance and, further positively valued by the student users.

It can be said that ICT has favoured interactivity, i.e. as a new form of social engagement and supporting the emergence of new educational environments (what have been called 'network learning environments'). These environments serve as venues where the exchange of ideas and collaboration amongst various parties (e.g. student-student or student-teacher) can occur; they thus function as an anchor (Goldie, 2016; Silva Quiroz & Romero Jeldres, 2018). Gil and others (2003) have called this new way of teaching through network connectivity an 'interaction culture', one that is much more visible in the young population (who have developed new forms of coexistence through them). An example would be the study carried out by Lin Ho (2000), in which it was determined that ICT can be used as a tool not only to develop students' interpersonal skills, but also to display their sense of awareness of intercultural concerns (and thus function as part of an international dynamical system). Rickard and Austin (2017) demonstrated how intercultural collaborative work could be accomplished (i.e. with digital tools such as e-books, improved ICT skills and, as well, communicative and collaborative capacity). It must be taken into account that ICTs are presented as a new contextualised field in the most immediate environments of children. The successful uses of ICTs tend to favour pedagogies that are not invisible to everyone, e.g. collaborative work through active models, shared skills, lessons that contain elements of discovery, and the like (Ingram, 2016).

Gender is another variable that can influence professional choices. Ashton (2018) suggested that do possible evolutionary pressures between men and women, which would lead to differences in choices. It should be noted that the fields of professional knowledge continue to present traditional gender biases (Macías-González et al., 2019). These same authors highlight the tendency of women to choose careers in health sciences and social sciences. Meanwhile, the men outperform women in engineering, architecture and sports career. These results are in agreement with previous studies which affirm that these gender choices are linked to the cultural construct of beliefs that were assigned to men and women; for example, in the case of women in health and pedagogy and men in engineering and industry (López-Sáez, 2014; Zubieta & Herzig, 2016).

Finally, the country where the professional orientation is carried out is one of the variables considered in this study. Nowadays, there is a low presence of vocational guidance in primary education in textbooks in the countries of the European area where the present study is registered, as well as in Latin America. This reduces the

opportunity for students, at this educational stage, to gain access to, and thereby learn about, the world of work. This supports the opinion of Ortega Ruiz and others (2005), who suggest that a student's ability and success in his studies, as well as the presence of good vocational guidance adapted to the context, will help him make the right career decision. Undoubtedly, a change of focus from academics to the world of work begins during the primary years of education. In this regard, González Lorente and González Morga (2015) point out the need to include in the academic guides of all territories educational content that can support the student in this transition (e.g., exploration/self-knowledge, exploration/knowledge of their environment, construction of their own personal and socio-social being), professional identity, the development of a decision-making process and the elaboration of an action plan that leads to successful career decisions. In addition, Zuchowski and others (2021) confirm that the success of vocational guidance will depend on the relationship that schools have with companies depending on the territorial policy.

In accordance with the above, the objective of the current research was to analyse to what extent an educational platform contributes to a better recognition of vocational interests in matched students in an intercultural network of collaborative work (with the purpose of assisting in the development of one's professional identity). In addition, the influence of gender and country of residence variables on vocational interests will be addressed.

## 2. Method

An evaluative research of a collaborative nature was carried out with a longitudinal pretest-posttest approach when collecting information throughout the development of the intercultural program. A pre-/posttest format was used to collect data regarding development of the intercultural program.

An ad hoc questionnaire was designed based on the Interests and Professional Preferences Questionnaire (De la Cruz, 2015). This instrument uses 15 professional fields: Scientific (SC), Technical field (I), Sanitary field (S), Scientific-Social Humanities (SSH), Legal-Social field (LS), Communication-Information (CI), Psycho-pedagogical field (P), Business-Administrative-Commercial (BAC), Computer (C), Farming (F), Artistic-Plastic field (AP), Artistic-Music field (AM), Armed Forces-Security (AFS), Sports (SP), and Tourism-Hospitality (TH). Each field had 5 items that refer to that profession. For example, Professional field 9. Computer:

- Disassemble and mount computers.
- Perform analysis and organization of data applied to information technology.
- Manage the connection of computers to networks.
- Develop programs with computer languages.
- Build computer solutions to everyday needs.

In our case, it was adapted to the age of the children in the third grade of primary education. A team of seven expert judges was selected to ensure element of content validity; these included professional counsellors and university professors specialising in primary education. The 180 items of the original questionnaire were reduced to 75 and their wording was adapted to the population being studied. In this way, the '*Escala de intereses profesionales en alumnado de tercer ciclo de Educación Primaria (EIPEP)*' was derived. This test is easier for primary school-aged students to complete than the original

version. Factor analysis and reliability tests were carried out. The new instrument is a Likert-type scale with the options: A. I like it very much; B. I like it a lot; C. I like it; D. I don't like much E. I don't like it at all.

