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## Analysis of Transversal Competences in Spanish University Teachers and Students

Ana Rodríguez Martínez<sup>1</sup>, Verónica Sierra Sánchez<sup>1</sup>, Cecilia Latorre Cosculluela<sup>1</sup> &  
Sandra Vázquez Toledo<sup>1</sup>

### Abstract

The objective of this study is to analyze the level of instrumental, personal and systemic transversal competences of teachers and university students in Spain. We start with an investigation with a descriptive-correlation design. The methodology is quantitative, using descriptive (percentages, frequencies) and inferential analyzes (contingency tables and  $\chi^2$ ) in relation to the analyzed competences. A sample of 712 participants (509 students and 138 teachers) was taken from eight Spanish faculties. The results obtained show that the competency profile of the university teacher stands out in 13 of the 24 competences analyzed, and the student reaches higher values in 11 of the 24. The Differences are found according to gender and university faculty. We conclude that the Spanish university professors are creative and, autonomous and have the ability to face and solve problems through teamwork using emotional intelligence. They are concerned with attention to diversity, ethics, quality and the environment. Students, on the other hand, demonstrate initiative, leadership and an entrepreneurial spirit and have the ability to work in international contexts, speak other languages, organize and plan, and manage information and ICT to communicate effectively and make successful decisions.

**Key words:** Transversal competences; university teachers; university students; higher education; competencies .

### 1. Introduction

Following Rodríguez, Cano, and Cortes (2018), we understand the end of competence as an integrated set of knowledge, aptitudes (skills, abilities), attitudes and values that facilitate effective and efficient development of an activity (for an individual or group).

Basic skills are acquired as a result of basic education and include reading, writing, oral communication, and basic mathematics. For example, these skills are referred to as basic skills in the U.S., core skills in the U.K., key competencies in Australia, and basic skills in France. Transversal competences are considered characteristics that directly influence the entrepreneurship; they refer to the proper performance behaviors in different sectors or activities and are usually related to the general technological interaction. They concern the handling of equipment and tools or skills such as negotiation, control, interaction with customers (core behaviors in the U.S., generic units in the U.K. and cross-industry standards in Australia). Specific skills are directly related to the exercise of specific occupations and are not easily transferable across occupations, given their technological characteristics. This is the case with competences such as the operation of numerical control machinery, the checking of patients, and the elaboration of financial states. (industry-specific standards in the U.K. and Australia). Specific labor competencies are necessary for the proper performance of occupations of the productive sector. Having these skills means having the knowledge, skills and attitudes necessary to achieve high-quality results in the fulfillment of an occupation and, therefore, facilitates the achievement of organizational goals. Specific labor skills are related to productive functions. These skills enable people to perform an occupation in a group of occupations. The professional action competence is presented as the combination of competences related to various aspects; a) knowledge of aptitudes and technical skills (knowledge); b) the methodological ways of doing work (knowing how to do a task);

c) Guidelines and forms of individual and collective behavior (knowing how to be); and d) the forms of organization and interaction (knowing how to be). This only defines competence in action, in work situations, just

<sup>1</sup> Department of Educational Sciences, University of Zaragoza (Spain) c/ Pedro Cerbuna, 12 (50009)  
Corresponding Author E-\*mail: [anaromar@unizar.es](mailto:anaromar@unizar.es) +34 653139450

as “professional action competence” indicates,; therefore, we consider the same combination of skills included in professional labor competence to reflect on the need to put into practice theoretical knowledge, among other types of knowledge’s. Professional action

Competence is therefore developed at the end of the training. We consider that a competent professional demonstrates professional competence when using the knowledge and skills learned during training, in such a way that, for example, when working with graduates, a professor starts with highly developed skills (technical competence or ) (knowledge). Furthermore, the professor applies this knowledge to different professional situations and adapts it to the requirements of his or her work (methodological competence, knowing how to do a task). However, such application and adaptation is not enough with this. In order to be truly competent, an individual must be able to relate to and interact with work colleagues through teamwork to accomplish professional tasks (participatory competence, knowing how to be). Last, an individual must be able to solve problems autonomously and flexibly and, collaborate with others in the organization (personal competence, knowing how to be) (Cortés, Rodríguez,& Val, 2018 ).

