



Design and validation of a questionnaire (LLQ) on facilitating the development of the learning to learn competence in university educators

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Título: Diseño y validación de un cuestionario (CAA) sobre la facilitación del desarrollo de la competencia aprender a aprender en el profesorado Universitario.

Resumen: En el marco del Espacio Europeo de Educación Superior, el profesorado ha de contar con capacidades profesionales para impulsar en el alumnado la competencia aprender a aprender, que hace referencia a la capacidad de autorregulación del propio proceso de aprendizaje. El objetivo del presente trabajo consistió en diseñar y validar un cuestionario para medir los contextos facilitadores de aprendizaje que el profesorado universitario activa para el desarrollo de la competencia aprender a aprender, el CAA. En primer lugar, partiendo de la revisión teórica y empírica, se definieron 86 ítems. A continuación, se examinaron la validez de contenido ($n = 20$ expertos), la validez basada en los procesos de respuesta ($n = 10$ docentes), la validez basada en la estructura interna ($n = 415$ docentes) y la validez concurrente. Los resultados mostraron una adecuada calidad psicométrica, fiabilidad de las puntuaciones y bondad de ajuste. La versión final del CAA comprendió 4 dimensiones y 39 ítems. Este instrumento puede ser una herramienta de rápida aplicación, válida y fiable, para conocer el desarrollo de los contextos facilitadores de aprendizaje de la competencia aprender a aprender. Asimismo, puede servir para detectar necesidades de formación profesional en el desarrollo de dicha competencia.

Palabras clave: Aprender a aprender. Competencia profesional. Evaluación educativa. Educación superior. Competencia. Instrumentos evaluación.

Abstract: Within the European Higher Education Area framework, educators must have acquired professional skills in order to promote the learning to learn competence, which refers to the ability to self-regulate the learning process itself, in their students. The objective of this work was to design and validate a questionnaire, the learning to learn questionnaire (LLQ), to measure the facilitative learning contexts implemented by university educators to develop the learning to learn competence. First, based on a theoretical and empirical review, 86 items belonging to 7 dimensions were defined. Next, content validity ($n = 20$ experts), validity based on response processes ($n = 10$ teachers), validity based on internal structure ($n = 415$ teachers), and concurrent validity were examined. Our results showed sufficient psychometric quality, reliability of scores and goodness of fit. The final version of the LLQ consisted of 4 dimensions and 39 items. This instrument can be considered a valid and reliable tool that can be quickly applied in order to identify the development of facilitative learning contexts in the evolution of the learning to learn competence. Likewise, it can also serve to detect training needs in the development of this competence in university educators.

Keywords: Learning to learn. Professional competence. Educational assessment. Higher education. Competence. Tool evaluation.

Introduction

Within the European Higher Education Area (EHEA) framework, it is essential for students to develop competences that allow them to consciously construct knowledge, to learn in different contexts and modalities throughout their lives, to deal with future learning challenges and to adapt knowledge to changing situations (Cano, 2008). The acquisition of competences by students is the primary objective of education and contents are indispensable resources for the development of those competences (Bolívar, 2008).

In the project entitled Defining and Selecting Key Competencies put forth by the Organization for Economic Cooperation and Development (OECD), competence is defined as “the ability to respond to complex demands and carry out different tasks appropriately..., this entails a combination of practical skills, knowledge, motivation, ethical values, attitudes, emotions, and other social and behavioral components that are mobilized together to achieve effective action” (Ministry of Education, Culture and Sport of the Govern-

ment of Spain, Ministerio de Educación, Cultura y Deporte, MECD, 2013, pp.17-18).

The ordinance on official university education (Royal Decree 1393/2007) states that students should acquire both general and specific competences. Through cross-curricular competences one gains the ability to continue learning and keeping oneself up to date throughout one’s life, develops the ability to communicate and work in multidisciplinary and multicultural groups and learns to make the best use of all available resources (Agenda Nacional de Evaluación de la Calidad y Acreditación, 2014). Specifically, the cross-curricular competence of learning to learn is a basic competence that has a great influence on all others, primarily because it is key for the permanent learning that takes place in different vital contexts of human development (Black et al., 2006). This competence includes a set of skills that require personal autonomy, critical thought and reflexive capacity about the learning process itself (Black et al., 2006). Learning to learn entails developing knowledge about the mental processes involved in the process of knowledge construction and applying new knowledge and abilities in other contexts (MECD, 2018). Furthermore, in order to acquire this competence it is necessary to develop attitudes and values such as motivation and confidence. This allows the student to plan realistic objectives and achieve goals, thus feeding back

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to his or her confidence and personal ability to achieve tasks and set more complex learning objectives (MECD, 2018).

In the present Spanish educational system, the primary responsibility of providing comprehensive training in competences falls to educators, which has meant that this group has had to face demanding training challenges and come to terms with a new teaching approach focused on the student (Zabalza, 2009). Regarding the development of the learning to learn competence within the university framework, the importance of carrying this out through facilitative teaching and learning contexts has been pointed out (Fazey & Fazey, 2001; Wingate, 2007). In this respect, there are many different variables that have been associated with the development of this competence (Coll et al., 2012; Muñoz-San Roque et al., 2016; Villardón et al., 2013). On the one hand, the teaching-learning approaches of university educators should be noted (Monroy et al., 2015; Trigwell & Prosser, 2004). Two types of teaching approaches are identified, specifically, one approach characterized by a strategy that focuses on the educator, in which teaching is understood as transmission or communication, and a polar approach that applies a strategy that focuses on the student. The former involves a traditional learning approach such as knowledge acquisition, in which the amount of learning is emphasized, while in the latter, teaching is understood as the process of the creation of learning opportunities in which the educator tries to influence both the way in which the students think about their learning and the construction of knowledge. In order for teaching to facilitate the learning to learn competence and deeper learning, the educator's approach to learning must focus on the student (Trigwell & Prosser, 2004).