The Kaiser-Meyer-Olkin (KMO) adequacy index reached a value of 0.381 and Bartlett's sphericity test was 81884.329 ( $p < 0.00$ ). These data led to the rejection of the null hypothesis, reflecting that the responses were considered to be substantially related, which justifies completion of the factor analysis. Analysis of the main components and Varimax rotation showed, after 21 iterations, the convergence in 15 factors that explained 82.37% of the variance. Cronbach's alpha was 0.976, which demonstrates the high internal consistency of the instrument and also that it is reliable. In the Table 1 can see the alpha values of each factor. Except for the Technical and Sanitary factors, all the others present values  $< 0.7$ , the highest being the Artistic-Plastic field with 0.867.

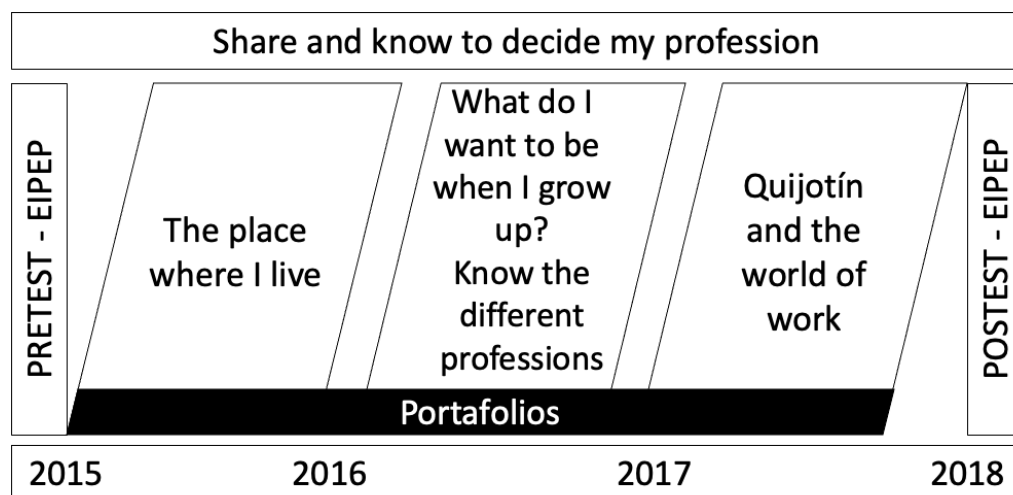
**Table 1**  
*Alpha values in each of the factors*

SC	T	S	SSH	LS	CI	P	BAC
0.773	0.552	0.682	0.745	0.803	0.725	0.795	0.774
C	F	AP	AM	AFS	SP	TH	
0.739	0.848	0.867	0.688	0.855	0.799	0.803	

*Note.* (Scientific (SC); Technical field (T); Sanitary field (S); Scientific-Social. Human. (SSH); Legal-Social field (LS); Communication-Information (CI); Psychopedagogical field (P); Business-Adm.-Commercial (BAC); Computing (C); Farming (F); Artistic-Plastic field (AP); Artistic-Music field (AM); Armed forces-Security (AFS); Sports (SP); Tourism and Hospitality (TH).

The study is based on a research developed over a decade by the IDEO Research Group (HUM 660) within the framework of the 'International e-Culturas Network' (Pantoja, 2013, 2016). Specifically, the study focuses on the period from 2015 to 2018, when the idea called 'Share and know to decide my profession' was developed. Broadly speaking, the project is based on three phases (Figure 1) during which students from different countries, grouped into sets of three, working collaboratively with the materials available on the educational platform of the project. The project website no longer exists; however, all the information is on the research group website (<http://www.ujaen.es/investiga/ideo/>).

**Figure 1**  
*Project phases*



The intercultural program has the following characteristics:

- The digital platform e-Culturas is the one that supports the full weight of the research.
- The work is carried out in a twinning system between children from different countries. The teams are made up of 3 or 4 members.
- All the material is in Spanish and Portuguese and it is work at the same time for the children in their different countries of residence.

The sequence of the program is (Pantoja, 2016):

The place where I live: It is an interactive album that allows children to put pictures and write text. It is distributed in three thematic blocks: who are we? my work and the work of my relatives. At the end, the twinned group conducts an investigation that collects information on a typical local food and explains what professions are involved to make it possible.

What do I want to be when I grow up? Carrying out activities around 11 professional branches with the aim of introducing students to vocational guidance through the knowledge of professional group and thus acquiring their own concept of what each one wants to do. The work sequence includes a brief theory notebook detailing the most relevant professions; interactive activities such as puzzles, completing texts, looking for pairs, tangram, etc; a final activity related to the biography and professional career of an important character, and, finally, a group task that varies in each branch. The result is published in the existing digital mural on the platform. Table 2 shows an example of work plan in What do I want to be when I grow up?

