# Teaching Competencies of Pre-Service Spanish Language Teachers through the ECO method

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Developing the teaching competencies of pre-service Spanish Language and Literature teachers is one of the current demands in higher education. A teaching-learning experience has been developed through the ECO method (Explore, Create, Offer), which is an innovative methodology inspired by Human Centred Design, Design Thinking, and challenge-based learning. The aim of the study was twofold: a) to check whether pre-service teachers perceive that their teaching competencies have improved after this experience; b) to find out the relationships between their perception of the different competencies and certain socio-demographic characteristics. A Likert-type questionnaire on teaching competencies before and after the experience was conducted. 92 participants took part in the pre-test and 66 in the post-test. The results show an improvement in the perception of their competencies at the end of the experience and high levels of motivation throughout the course. These improvements occurred regardless of socio-demographic characteristics such as age or educational background. It is concluded that the ECO method favours the acquisition of competencies, fosters motivation, and offers equal learning opportunities, thus fulfilling the democratising function of the university.

**Key words:** *active learning; higher education; educational innovation; teaching methods; pre-service teacher education; teaching skills*

## 1. INTRODUCTION

Teaching work involves facing unexpected and sometimes unimagined challenges (Willis, 2021). For this reason, one of the main objectives in university classrooms must be to equip students of education (pre-service teachers) with tools that allow them to develop their learning and become competent (Gleeson et al., 2021; Jääskelä et al., 2018; López-López et al., 2018), with a practical and professionalising orientation (Trinidad et al., 2021; Alzafari & Kratzer, 2019; Menéndez & Naylor, 2019; Suleman, 2018; Bendermacher et al., 2017; European Commission, 2013).

This study aims to assess the development of teaching competencies that students, as future teachers of Spanish Language and Literature (LCL), have achieved during an innovative teaching-learning experience. For this purpose, the authors have compared the students' perception of their own competencies before and after the implementation of the teaching project, which was executed through the ECO method (Herrero-Vázquez & Torres-Gordillo, 2020; Melero-Aguilar et al., 2020; Torres Gordillo, García-Jiménez & Herrero-Vázquez, 2020; Torres-Gordillo, Melero-Aguilar & García-Jiménez, 2020; Torres-Gordillo & Herrero-Vázquez, 2020). This work with the ECO method is part of a teaching innovation project, supported by the University of Seville's 3rd Teaching Plan. It involves more than 2,800 undergraduate and graduate students and 43 teachers from 8 universities in Spain, Chile, and Argentina.

Thus, two objectives were pursued: a) to check whether students perceive that their teaching skills have improved after the experience with the subject and with the ECO method; and b) to find out the relationships between their perception of the different skills and certain sociodemographic characteristics.

## 2. TEACHING COMPETENCIES

It is essential to frame the concept of "teaching competencies" that serves as the basis for this study. They are defined as the multidimensional set of knowledge, skills and attitudes that allow the satisfaction, both cognitively and emotionally and in a functional way, of the demands that may be generated from the various contextual situations of the teaching-learning environment (König et al., 2020; Syahrial et al., 2019; Blömeke, 2017).

There is a myriad of perspectives on teaching competencies in the specialised literature and, in particular, on the dimensions and categories that can be established and analysed. There is, however, great consensus on the theoretical foundations of Shulman (1987), still accepted by prestigious institutions such as the OECD (Guerriero, 2017). This study focuses on three fundamental dimensions (and their corresponding categories): *professional knowledge* (PK), *affective-motivational disposition* (AMD) (Blömeke, 2017; Guerriero, 2017) and *digital*

*competence* (Sánchez-Caballé et al., 2021; Songkram et al., 2019). Likewise, these dimensions are theoretically supported by the concept of *opportunity to learn* (OTL), which is especially relevant in the ECO method.