The level of transversal competences among university professors has been analyzed in previous studies (Aguado, González, Antúnez, & de Dios, 2017; Lozano, Boni, Peris, & Hueso, 2012). Other studies have compared these values across sexes (González & de Lázaro, 2016). However, no study has compared the levels of competences in teachers and students with the intention of creating a profile for each group to reflect the best synergies and common strengths and detect the needs of each.

Among the comparative studies that find significant relationships between the competences of the teachers of the 21st century, we highlight that of Euler,(2015) .

The basis for transforming and improving the education behind the university degree is to passing on the knowledge and the transversal competencies that serve as strengths and support to be able to work on with others (Contreras & Aceituno, 2017 ). Based on this paradigm, in this study, we focus on the purpose of this investigation in seek to understand reality in order to seek improvement. Before designing interventions, we must analyze and understand the context. The teacher acts as the basis of a high-quality university system, and we bet on support a two-pronged intervention:1) working with the teachers and 2) working with students, who will be teachers in the future, the former being the models for the latter.

The complexity and competences of teachers and students has have been studied, among others, by Delors et al. (1996) ,Carless and Joughin (2006) , Hortigüela, Pérez,andAbella (2014) and Aguado et al. (2017).The results indicate that the competences can develop, improve and function even at already high levels of performance, and the unique context must be considered before planning the teaching strategy.

To provide a new perspective, in this article, we developed our own method for analyzing the competences of teachers and students before designing the intervention. Each student learns differently and coexists with a mainstream culture that must be followed. The conditions of future the teachers need to be understood, and this analysis supports positive advances with potential repercussions on contextual and social improvement (Kurz & Bartram, 2002 ). Efforts to investigate the competences of teachers and university students is are planted as an investment in the future.

In the last recent years, Spanish universities have undergone a process of transformation in response to the commitments made with the creation of the European Higher Education Space (EEES). The Bologna Process not only opened public debate surrounding the meaning and purpose of the university institution in the 21st century but also urged a renewed commitment to the environment (López, Guerrero, & García, 2018). The Agencia de Calidad y Prospectiva Universitaria de Aragón (ACPUA) engages in theoretical-practical research of the transversal skills of teachers and university students. Such knowledge is considered as a necessary starting point for interventions through training programs to improve university quality. This is the theme outlined in this article. There are many institutions that have established benchmarks with respect to the competences of 21st-century teachers and students (Binkley et al., 2012; World Economic Forum, 2015), and all of them value the analysis of the initial competitive level of participants before the proposal of training interventions.

## 2. Method

### 2.1. Goals

⇒ Analyze the level of instrumental, personal and systemic transversal competences of teachers and university students in Spain.

⇒ Check whether there are significant relationships of transversal competences by gender.

⇒ Describe the preferential level of competence according to the source of choice.

## 2.2. Methodological design and statistical analysis

We started with an investigation with a descriptive-correlational design. The work methodology was quantitative, using descriptive (percentages, frequencies) and inferential (contingency tables and  $\chi^2$ ) analyzes in relation to the analyzed skills. The statistical analysis of the data obtained is was carried out through using the SPSS statistical program.

A questionnaire was sent in Google Forms format to the members participating in the call for the 2018-2019 University of Zaragoza teaching innovation project.

All the analyses concern the perceptions of teachers and students regarding the different transversal competences defined in the Tuning Project (Table 1).

