

## Information sources used by high school students in the college degree choice

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### Abstract

**Introduction:** Searching for information is a necessary step for young people to decide what to study and prevent school drop-out. The aim of this study is to identify the main sources of information used by students in choosing a university career and to assess the degree of usefulness of these sources. **Method:** A new measuring instrument to assess the use and usefulness of the information sources used in choosing university studies was developed. 2,005 high school students aged 17 to 24 ( $M = 17.56$ ,  $SD = .77$ ) participated in the study, representing 44.95 % of the total of school centers of the Principality of Asturias (Spain). **Results:** The new instrument has adequate psychometric properties and shows that the information from parents and web pages by universities are the most used and most useful information sources for pre-university students. **Conclusions:** Obtaining this type of information is very important, as it encourages investing in those activities or resources that are important for pre-university students.

**Keywords:** Scale, information sources, professional guidance, college degrees.

### Resumen

**Fuentes de información que utilizan los estudiantes de Bachillerato en la elección de carrera universitaria. Introducción:** la búsqueda de información constituye una condición necesaria para que los jóvenes decidan qué carrera estudiar y prevenir la deserción educativa. El objetivo de este trabajo es identificar las principales fuentes de información utilizadas por los estudiantes en la elección de la carrera universitaria y valorar su grado de utilidad. **Método:** se desarrolló un nuevo instrumento de medida para evaluar el uso y la utilidad de las fuentes de información utilizadas en la elección de estudios universitarios. Participaron 2.005 estudiantes de segundo curso de Bachillerato con edades comprendidas entre los 17 y los 24 años ( $M = 17.56$ ;  $DT = .77$ ) que suponen el 44,95% del total de los centros educativos asturianos que imparten Bachillerato. **Resultados:** el nuevo instrumento presenta unas propiedades psicométricas adecuadas y ha permitido comprobar que la información procedente de los padres y las páginas web de las universidades son las fuentes más utilizadas y valoradas por los estudiantes preuniversitarios. **Conclusiones:** la obtención de este tipo de información es muy relevante, ya que favorece la inversión en aquellas actividades o recursos que realmente son importantes para el alumnado preuniversitario.

**Palabras clave:** escala, fuentes de información, orientación profesional, carreras universitarias.

Most young people, when the time comes to choose what to study for a degree, can be indecisive about the best direction to take (De León & Rodríguez, 2008). Most of the time, this is due to pre-university students not having been given sufficient guidance on the choice of degree and feeling confused about how universities work and what is available to them (Domínguez, Álvarez, & López, 2013). Students need to have sufficient information to reduce the margin of error in their decision. The search for information is necessary for students to be able to decide which degree course is most appropriate for them in terms of their personal characteristics and so to prevent dropping out (González-Maura, 2009). However, many students claim to feel uninformed about university courses

(Cano, 2008) because often the sources of information that they use (family, peers, and the internet) are contradictory or contain inaccuracies that they do not know how to resolve (Font-Mayolas & Masferrer, 2010).

Fondevila-Gascón, Carreras and Del Olmo (2012) stated that the most commonly used sources of information by young people in the process of going to university are from the place where they study (teachers, tutors or careers advisors and university students) and from those people closest to them (family and friends). In terms of communication media, the internet is preferred by a considerable margin over other media (television, press and radio).

These results are similar to those from other researchers such as Vertsberger and Gati (2015), who reported that the main sources of information are found in people close to the student (family, friends and careers advisors at school) and information on the internet about different universities and degree courses.

The reason that Information and Communication Technology (ICT) is one of the most commonly used sources of information is

due to pre-university students being from a new generation which makes more use of social networks and forums than other, more traditional sources such as university prospectuses, for example (Flores-Vivar, 2009). In fact, in Spain, The Social Networks Observatory, *The Cocktail Analysis* (Romero & Díez, 2013) shows that 91% of internet users use social networks, averaging 2.31 accounts per user.