## 2.1. Professional Knowledge

According to the most relevant and current studies (Appova & Taylor, 2020; Ibañez & Villasana, 2020; Malva et al., 2020; Blömeke, 2017; Leal-Castro, 2015; European Commission, 2013; Loewenberg-Ball et al., 2008; Loewenberg-Ball, 2000), it is necessary to consider three categories of knowledge to determine PK. First, *content knowledge* (CK) refers to the theoretical-practical knowledge specific to the area under study, which in the case of this experience regarding Didactics of Language and Literature would correspond to the pragmalinguistic and literary contents included in the curriculum for Primary Education. Secondly, *pedagogical content knowledge* (PCK) refers to the knowledge of didactic and methodological strategies specific to the area of knowledge, including techniques for designing, adapting, and implementing didactic materials and proposals; here it is indispensable to refer to the Communicative Approach. Finally, *general pedagogical knowledge* (GPK) brings together the general knowledge involved in the management and organisation of both the classroom and the teaching-learning process, regardless of the peculiarities of the subject.

In this study, the three types of knowledge were analysed as a whole. Specifically, the decision was made to combine CK and GPK together with PCK, which plays a central role in the development (and eventual mastery) of teaching competencies (Syahrial et al., 2019; Blömeke et al., 2014). PCK enables the establishment of "connections between the teacher's subject and didactic knowledge" (Ibañez & Villasana, 2020); that is, it is necessary to have a deep CK and GPK beforehand in order to successfully implement PCK.

Within the GPK, communicative competence (with the focus on the ability to speak adequately in public) and research competence are assessed in this study. Firstly, the achievement of good communicative competence will allow the pre-service teacher to clearly present their explanations and arguments in front of their audience (the class group); this leads to cross-cutting improvements in self-confidence, self-efficacy, critical thinking, and leadership skills (Gràcia et al., 2020; Miller, 2019; Nash et al., 2016). Secondly, research competence maintains a close link with teaching competence, complementing it (Abdel-Latif, 2021; Zaman, 2004; Vidal & Quintanilla, 2000). Students must learn to observe, detect, and identify needs and problems in the classroom context and be able to autonomously and efficiently access valuable information that allows them to understand contingencies and take appropriate actions (Palali et al., 2018; Elken & Wollscheid, 2016). In the words of Palali et al. (2018, p. 48): "excellent research performance contributes to a higher teaching quality".

## 2.2. Affective-Motivational Disposition

In order to be able to analyse teaching competencies multidimensionally, it is also necessary to pay attention to AMD. It is essential to, firstly, address the beliefs and attitudes of the future teacher regarding the content (Language and Literature) and its didactics and, secondly, to consider the psycho-emotional and motivational factors regarding their own work and teaching context (Keller-Schneider et al., 2020; Blömeke, 2017; Blömeke et al., 2014). The ECO method is characterised by offering students the freedom to define challenges based on the needs they detect in society and that result from their own personal interest (Torres-Gordillo & Herrero-Vázquez, 2020). This freedom to define their project and determine how their work will contribute to society, promotes student empowerment and has a direct impact both on their learning,  on achieving and maintaining high levels of motivation (Willis, 2021; Melero-Aguilar et al., 2020). As Auerbach (1986, p. 423) argued some time ago, "people are empowered not by acting in isolation, but by pooling resources, developing strategies together, and learning from each other. Interactive learning ―hypothesizing, testing, comparing experiences, and refining ideas together― helps to develop critical thinking".

## 2.3. Digital competence

The aforementioned knowledge is also interrelated with digital knowledge or *digital competence*, which is essential for the development of complete and effective teaching competencies (Lucas-Oliva, 2021; Jäger Biela et al., 2020; König et al., 2020; Lucas-Oliva & Marvizón-Alonso, 2020; Songkram et al., 2019). As Torres-Gordillo, García-Jiménez & Herrero-Vázquez (2020) explain, the effective use of digital tools is closely related to the communicative competence required to cooperatively carry out a project. The ECO method generates the ideal context that will allow students to develop digital competence, communicative competence, and cooperative work in harmony and in a meaningful way. Under the dimension of digital competence, three categories are assessed in this study: a) ICT for communication, which includes those digital tools that enable remote communication between different types of users (student-schoolchild, teacher-student, etc.) and with different communicative objectives; b) ICT for education, which covers all technology with a didactic purpose (materials design, class teaching, etc.); and c) ICT for project management, which considers virtual media and strategies that facilitate the organisation of work, such as distribution of tasks or time management (project managers, agile methodologies, etc.) (Rubach & Lazarides, 2021; Fernández-Batanero et al., 2020).

