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Evaluación de Competencias en los Trabajos Fin de Grado o Trabajo Fin de Máster en la Formación Inicial del Profesorado de Educación Física. Diseño y validación de un cuestionario

Evaluation of Competences in the Final Degree Projects or Final Master's Degree Project in the Initial Training of Physical Education Teachers. Design and validation of a questionnaire

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Resumen. El Espacio Europeo de Educación Superior (EEES) ha traído importantes cambios a las universidades europeas. Entre ellos, la incorporación de las competencias que debe abordar cada titulación. En concreto, en el caso de la formación del profesorado de Educación Física, se deben adquirir tanto competencias transversales y genéricas como específicas para el posterior ejercicio de su profesión. En este contexto, cuando los estudiantes realizan su Trabajo Fin de Grado (TFG) o Trabajo Fin de Máster (TFM), ponen en acción todas las competencias que han adquirido a lo largo de la titulación correspondiente. Por ello, en este trabajo se presenta el diseño y validación de una herramienta de evaluación diagnóstica que permite recoger la percepción de profesores, estudiantes y egresados sobre el grado de consecución de las diferentes competencias. La muestra participante en la validación del instrumento está formada por 504 sujetos distribuidos en 45 universidades españolas. Los análisis tanto del cuestionario como de las escalas que lo componen muestran una adecuada validez de contenido, una apropiada validez de constructo con un buen ajuste al modelo teórico y buenos niveles de fiabilidad. Por tanto, se confirma que el instrumento es óptimo y adecuado para evaluar la percepción del nivel de adquisición de competencias en estudiantes de Educación Física.
Palabras Clave: Educación Superior; Competencias Docentes; Validación de Escalas; Proyectos Fin de Carrera; Educación Física.

Abstract. The European Higher Education Area (EHEA) has brought major changes to European universities. Among them is the incorporation of the competencies that must be addressed by each degree. Specifically, in the case of the training of Physical Education teachers, both transversal and generic as well as specific competencies must be acquired for the subsequent exercise of their profession. In this context, when students carry out their Final Degree Project (FDP) or Final Master's Project (THESIS), they put into action all the competences they have acquired throughout the corresponding degree. Therefore, this paper presents the design and validation of a diagnostic evaluation tool that allows to collect the perception of teachers, students and graduates on the degree of achievement of the different competences. The participating sample in the validation of the instrument is made up of 504 subjects distributed among 45 Spanish universities. The analyses of both the questionnaire and the scales that comprise it show adequate content validity, an appropriate construct validity with a good fit to the theoretical model and good levels of reliability. Therefore, it is confirmed that the tool is optimal and appropriate for assessing the perception of the level of competence acquisition in Physical Education students.
Keywords: Higher Education; Teaching Competences; Scale Validation; Final Degree Projects; Physical Education.

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Introduction

The creation and consolidation of the European Higher Education Area (EHEA) with the participation of 48 countries involved has been possible after a process of European convergence that seeks to harmonize the different university systems of the countries that comprise it in order to train the future professionals that today's society demands (Rodríguez-Esteban & Vieira-Aller, 2009). The term of employability is considered fundamental for the proper development of university studies, whose main objective is to ensure the knowledge, skills or qualities that any professional must implement in his or her work through the learning and development of certain competencies (OECD, 2005). This has entailed profound changes in the way of understanding the education of students, so that innovative teaching-learning processes have been opened in the current academic curricula and have resulted in a new concept of competence (Cobham-Ledgerwood, 2022). The Anglo-Saxon world has a certain tradition in competency-based teaching; however, this methodology is relatively new in higher education in Southern and Eastern European countries (Ángel et al., 2016).

The concept of competency can be defined on the basis of different references. According to the Tuning Project (2007), "a competency is the dynamic combination of attributes, in relation to knowledge, skills, attitudes and responsibilities, that describe the learning outcomes of an educational program or what students are able to demonstrate at the end of an educational process". Thus, these competencies include knowledge ("knowledge"), skills ("knowing how to do it"), attitudes ("knowing how to be") and responsibilities that any specialist must perform in the fulfillment of his/her civic and labour obligations ("knowing how to act") (Tejada-Fernández, 2005).