On the other hand, a number of authors have associated metacognition with greater development of the learning to learn competence (Fazey & Fazey, 2001; Veenman et al., 2006). Metacognition refers to the ability to reflect on learning processes and understand them in depth (Veenman et al., 2006). This allows students to expand their knowledge of themselves as people in training and inspires autonomous learning, which, in turn, influences learning self-regulation (van der Stel & Veenman, 2010). This process requires the student to define objectives, plan processes to achieve those objectives, regulate learning development, and develop the ability to evaluate his or her own process (Villardón et al., 2013).

The learning to learn competence in the university setting consists of a complex process of personal development that for the student involves making changes in his or her perceptions, in his or her learning habits, and in his or her epistemological beliefs (Wingate, 2007). Therefore, in order for this competence to be successfully developed, students must receive personalized support (Zabalza, 2009). This means a positive educational environment, based on respect and mutual trust, in which the individual feels heard, accepted and empowered. To accomplish this, it is essential that the relationships between educator and students be positive and close, characterized by fluid two-way communication in

which meanings are shared (Coll et al., 2012). The students must also understand that they are active and responsible individuals, capable of directing their own learning (Putwain et al., 2013). All of these are aspects that strengthen their academic self-concept (Coll et al., 2012).

Furthermore, the development of the learning to learn competence must take place in different contexts and through a diverse methodology (Wingate, 2007). Starting with the principle that a methodology must be based on meaningful learning, it must also be functional, inspiring and aimed at action, able to combine the individual sphere with the social (Novak, 2002). It is worth noting that some research has found that the use of diverse methodologies facilitates learning and makes it possible to respond to the heterogeneity of student demands (Wingate, 2007; Zabalza, 2009). The methodology for the development of the learning to learn competence involves posing learning situations typical of the profession, real or simulated, and a system for evaluation that is not separate from training (Monereo & Lemus, 2010). Likewise, the students must be considered active subjects in this process and their critical reflection on their practice must be strengthened, a necessary behavior so that they may incorporate improvements in their learning process, this being the primary objective of evaluation (Margalef, 2014).

On the other hand, effective teaching of the learning to learn competence also requires an instructional commitment (Wingate, 2007); that is, valuing the liking of the profession, enjoying it, demonstrating affective and intellectual involvement in the work of teaching, internalizing an enterprising culture and expressing a positive attitude toward change (Zabalza, 2009). The quality of higher education depends on the availability of a teaching staff with excellent training in the development of competences. This in turn requires creating measurement instruments that evaluate the state of their implementation. With respect to the learning to learn competence, although there are valid measurement instruments to evaluate some of the variables mentioned above (e.g., the Spanish version of the Approaches to Teaching Inventory, S-ATI-20, Monroy et al., 2015; and the Self-Perception Scale of the Level of Development of the Learning to Learn Competence, la Escala de Autopercepción del Nivel de Desarrollo de la Competencia de Aprender a Aprender, EADCAA, Muñoz San-Roque et al., 2016), most are based on the student perspective (e.g., the Learning Competence Scale, LCS, Villardón et al., 2013), and there are currently no instruments in Spanish that allow specific, valid and reliable measurement of the development of this competence in university teaching staff. Thus, the purpose of the present study was to design and validate a questionnaire to measure facilitative learning contexts implemented by university teaching staff to develop the learning to learn competence.

Method

Participants

The instrument was administered to 415 educators (204 women and 211 men; M of age = 45.03; SD = 10.58) in higher education from various universities in Spain. Sample selection was random, but we tried to achieve balance with regard to gender, age group, ownership of the universities in question, subject taught and participants' teaching experience. Likewise, we ensured that all areas of knowledge were represented (Table 1). Participation was voluntary and all participants gave their informed consent before being included in the study. Educators not actively teaching in higher education at the time of the study were excluded (n = 15).

Table 1
Sociodemographic data of the participating educators.

Variables	n	Percentage
Gender		
Male	211	50.8%
Female	204	49.2%
Age group		
23-35 years	90	21.7%
36-45 years	117	28.2%
46-55 years	130	31.3%
> 56 years	78	18.8%
Education		
Associate's Degree	2	0.5%
Bachelor's Degree	78	18.8%
Other Undergraduate Degree	14	3.4%
Official Master's Degree	52	12.5%
Doctorate	269	64.8%
Ownership of the participant's university		
Public	237	57.1%
Private	178	42.9%
Area of knowledge		
Arts and Humanities	66	15.9%
Sciences	39	9.4%
Health Sciences	8	1.9%
Social and Legal Sciences	232	55.9%
Engineering and Architecture	70	16.9%
Teaching experience		
0-5 years	110	26.5%
6-15 years	111	26.7%
16-25 years	110	26.5%
> 25 years	84	20.2%