Table 1 Distribution of transversal competences.

| <b>Instrumental (understand)</b>                  | <b>Personal (express)</b>              | <b>Systemic (reinventing)</b>             |
|---|--|---|
| Capacity of analysis and synthesis                | 9. Work with equipment                 | 17. Autonomous learning                   |
| Capacity of organization and planning             | Interdisciplinary team work            | Adaptation to new situations              |
| Oral communication and writing in native language | Work in an international context       | Creativity                                |
| Conceptions of a foreign language                 | Skills in intrapersonal relationships  | 20. Leader                                |
| Computer knowledge related to the area of study   | Skills in interpersonal relationships. | Cognition of other cultures and customs   |
| Capacity of information management                | Recognition of multicultural diversity | 22. Initiative and entrepreneurial spirit |
| Troubleshooting                                   | Critical reasoning                     | Motivation for quality                    |
| Making decisions                                  | Ethical commitment                     | Sensitivity to environmental issues       |

Source: authors' elaboration adapted from the Tuning project

## 2.3. Population and sample

We used a sample of 712 participants (529 students and 183 teachers) from eight Aragonese faculties that comprise different university macro areas: 1) Faculty of Education (28.9%), 2) Faculty of Law (13.3%), 3) Faculty of Health Sciences (9.1%), 4) Faculty of Philosophy and Literature (8.6%), 5) Faculty of Human Sciences and Education (18%), 6) Faculty of Economics and Business (7%), 7) Faculty of Medicine (8.6%), and 8) Faculty of Social and Work Sciences (6.5%).

Of the sample are, 56.3% were men and 41.2% were women. 58.8% of the participants, 58.8 were being trained, compared to 41.2% who were not carrying out any complementary training along with their university task. Regarding the employment situation of teachers, 44% worked full time, 51% worked part time and 5% were not working mainly due to stays, leaves and / or and/or leaves of absence. Ninety-one percent of the students did not work, although 8% worked part time and 1% full time. Of the participants, 74.3% of were students and 25.7% were teachers.

## 2.4. Instrument

The instrument used for collecting information was the questionnaire for the evaluation of Transversal Competences in University Students (Aguado et al., 2017), based on the competencies identified by the Tuning project within the framework of the European Higher Education Area. This project (Tuning), of worldwide recognition, divides the transversal competences into three main blocks: 1) instrumental, 2) personal, and 3) systemic.

We address the results in three large blocks, following the objectives set out in the study.

First (Table 2), we analyze the level of transversal instrumental, personal and systemic competences of university teachers and students in Spain, and we find that teachers reach higher levels of analysis and synthesis capacity, in oral and written communication and in problem solving than students, who report having more organization and planning capacity, more knowledge of languages and ICT, greater capacity for information management and higher decision-making capacity.

Especially significant levels are reached in the competence of oral and written communication (F 38,634; gl. = 1, 21.14 p. = .000) and information management (F 37,958; gl. = 1, 20,827 p. = ., 000).

Table 2. *Average instrumental skills in teachers and students.*

| <b>Cross-cutting skills</b>              | <b>Average teachers</b> | <b>Average students</b> | <b>F</b> | <b>gl</b> | <b>Sig.</b> |
|--|-------------------------|-------------------------|----------|-----------|-------------|
| Instrumental                             |                         |                         |          |           |             |
| Analysis and synthesis capacity          | 2.89↑                   | 2.81                    | 1.245    | 1         | 0.265       |
| Capacity of Organización y Planificación | 2.77                    | 2.82↑                   | 0.539    | 1         | 0.463       |
| Oral and Writing Communication           | 2.77↑                   | 2.38                    | 38.634   | 1         | 0.000**     |
| Language knowledge                       | 2.21                    | 2.43↑                   | 8.083    | 1         | 0.005       |
| ICT management                           | 2.54                    | 2.56                    | 0.183    | 1         | 0.669       |
| Information management                   | 2.55                    | 2.94↑                   | 37.958   | 1         | 0.000**     |
| Troubleshooting                          | 2.97↑                   | 2.82                    | 7.484    | 1         | 0.006       |
| Making decisions                         | 2.81                    | 2.95                    | 3.358    | 1         | 0.067       |

Source: authors' elaboration

Focusing on personal skills, the results indicate (Table 3) that teachers have significantly higher levels of teamwork skills (F 26,623; gl. = 1, 12,585 p. =, = .000) and emotional intelligence. The same grouping applies to intrapersonal skills (F 22,043; gl. = 1, 15,823p. = .000) and interpersonal skills (F 10,849; gl. = 1, 4,932 p. =, = .0001). On the other hand, students reach significantly higher levels of ability to work in international contexts (F 40.59; gl. = 1, 27,999 p. = .000). There are few appreciable differences in competencies such as attention to diversity and inclusion, critical reasoning and ethical commitment.