## 2.4. Opportunity to learn

In the context of pre-service teacher training, it is essential to pay attention to another widely discussed concept that is closely related to the development of teaching competencies, called *opportunity to learn* (OTL) (European Commission, 2013). Often, university curricula and

teachers are strongly oriented towards the contents and competencies of their subject and area of knowledge, and not so much towards the development of PCK (Appova & Taylor, 2020). However, scientific evidence shows that it is "crucial to provide learning opportunities in professional development for teachers and in training for future teachers" (König et al., 2020). The ECO method covers this deficiency and responds to this problem by giving students the possibility of establishing direct contact with the professional world in order to develop and implement didactic solutions to problems that they themselves have identified; that is, it offers enormous opportunities for experiential learning based on professionally authentic challenges and contexts (Herrero-Vázquez & Torres-Gordillo, 2020; Melero-Aguilar et al., 2020; Cruger, 2017).

## 3. ECO METHOD

The ECO method was born out of the aforementioned professional and social demands, taking advantage of the natural rise of active methodologies (McLaughlan & Lodge, 2019; Sánchez-Marín et al., 2019; López-López et al., 2018) and within the framework of university teaching innovation, whose curricula are now oriented towards competency-based learning (Gleeson et al., 2021; Sánchez-Caballé et al., 2021; Williams & Williams, 2019). Among the previously mentioned active methodologies, the ECO method combines the characteristics of *project-based learning* (PBL), *challenge-based learning* (CBL), *student-centred approach*, *flipped classroom* (FC) and *service learning* (SLA), all structured in accordance with the parameters stipulated by *human centred design* (HCD), *design thinking* (DT), and adapted to the context and requirements of higher education (Melero-Aguilar et al., 2020; Torres-Gordillo, Melero-Aguilar & García-Jiménez, 2020).

The new methodological approach to teaching-learning proposed by the ECO method proposes, as its main objective, that students acquire the contents and competencies programmed for the various subjects of the university curriculum from and for society (Lucas-Oliva & Torres-Begines, 2019). To this end, students are organised into cooperative teams, which they form based on common interests and concerns related to the subject area. After this, they will have to establish direct contact with the social reality of their immediate environment in order to define and develop their projects (Herrero-Vázquez & Torres-Gordillo, 2020; Melero Aguilar et al., 2020; Herrero-Vázquez & Mora-Gutiérrez, 2018).

One of the peculiarities of the method consists of giving freedom to the teams in each phase (Explore, Create and Offer) of the ECO learning process (see Table 1). Students will assume responsibility both for defining (within the framework provided by the professor) what problem they are interested in investigating and tackling (*Explore phase*), and for ideating, prototyping and validating solutions (*Create phase*), which they can then offer to society in general and to the beneficiaries of the solution in particular (*Offer phase*) (Herrero-Vázquez & Torres-Gordillo, 2020; Lucas-Oliva & Torres-Begines, 2019). This freedom to decide and act fosters

a sense of responsibility towards their learning. Moreover, this commitment to a problem and a community, in which they have taken an interest of their own accord, leads to a high level of involvement and (intrinsic) motivation to develop a product-solution of the highest possible quality; an aspect that consequently affects their learning (Debbağ & Yıldız, 2021; Paz Illescas et al., 2019; Carrillo-García & Martínez-Ezquerro, 2018; Ibarrola, 2018).

Table 1. Equivalent stages of the ECO method and DT (Torres-Gordillo, García-Jiménez & Herrero-Vázquez, 2020)

| STAGES | | STEPS |
| --- | --- | --- |
| ECO | DT | |
| Explore | Empathy | Observe<br>Understand<br>Discover |
| | Define | Process<br>Choose a point of view<br>Formulate the challenge |
| Create | Idea | Imagine<br>Establish selection criteria<br>Choose between alternatives<br>Decide on an idea/solution |
| | Prototyping | Build<br>Submit to interaction<br>Rebuild |
| | Evaluate | Gain understanding<br>Apply feedback<br>Refine solution |
| Offer | Share | Implement action plan<br>Disseminate<br>Test<br>Spread<br>Celebrate |

The confluence of the aforementioned characteristics and peculiarities of the ECO method also fosters the development of digital and cooperative work competencies (Chen, 2021; Torres-Gordillo, García-Jiménez & Herrero-Vázquez, 2020; Morilla-García, 2014) and enhances creativity, empathy, and resilience (Nguyen, 2018; OECD, 2016). In the words of neuroscientist and educator Judy Willis (2021, p. 22): "educators are the wings that propel all students to thrive and build their adaptability, creativity, and resilience to become the best global citizens the world has ever seen".