Instruments

Learning to Learn Questionnaire (LLQ). The LLQ is a questionnaire that measures facilitative teaching and learning contexts for the development of the learning to learn competence in university teaching staff. It consists of 39 items to which the participant responds using a 5-point Likert scale ranging from "Strongly disagree/Almost never" to "Strongly agree/Almost always." The LLQ takes approximately 20-25 minutes to complete and includes 4 factors. The Commit-

ment to Students and to Teaching factor (8 items) focuses on the educator's involvement in having an impact on the student's personal and professional development. It also refers to the educator's commitment to the profession and to the quality of teaching through the analysis of his or her own practice and continuous improvement (e.g., "I believe that I learn continually in my interaction with students and that this contributes to my personal and professional development"). The Classroom Environment factor (7 items) refers to teaching-learning environments based on acceptance, commitment and mutual respect, for which it is key that positive and close relationships be established both between instructors and students and among students (e.g., "I value the students' contributions and let them know it"). The Methodology factor (15 items) refers to active teaching-learning methodologies focusing on the students. These are methodologies that include an investigative approach and explore complex situations related to the sociocultural situation of the students. Teaching is understood to be a process of the creation of learning opportunities in which the educator tries to influence both the way in which the students think about their learning and the creation of knowledge (e.g., "I prioritize methodological strategies that involve inquiry and problem solving"). Finally, the Self-Regulation factor (9 items) describes the type of support provided by the educator so that the student makes an appropriate transition from external to internal regulation of the learning process. For this purpose, it favors metacognition and inspires autonomous learning, which in turn influences self-regulation in learning (e.g., "I self-evaluate my intervention in the classroom with the students in order to offer strategies to help the students develop this self-evaluation ability").

Spanish version of the Approaches to Teaching Inventory (S-ATI-20), Monroy et al., 2015; original version by Trigwell and Prosser, 2004). The S-ATI-20 measures the teaching approaches of university educators. It consists of 20 items grouped into two 10-item scales, each of which represents one of the extremes on a continuum of teaching approaches: Professor-Centered Transmission of Information (PCTI) (e.g., "It is recommended that students base their studies on what I offer them"), and Student-Centered Conceptual Change (SCCC) (e.g., "In the class periods of this course I deliberately incite debate and discussion"). The PCTI refers to a type of approach that addresses teaching by focusing on the professor in terms of how he or she structures, presents, manages and transmits the subject matter, independent of what the students do. For the purposes of the present study, we used the CCCE, which is characterized as a teaching approach that focuses on the student. In our sample, the internal consistency index determined by Cronbach's alpha coefficient was .91.

Procedure

First, the construct under consideration was conceptualized and operationalized. Next, we defined who to evaluate and the use to which the obtained scores would be put, and discussed the reason for and viability of the creation of the instrument (Abad et al., 2011). This process gave rise to the creation of the items and to the proposal of the dimensions to which those items could theoretically be assigned. The first version of the questionnaire consisted of 86 items.

In order to determine to what extent the content of the questionnaire was consistent with and appropriate for its specific objectives, an evaluation was carried out by a group of experts. Specifically, a total of 18 expert judges (6 men and 12 women) from various Spanish universities participated, as did 2 expert judges (1 man and 1 woman) from one Chilean university. The following criteria were followed to select people for the panel of experts: experience with the construct under consideration; reputation in the scientific community; availability and motivation to participate; and impartiality.

The process was carried out in two phases. First, 5 experts were chosen to be part of a work group. After specifying to the participants both the objective of the test and the dimensions and indicators measured by each of the items, a consensus was reached through discussion about the validity of the dimensions and the items. With the agreed upon version as a point of departure, a panel of experts ($n = 15$) was created and the Delphi method was applied to evaluate the content validity of the test. To evaluate the relevance and representativity of the dimensions and the items, a tool was created with its respective indicators for both quantitative (a 10-point Likert scale; from “not at all relevant” to “totally relevant”) and qualitative assessment. Once the first assessment was completed, each of the experts was informed as to the answers and the reasons given by the rest of the participants and they were given the chance to change a response after evaluating other possible arguments. Two rounds of assessment were conducted until the number of items per dimension was established and a first version of the questionnaire was achieved. The entire process was carried out telematically. Dimensions and items with quantitative scores lower than 7 or qualitative scores with less than 70% agreement among experts were eliminated (Bulger & Housner, 2007).

To obtain evidence of validity based on the response processes, the cognitive interview method was used (Miller et al., 2014). The questionnaire was given to 10 university educators. First, while they completed the questionnaire, participants were asked to verbalize their thoughts. Next, verbal information about the answers given during the questionnaire was compiled through a semi-structured interview. This is how the quality of the responses was evaluated and how it was determined whether the items elicited the expected information. Light modifications were made, such as,

for example, on the item “When I send positive messages, I keep in mind the characteristics of each student, the moment and the possible consequences,” which caused certain comprehension problems, the words “appreciative messages” were changed to “opinions and assessments,” since that was easier to understand while still remaining faithful to the meaning of the original item.

Next, a pilot study was carried out in order to obtain empirical data on the application of the LLQ. A total of 50 university educators (64.4% women and 35.4% men) between 25 and 60 years of age participated. An analysis of response trends was carried out on the items; we also conducted an analysis of indices based on distribution and a study on the relationship between each of the items that composed the scale and the scale itself according to the discrimination index. Thus, we obtained a preliminary version of the LLQ that included 80 items.

Finally, in order to obtain evidence of the validity and reliability of LLQ scores, we got in touch telematically with 1500 instructors from various Spanish universities and invited them to participate in the study.