Although there are different models that group the competencies together, the most widely accepted proposal in the university world tends to be the one that differentiates between two fundamental types: a) generic or transversal competencies and b) specific competencies (Palacios et al., 2019). In the case of general competencies, also called transversal or fundamental, the Organization for Economic Cooperation and Development (OECD, 2002) launched the project called DeSeCo (Definition and Selection of Competencies) in which it established that they are those needed by human beings to face the demands of the different contexts of their lives as citizens. Among these are those related to the interactive use of different tools for the

correct use of language, text and technology; the ability to establish social interaction with any group, developing empathic capacity and the possibility of acting autonomously in order to develop life plans and personal projects. These competencies should be worked on in all subjects, making a horizontal journey through the curriculum of the different subjects that are implemented in each degree.

Assessing generic or transversal competencies is considered fundamental to know the degree of their achievement in the process of implementation of the different degrees and the satisfaction of the different agents involved (Hortigüela et al., 2018). In this field of competence measurement, it is worth mentioning the work of Muñoz-San Roque et al. (2016), who developed a scale of Self-Perception of the Level of Development of Learning to Learn Competence (EADCAA), in which it was determined that it was necessary to have useful tools that would serve to assess students' perception of their own competences. In the work of Aguado et al. (2017), a questionnaire was used in which they evaluated the competencies that appear in the Tuning project, established within the framework of the EHEA. Also, along these lines, Peña-Hita et al. (2018) developed a questionnaire in order to collect the perceptions of university students on the development of generic competencies from the use of social networks. In the field of competencies related to communication skills and critical reasoning, García-Martín et al. (2019) designed a questionnaire for students with the purpose to assess the transversal activities carried out, paying special attention to generic competencies such as critical reading and textual construction.

Specific competencies, also known as labour or professional competencies, cover broad fields of work depending on the labour-professional field in which they are to be applied. Among those that are usually developed are the technical competence on specific contents of the job, the ability to adapt to the problems of professional performance, the willingness to cooperate, altruism and team spirit, as well as the capacity for coordination, responsibility and decision-making in the work environment (Corominas, 2001; Navío, 2005; OXFAM NOVID, 2011). In most developed countries, documents have been designed that describe the competencies for the different professional families and the criteria for assessing the level of their acquisition. Some examples are: the USA National Skills Standards in the United States; General National Vocational Qualifications in the United Kingdom; National Competency Standards at Technical and Further Education in Australia (Corominas, 2001; Palacios et al., 2019).

Among all the professional competencies, those related to the teaching profession should be highlighted because of their importance for the objectives of this paper. According to Palacios et al. (2019), research on these competencies originated in the 1970's, within the prevailing approaches at that time in teacher training, such as technological and behaviorist approaches. Navío (2005) points out CBTE (Competency Based Teacher Education) as a good example of these proposals. Another of the works to be highlighted in this field of teaching competencies is the one carried out by Bourgonje & Tromp (OXFAM NOVID, 2011), on quality educators, in which they analyse the competencies and standards for teachers in different countries.

When we speak of teaching competencies, we are referring to the work of the teacher through the application of cognitive and metacognitive skills focused on: learning to think, to know, to feel and to act as a teacher. According to Perrenoud (2004), the task of teaching is developed through the application of ten competencies: 1. Organizing and motivating learning situations; 2. Involving students in their learning and work; 5. Working in teams; 6. Participating in school management; 7. Informing and involving parents; 8. The use of new technology; 9. Confronting tasks and ethical dilemmas of the profession; y 10. Organising their own continuous education.