Along the same lines, Fondevila-Gascón, Del Olmo and Sierra (2012) suggested the possibility that the use of social networks would overtake that of university websites. In addition, they confirmed that whereas men made more use of social networks, women preferred to use university websites. Despite both men and women deciding to use ICT in the decision making process, there are gender differences in how they make use of it. Ultimately, though, the use of traditional sources of information has decreased owing to the increased use of ICT (Metzger, Flanagin, & Zwarun, 2003).

Although previous research has been able to identify some of the most used sources, there has not been any detailed information to date which would identify the degree of usefulness, as perceived by students. Currently, most universities invest in orientation for prospective students (prospectuses, seminars, open days and campus visits) without knowing whether this investment encourages the choice of specific courses or not. Understanding the usefulness of these activities would allow universities to invest in those resources which are shown to be most useful for students. In this context, the principal aim of this study is to investigate the use and usefulness of the main sources of information at a general level (considering the whole sample), as well as in terms of gender, type of school (state, private, or mixed) and which branch of higher education (science, social sciences, humanities, or arts) the participating student is doing. In this way, sufficient information will be gathered to determine which types of sources are most useful to the students, and whether there are differences between boys and girls, types of schools, or branches of study.

In order to achieve this objective it is necessary to design a new measuring instrument for the evaluation of the use and usefulness of the various sources of information available to the students.

The results of this research will have significant benefits both at an administrative level (the university will have information available about the type of resources that are most beneficial for the students) and at the level of careers advice (educators will know what is most useful for students deciding between one course or another).

## Method

### Participants

A sample of 2,005 students in the second year of “bachillerato” (high school, normally for students aged between 16 and 18) was used (46.10% boys and 53.9% girls), aged between 17 and 24 ( $M = 17.56$ ;  $SD = .77$ ). The students all came from 49 schools in the Principality of Asturias in Spain (79% of the sample attended state schools, 10.1% a mixed (state/private) school, and 10.9% a private school). They represent 44.95% of the total number of students doing the second year of bachillerato. The students were studying different branches of bachillerato: Science and Technology (54.4%), Social Sciences (30%), Humanities (14.2%), and Arts (1.4%).

### Instruments

Members of the University Information and Careers Service (SIOU), which groups together information and careers services in Spanish universities and is a professional network within the Conference of Rectors of Spanish Universities (CRUE-Universidades Españolas), were tasked with organising various expert meetings to design a new scale to measure the use and usefulness of different sources of information for bachillerato students.

The items were developed following the principal international directives and standards for test construction (American Educational Research Association, American Psychological Association and National Council on Measurement in Education, 2014; Haladyna & Rodríguez, 2013; Moreno, Martínez, & Muñiz, 2015). The first version of the test was administered in two schools (one private, one state funded) with the aim of checking the comprehensibility and clarity of the items.

Based on the results of the pilot study, some modifications were made in order to improve item comprehensibility. Items which referred to student fairs were removed, as a significant proportion of students were unaware of this kind of activity.

The final version of the questionnaire was made up of 17 items with a 10-point Likert type scale, ranging from 1 (*not used or not useful*) to 10 (*used a lot or very useful*). In this way, the students independently score the use and usefulness of each of the 17 sources mentioned in the scale in parallel.

### Procedure

Initially, contact was made with management teams and careers departments in the 49 participating schools in the Principality of Asturias. The schools were informed of the aims of the study, and its voluntary and anonymous nature. Then, once any questions arising had been answered, the personnel making up the management team or careers departments were tasked with applying the questionnaire and sending completed documents to the Guidance and Access department of the Vice-rector of Students at the University of Oviedo. This research was approved by the ethics committee in the department of Psychology at the University of Oviedo.