Data analysis

For our study of the evidence of the validity of the internal structure of the LLQ, the total sample ($n = 415$) was divided into two equivalent groups by random selection using the SPSS V. 24 program. An exploratory factorial analysis (EFA) was carried out on the first half ($n = 207$), and a confirmatory factorial analysis (CFA) on the second half ($n = 208$). In order to carry out the EFA of the preliminary version of the LLQ, the FACTOR 10.8.02 program (Lorenzo-Seva & Ferrando, 2013) and the Mplus v7.4 software were used. Responses to the items were treated as ordinal categorical variables. Therefore, a factorial method of analysis was chosen with the categorical variable methodology (GVM-AF, Muthén & Kaplan, 1985) based on polychoric inter-item correlations. First, using the polychoric matrix of correlations as a point of departure, the number of dimensions to retain was determined through the procedure of optimized parallel analysis with random extraction of 500 submatrices and based on minimum rank factor analysis (Timmerman & Lorenzo-Seva, 2011). Next, the EFA was carried out using unweighted least squares estimation and promax factor rotation (Lorenzo-Seva, 1999), since it was expected that the factors would correlate. The degree of fit of the data to the factorial analysis was tested using Bartlett’s test of sphericity and the Kaiser-Meyer-Olkin (KMO) index, and items were selected that showed standardized factorial loads greater than .30. The following indices were used to determine the goodness of fit of the model: the root mean square error of approximation (RMSEA), the goodness of fit index (GFI), and the standardized root mean residual (SRMR). A multiple imputation procedure (Hot-Deck Multiple; Lorenzo-Seva & Van Ginkel, 2016) was used to manage missing data.

In order to validate the factorial solution suggested by the EFA, a CFA was carried out with the second half of the sample ($n = 208$). Data were analyzed using the Mplus version 7.4 software. To analyze the fit of the proposed model in the CFA, we used the robust weighted least square estimator with a χ^2 adjusted for mean and variance (WLSMV), a method that is preferable to others when the variables are ordinal in nature and do not follow a normal distribution, and there are indicators that show ceiling and floor effects (Finney & DiStefano, 2013). The following goodness of fit indicators were used: (1) χ^2 divided by degrees of freedom (quotients of ≤ 2.0 indicate excellent fit; lower values indicate less fit; Bollen, 1989); (2) the comparative fit index (CFI); (3) the Tucker-Lewis index (TLI); and (4) the root mean square error of approximation (RMSEA) and weighted root mean square residual (WRMR). CFI and TLI values greater than .90 and .95, respectively, were taken to indicate an acceptable fit and an excellent fit (Hu & Bentler, 1999). For the RMSEA, values under .08 and .06 indicate acceptable fit and appropriate fit, respectively (Hu & Bentler, 1999), and finally, WRMR values under 1 indicate a good fit (DiStefano et al., 2018).

Our estimation of the reliability of the scores was based on the triphasic model proposed by Viladrich, Angulo-Brunet and Doval (2017).

Table 2

Goodness of fit indices of the model in the EFA.

Index	Unidimensional Model	Bidimensional Model	Tridimensional Model	Quadridimensional Model
RMSEA	.051	.047	.042	.039
CFI	.898	.916	.936	.946
SRMR	.083	.073	.065	.059

The results of the EFA made it clear that 5 items (8, 32, 65, 67, 68) showed a factorial load lower than .30, and these items were eliminated progressively one by one. It was also found that 11 items (4, 25, 29, 33, 48, 53, 55, 57, 59, 60, 62) showed a factorial load that was similar in more than one dimension, and these too were eliminated. Finally, we discarded 5 items (2, 14, 51, 52, 61) whose placement in the proposed factor had no substantive meaning. In total, the final version that resulted from these analyses comprised 43 items grouped into 4 factors: Commitment to Students and to Teaching (9 items), Classroom Environment (7 items), Methodology (18 items), and Self-Regulation (9 items), together accounting for 50.40% of common variance.

Confirmatory factorial analysis

First, in order to evaluate the unidimensional structure of the LLQ, a CFA was carried out with the 43 items extracted in the EFA. This model showed the following indices of fit: $\chi^2[819, n = 208] = 1473.5, p = .0001; \chi^2/df = 1.80; CFI = .895; TLI = .890; RMSEA[CI90\%] = .062[.057; .067]; WRMR = 1.306$. Next, the quadridimensional model proposed in the EFA was put to the test, and showed better fit:

In order to analyze the convergent validity of the LLQ, predictable relationships between LLQ scores and S-ATI-20 scores (Monroy et al., 2015) were examined. For the present study, the SCCC factor was used. Given that it did not fulfill the assumption of normality, the correlation coefficient was estimated from Spearman's rho.

Finally, differences in the expression of the LLQ dimensions were studied according to gender, age and teaching experience. First, the invariance of the structure of the model obtained in the CFA was tested. Then, to analyze differences, we used the Spearman's rho correlation coefficient, the Kruskal-Wallis test and the Mann-Whitney *U* test.

Results

Exploratory factorial analysis

The polychoric matrix of correlations showed appropriate indicators of fit for its factorization (Bartlett's statistic = 7248.9; $g^2 = 2016; p < .0001; KMO = .902; p < .0001$). Next, based on that polychoric matrix of correlations, an optimized parallel analysis was carried out in which 4 factors exceeded the percentage of variance explained by those generated randomly. As seen in Table 2, the model composed of 4 factors showed a better fit.