## 4. METHOD

The research uses a quantitative, non-experimental approach, characterised by the use of a single group with pre-test and post-test. It is based on the use of correlational techniques and comparison of means.

### 4.1. Participants

Initially, a survey on the perception of competencies was carried out among 92 students of the two groups of a subject in the area of Language Didactics. The students who participated in the teaching innovation project underwent the same survey again after finishing the course, amounting to a total of 66 students (82% women; 18% men). The two groups of students were distributed over two shifts, morning (64%) and afternoon (36%). Most of the students came from secondary school (84%). All participating students gave their informed consent for the use of their data in the project.

### 4.2. Instrument

The instrument consists of 6 demographic questions (gender, previous studies, job, relatedness of work and subject, class shift and age), 9 questions on the perception of their competencies (public speaking, researching, designing class sessions, designing didactic material, designing evaluative material, teamwork, using ICT for project management, using ICT for communication, and using ICT for education) and one question on their level of motivation (interest and involvement with the subject matter and the course).

The questions corresponding to competencies were answered on a Likert-type scale of 1-7 (1 = I have never done it and would not know how to do it; 2 = my competence is very low, I do not have the required knowledge or skills; 3 = it takes me a lot of effort and uncertainty, I do not have the required knowledge or skills; 4 = I am used to doing it, but do not necessarily do it well; 5 = I am competent, but do not have the required knowledge or skills; 6 = I can perform well and have some knowledge and skills; 7 = I perform with fluency and mastery and have the required knowledge and skills). Furthermore, the question on motivation level used the following categories: 1 = I have never liked Language, nor reading/writing/public speaking, nor have I ever found sense in learning grammatical issues; 2 = Language has always been difficult for me, I always find it hard to pass; 3 = I have never been too good at Language, if I pass, I am happy; 4 = it neither attracts nor repels me, I was never too keen on the arts, but I was not doing badly; 5 = it can be interesting, I'm not bad at language, but the most important thing is the grades; 6 = I find it very interesting and I like Language, but the important thing is to pass and get good grades; 7 = I find it very interesting, I've always loved language and I'm eager to learn more, because that will lead me to get good grades.

The instrument was administered through an online Google Form on two occasions: in the first week of classes, once the students had decided by secret voting to work with the ECO method, and in the last week, before the grades were published, in order to avoid bias. Table 2 shows the relationship between the questions in the questionnaire and the dimensions and categories presented in the theoretical framework.

Table 2. Dimensions, categories, and questions in the questionnaire

| Dimensions | Categories | Questions in the questionnaire |
|---|---|---|
| Professional Knowledge (PK) | Content Knowledge (CK) | a) Designing class sessions |
| | Pedagogical content knowledge (PCK) | b) Designing didactic material |
| | | c) Designing evaluative material |
| | General pedagogical knowledge (GPK) | d) Public speaking |
| | | e) Research |
| Affective-motivational dispositions (AMD) | Beliefs and attitudes towards content and its didactics | f) Motivation regarding the subject matter/course |
| | Psycho-emotional and motivational factors towards teaching work | |
| Digital competence (DC) | ICT for communication and project management | g) ICT for communication |
| | | h) ICT for work organisation |
| | ICT for didactic purposes | i) ICT for didactic purposes |

## 4.3. Data analysis

To guarantee the reliability of the instrument, Cronbach's alpha coefficient was calculated for the 10 items, obtaining a result of 0.761. Therefore, it can be considered an acceptable instrument (George & Mallery, 2003). After ensuring the reliability of the instrument, descriptive statistics (minimum, maximum, mean, and standard deviation) correlations using Spearman's Rho and Wilcoxon's Z test were calculated to compare two related nonparametric samples. Cohen's d was used to find out the effect size (Lenhard & Lenhard, 2016).