### Data analysis

First, the univariate item statistics were calculated (mean, standard deviation, asymmetry and kurtosis). Then, the entire sample was randomly divided into three subsamples to study dimensionality. In the first subsample ( $N_1 = 665$ ) an Exploratory Factor Analysis (EFA) was carried out on the item responses using the scale of use for each source of information. The number of factors was determined using the method of Optimal Implementation of Parallel Analysis proposed by Timmerman and Lorenzo-Seva (2011) with 5,000 resamples. The fit of the data to the model was checked using the Goodness of Fit Index ( $GFI > .90$ ) and Root Mean Squares of Residuals ( $RMSR < .08$ ) following recommended standards (Kline, 2011). Polychoric correlation was used as an input matrix for the data, the method of factorisation was weighted least squares and Promin's rotation method (Lorenzo-Seva & Ferrando, 2013). A Confirmatory Factor Analysis was performed on the second subsample ( $N = 692$ ), correlating item

measurement errors with the aim of obtaining a more realistic representation of the subsample. The third subsample (N =648) was used to carry out cross validation of the model, this time using the answers for the usefulness scale. The estimation method for both confirmatory models was robust weighted least squares, indicated for categorically ordered data (Muthén & Muthén, 1998-2012).

The evaluation of the fit of the data to the model was performed with multiple criteria:  $\chi^2/df$ , the Comparative Fit Index (CFI), the Tucker Lewis Index (TLI), and residual root mean square error of approximation (RMSEA). The literature suggests that the fit may be considered adequate when  $\chi^2/df < 5$ , CFI  $>.90$ , TLI  $>.90$  and RMSEA  $<.08$  (Kline, 2011). Estimation of the reliability of the scores in the scale was done via alpha for ordinal data (Elosua & Zumbo, 2008). Finally, Student's *t*-test was used to examine the differences in the dimensions of use and usefulness of the sources of information in terms of gender. In addition, an ANOVA was performed to look at differences in the aforementioned dimensions in terms of school type and branch of bachillerato being studied. The data were analysed using SPSS 20, FACTOR 10 (Lorenzo-Seva & Ferrando, 2013), MPLUS 7 (Muthén & Muthén, 1998-2012), and FlexMIRT (Cai, 2013).

## Results

Below, *Table 1* gives the descriptive statistics about the degree of use and usefulness for each of the sources analysed.

The results demonstrate that the most used sources of information for the students were parents' advice and information on the university websites. The least used were those in contexts which were external to the student, such as activities in the university itself or open days and site visits.

Similar results were found with respect to the usefulness of the sources of information. The most useful sources according

to students are also the most used (information from parents and university websites). Similarly, the sources which were seen as least useful were the least used (site visits and university organised activities).

### Test dimensionality

An Exploratory Factor Analysis was performed on the first subsample of the item responses using the scale of use of sources of information. The Kaiser Meyer Olin index (KMO  $>.70$ ) and Barlett's test ( $p <.001$ ) show that the matrix of data is appropriate for factorisation. The method of Optimal Implementation of Parallel Analysis recommends the extraction of two factors, however, bearing in mind the factorial weights once the matrix is rotated and the content of the items, it was thought more appropriate to extract 3 factors. The main reason is that, from a theoretical point of view, the construct would be much more representative and so, be more appropriate to the objectives of the evaluation. The first factor is made up of items related to careers guidance organised by the school (e.g., information from careers advisors or teachers, as well as information from school careers guidance activities), and explains 28.39% of the variance. The second factor refers to a mix of items related to the social environment close to the students (e.g., information from friends, family, and schoolmates), and explains 10.79%. The third factor is made up of various items linked to the use of communication media (e.g., information from television, radio, the press, and the internet), representing 8.67% of the variance. The statistical indicators demonstrate a good fit of the data to the model (GFI = 0.97; RMSR = .068). The correlation between the first and second factor was .52, between the first and third .30, and between the second and third .27.

The results of the CFA performed on the second subsample confirm the fit of the data to the model ( $\chi^2/df = 497.35/112 = 4.44$ ; CFI = .90; TLI = .88; RMSEA = .073 [90% CI = .066 - .079]).