$\chi^2[854, n = 208] = 1408.4, p = .0001; \chi^2/df = 1.65; CFI = .913; TLI = .908; RMSEA[CI90\%] = .056[.051; .061]; WRMR = 1.215$. Nevertheless, inappropriate items were successively eliminated in order to choose the most parsimonious model, the model that made conceptual sense and showed optimum goodness of fit based on the values of the indices of modification obtained from the Mplus v7.4 program. Finally, our obtained result consisted of 39 items grouped into 4 factors: Factor 1, Commitment to Students and to Teaching (8 items); Factor 2, Classroom Environment (7 items); Factor 3, Methodology (15 items); and Factor 4, Self-Regulation (9 items), $\chi^2[696, n = 208] = 992.7, p = .0001; \chi^2/df = 1.43; CFI = .950; TLI = .946; RMSEA[CI90\%] = .045[.039; .052]; WRMR = 1.024$. All factorial loads were statistically significant ($p < .0001$) and greater than .40 (values between .45 and .80). It must be noted that an equivalence was found in this factorial structure both in the first half of the sample, $\chi^2[696, n = 207] = 970.9, p = .0001; \chi^2/df = 1.40; CFI = .953; TLI = .949; RMSEA[CI90\%] = .044[.037; .050]; WRMR = 1.004$, and in the total sample, $\chi^2[696, n = 415] = 1257.3, p = .0001; \chi^2/df = 1.81; CFI = .951; TLI = .947; RMSEA[CI90\%] = .044[.040; .048]; WRMR = 1.143$.

Table 3 shows the LLQ dimensions, the items included in each dimension, and the standardized factorial loads.

Table 4 shows the means, standard deviations and Spearman's rho correlations among the different factors that comprise the measurement instrument.

Table 3
CFA. LLQ dimensions, items included in each dimension, and standardized factorial loads.

Item	Factor	Factor	Factor	Factor
	1	2	3	4
Factor 1: Commitment to Students and to Teaching				
5. I always have positive expectations regarding the students' learning process.	.644			
6. When I give opinions and assessments, I keep in mind the characteristics of each student, the moment and the possible consequences.	.688			
7. I often share with the students the usefulness of all questions posed by the group, without rejecting those questions and making their value clear.	.675			
9. I keep the contributions of each student in mind and analyze the suitability of those contributions with the students.	.669			
10. I consider the students' voice to be important and try to ensure polyphony.	.771			
11. It is important for each student to feel that I keep how he or she feels in mind.	.735			
18. I take care to prepare and teach class the best way possible.	.579			
19. I believe that I learn continually in my interaction with students and that this contributes to my personal and professional development.	.735			
Factor 2: Classroom Environment				
26. I present opportunities for the group to observe that the classroom is a space of trust where students can discuss worries, questions or problems.		.713		
27. I value the students' contributions and let them know it.		.802		
28. I devote class time to creating a good work atmosphere.		.748		
34. I maintain interpersonal relationships that facilitate communication with students, both in and out of class.		.633		
35. I create spaces and opportunities for individual participation within the group.		.724		
37. During my interaction with students, I try to initiate conversations about topics related to the course.		.677		
50. I devote class time to ensuring that the meanings that the students and I use are shared.		.660		
Factor 3: Methodology				
3. Work on the specific competences of the course is closely linked with the joint construction process in the classroom through the conversations that take place there.			.621	
12. I prioritize methodological strategies that involve inquiry and problem solving.			.512	
15. Dynamics are proposed on a regular basis in our classes that lead the students to examine their learning process.			.555	
16. I revise my teaching plans keeping student feedback and my own assessment in mind.			.652	
20. I plan times, spaces, processes and instruments to facilitate a personal construction of knowledge on the part of the students.			.666	
21. I give assignments in which my students write texts that make it possible to analyze, order, become aware of and/or plan the construction of knowledge.			.526	
22. I propose dilemmatic situations so that the students will ask themselves questions.			.610	
24. I give assignments so that the students will make systematic use of the following questions: "What do I want to achieve?", "How am I going to achieve it?" and "How will I know that I have achieved it?"			.548	
30. I plan the beginning of classes with a dynamic, question, brief reading or hypothetical approach to contextualize the course material and orient ourselves to it.			.505	
31. I present a final activity in each class period to maintain the students' desire and excitement to continue with the topic.			.509	
39. I present learning contexts based on research-action approaches.			.534	
41. I propose situations and tasks that require individual responsibility in order to achieve group success.			.522	
47. In planning my classes, I reserve and devote time to the preparation of participation strategies.			.801	
54. I use different activities throughout the course that allow me to monitor my students.			.655	
64. The types of tasks that I pose make it possible for students to have the option to integrate improvements into their own process.			.704	
Factor 4: Self-Regulation				
36. I provide learning situations that match reality as closely as possible.			.684	
38. I plan assignments that require students to integrate learning from other courses.			.452	
43. I share course planning with my students and explain it as a strategy for developing this competence (planning) in them.			.636	
44. I share and explain with the students both class objectives and the means that I will use as a strategy for			.611	

Item	Factor	Factor	Factor	Factor
	1	2	3	4
developing this competence (definition and monitoring of objectives) in them.				
45. I self-evaluate my intervention in the classroom with the students in order to offer strategies to help the students develop this self-evaluation ability.				.637
46. I make sure that my students have the necessary support to respond to the assignments I present in class.				.586
56. I ensure coherence between learning and evaluation activities (I evaluate what has been taught and how it has been taught).				.533
58. I communicate and make it clear to my students that errors are learning opportunities.				.622
66. I systematically analyze what has happened in class.				.565

Table 4
Means, standard deviations, and correlation coefficients among LLQ factors.