## 5. RESULTS

Firstly, the descriptive statistics are presented (see Table 3). In the initial measurements (pre-test), the mean perception of the competencies ranged from 4.58 to 6.4 points, on a 7-point scale. The competencies perceived to have a lower performance are those related to the design of class sessions, didactic material, and evaluative material, i.e. competencies more related to theoretical content. As for the final perceptions (post-test), it can be observed that the averages

are between 5.89 and 6.73 points, also highlighting a reduction in the standard deviation or, in other words, less variation in the scores.

Table 3. Results of descriptive statistics, Wilcoxon Z-test, and $d_{Cohen}$-test

| | Initial measurement | | | | Final measurement | | | | Wilcoxon test | |
|---|---|---|---|---|---|---|---|---|---|---|
| | N | Min/Max | M | DT | N | Min/Max | M | DT | Z | $d_{Cohen}$ |
| Public Speaking | 92 | 1/7 | 5.17 | 1.457 | 66 | 3/7 | 5.94 | 1.036 | -4.480** | 0.847 |
| Research | 92 | 2/7 | 5.48 | 1.000 | 66 | 5/7 | 6.29 | .674 | -5.472** | 1.083 |
| Designing class sessions | 92 | 1/7 | 4.65 | 1.613 | 66 | 4/7 | 6.12 | .795 | -5.618** | 1.121 |
| Designing didactic material | 92 | 1/7 | 4.58 | 1.612 | 66 | 4/7 | 6.09 | .907 | -5.722** | 1.149 |
| Designing evaluative material | 92 | 1/7 | 4.62 | 1.466 | 66 | 4/7 | 5.89 | .844 | -5.461** | 1.08 |
| Teamwork | 92 | 3/7 | 6.33 | .800 | 66 | 3/7 | 6.73 | .621 | -3.586** | 0.657 |
| Using ICT for project management | 92 | 3/7 | 5.89 | .988 | 66 | 3/7 | 6.36 | .871 | -3.255** | 0.591 |
| Using ICT for communication | 92 | 3/7 | 5.96 | .913 | 66 | 2/7 | 6.39 | .943 | -3.461** | 0.632 |
| Using ICT for education | 92 | 1/7 | 5.60 | 1.090 | 66 | 3/7 | 6.32 | .807 | -4.311** | 0.81 |
| Level of interest and involvement with the subject matter and the course | 92 | 2/7 | 6.40 | 1.120 | 66 | 2/7 | 6.55 | 1.026 | -1.490 | - |

Note: $p<0.01$**/$p<0.05$*

To determine whether there are differences between initial and final perceptions, the Wilcoxon Z test was used. This non-parametric test is used to compare two related samples, i.e. the initial perception of the students was collected to be compared with the final perception. As can be seen in Table 3, the perception of competencies obtained significant differences after completing the course with the ECO method with a confidence level of 99%. The level of interest and involvement with the subject and the course did not show statistically significant changes. Students obtained a large effect size in the competencies of public speaking, research, designing class sessions, designing didactic material, designing evaluative material, and using ICT for education; while they reached an intermediate effect size in the competencies of teamwork, using ICT for project management and using ICT for communication (Cohen,

1988). According to Hattie's (2009) classification of effect size, all scores are in the desired effect zone.

The results of the Spearman's Rho correlations are presented below (see Table 4). The use of this coefficient is determined by the use of ordinal measures in the questionnaire. Only significant correlations that are at least moderate, i.e. Sp > 0.5, are presented. First, in the initial measurement, a high correlation between designing evaluative material (Sp = 0.830; p < 0.01) or designing class sessions (Sp = 0.818; p < 0.01), and designing didactic material stands out. In addition, designing evaluative material has a high correlation with designing class sessions (Sp = 0.755; p < 0.01). On the other hand, there is a moderate correlation between using ICT for communication and using ICT for project management, as well as for education. Likewise, there is a moderate correlation between using ICT for education and using ICT for project management.