*Table 1*  
Descriptive statistics about the level of use of each of the sources of information being analysed

Items	USE				USEFULNESS			
	M	SD	Asym.	Kurt.	M	SD	Asym.	Kurt.
1. School Careers Advisor	2.41	2.99	0.88	-0.55	3.66	3.44	0.31	-1.31
2. School Teacher / Tutor	4.64	3.13	-0.14	-1.11	5.42	3.20	-0.42	-0.95
3. Parents	6.16	3.10	-0.64	-0.58	6.24	3.05	-0.67	-0.48
4. Friends	4.63	3.12	-0.11	-1.08	4.73	3.11	-0.17	-1.04
5. Other family members	4.93	3.21	-0.26	-1.12	5.15	3.21	-0.32	-1.03
6. University or ex-university students	4.19	3.48	0.04	-1.45	5.01	3.58	-0.26	-1.38
7. School careers activities	3.35	3.31	0.42	-1.22	3.76	3.42	0.26	-1.34
8. Presentations about university in my school	4.71	3.44	-0.13	-1.34	5.01	3.52	-0.24	-1.33
9. University Guidance service	3.81	3.41	0.22	-1.33	4.67	3.50	-0.13	-1.36
10. University office of Information	2.40	3.23	0.96	-0.53	3.15	3.43	0.53	-1.17
11. Open days	3.66	3.84	0.38	-1.46	4.74	3.90	-0.08	-1.59
12. Activities or workshops in the university itself	1.52	2.72	1.63	1.35	2.94	3.55	0.66	-1.13
13. Site visits or stays at the university	1.14	2.38	2.07	3.25	2.40	3.27	0.93	-0.63
14. University websites	6.16	3.33	-0.68	-0.73	6.64	3.11	-0.94	-0.14
15. Social networks	3.66	3.55	0.26	-1.42	4.06	3.49	0.13	-1.40
16. Radio, Television, Press	3.46	3.26	0.34	-1.22	3.79	3.22	0.18	-1.24
17. University prospectuses, information leaflets	4.08	3.30	0.08	-1.30	4.60	3.31	-0.14	-1.29

Note: M = mean; SD = Standar Deviation; Asym = Asymmetry; Kurt = Kurtosis.

The cross-validation performed on the third subsample using the responses to the usefulness scale also demonstrated adequate fit ( $\chi^2/df = 394.299/112 = 3.52$ ; CFI = .94; TLI = .92; RMSEA = .064 [90% CI = .057 - .071]). As can be seen in Figures 1 and 2, all of the weights were over .20 and the correlation between factors ranged between .40 and .58.

Table 2 shows the correlation matrix between the dimensions of use and usefulness of information sources. The highest level of convergence is found between the use of the family as a source of information and the utility ascribed to it by the participants. As expected, the largest divergence was seen between different dimensions. All of the correlations were statistically significant ( $p > .001$ ).

**Reliability**

The alpha coefficient for ordinal data corresponding to the items in the scale of Use of information sources was .82 for the school dimension (activities carried out in the school), .76 for the family dimension (friends, parents, family members), and .71 for the media dimension. The respective alpha coefficients for the Usefulness scale were .81, .76, and .78.

*Differences in terms of gender, branch of study, and school type*

*Gender differences*

As can be seen in figure 3, while there are no significant differences between boys and girls in the level of usefulness attributed to the sources of information, there are differences in the three dimensions (school, family, and media) when the use of those sources is examined.