Table 3. *Average personal competences in teachers and students.*

| <b>Cross-cutting skills</b>          | <b>Average teachers</b> | <b>Average students</b> | <b>F.</b> | <b>gl</b> | <b>Sig.</b> |
|--------------------------------------|-------------------------|-------------------------|-----------|-----------|-------------|
| Personal                             |                         |                         |           |           |             |
| Team work                            | 3.15↑                   | 2.85                    | 26.623    | 1         | 0.000**     |
| Working in international contexts    | 2.5                     | 2.96↑                   | 40.59     | 1         | 0.000**     |
| Intrapersonal skills                 | 2.73↑                   | 2.39                    | 22.043    | 1         | 0.000**     |
| Interpersonal skills                 | 2.91↑                   | 2.72                    | 10.849    | 1         | 0.001       |
| Attention to diversity and inclusion | 2.93                    | 2.9                     | 0.379     | 1         | 0.538       |
| Critical reasoning                   | 2.78                    | 2.75                    | 0.204     | 1         | 0.652       |
| Ethical commitment                   | 2.76                    | 2.74                    | 0.119     | 1         | 0.73        |

Source: authors' elaboration

Regarding systemic competences (Table 4), teachers achieve higher levels of autonomous learning, motivation for quality and environmental sensitivity, with the levels achieved in the ability to adapt to new situations being more significant (F 14,469; gl. = 1, 7,397p. = .000). and creativity (F 7,465; gl. = 1, 5,685p. = .000).

Table 4-. Systemic average competencies in teachers and students.

| Cross-cutting skills                    | Average teachers | Average students | F      | gl. | Sig.    |
|---|------------------|------------------|--------|-----|---------|
| <i>Sistémicas</i>                       |                  |                  |        |     |         |
| Autonomous Learning                     | 2.9↑             | 2.86             | 0.499  | 1   | 0.48    |
| Adaptation to new situations            | 2.83↑            | 2.6              | 14.469 | 1   | 0.000** |
| Creativity                              | 2.84↑            | 2.64             | 7.465  | 1   | 0.006   |
| Leadership                              | 2.77             | 2.78             | 0.027  | 1   | 0.869   |
| Knowledge of other cultures and customs | 2.35             | 2.33             | 0.145  | 1   | 0.704   |
| Initiative and entrepreneurial spirit   | 2.86             | 2.93↑            | 1.596  | 1   | 0.207   |
| Motivation for Quality                  | 2.96↑            | 2.81             | 6.127  | 1   | 0.014   |
| Environmental sensitivity               | 2.85↑            | 2.79             | 0.978  | 1   | 0.323   |

Source: authors' elaboration

In this case, students reach only significantly higher levels in the initiative and entrepreneurship competence (F 1,596; gl. = 1, 0.675p. = .000).Table 4. Medias competencias is témicasendocentes y e estudiantes

Second, we checked the differences between the transversal competences (instrumental, personal and systemic) by gender.

As shown in Figure 1, women reach higher levels in all transversal competences except for four of them, in which men reach higher scores: 1) information management (instrumental), 2) decision making (instrumental), 3) attention to diversity and inclusion (personal) and 4) ethical commitment (systemic).



Figure 1.Level of transversal competences according to sex.

We found especially significant relationships between the ability to work as a team and the female gender and attention to diversity and male gender (Table 5).