These teaching competencies have been related to the interpersonal style perceived by students of the Higher Education teacher (Moreno-Murcia et al., 2019) or the self-perception of competence both in terms of generic and specific competencies of future teachers (Salcines-Talledo et al., 2018). It is also understood that there is a need for a teacher training system that enables teachers to acquire and develop the skills they need, including three key components: the stimulation of teachers' active engagement in lifelong learning and the development of competences and provision of coherent, appropriate, and relevant learning opportunities, through which all the teachers can acquire and develop the competences they need (González et al., 2018). Specific scales have been developed for very specific fields such as psychomotor professional competencies in initial teacher training (Martínez-Mínguez et al., 2022), as well as those closer to the field of didactic organisation (Dios et al., 2018). Cortés-Ibarra & Martínez-Clares (2020) have focused on evaluative practices as a professional competence of teachers. It is also worth noting the work of Moreno-Murcia et al. (2015) in the field of university teacher performance and the contributions in the measurement of competencies by Fernandes et al. (2016), by means of a scale structured in 23 statements distributed in four dimensions: pedagogical-didactic, research, academic management and university extension competencies.

Works related to teaching competencies are present in a wide range of countries. Thus, Senthil-Murugan & Sivasakthi-Rajammal (2018) do so in the Indian context, by developing a questionnaire consisting of 42 teaching competencies to be applied to Secondary School teachers; Metsäpelto et al. (2021), in the Finnish context, by creating a questionnaire consisting of generic and specific teaching competencies; Arifin et al. (2021), from Malaysia, make a set of suggestions for understanding the competencies required to be a teacher (Technical and Vocational Education and Training-TVET); Sylvester et al. (2020) propose a self-report scale to measure the competence of teachers in the specific field of Action Research for Filipino teachers; a subject that is also addressed by Hernández et al. (2021), in this

case, applied to the Colombian context.

According to Palacios et al. (2019), work on the specific teaching competencies of Physical Education teachers has focused mainly on the analysis of the type of competencies that should be present in the training of future teachers (Romero, 2009). Among the most relevant contributions on this subject is the proposal by Salcines-Talledo et al. (2018), who develop and validate a scale of self-perception of transversal as well as professional competencies for students, which includes a specific scale for the initial training of Physical Education teachers (FIPEF). Along the same lines, Baena-Extremera et al. (2015) validate to the Spanish context the Evaluation of Teaching competencies Scale-ETCS with the aim of measuring the competencies of Secondary Physical Education teachers. In the same year, Aparicio-Herguedas & Fraile-Aranda (2015) apply the Assessment scale of interpersonal skills of the Physical Education Teacher (EcoiDEF) as an instrument to measure the competencies of the future Physical Education teacher. In this same line of work, according to Prat (2001), the professional profile of the Physical Education specialist teacher should be structured around five basic functions or areas of competence: the psycho-socio-pedagogical, the area of Physical Education, the generalist, the humanistic and attitudinal and that of school organisation and management. Furthermore, according to Lleixa and Hernández (2020) and Villaverde et al. (2021), the future Physical Education teacher will have a broad knowledge of the subject and will be involved in expanding it, promote values, pursue the proposed goals, create a pleasant environment during the sessions and ensure a good understanding among all the agents involved in teaching.

In the European context, the training of future Physical Education teachers culminates with the completion of the credits assigned to the Final Degree Project (FDP) or the Final Master's Project (THESIS). In these subjects, students must demonstrate all the skills learnt throughout the previous years, always supervised by a teacher-tutor, although each university regulates in their own way, the process of completion and the way it is evaluated (Ortega-Sánchez & Gómez-Trigueros, 2019). Research suggests that students, throughout grade level, are not explicitly aware of compentential development (Hill et al., 2022). Among the skills that are developed in the elaboration of these works, the search, analysis, management and evaluation of information stand out, as well as the implementation of appropriate methods for teaching practice (Hernández et al., 2016).