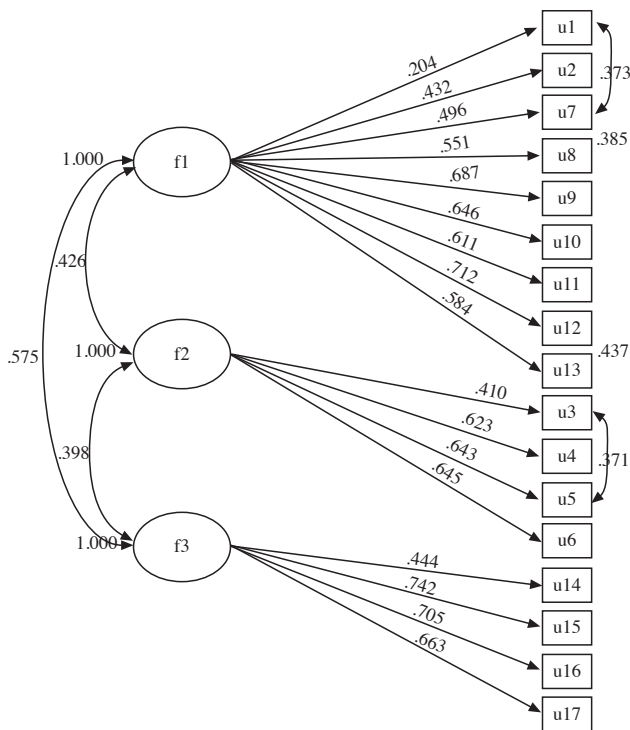


Figure 1. Confirmatory Factorial Analysis with the scale of use of information sources ( $N_2 = 692$ )

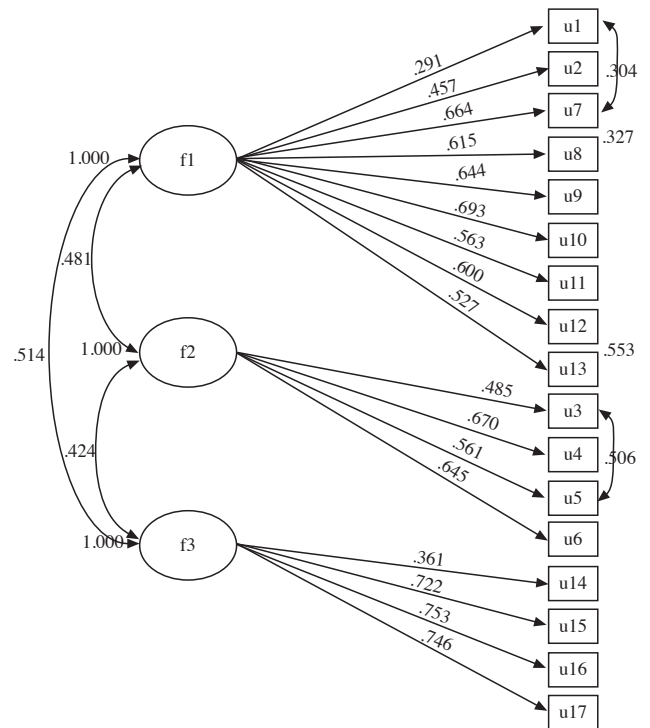


Figure 2. Confirmatory Factorial Analysis through cross validation with the scale of usefulness of information sources ( $N_3 = 648$ )

		Utilidad		
		School	Family	Media
Uso	School	0.66 <sup>1</sup>	0.26 <sup>1</sup>	0.46 <sup>1</sup>
	Family	0.22 <sup>1</sup>	0.81 <sup>1</sup>	0.27 <sup>1</sup>
	Media	0.33 <sup>1</sup>	0.28 <sup>1</sup>	0.76 <sup>1</sup>

Note: <sup>1</sup>  $p > .001$

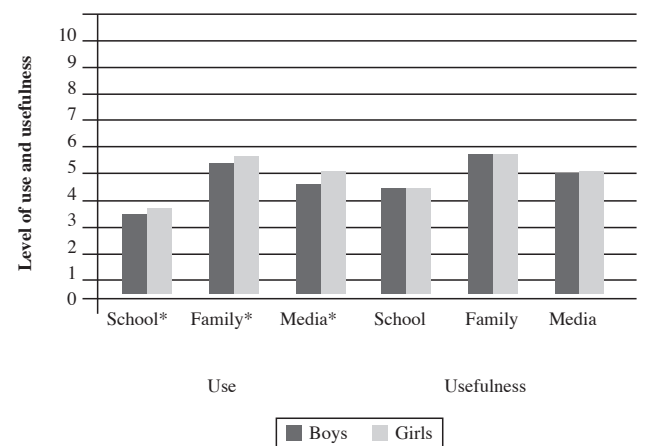


Figure 3. Differences in the use and usefulness of the information sources according to gender. \*  $p < .05$ ; \*\*  $p < .001$