Table 4. Spearman's Rho correlations at initial measurement (pre-test)

|  |  | PREdesigning class sessions | PREdesigning evaluative material | PREusing ICT for project management | PREusing ICT for education |
|---|---|---|---|---|---|
| PREdesigning didactic material | Correlation coefficient | .818** | .830** | .116 | .259* |
|  | Sig. (bilateral) | .000 | .000 | .272 | .013 |
|  | N | 92 | 92 | 92 | 92 |
| PREdesigning evaluative material | Correlation coefficient | .755** | 1.000 | .029 | .150 |
|  | Sig. (bilateral) | .000 | . | .787 | .154 |
|  | N | 92 | 92 | 92 | 92 |
| PREusing ICT for project management | Correlation coefficient | .104 | .029 | 1.000 | .688** |
|  | Sig. (bilateral) | .325 | .787 | . | .000 |
|  | N | 92 | 92 | 92 | 92 |
| PREusing ICT for communication | Correlation coefficient | .052 | -.066 | .697** | .617** |
|  | Sig. (bilateral) | .625 | .532 | .000 | .000 |
|  | N | 92 | 92 | 92 | 92 |

As for the correlations of the final measurement, the design variables, on the one hand, and the ICT use variables, on the other, show a relationship, as was the case in the initial measurements (see Table 5). In addition, a moderate relationship is found between designing class sessions (Sp = .580; p < .01) designing didactic material (Sp = .502; p < .01) and using ICT for education. Likewise, using ICT for communication has a high relationship with designing

didactic material (Sp = .729; p < .01) and a moderate relationship with designing evaluative material (Sp = .579; p < .01). This result could indicate that experience with the ECO project and the subject favoured a more professional use of ICT for the design of educational materials. Demographic characteristics related to the previous level of studies or employment status either did not show significant correlations or these were minimally moderate with the perception of their competencies.

Table 5. Spearman's Rho correlations in the final measurement (posttest)

| | | POST-designing class sessions | POST-designing didactic material | POSTusing ICT for project management | POSTusing ICT for communication |
|---|---|---|---|---|---|
| POSTdesigning didactic material | Correlation coefficient | .866** | 1.000 | .619** | .729** |
| | Sig. (bilateral) | .000 | . | .000 | .000 |
| | N | 66 | 66 | 66 | 66 |
| POSTdesigning evaluative material | Correlation coefficient | .639** | .660** | .527** | .579** |
| | Sig. (bilateral) | .000 | .000 | .000 | .000 |
| | N | 66 | 66 | 66 | 66 |
| POSTusing ICT for project management | Correlation coefficient | .497** | .619** | 1.000 | .707** |
| | Sig. (bilateral) | .000 | .000 | . | .000 |
| | N | 66 | 66 | 66 | 66 |
| POSTusing ICT for communication | Correlation coefficient | .640** | .729** | .707** | 1.000 |
| | Sig. (bilateral) | .000 | .000 | .000 | . |
| | N | 66 | 66 | 66 | 66 |
| POSTusing ICT for education | Correlation coefficient | .580** | .502** | .707** | .684** |
| | Sig. (bilateral) | .000 | .000 | .000 | .000 |
| | N | 66 | 66 | 66 | 66 |

## 6. DISCUSSION

The aim of this study was to determine whether the students' perception of their competencies improved after the teaching-learning experience was offered in the subject through the ECO method. The results show a clear improvement in the students' perception of their competencies at the end of the experience. These results should be interpreted with caution, as this improvement could be due to the students' own maturational growth. Nevertheless, the results could indicate that the ECO method improves the competencies analysed, since the students' perception of them has shown a clear improvement. The development of competencies that prepare students professionally and socially is one of the top-priority objectives in higher education (Gleeson et al., 2021; Sánchez-Caballé et al., 2021; Williams & Williams, 2019) and, for this reason, it is necessary to continue research on methodologies that contribute to this goal. Some of these competencies, such as public speaking or teamwork, are closely related to soft skills and are highly valued in the teaching profession (Chen, 2021; Songkram et al., 2019; Suleman, 2018). Developing this type of professional competencies, with student-centred teaching in overcrowded university classrooms, is one of the current challenges facing higher education (Alzafari & Kratzer, 2019). The ECO method could contribute to responding to this problem, as it promotes autonomous learning and student accountability for their own work (Melero-Aguilar et al., 2020; Lucas-Oliva & Torres Begines, 2019).

Another relevant aspect revealed by the results of the ECO method is the improvement that students perceive in their PCK, which includes CK and GPK. This is observed in the design of didactic sessions and of teaching and evaluative materials. It has been widely studied under the Pygmalion effect that relying on one's own competencies to perform an action results in a better execution of the action (Carballo Márquez & Portero Tresserra, 2018), and the ECO method clearly favours this effect (Torres-Gordillo & Herrero-Vázquez, 2020).