**Table 2**  
*Example plan for the scientific-technical branch*

Theory notebook	Activities	Great doctors and biologists	Teamwork
Medicine and nursing	Puzzle	Alexander Fleming	Research the profession of doctor
Veterinary	Complete text	Santiago Ramon y Cajal	
Biology	Find pairs	Louis Pasteur	
Psychology			

Quijotín and the World of Work: This is an interactive game in which twin brothers, as a team, share in the different adventures and events that happen to this fictional character. Quijotín is an adventurer who travels the world, and wherever he goes, he performs various jobs as an apprentice. As Quijotín arrives in a country and finds a job, problems arise that each team must solve, using the Internet for support. The teams thus discuss the world of work and begin the decision-making process of vocational guidance.

One of the main characteristics of the project is the cultural diversity of the students (from Argentina, Brazil, Chile, Spain, Paraguay, and Portugal); which allows them to see the vocations from a variety of cultural contexts. The intercultural nature of the exchange of information and learning about the professions is what confers innovation on this project, and the use of ICT through the platform, the digital mural, and the internal social network, provides added value. The videoconferences and, in a special way, the collaborative way of working with the various materials, are its primary elements. The project develops between March and December at a rate of 2 hours per

week, divided according to the criteria of each tutor, and within the didactic programming of different subjects.

### *Sample design*

The intercultural and collaborative nature of the research involved at all times the participation of complete classrooms (natural groups), and their selection was subject to technical availability criteria (computer equipment and internet access), reason why the final sample was intentional. The participating centres are all publicly-owned and with very similar characteristics. The inclusion of some countries or others in the investigation adhered to available access to the centres (and reflected in the regulations and ethical norms of same). The research team required from the various directors the corresponding approval of participation permits (informed consent and ethical report). The research process was coordinated with the start and end of school in Latin America (March to December) because the tutors would have been different if the European calendar was followed. For this reason, Spanish and Portuguese children who began research at the 5th level continued with their same group and tutor in September, already in 6th. The ages were the same in all groups.

In total, the sample consisted was 1184 primary school students, distributed in 43 classrooms in 35 schools in six different countries. Table 3 shows the distribution according to sex and age of the students (between 11 and 12 years old). The name of the stage varies by country, but there is a correspondence in the educational level.

**Table 3**

#### *Participant identification data*

Age	Sex		Country					
	Boys	Girls	Argentina	Brasil	Chile	España	Paraguay	Portugal
11.86	598	586	246	256	124	352	102	104
±0.88	(50.5)	(49.5)	(20.8)	(21.6)	(10.5)	(29.7)	(8.6)	(8.8)

Regarding the sampling distribution, approximate percentages of students (50.5%) and female students (49.5%) are found. All tasks are carried out exclusively in schools, which have computer equipment and a network connection. This avoids the possible digital divide.

In order to verify the equivalence of the groups, an t-test was carried out, taking as reference the subjects at the beginning of the investigation and the means in their academic performance in the two main common subjects (Native language and Mathematics). As can be seen in Table 4, there were no differences in the average scores of the study participants.

**Table 4**

#### *Equivalence of groups of countries (t-test)*

	Argentina	Brasil	Chile	Spain	Paraguay	Portugal
M	6,2	6,9	7	7,4	6	7
F	0.993	0.627	0.681	0.661	0.178	0.647
Sig	0.421	0.679	0.638	0.653	0.971	0.741

*Note.* M=Means of the grades in the subjects of Native language and Maths.

### *Analysis of data*

The data analysis was carried out by proceeding, first, to regroup the different values collected across the 4 years that the study lasted (as pretest-postest). On the total

sample, a complete descriptive analysis, contingency tables, t-test of mean differences for related samples and linear correlation were carried out, taking into account vocational interests, sex, and country.

### 3. Results

The variables sex and country have been taken into account in relation to the 15 professional fields. Firstly, the values of each field were added and, later, the mean was obtained; they could thus range from 5 to 25 points.

The main differences in means between pretest and posts are seen in Legal-Social field (LS ( $p=0.008$ ), Communication-Information (CI) ( $p=0.001$ ), Farming (F) ( $p=0.001$ ) and Sports (SP) ( $p=0.001$ ), meaning in the latter an increase of 3.17 points in the post-test, the highest of all professional fields (Table 5).

**Table 5**

*Comparison pretest-posttest scores professional fields best and worst rated*

Prof. Fields	Pretest		Posttest		P
	M	SD	M	SD	
S	13.78	4.81	12.97	6.74	0.051
LS	14.24	5.83	14.61	6.58	0.008
CI	13.08	5.10	13.84	6.72	0.001
C	14.44	5.55	13.99	6.81	0.053
F	16.10	6.46	16.33	7.79	0.001
AM	14.85	5.51	14.46	7.12	0.108
SP	17.29	9.15	20.46	10.72	0.000

*Note.* (1) M=Means; SD=Standards deviation;  $p<0.05$ . (2) Sanitary field (S); Legal-Social field (LS); Communication-Information (CI); Computing (C); Farming (F); Artistic-Music field (AM); Sports (SP).