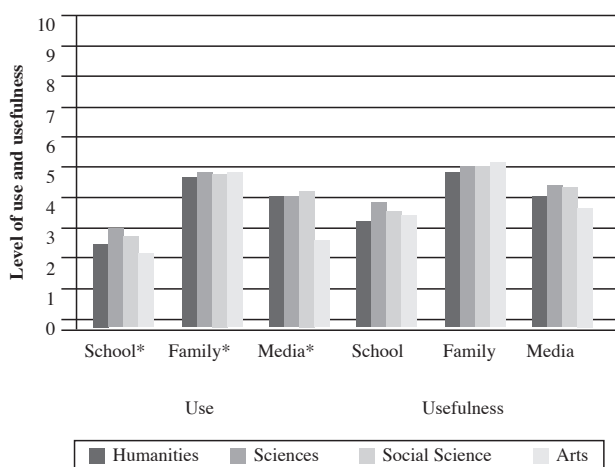
Girls gave slightly higher scores than boys for the use of information sources related to their school, the people around them (family, friends, and schoolmates...), and means of communication.

*Differences in terms of branch of study*

Figure 4 shows differences of use and usefulness of information sources according to the different branches of bachillerato being studied.

The analysis showed statistically significant differences in the use of information sources. Specifically, the Science and Technology branch made most use of activities in schools, while the Arts branch made least use of those. Similarly, the Social Sciences, and Science and Technology branches made more use of the media (radio, television, press and the internet) whereas the Arts branch hardly used that at all.

When differences in level of usefulness were examined, they were only seen in the level of usefulness of school based activities. Students studying Social Sciences and Science and Technology branches assigned more value to these activities while those studying Humanities and Arts gave lower scores.



**Figure 4.** Differences in the dimensions of use and usefulness of information sources in terms of branch of study. \*  $p < .05$ ; \*\*  $p < .001$

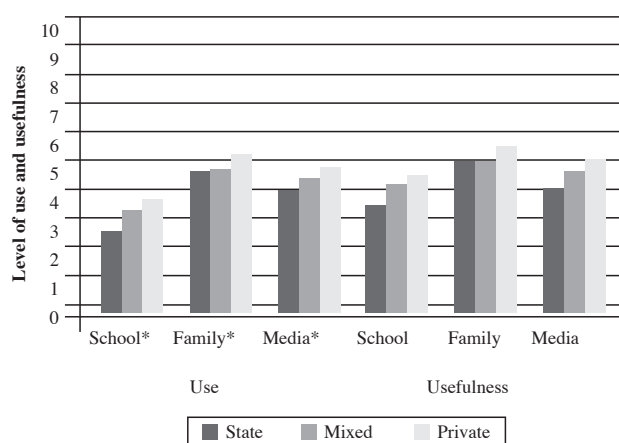
*Differences according to school type*

Analysis of differences in terms of school type (state, private and mixed) showed that there are significant differences in the dimensions of use and usefulness of information sources (Figure 5).

The results show that students in private and mixed schools not only make more use of the various sources of information but also consider them more useful than students in state schools.

Discussion

Choosing a degree course is a complicated decision for students. Often they do not have sufficient information to opt for a specific course (Cano, 2008), which might result in a less than successful choice (Font-Mayolas & Masferrer, 2010). One good way to avoid incorrect decisions would be to improve careers guidance activities that are aimed at reducing bad decisions. The fundamental aim of



**Figure 5.** Differences in the dimensions of use and usefulness of information sources according to school type. \*  $p < .05$ ; \*\*  $p < .001$

this study is the identification of the most used and most valued sources of information for students during the process of choosing a university course. To that end, a new scale was produced of use and usefulness of information sources available when choosing what course to study.