Table 5. Significant relationships according to sex (Pearson's Chi-square).

| Chi-square tests             | Value               | gl | Sig. asymptomatic | Chi-square tests for                 | Value               | gl | Sig. asymptomatic |
|------------------------------|---------------------|----|-------------------|--------------------------------------|---------------------|----|-------------------|
| teamwork                     |                     |    |                   | attention to diversity and inclusion |                     |    |                   |
| Pearson's Chi-square         | 28.857 <sup>a</sup> | 2  | 0                 | Pearson's Chi-square                 | 82.220 <sup>a</sup> | 2  | 0                 |
| Likelihood ratio             | 29.286              | 2  | 0                 | Likelihood ratio                     | 83.997              | 2  | 0                 |
| Linear by linear association | 28.734              | 1  | 0                 | Linear by linear association         | 25.789              | 1  | 0                 |
| N of valid cases             | 712                 |    |                   | N of valid cases                     | 712                 |    |                   |

In the instrumental competences block, we found differences in the results by gender, with a significantly higher the capacity for analysis and synthesis ( $F = 6.076$ ;  $gl. = 1, 4.212$   $p. = ., 014$ ) with appreciable effect size (eta square = ., 008);, planning and organization capacity ( $F = 2,978$ ;  $gl. = 1, 1,595$   $p. = .085$ ) with appreciable effect size (eta squared = .004); and knowledge of languages ( $F = 13,999$ ;  $gl. = 1, 12.048$   $p. = ., 000$ ) with appreciable effect size (eta square = ., 019) in women. On the other hand, we found significantly higher levels of decision-making capacity ( $F = 48,382$ ;  $gl. = 1, 20,248$   $p. = ., 000$ ) with appreciable effect size (eta square = ., 064) and problem solving ( $F = 1,720$ ;  $gl. = 1, 1,197$   $p. = ., 190$ ) with appreciable effect size (eta square = ., 019) in men.

In the personal skills block, we found differences in the results by gender, with the ability to work in a team significantly higher ( $F = 25,190$ ;  $gl. = 1, 11,931$   $p. = .000$ ) with appreciable effect size (eta square = ., 034); working in international contexts ( $F = 7,503$ ;  $gl. = 1, 5,414$   $p. = .006$ ) with appreciable effect size (eta square = ., 010); intrapersonal skills ( $F = 45,951$ ;  $gl. = 1, 31,942$   $p. = ., 000$ ) with appreciable effect size (eta square = ., 061);, and interpersonal skills ( $F = 54,927$ ;  $gl. = 1, 23,530$   $p. = ., 000$ ) with appreciable effect size (eta square = ., 072), and critical reasoning ( $F = 28,561$ ;  $gl. = 1, 51,700$   $p. = ., 000$ ) with appreciable effect size (eta square = ., 039), in women., On the other hand, attention to diversity ( $F = 24,058$ ;  $gl. = 1, 11,139$   $p. = ., 000$ ) with appreciable effect size (eta square = ., 033), and inclusion and ethical commitment ( $F = 9,894$ ;  $gl. = 1, 4,638$   $p. = ., 002$ ) with appreciable effect size (eta squared = ., 014), reaches significantly higher levels in men.

In the systemic skills block, women reach significantly higher levels than men in all skills, including autonomous learning, adaptation to new situations, creativity, leadership, knowledge of other cultures and customs, initiative and entrepreneurship, motivation for quality and sensitivity to the environment.

To finish the results section, we describe the main levels of competence by faculty of origin.

Based on the mean scores of the participants in the study, the lowest competency levels are reached in 1) language knowledge and 2) intrapersonal skills, and the highest competence levels correspond to the competences of 1) environmental sensitivity and 2) ethical commitment .