In boys, there was found to be an increase in interest in all professional fields in the posttest with respect to pretest values, the only exception being Sports ( $M=18.87$ ;  $SD=11.59$ ). This was also found in girls (although it was least preferred both in the pretest and in the posttest;  $M=22.09$ ;  $SD=9.49$ ). The girls showed less certainty in the pretest than boys in virtually every field. The highest preference values in children in the posttest were in the Sanitary field ( $M=12.39$ ;  $SD=7.27$ ), Communication-Information ( $M=13.01$ ;  $SD=7.42$ ), Business-Administration-Commercial ( $M=13.25$ ;  $SD=7.68$ ) and Artistic-Musical field ( $M=13.51$ ;  $SD=6.63$ ). Girls, meanwhile, expressed a greater degree of indecision; the majority showed a predilection for Computer Science ( $M=13.38$ ;  $SD=6.19$ ) and Healthcare ( $M=13.55$ ;  $SD=6.10$ ).

The Cohen  $t$  and  $d$  tests were performed to determine if there were differences between the scores of the boys and girls between pretest-posttest and, as well, to verify the effect size. A  $t$ -test was carried out for independent samples, taking as reference the variable sex and the 15 professional specialties. There are significant differences between means ( $p\leq 0.05$ ) in all fields, with the exception of the Sanitary field, Communication-Information, Armed Forces-Security, Tourism, and Hospitality. The size of the effect calculated by Cohen's  $d$  indicates a greater effect in boys in the Sanitary field ( $d=0.29$ ) and in girls in the Scientific ( $d=0.41$ ) and Communication-Information ( $d=0.30$ ) fields. In contrast, this effect was reversed in the Sports (Boys:  $d=-0.27$ ; Girls:  $d=-0.38$ ). Can be see this in Table 6.

The three countries with more participating students are analysed below (Table 7); these also have varying cultural realities, that is, Spanish, Argentine, and Brazilian



(Portuguese influence). After segmenting the file in SPSS, a t-test was performed for related samples (pre-post). Matches were checked in terms of professional preferences, with the Health, Communication-Information, and Information Technology branches being the most chosen among students. In turn, the Sports branch was the least chosen option in Argentina and Spain, as in the sex variable, but not in Brazil, where it is a high preference option for students. They are followed by Armed Forces-Security and Psycho-pedagogical field as low-preference options in the three countries.

**Table 6**

*Pretest-posttest scores by the gender in the different professional fields*

Prof. Fields	Boys					Girls				
	Pretest	Posttest	t	p	d	Pretest	Posttest	t	p	d
SC	14,14 (5.65)	14.08 (8.14)	0.16	0.87	0.00	14.62 (3.89)	16.93 (6.80)	-8.13	0.00	0.41
T	15,27 (4.87)	14.35 (7.96)	2.48	0.01	0.13	15.01 (4.25)	15.21 (5.79)	-0.70	0.48	0.03
S	14,25 (4.98)	12.39 (7.27)	5.17	0.00	0.29	13.31 (4.58)	13.55 (6.10)	-0.84	0.40	0.04
SSH	15.27 (5.81)	14.40 (8.78)	2.04	0.04	0.11	16.77 (5.11)	17.43 (7.42)	-1.92	0.06	0.10
LS	14.75 (6.54)	13.88 (7.33)	2.21	0.03	0.12	15.74 (4.96)	15.35 (5.63)	1.48	0.14	0.07
CI	13.07 (5.45)	13.01 (7.42)	.14	0.89	0.00	13.09 (4.73)	14.68 (5.80)	-5.75	0.00	0.30
P	15.08 (5.94)	14.12 (8.37)	2.34	0.02	0.13	16.54 (5.45)	17.85 (7.52)	-3.76	0.00	0.19
BAC	14.37 (6.56)	13.25 (7.68)	2.89	0.00	0.15	15.15 (4.91)	14.75 (5.64)	1.57	0.12	0.07
C	15.26 (6.03)	14.10 (7.37)	3.43	0.00	0.17	13.60 (4.89)	13.38 (6.19)	-0.88	0.38	0.03
F	15.40 (6.98)	14.30 (8.36)	2.94	0.00	0.14	16.82 (5.81)	16.38 (7.02)	1.57	0.12	0.06
AP	16.87 (7.28)	14.43 (8.40)	6.24	0.00	0.31	17.35 (6.62)	16.39 (6.73)	3.08	0.00	0.14
AM	14.66 (6.06)	13.51 (7.63)	3.05	0.00	0.16	15.04 (4.87)	15.43 (6.43)	-1.35	0.18	0.06
AFS	15.29 (6.86)	15.01 (9.29)	0.72	0.47	0.03	16.61 (6.28)	17.03 (7.42)	-1.23	0.22	0.06
SP	15.93 (9.92)	18.87 (11.59)	- 34.37	0.00	- 0.27	18,68 (8.07)	22.09 (9.49)	- 41.68	0.00	- 0.38
TH	13.40 (7.78)	13,39 (7.78)	-0.91	0.46	0.00	16.42 (6.23)	16.41 (6.23)	-3.55	0.12	0.00