Dimension	M	SD	1	2	3	4
1. Commitment to Students and to Teaching	33.71	4.09	1			
2. Classroom Environment	22.51	4.21	.65**	1		
3. Methodology	52.99	9.29	.57**	.63**	1	
4. Self-Regulation	33.29	5.45	.56**	.61**	.70**	1

** $p < .01$.

Internal consistency

In the first phase, univariate distributions and the relationships among items were studied based on the model proposed by Viladrich et al. (2017). Our exploration of the data made ceiling effects evident, the asymmetry values did not particularly stand out, and high kurtosis values were observed, and data were therefore treated as ordinals. For this reason, polychoric correlation coefficients were obtained. In the second phase, first tau-equivalent measurement models and a congeneric measurement model were specified with the CFA. Next, the parameters of the model were estimated, the goodness of fit indices were calculated, and the measurement model with the best fit and that was also parsimonious and interpretable was chosen. We applied the WLSMV estimator using the Mplus version 7.4 program to fit the measurement models to the data. Table 5 shows the principle results of the measurement models.

Table 5
Principle results of the measurement models.

Fitted model	χ^2	df	p	CFI	TLI	RMSEA [CI95%]
TM	1257.31	696	.0001	.951	.947	.040-.048
CM	1584.74	734	.0001	.925	.924	.049-.056

Note. TM = Essentially tau-equivalent measurements; CM = Congeneric measurements; CFI = Comparative fit index; TLI = Tucker-Lewis index; RMSEA = root mean square error of approximation; CI = Confidence interval.

As can be seen in Table 5, the fit to the model of congeneric measurements was better than that of tau-equivalent measurements. Therefore, internal consistency was estimated based on the ordinal omega coefficient (Gadermann et al., 2012). The values were .826 [.814-.838] for Commitment to

Students and to Teaching, .815 [.802-.828] for Classroom Environment, .887 [.880-.894] for Methodology, and .784 [.768-.800] for Self-Regulation.

Relationships between LLQ dimensions and the S-ATI-20 (Monroy et al., 2015)

Moderate positive correlations were obtained between the participants' scores on the LLQ dimensions and on the SCCC dimension of the S-ATI-20 (Monroy et al., 2015). More detailed information is given in Table 6.

Table 6
Correlations between participants' scores on the LLQ dimensions and on the SCCC dimension of the S-ATI-20.

LLQ dimensions	SCCC dimension of the S-ATI-20			
	1	2	3	4
Commitment to Students and to Teaching	.537*			
Classroom Environment		.558*		
Methodology			.641*	
Self-Regulation				.418*

* $p < .01$

Note.- 1: Commitment to Students and to Teaching. 2: Classroom Environment. 3: Methodology. 4: Self-Regulation

Differences in the expression of LLQ dimensions based on gender, age and teaching experience

Table 7 shows the goodness of fit indices of the configural invariance models based on gender, age and teaching experience.

Table 7
Goodness of fit indices of the configural invariance models.

Variable	χ^2	CFI	TLI	RMSEA	CI _{90-RMSEA}	WRMR
Gender	2003.483[1392]*	.946	.942	.046	.041, .050	1.464
Age	3778.306[2784] *	.924	.919	.059	.054, .063	2.124
Teaching experience	3733.748[2784] *	.925	.920	.057	.052, .062	2.085

N = 415; * *p* < .01

As seen in Table 7, the indices of fit make it possible to accept the equivalence of the factorial structure obtained in the CFA for the different groups based on gender, age and teaching experience.

In order to examine whether there were differences between female and male instructors in their scores on the LLQ dimensions, we used a Mann-Whitney *U* test, which yielded statistically significant differences between the rank measurements for all four factors: Commitment to Students and to Teaching, *U* = 17771, *p* = .002; Classroom Environment, *U* = 18758.5, *p* = .023; Methodology, *U* = 18216, *p* = .009; and Self-Regulation, *U* = 17098, *p* = .001. Consistent with these results, the sizes of the effect associated with the differences in rank between female and male instructors were small in magnitude in all cases (*r* = .15, *r* = .11, *r* = .13 and *r* = .18, respectively).

In order to determine whether there were differences in the scores on the LLQ dimensions based on age, we used the Kruskal-Wallis test, in which age group was the predictor variable and the scores on the LLQ dimensions were the criterion variable. The results showed that there were no statistically significant differences in LLQ dimension scores based on age group.

Finally, in order to verify whether teaching experience groups (0-5 years, 6-15 years, 16-25 years, more than 25 years) differed in the LLQ dimensions, the Kruskal-Wallis test was applied. The results showed that there were no statistically significant differences in the LLQ dimension scores based on teaching experience.

Discussion

The purpose of the present study was to design and validate a questionnaire, the LLQ, to measure facilitative learning contexts implemented by university teaching staff to develop the learning to learn competence. For this purpose, we examined content validity, validity based on response processes, validity based on internal structure, and concurrent validity.

The obtained results make it clear that the LLQ fulfills the criteria for the creation of psychometric instruments with arguments of validation, for which reason we believe that it is an appropriate tool for measuring facilitative learning contexts implemented by university teaching staff to develop the learning to learn competence. First, evidence was obtained both about content validity and about validity based on response processes. Our results yielded an LLQ composed of 39 items grouped into 4 factors: 1. Commitment to Students

and to Teaching (8 items); 2. Classroom Environment (7 items); 3. Methodology (15 items); and 4. Self-Regulation (9 items). All factors showed good internal consistency indices. The convergent validity of the questionnaire was examined by calculating the correlations between the LLQ dimensions and the SCCC dimension of the S-ATI-20 (Monroy et al., 2015). This analysis provided evidence in favor of convergent validity.