As shown in Figure 2 for the Faculty of Education, the highest average levels are reached for 1) ICT management and 2) attention to diversity and inclusion. In the Faculty of Health Sciences, place the highest average levels are found for 1) capacity for analysis and synthesis 2) emotional intelligence (intrapersonal and interpersonal skills), 3) creativity, 4) initiative and 5) motivation for quality. In the Faculty of Philosophy and Letters, we find the levels highest means for 1) teamwork and 2) critical reasoning,. in the Faculty of Economics and Business, we find the highest average levels for 1) knowledge of languages, 2) ability to work in international contexts, 3) ethical commitment and 4) knowledge of other cultures and customs. In the Faculty of Medicine, the highest scores are obtained in 1) autonomous learning, 2) leadership and 3) environmental sensitivity. Finally, in the Faculty of Social Sciences and Work, the highest average levels are reached in 1) organizational and planning capacity, 2) information management, 3) problem solving, 4) decision making and 5) adaptation to new situations. The Faculty of Law (Zaragoza) and the Faculty of Human Sciences and Education (Huesca) are the only departments in which no average competence levels stand out.

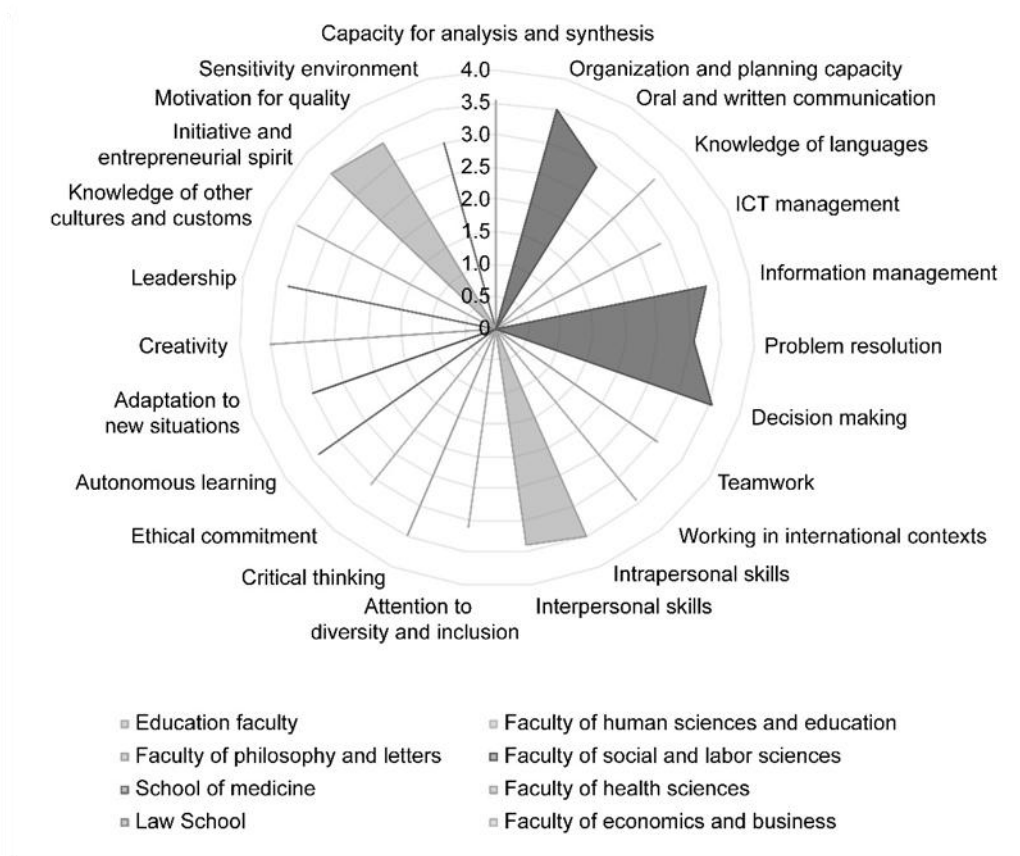


Figure 2. Level of transversal competences by faculty.

#### 4. Discussion and Conclusions

Adjusting to the objectives set out in said this study, we conclude that there are significant differences between the levels of transversal competences (instrumental, personal and systemic) of university teachers and students in Spain, and we find differences according to gender and faculty of origin.