The analysis of the instrument’s dimensionality showed that the different sources being analysed fall into three factors which correspond to sources close to the individual (e.g., family, friends, parents), sources external to the individual (e.g., campus visits, open days) and communication media (radio, television, press and the internet). In addition, the new instrument was confirmed to have adequate psychometric properties of reliability and construct validity in a large sample of Spanish adolescents.

In line with previous research (Fondevila-Gascón, Carreras, & Del Olmo, 2012; Vertsberger & Gati, 2015), the results showed that parents’ opinions and university websites were the most often used sources of information for pre-university students (those studying their second year of bachillerato). It is clear from this finding that pre-university students prefer to use the internet rather than other, more traditional sources, such as campus visits, open days, or university prospectuses (Flores-Vivar, 2009; Metzger, Flanagan, & Zwarun, 2003).

The results of this study also indicate that the family and the internet are not only the most used sources of information, but also the most valuable according to the students (Flores-Vivar, 2009).

So, because university websites were valued similarly highly to information from parents, universities must work to ensure that they design intuitive and informative websites about the different services and amenities that new students will find on offer.

Analysis of differences in terms of gender showed that there are no statistically significant differences in level of usefulness seen by the students but that there are differences in the level of use. The results indicate that despite girls and boys ascribing similar usefulness to the sources of information, girls use them more than boys. In terms of branches of study, it was found that students studying Science and Technology, and Social Sciences made most use and assigned most value to the sources of information. One possible explanation for this is that the degree courses which require these branches of study are often the most popular and offer the best education and so, have the best information available.

When the sources of information are examined according to school type, it is seen that students in private and mixed schools use all of the sources more and value them more highly. There may be a number of explanations for this. On the one hand, it is possible that there are specific activities in private and mixed schools which provide more effective career guidance to their students compared to state schools. On the other hand, a different possibility may be that academic expectations are higher in schools with a higher socioeconomic level (Suárez-Álvarez, Fernández-Alonso, & Muñoz, 2014), which might, in part, explain a greater level of student concern in private schools about the choice of university degree and consequently, greater use of information sources.

With these findings in mind, it would be interesting in the future to look more deeply into the difference between the different types of school, with the aim of instituting practices in all of them which have been shown to be effective in students' careers guidance.

The results of this research have significant practical implications. Firstly, the research provides a new, reliable measuring instrument with adequate construct validity for the evaluation of *the use and usefulness of information sources used in the choice of university degree courses*. To date, there have been no instruments with these characteristics, which means that this is a contribution that is particularly significant in the field of educational careers advice and professional development. Thanks to the design and application of this instrument, the main objective of this study was achieved, which was to gain a detailed understanding of the weight of the different sources of information in terms of gender, branch of study, and type of school. The results allow three clear conclusions to be drawn: (1) Family plays a key role, followed by websites and school activities; (2) students in private and mixed schools use the information sources more and value them more highly than students in state schools; and (3) students studying the science branches of bachillerato make most use of information sources and value them the highest. In a logistical sense, the results

provide important information for universities when it comes to investing in those sources of information which are most used and most useful for the students. This will allow them to reduce costs and improve the effectiveness of their activities. For example, in these results one can see how important university websites are for attracting new students.

At an individual level, the research has given us a much better understanding of students' realities, as a boy studying art in a state school will not seem to have the same perception of use and usefulness of the sources of information as a girl studying science in a private school.

The results must be interpreted with the following limitations in mind, which may be addressed in future work. Firstly, it would be advisable to improve the evidence of validity of the instrument (Lane, 2014; Padilla & Benítez, 2014; Ríos & Wells, 2014; Sireci & Faulkner-Bond, 2014), and to apply the instrument in other communities to see whether the most used and most valued sources of information are the same as the current study. It would also be interesting to gather longitudinal data which would allow us to check whether those who made most use of these resources are less likely to make unsuccessful choices of university courses. Finally it would be a good idea to have measures such as students' academic achievement in order to see if there is any relationship with the use and usefulness of the different sources of information.

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