*Note.* (1) M=Means; SD=Standard Deviation;  $p < 0.05$ ;  $d$ =Cohen's  $d$ . (2) Scientific (SC); Technical field (T); Sanitary field (S); Scientific-Social. Human. (SSH); Legal-Social field (LS); Communication-Information (CI); Psychopedagogical field (P); Business-Adm.-Commercial (BAC); Computing (C); Farming (F); Artistic-Plastic field (AP); Artistic-Music field (AM); Armed Forces-Security (AFS); Sports (SP); Tourism and Hospitality (TH). (3) Bold are the extreme values in each test. Student  $t$ , significance  $p < 0.05$  and Cohen's  $d$  (small=0.20; medium=0.50 and large=0.80).

**Table 7*****Pretest-Posttest scores of the country variable in the different professional fields***

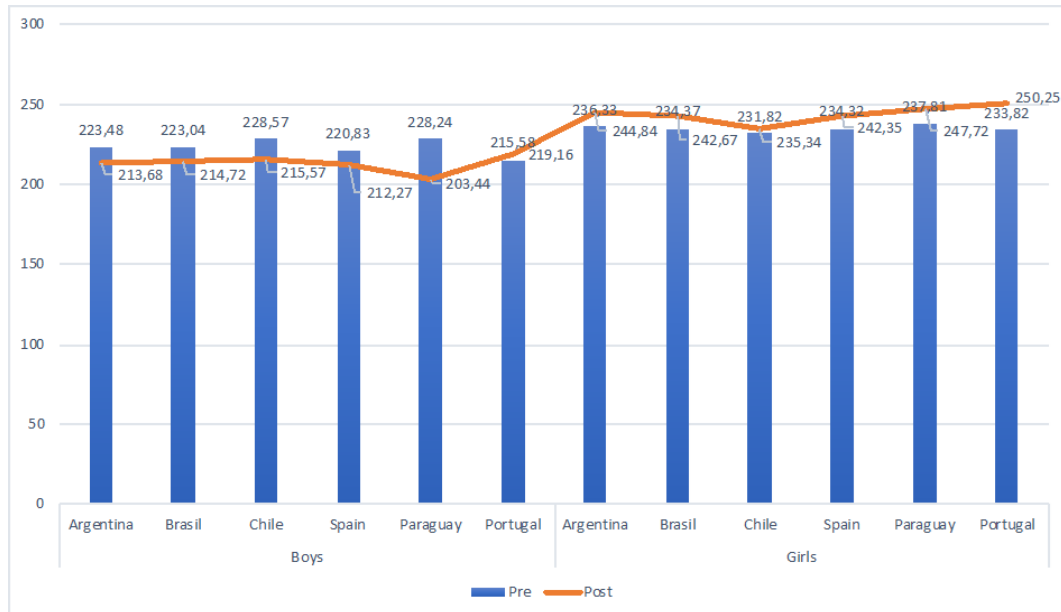
		Argentina (N=246)				Brasil (n=256)				Spain (n=352)			
		M (SD)	t	P	d	M (SD)	t	P	d	M(SD)	t	p	d
S	Pre	13.80 (4.82)	1.62	0.11	0.14	13.78 (4.77)	1.50	0.13	0.13	13.83 (4.77)	1.87	0.06	0.00
	Post	12.97 (6.67)				13.00 (6.79)				13.83 (7.00)			
CI	Pre	13.11 (5.07)	-1.43	0.15	-0.12	13.10 (5.05)	-1.64	0.10	-0.14	13.00 (5.11)	1,89	0.06	0.13
	Post	13.84 (6.67)				13.95 (6.79)				13.81 (6.85)			
PS	Pre	15.94 (5.77)	-0.42	0.68	-0.03	15.79 (6.78)	3.30	0.76	-0.02	15.68 (5.74)	-0.46	0.64	0.03
	Post	16.19 (8.32)				15.98 (8.26)				15.90 (8.28)			
C	Pre	14.47 (5.51)	0.66	0.51	0.05	14.45 (5.51)	1.53	0.29	0.08	14.41 (5.43)	0.92	0.36	0.06
	Post	14.13 (6.91)				13.90 (6.83)				14.01 (7.00)			
AF	Pre	16.04 (6.57)	-0.25	0.80	-0.01	15.88 (6.47)	-0.25	0.80	-0.01	15.67 (6.57)	-0.65	0.51	-0.03
	Post	16.18 (8.50)				16.01 (8.56)				15.97 (8.99)			
S	Pre	17.44 (9.12)	-24.40	0.00	0.32	17.34 (9.20)	-24.70	0.00	0.68	17.32 (9.35)	-28.60	0.00	0.31
	Post	20.64 (10.65)				10.55 (10.78)				20.47 (10.94)			

*Note.* (1) M=Means; SD=Standard Deviation;  $p < .05$ ;  $d$ =Cohen's d. (2) Sanitary field (S); Communication-Information (CI); Psychopedagogical field(P); Computing (C); Armed forces-Security (AFS); Sports (SP). (3) Bold are the extreme values in each test. Student t, significance  $p < .05$  and Cohen's d (small=.20; medium=.50 and large=.80).