The only variable that did not show significant changes was motivation and involvement with the subject, as high values were recorded from the beginning. This is positively assessed and may be due to the expectations of the students when working with the ECO method and the freedom to decide on the methodology to be followed in the subject. As has been demonstrated from Neurodidactics and the *flow theory*, motivation increases when the purpose of the task is understood, the objectives are clear and achievable, progress becomes manifest and positive social relationships are involved (Willis, 2021, 2012; Ibarrola, 2018; Di Gesù et al., 2014; Csikszentmihalyi, 2008, 2007). The ECO method offers the ideal structure for all these factors to come together. The students acquire the theoretical knowledge to satisfy practical objectives, with which they are emotionally involved. In addition, the progress of the ECO process through its phases offers constant feedback that allows students to perceive the achievement of their accomplishments and goals.

The second objective pursued by the research was to determine the relationships between the perception of the different competencies of the students and some of their sociodemographic characteristics. The results showed no relationship between work experience or educational level and the perception of competencies, which could indicate that challenge-based methodologies like the ECO method contribute to students' competence and theoretical development (Kohn-Rådberg et al., 2020; Legaki et al., 2020), regardless of whether or not they had previous experience and knowledge. As expected, design-related competencies were mutually linked, as were competencies involving the use of ICT. In contrast, after the teaching-learning experience, the data revealed a correlation between ICT competencies and professional competencies (CK, PCK and GPK), indicating a more professionalised digital competency development. Therefore, it could be understood that the ECO method fosters the development of digital competence with a professionalising orientation (Chen, 2021; Torres-Gordillo, García-Jiménez & Herrero-Vázquez, 2020; Morilla-García, 2014).

As for the limitations of the research, the use of students' perceptions of their competencies and the non-experimental methodology do not allow us to establish causal relationships between the ECO method and the perceived improvement of competencies. Future studies could consider experimental approaches, although when applied to the Educational Sciences, greater limitations are found in their implementation. Furthermore, in order to broaden the possible impacts of the subjects taught with the ECO method, the use of standardised tests with pre-test and post-test measurements would contribute to knowing if there are improvements in certain competencies, not just in their perception. Finally, studies on challenge-based methodologies seek to demonstrate their benefits on the development of competencies and increased motivation; however, they often forget to assess the impact that taking on challenges has on students (Gallagher & Savage, 2020). Therefore, the study of the impact of challenges on students, their learning and on society is also another line of research to be considered in the future.

## 7. CONCLUSION

Society is constantly evolving and consequently so are the skills that an individual must possess in order to perform competently. This evolution is reflected in the professional field and specifically in the teaching profession, where it is necessary to have a balanced set of professional competencies and affective-motivational dispositions that give rise to effective teaching skills. In this situation, the higher education of future teachers plays a crucial role, since it must provide students with the tools and learning opportunities that allow them to develop the aforementioned competencies. However, the university context often encounters a multitude of drawbacks that hinder this task.

For these reasons, it is essential to investigate methodological proposals that break with these difficulties and go hand in hand with the constant social evolution. In this sense, the ECO

method plays an important role, since it opens university classrooms to society, encouraging students to acquire knowledge and skills from and for the community. The ECO method has allowed these pre-service teachers to come into direct contact with the educational centres (teachers and students), identify problems and needs, define challenges based on their own interest, and develop didactic solutions to be implemented later in the Language and Literature classroom.

This study has verified that high levels of motivation have been maintained throughout the entire course (four months in duration), perhaps due to this freedom of action and the empowerment brought about by the commitment to a social problem. The results have shown a high level of involvement with the subject, i.e. a highly favourable AMD. Likewise, the students' confidence in their professional competencies (CK, PCK and GPK) has clearly increased after the experience with the ECO method. These improvements have occurred regardless of demographic characteristics such as age or previous education or work experience, which could indicate that the ECO method offers equal learning opportunities to students, thus fulfilling the democratising function of the university. This research broadens the debate on the role of higher education and offers practical methodological proposals for its implementation in university contexts.

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