The complexity of education implies knowing the contextual peculiarities and the competency characteristics of the active agents in the learning process, which in this case are teachers and university students (Kurz& Bartram, 2002). Knowing the strengths and limitations of the agents involved in terms of their competences allows us to plan teaching based on the unique , individual contexts in which the teachers and students coexist (López et al., 2018). Knowing what are the instrumental, personal and systemic competences of teachers and students facilitates the improvement of education to build healthy and well-grounded relationships. This study seeks a change of view that starts not only by observing the other (student-teacher), but also by critically reflecting on the competences to be improved.

Based on the results, we observe that each student learns differently and lives within a mainstream culture that conditions their his or her learning and evolution. Teachers' competences are not always at the desirable level, and training is an ally that allows positive progress. One of the limitations in the acquisition of transversal competences is the need for continuous training. In many studies, such as Bolívar (2010) , Villa, Arranz, Campo, and Villa (2015) and Aguado et al. (2017), only slight improvement in competence is observed, which lacks permanence and is positive but insufficient.

We consider it necessary to define the terminological used regarding competences in general and transversal competences in particular. In this study, we start with and adapt the skills worked on in the Ttuning project, as it is one of the most widely used classifications at a the European level. Regarding the results, we conclude that the competency profile of the university teacher stands out in 13 of the 24 competencies analyzed. Aragonite university professors tend to be creative, autonomous and critical, having the capacity to analyze and synthesize, to face and solve problems as a team and with emotional intelligence. They are also concerned with attention to diversity, ethics, quality and the environment.

These results are in line with those achieved in other European studies, such as Segers and Dochy (2001) and Gürsen, Açıkyıldız, Dgar, and Sözbilir (2007), which define the teacher of the 21st century with aas having great creative capacity, work and future vision. On the other hand, and in line with the results found in this study, authors such as Bisquerra (2002) and Gustafsson, Proczkowska-Björklund, and Gustafsson (2017), highlight the importance that university teachers and professionals develop emotional intelligence by being This, which is one of the keys to educational improvement.

In line with the results found in this study, McGrath (2002) highlights a growing interest on the part of teachers in topics related to attention to diversity, ethics, and the quality of the work done. The importance that people attribute to a job well done and to the fulfillment of their expectations in life sets a pattern in their behavior that helps them to improve and grow professionally. Quality is not a new topic; since the times of tribal chiefs, kings and pharaohs, arguments and parameters about quality have existed. The word quality has multiple meanings. It is a set of properties inherent in an object that give it the capacity to satisfy implicit or explicit needs. (Rodríguez et al., 2018).

This description helps us, on the one hand, better know university teachers and, on the other hand, to focus on the teachers who are involved and competent to carry out their work and contribute socially to the improvement of education. On the other hand, the students stand out in 11 of the 24 competences analyzed. These are people with initiative, leadership and an entrepreneurial spirit; they have the ability to work in international contexts, speak other languages, organize and plan, manage information and ICT to communicate effectively and make successful decisions.

Ermenc and Vujisic -Živkovic (2015), Robledo, Fidalgo, Arias, and Álvarez (2015) and González (2015) describe and analyze the significant relationships between 21st-century students, highlighting competencies such as initiative, leadership, languages and the use of ICT, among others. Their results are in line with those found in this study and highlight that the development of these competences can help prepare students face the challenges of professional practice from a holistic perspective.

There are differential nuances between the competencies profiles of men and women participating in the research, with women reaching higher levels in 20 of the 24 competencies analyzed. We conclude that based on these data, men have greater capacity for information management, decision-makings, ethical commitment and attention to diversity and inclusion, competencies also valued in recent studies (León, Crisol, & Moreno, 2018). This article describes the reality in a certain context that may or may not be reproduced in other faculties and communities. The results are not as unexpected, but mostly positive.

There are many aspects for improvement in both students and teachers, but after analyzing these results, we focus on highlighting the strengths. We propose that future work address the on the limitations. The limitation of these studies concerns the impossibility of monitoring the evolution of skills. This would allow us to have not only a photo of reality, but also a video of movements and trends. Therefore, follow-up research may take a longitudinal perspective and expand the sample to check whether the competency profiles are maintained.

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