The differences between pretest-posttest were checked according to country and sex (Figure 2). The most significant differences ( $p < 0.001$ ) are found in boys from Paraguay and in girls from Argentina and Spain, countries with a similar culture. It is striking that children in all countries, with the exception of Paraguay, improved their preferences in the professional fields in the posttest, while girls went the opposite way and lowered their predilections after the application of the program. This shows, in some way, the existence of a lack of clear professional/vocational direction in girls, as compared to boys. There may be an influence of family environments with accentuated traditional roles. Although, this could not be verified in the investigation.

**Figure 2**

*Differences between pretest-posttest according to sex and country of residence*



Finally, a MANOVA was performed in which sex acted as the independent variable and the different professional fields and the country of residence as dependent variables. There were statistically significant differences in pretest, Wilks lambda=0.220,  $F(15, 1167)=275.425$ ,  $p=0.000$  and posttest, Wilks lambda=0.443,  $F(15, 1167)=101.900$ ,  $p=0.000$ . In order to identify the professional fields that had the most change before and after applying the program, the effects-intrasubject test was carried out, which shows the significant differences included in Table 8. The effect size was measured by Partial  $\eta^2$  and takes, as reference, the values indicated by Fritz et al. (2012), being average when it is between 0.06 and 0.14. As can be seen, with the exception of the technical field, there was a clear influence in all professional fields according to sex and country of residence. The most significant changes were seen in the Communication-Information fields: in the pretest,  $F=0.157$ ;  $p=0.855$ ; partial  $\eta^2=0.000$  passing  $F=9.337$ ;  $p=0.000$ ; Partial  $\eta^2=0.016$ , and Computing passing from one  $F=0.169$ ;  $p=0.845$ ; partial  $\eta^2=0.000$  at  $F=13.403$ ;  $p=0.000$ ; Partial  $\eta^2=0.022$ . Finally, the Tourism-Hospitality field reached the highest partial  $\eta^2$  value (0.044) and an observed power of 1,000. These values indicate that the elements linked to the intercultural program, 'Sharing and knowing to decide my profession' have been the ones that have strengthened the most in the choice of students (Communication-Information and Tourism-Hospitality), together with Computer Science as a thread of work and the relationship between students.

**Table 8**  
**MANOVA professional fields, sex and country of residence (pretest-postest)**

Dep. variables	Type III of sum of squares	gl	Quadratic mean	F <sup>a</sup>	Sig.	$\eta^2$ parcial <sup>a</sup>	Observed power
SC_A <sup>b</sup>	69.81	2	34.90	1.47	0.22	0.00	0.32
T_A	19.69	2	9.84	0.47	0.62	0.00	0.13
S_A	400.34	2	200.17	4.42	0.01	0.01	0.76
SSH_A	662.94	2	331.47	11.03	0.00	0.02	0.99
LS_A	293.25	2	146.62	4.32	0.01	0.01	0.75
CI_A	8.17	2	4.08	0.15	0.85	0.00	0.07
P_A	632.47	2	316.23	9.75	0.00	0.02	0.98
BAC_A	187.04	2	93.52	2.77	0.06	0.01	0.55
C_A	15.72	2	7.86	0.16	0.84	0.00	0.08
F_A	596.92	2	298.46	7.20	0.00	0.01	0.93
AP_A	67.63	2	33.81	0.69	0.49	0.00	0.17
AM_A	53.28	2	26.64	0.87	0.41	0.00	0.20
AFS_A	515.60	2	257.80	5.94	0.00	0.01	0.88
SP_A	2242.97	2	1121.48	13.66	0.00	0.02	0.99
TH_A	696.81	2	348.40	9.02	0.00	0.01	1.00
SC_B	2400.77	2	1200.38	21.26	0.00	0.04	1.00
T_B	218.74	2	109.37	2.24	0.10	0.00	0.46
S_B	261.26	2	130.63	5.68	0.00	0.01	0.86
SSH_B	2721.54	2	1360.77	20.53	0.00	0.03	1.00
LS_B	639.41	2	319.70	7.44	0.00	0.01	0.94
CI_B	832.11	2	416.05	9.33	0.00	0.02	0.98
P_B	4125.18	2	2062.59	32.45	0.00	0.05	1.00
BAC_B	669.35	2	334.67	7.33	0.00	0.01	0.93
C_A	810.95	2	405.47	13.40	0.00	0.02	0.99
F_B	1282.08	2	641.04	10.72	0.00	0.02	0.99
AP_B	1141.12	2	570.56	9.79	0.00	0.02	0.98
AM_B	1090.68	2	545.34	10.91	0.00	0.02	0.99
AFS_B	1205.30	2	602.65	8.48	0.00	0.01	0.96
SP_B	3061.07	2	1530.53	13.58	0.00	0.02	0.99
TH_B	2696.81	2	1348.40	27.02	0.00	0.04	1.00