The studies related to the measures of these teaching competencies, both general and specific, of the FDP and THESIS of Physical Education, are scarce and the few studies carried out address this topic in a marginal way. Among them, it is worth mentioning those that have related the acquisition of competencies in these final projects with the supervision task performed by the tutor (Chisvert-Tarazona et al., 2021), with the importance of the use of different types of rubrics to know at all times how the process is developing (Pegalajar-Palomino, 2021; Postmes et al, 2022), the transcendence of the tutoring process in the final acquisition of competencies (Lera-López, 2021), satisfaction as an indicator of the quality of the competence acquisition process (Saiz-Manzanares et al., 2019), the detection of the main problems in its development (Martón et al., 2018) as well as the possibility of choosing or agreeing on the subject with them (Rekalde-Rodríguez, 2011; Vera & Briones, 2015).

With regard to the evaluation of the competencies developed in the FDP and THESIS, we can highlight the study conducted by Rullán et al. (2010), who suggest, after the analysis carried out on the type and number of transversal competencies established as evaluable for 64 Degrees, that the branch of knowledge is a determining factor for the design of the evaluation by competencies and, therefore, it is necessary to reduce their number to adapt them to the needs of each degree program. More specifically, Bonilla-Delgado & Martín-López (2012) present a proposal to carry out an objective, clear and transparent procedure for the evaluation of the competencies in the FDP, completing it with the elaboration of a Guide that facilitates the faculty with the definition of the evaluation procedures for the acquisition of the competencies in these works. As Sonvella-Velasco et al. (2024) point out, students value positively the competences they develop during the completion and defence of their work, and it would be very interesting for teachers to propose activities in the form of seminars, guides and tutorials that help students to develop the competences necessary to carry out the work.

As several authors have pointed out (Moreno et al., 2015; Salcines-Talledo et al., 2018), competency assessment, despite its importance, is still a limited field of study and a pending subject in many educational systems, including the Spanish one (Martínez-Mínguez et al., 2022). This lack of work is even more evident in the field of the professional teaching competencies of future Physical Education teachers. Even the few works that exist, focus on the study of their importance and their orientation towards the professional profile, but not on their extent. As Tejada & Ruiz (2016) point out, the complexity of the measures of professional competencies requires the use of specialised instruments and the participation of all the agents involved, facets which are not yet available.

Thus, the main objective of this study is the construction and subsequent validation of a scale to measure the perceptions of students, future teachers, as well as to graduates and teachers about the transversal, generic teaching and specific teaching competencies in the subject of Physical Education which is acquired throughout the training and measured through the FDP and THESIS. It is assumed that the perception these groups have about the acquisition of these competencies will serve to know their degree of attainment as they are written in the study plans and thus can be better adjusted, if it were the case, with those required in these subjects at the end of the studies.

Methodology

This study presents an instrumental research design relevant to the analysis of the psychometric properties of diagnostic assessment tools (Ato et al., 2013). Specifically, we provide the validation of the questionnaire designed ad hoc entitled: "Evaluation of Competencies in the Final Degree or Final Master's Projects, in the Initial Training of Physical Education Teachers" applied in the project[1], by the National Network of Formative and Shared Evaluation in Higher Education, aimed at students, graduates and teachers who have performed or tutored the FDP and/or THESIS related to the initial training of Physical Education teachers. It also provides the psychometric analysis of each of the three subscales that make up the tool.

The objectives of this article, in which its purpose is to test the validity and reliability of the questionnaire and the subscales, are as follows:

•To test the content validity.

•To study the construct validity of the tool and its adjustment to the theoretical model.

•To address the internal consistency of the questionnaire and subscales.

Participants

In this research, 504 subjects from 45 Spanish universities participated, who completed the instrument during the 2020-2021 academic year. Specifically, 185 students, 137 graduates and 182 teachers, belonging to Faculties of Education and Faculties of Physical Activity and Sport Sciences. Since some of the questions in the tool vary depending on the sample who completes it, below is a summary of the common sociodemographic variables.