Regarding differences in LLQ dimension scores based on age and teaching experience, the present results found no differences in participants' scores on these dimensions. Thus, we can conclude that the professional competence needed to facilitate learning spaces to develop the learning to learn competence does not depend on either years of teaching experience or on age. To our way of thinking, a greater ability in this competence is probably associated with dynamic and flexible variables that have an impact in general on the development of professional competences in the university context (Feixas et al., 2013; Ion & Cano, 2012; Tejada Fernández & Ruiz Bueno, 2016). Thus, on the basis of the proposal by Feixas et al. (2013), these variables could be grouped into training factors (receiving a specific teaching training in that competence), environmental factors (implementing it with the support of peers, receiving supervision and institutional recognition, teaching culture of the work group), and individual factors (personal work organization). In future studies, it would be interesting to determine what types of teacher training factors are associated with greater development of the learning to learn competence in university educators.

Furthermore, it should be noted that differences were found between female and male educators in their LLQ dimension scores. Specifically, female educators showed higher scores than male educators on all LLQ dimensions. It is risky to hazard an explanation for this result given that there is no precedent whatsoever in this type of study. Nevertheless, we believe that these results may be associated with a greater presence in female instructors than in males of certain variables, such as, for example, a greater awareness of the importance of student-based teaching, having received greater specific training in the development of the learning to learn competence, and having achieved a greater transfer of that training. These are mere conjectures given that these variables were not measured for the present study. It is essential to continue advancing in this field of study and to conduct studies with larger samples in order to obtain complementary information.

Conclusion

Adaptation to the EHEA has brought with it a profound change in university education, both in degrees and in content and teaching methodology. Teaching-learning methodologies aimed at the development of competences have to do more with what the student learns than with what the instructor teaches, and are associated with greater student comprehension, motivation and participation in the learning process (Guisasola & Garmendia, 2014).

The LLQ is the first instrument in the Spanish language for evaluating the development of facilitative learning contexts in the creation of the learning to learn competence in university teaching practice, and is a tool that can be applied quickly and that is both valid and reliable. Therefore, in the framework of the EHEA, the LLQ may be of great use for university teaching staff since educators can thereby have at their fingertips an exact measurement of how they are implementing the development of the learning to learn competence in their teaching practice and thus be able to determine appropriate actions for improvement.

Furthermore, it must be kept in mind that professional teaching competences are developed dynamically throughout the individual's entire working life. Being an educator in higher education means learning to be such an educator, and most university centers have therefore opted for continuous training for the teaching profile. In this respect, the LLQ can

serve to detect professional training needs on the center level in the development of this competence.

To conclude, we must point out that the present study has a certain number of limitations. First, this work was carried out with a small sample of university educators who participated voluntarily. Therefore, it would be preferable to carry out a probabilistic sampling to avoid limitations associated with the generalization of results. Second, we believe that the size of the sample, though sufficient, is not large, and it would therefore have been desirable to have used a larger sample. Third, although the present sample was heterogeneous with respect to gender, age group, studies, teaching experience and knowledge area, it must be noted that educators in the knowledge area of Sciences and Health Sciences were infrarepresented. Therefore, it would have been more appropriate to use a sample that was more representative of the stated knowledge areas. Finally, for the purpose of accumulating greater evidence in favor of the validity of the interpretation of the scores, it would be interesting to conduct comparative studies of the academic performance of students who receive instruction from educators with different levels of skill in putting into practice the facilitative learning contexts of the learning to learn competence. Likewise, keeping in mind that the range of natural application is the university teaching framework, it would be appropriate to seek information on the consequences of the application of the LLQ.

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Appendix 1

CUESTIONARIO APRENDER A APRENDER (CAA)

El *Cuestionario Aprender a Aprender* trata sobre los contextos facilitadores de aprendizaje que el profesorado universitario activa en el desarrollo de la competencia aprender a aprender.

A continuación, encontrará una serie de frases que describen conductas relacionadas con el desarrollo de la competencia aprender a aprender.

Cada frase tiene cinco posibles respuestas, según el grado de acuerdo con la frase o la frecuencia.

Muy en desacuerdo / Casi nunca	En desacuerdo / Muy poco frecuente	Ni de acuerdo, ni en desacuerdo / Algunas veces	De acuerdo / Muy frecuente	Muy de acuerdo / Casi siempre
1	2	3	4	5

Por favor, marque con un aspa (X) la respuesta que considere más adecuada. Si una vez que ha dado una respuesta desea cambiarla, tache claramente la respuesta no deseada y marque con un aspa la opción de la nueva respuesta que desea dar.

Por favor, dé una respuesta a todas y cada una de las frases. Si considera que no lo sabe o tiene dudas, responda lo que considere más acertado.

Gracias por su colaboración.