*Note.* (1) Scientific (SC); Technical field (T); Sanitary field(S); Scientific-Social. Human. (SSH); Legal-Social field (LS); Communication-Information (CI); Psychopedagogical field (P); Business-Adm.-Commercial (BAC); Computing (C); Farming (F); Artistic-Plastic field (AP); Artistic-Music field (AM); Armed forces-Security (AFS); Sports (SP); Tourism and Hospitality (TH). (2) <sup>a</sup>Only significant partial F and  $\eta^2$  values are included in the table with correspondence between pretest-postest. <sup>b</sup>. A pretest and B postest values are separated.

## 4. Discussion and conclusions

The present study shows how an intervention program on professional orientation in Primary Education can produce changes in the professional decision, obtaining a better knowledge of the professions and a greater exchange of information about them. Students were able to share their experiences with each other, which could lead to an exchange of opinions and experiences being a tool of development for advance of science education. The main change is found in Sports, although there are also in Legal-Social field (LS) ( $p=0.008$ ), Communication-Information (CI) ( $p=0.001$ ), Farming (F) ( $p=0.001$ ).

The network learning environment made the different telematics materials and tools available, as well as pairing between students from different countries. As a result of

the research, it was determined that collaborative activities among students from different countries had a positive impact on the development of the professional identity of the students (in addition to the relevant effect that ICT offers in terms of guidance).

It is clear that educational guidance must be updated as society advances, particularly in technology. As concluded by Hernando-Gómez (2009), it is a mistake for educational contexts not to introduce ICT to students. Malik Liévano and Sánchez García (2003) emphasised the importance of using ICT to support the process of orienting to various professional career paths (seeing it as an ally in this process rather than as an enemy). The present study has demonstrated that an educational platform designed to favour collaborative relationships between students and tutors allows notable improvements in the development of a vocational guidance. Similarly, Beidoğlu and others (2015) consulted the opinions of school advisors on the use of ICT for school guidance; they found a positive opinion on the use of interactive web pages and guidance programs. However, they did not register positive assessments regarding online advice. In accordance with the recently-cited literature, the present study has shown that an educational platform designed to favour collaborative relationships between students and tutors allows notable improvements in the development of avocational guidance.

Collaborative work in virtual environments between members of different countries, it was found, can increase the quality of acquired learning (despite the distance). There is thus a need for pedagogy and technology to come together to create this type of work environment. This process helps create suitable climates in which to develop feelings of connection and to facilitate both socialisation and the development of relationships. These, in turn, serve to humanise the virtual environment (Hernández et al., 2014). In this research, such collaborative interactivity was used to develop vocational guidance program. From there we can follow the lines of Gil and others (2003), who determined that ICT could serve as an interactive facilitator in the educational field (and, as such, should be used by guidance counsellors of educational programs. Regarding the intercultural environment promoted in this research, Manning and others (2017) have shown that such contexts promote decision-making at an early age.

Vocational guidance has perhaps been one of the most used tools to be implemented in virtual environments in recent years. Particular relevant are online courses offered to help young people make decisions about their professional futures. One of the keys (and novel) objectives of the present research was its focus on primary education; indeed, there are few precedents. One example is The Real Game program developed by the Organisation for economic Co-operation development (OCDE, 2004) and utilised in multiple countries. Vidal Ledo et al. (2009) demonstrated several virtual vocational guidance programs that work as useful tools when determining vocational preferences in secondary education, the Baccalaureate and higher education. The authors concluded that these types of programs, where vocational guidance was linked to ICT, were essential tools for making decisions regarding a student's future profession. Consistent with the current study, Ginevra and Nota (2018) examined the effectiveness of a career guidance program in which, after completion, the experimental group obtained significantly more hope, optimism, curiosity, enthusiasm in career exploration, occupational knowledge, planning capacity, and time perspective than the control group.

One of the main functions of vocational guidance is to help students make decisions about their future and to determine their preferences among the jobs available in a

society. The multicultural environment means diversity in terms of ethnicity, gender, religious, social belonging, etc. Collaborative work in an intercultural environment determines time management, information management, planning, decision-making, relationships, communication style, power, conflict resolution, leadership development and motivation (CHARIS, 2012). In the present investigation, professional preferences have been analysed from an intercultural perspective, taking into account gender and nationality. The professional interests that were most popular for males were Sanitary field, Communication-Information, Business-Administration-Commercial and Artistic-Music field, whereas Computer was the most popular for females. Diaz Martínez and others (2008) reported that the field of greater preference for both sexes in 12-year-old children was that of Social Sciences and Administration (21%), followed by Education Sciences, Humanities and Arts (11%) and Engineering and Technology (10%). Pérez Alonso-Geta (2005) determined that children had a greater preference for professions in Sports (35%) followed, by a minor percentage of preference, the Industry-Service-Construction (9.4%) and Sanitary field (9.3%). Girls opted for the Sanitary field (27.5%) and Teaching (24%) fields. The only preference shown in both studies was for the Sanitary field. Sports was valued well below the other fields in our research; however, Pérez Alonso-Geta (2005) found a greater preference for this field in children. According to this author, children can be influenced by their context and even by sports practice after school hours. The fact that girls expressed a greater predilection for Computing in our research may be due to social factors (FAD, 2007; Molina Martín & Fernández García, 2007), that is, they may have been influenced through contact with their counterparts in the digital environment in the project. In addition, the fact that boys in the posttest had clearer professional predilections than girls are a possible example of gender imbalance (Rossi Cordero & Barajas Frutos, 2015). Sarrió and others (2002) highlight the need to break the glass ceiling at work and women so that women do not fear when choosing certain professions. Finally, Asthon (2018), in this research, emphasizes how families influence the vocational interests of their children from a very young age.

Finally, living in one country or another partially determined preferences for one or another profession, depending on the value of this in the country. The highest preferences in the three countries analysed were Health, Communication-Information and Information Technology field. On the other hand, in the Business-Administrative-Commercial and Sports fields, there was a positive relationship with the country of residence. Until now, the relationship between one's own country and one's professional preferences had not been studied, although there has been found to be an influence of both context and economic level in professional preferences (Diez Martínez et al., 2008; González Maura, 2009; Paoloni, 2010). In addition, in a study by Vintere and Balode (2016) of students in Baltic countries, differences in preferences (when receiving guidance to possible career paths) were observed across countries. Tiwari and Galundia (2018) determined that if children obtained adequate vocational guidance—especially in locations where it was more difficult to make informed choices, such as the more rural countries— they could excel in those vocations at levels commensurate with their ability. On the other hand, following the evidence from the research of Bol and Van de Werfhorst (2013), country of residence is a variable that influences the vocational guidance provided, as the degree of development varies by country. European countries such as the Czech Republic, the Netherlands, Belgium, Austria and Switzerland have well-established guidance services in all three educational stages with optimal results, while countries such as Brazil, the United States, Australia, Ireland and Uruguay offer more dispersed and less efficient vocational guidance service.

Finally, Edwards and Quinter (2011) concluded that factors such as the resources of a country, political stability, and climate can influence the professional preferences of students to a high degree.

#### *Limitations and recommendations for future research*

One of the limitations of the research is the lack of control groups. However, this was not the objective of the project but rather to check the changes produced in the samples chosen based on the application of the intercultural program. In addition, the breadth of the research should be underlined, since it covers a culturally diverse population, which in some way was representative of the cultural link between Europe (Spain and Portugal) and South America (Argentina, Brazil, Chile and Paraguay). Added to this is the problem of access to a sample so geographically distant, with such different work habits. This limitation is also a strength, as this study can be considered preliminary in the field of educational science. In this sense, its continuity should lead to better interactions between participants, expanding, for example, the number and content of videoconferences, as well as establishing stronger prior contacts between schools in each country. Replication could lead to its adaptation to different linguistic fields, such as English or French.

As a final conclusion, it can be affirmed that the experience of young people working in collaboration with their counterparts from other countries to improve their knowledge of vocational options provided a degree of benefit in their vocational preferences. Specifically, it helped them clarify their interest and motivation for some professions they were already considering. However, there was a clearer predilection in men than in women in their established preferences. Country of origin is also an influential factor in professional decision-making given the varying levels of guidance offered in different countries. This R&D project could provide future directions for policy and school practitioners to promote vocational guidance from the primary education stage.

However, there is still a lot of effort to be done so that career guidance is considered as a profession and not simply as an inherent function of teaching (Navarro-Abal et al., 2016), increasing the quality of training received by counselors, specialization and transfer of the teaching profession. knowledge to real situations.

## Acknowledgments

The data reflected in this article have been made possible thanks to support received by the IDEO Research Group (HUM 660) (<http://www.ujaen.es/investiga/ideo/>) consecutively from the following organisations: Service National of Commercial Learning (SENAC; Brazil) (Exp. 2925); 'International e-Culturas Project'; and the University of Jaén (Spain), R&D Project (Ref. 2011/124) 'Sharing and knowing my profession: A proposal for intercultural net-worked career guidance'.

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