CUESTIONARIO APRENDER A APRENDER	GRADO DE ACUERDO				
	Muy en desacuerdo	En desacuerdo	Ni de acuerdo ni en desacuerdo	De acuerdo	Muy de acuerdo
	1	2	3	4	5
1. El trabajo de las competencias específicas de la asignatura está estrechamente vinculada con el proceso de construcción conjunta en el aula, a través de las conversaciones que en ella se desarrollan.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
2. Siempre tengo expectativas positivas con respecto al proceso de aprendizaje del alumnado.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
3. Cuando emito opiniones y valoraciones, tengo en cuenta las características de cada estudiante, el momento y las consecuencias potenciales.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
4. Comparto a menudo con las y los estudiantes la utilidad de todas las preguntas planteadas por el grupo, sin rechazarlas y explicitando su valor.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
5. Tengo en cuenta las aportaciones de cada estudiante y analizo, junto con ellos y ellas, la idoneidad de las mismas.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
6. Doy importancia a la voz del alumnado, procuro asegurar la polifonía.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
7. Es importante que cada estudiante sienta que tengo en cuenta cómo se encuentra.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
8. Priorizo las estrategias metodológicas que implican indagación y resolución de problemas.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
9. Es habitual que en nuestras clases se propongan dinámicas para que las y los estudiantes examinen su proceso de aprendizaje.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
10. Reviso mi planificación docente teniendo en cuenta la retroalimentación de los y las estudiantes y mi propia valoración.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
11. Me preocupa preparar e impartir clase de la mejor forma posible.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
12. Creo que en la interacción con las y los estudiantes aprendo continuamente y que esto contribuye en mi desarrollo personal y profesional.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

CUESTIONARIO APRENDER A APRENDER	FRECUENCIA				
	Casi nunca	Muy poco frecuente	Algunas veces	Muy frecuente	Casi siempre
	1	2	3	4	5
13. Planifico tiempos, espacios, procesos e instrumentos para facilitar una construcción personal del conocimiento por parte de las y los estudiantes.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
14. Planteo tareas en las que mis estudiantes deben escribir textos que posibilitan analizar, ordenar, tomar conciencia y/o proyectar sobre la construcción del conocimiento.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
15. Propongo situaciones dilemáticas para que las y los estudiantes se planteen preguntas.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
16. Planteo tareas para que las y los estudiantes hagan un uso sistemático de las preguntas: ¿Qué quiero conseguir?, ¿Cómo lo voy a conseguir?, ¿Cómo sé que lo he conseguido?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
17. Ofrezco oportunidades para que el grupo perciba que el aula es un espacio de confianza donde se pueden plantear preocupaciones, dudas o problemas.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
18. Valoro las aportaciones de los y las estudiantes y así se lo hago saber.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
19. Dedico tiempo de las sesiones de clases a crear una buena atmosfera de trabajo.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
20. Planifico el inicio de las clases con una dinámica, pregunta, una breve lectura o planteamiento de hipótesis para contextualizar y situarnos en la asignatura.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
21. Planteo una actividad final en cada clase para mantener el deseo y la emoción de seguir con el tema.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
22. Mantengo unas relaciones interpersonales que facilitan la comunicación con las y los estudiantes, tanto en clase como fuera de ella.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
23. Creo espacios y oportunidades de participación individual en el grupo.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
24. Ofrezco situaciones de aprendizaje lo más ajustadas a la realidad.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
25. Durante mi interacción con los y las estudiantes trato de entablar conversaciones sobre temas relacionados con la asignatura.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
26. Planifico tareas que exigen integrar aprendizajes de otras asignaturas.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
27. Propongo contextos de aprendizaje basados en planteamientos de la investigación-acción.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
28. Propongo situaciones y tareas que exigen de la responsabilidad individual para obtener el éxito colectivo	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
29. Comparto y explico la planificación de la asignatura con los y las estudiantes como estrategia para el desarrollo de esta competencia (planificar) en el alumnado.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
30. Comparto y explico los objetivos de la sesión y los medios que voy a utilizar con las y los estudiantes como estrategia para el desarrollo de esta competencia (definición y seguimiento de objetivos) en el alumnado.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
31. Realizo la autoevaluación de mi intervención en el aula con los y las estudiantes de cara a ofrecer estrategias para que las y los estudiantes desarrollen esta capacidad de autoevaluación.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
32. Para dar respuesta a las tareas que presento en clase, me aseguro de que los y las estudiantes dispongan de los apoyos necesarios.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
33. En la planificación de mis clases, reservo y dedico tiempo a la preparación de estrategias de participación.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
34. Dedico tiempo en la asignatura para cerciorarme de que los significados que utilizamos el alumnado y yo son compartidos.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
35. Utilizo diferentes actividades a lo largo de la asignatura que me permiten realizar el seguimiento del alumnado.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
36. Me aseguro de la coherencia entre las actividades de aprendizaje y de evaluación (evalúo lo que se ha enseñado y cómo se ha enseñado).	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
37. Comunico y explico a mis estudiantes que los errores son oportunidades de aprendizaje.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
38. El tipo de tareas que propongo facilitan que el alumnado tenga opciones de integrar mejoras en su propio proceso.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
39. Analizo sistemáticamente lo acontecido en clase.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

CORRECCIÓN:

Compromiso con los estudiantes y con la enseñanza: CAA2+CAA3+CAA4+CAA5+CAA6+CAA7+CAA11+CAA12

Clima del aula: CAA17+CAA18+CAA19+CAA22+CAA23+CAA25+CAA34

Metodología: CAA1+CAA8+CAA9+CAA10+CAA13+CAA14+CAA15+CAA16+CAA20+CAA21+CAA27+CAA28+CAA33+CAA35+CAA38

Autorregulación: CAA24+CAA26+CAA29+CAA30+CAA31+CAA32+CAA36+CAA37+CAA39