In relation to the gender of the participating students, 50.8% are men and 49.2% are women. In the case of graduates, 65% were male, 33.6% female and 1.4% non-binary; and with respect to teachers, 62.1% were male and 37.9% female. A predominance of male responses is observed in the three itineraries, given that the profile of entry to Physical Education degrees is mostly male. With respect to age, more than half of the student sample is between 22 and 25 years of age; graduates are between 22 and 29 years of age and there is a greater number of responses from teachers between 40 and 49 years of age. One can see that there is a great diversity of responses depending on the university of origin.

Instrument

A questionnaire is presented (Table 1) that takes as a reference the one proposed by Salcines-Talledo et al., (2018)" and Palacios et al., (2019), whose purpose is to collect information on the evaluation of competencies in the FDP or THESIS in the initial training of Physical Education teachers. Specifically, the questionnaire is divided into four blocks: sociodemographic data; transversal competencies; generic teaching competencies; and specific teaching competencies in Physical Education. In the analyses presented in this article, the first block corresponding to sociodemographic data is eliminated. The following three blocks are analysed, which correspond to the three Likert-type subscales, with the following response options: 1. Nothing, 2. A little, 3. Moderately, 4. Quite a bit, and 5. A lot.

Table 1.
Items for the questionnaire

Subscale 1. Transversal Skills
1.1. Analyse and synthesize
1.2. Organise and plan
1.3. Written and Oral Communication
1.4. Gesture and Body Communication
1.5. Use information and Communication Technology in the field of study
1.6. Develop Interpersonal Relationships Skills (empathy, assertiveness, respect and listening)
1.7. Develop Intrapersonal Skills (self-esteem, motivation and self-confidence)
1.8. Reason critically and reflectively
1.9. Develop an ethical commitment (e.g., responsibility, commitment, defence of equality values)
1.10. Develop autonomous learning
1.11. Adapt to new situations
1.12. Develop creativity
Subscale 2. Generic Teaching Competencies
2.1. Prepare proposals for change in the educational reality
2.2. Design learning situations
2.3. Encourage learning situations (e.g., through motivating innovative methodologies or activities)
2.4. Manage the learning progress
2.5. Design strategies for attention to diversity
2.6. Involve students in their learning
2.7. Confront duties and ethical dilemmas related to their profession (e.g., confidentiality, academic freedom limits, tolerance)
2.8. Attend to the teacher's professional self-development (auto-evaluation, lectures, courses, conferences, work networks)
2.9. Develop educational innovation processes in the classroom
2.10. Launch research processes in the classroom
Subscale 3. Specific Physical Education Teaching Competencies
3.1. Design, apply and analyse didactic interventions in the Physical Education subject
3.2. Elaborate and implement Physical Education programs that facilitate the effective inclusion of special need students
3.3. Design, develop and evaluate teaching-learning processes related to physical activity and sport with attention to the individual and contextual characteristics of people
3.4. Know the psychomotor development and its evolutionary maturation

[1] Reference: RTI2018-093292-B-I00.

3.5. Know the physical capacities and the factors that determine their evolution as well as know how to apply their specific technical fundamentals
3.6. Know the biological and physical foundations of the human body in relation to physical activity
3.7. Know the elements and foundations of body expression and non-verbal communication and its educational and cultural value
3.8. Know the basic fundamentals of school sports initiation and design specific tasks to use them in the field of education
3.9. Have strategies for the application of health elements on hygiene and nutrition in educational practices
3.10. Have teaching strategies that promote the acquisition of regular physical activity habits
3.11. Know how to use the game as a didactic resource and as teaching content
3.12. Know how to apply the fundamentals (techniques) of physical activities in the natural environment
3.13. Know how to use evaluation instruments in the subject of Physical Education
3.14. Have the ability to reflect on the teaching-learning process, the different organizational types and the different methodologies within Physical Education classes
3.15. Design, develop and evaluate teaching-learning processes related to motor skills, paying attention to the individual and contextual characteristics of people
3.16. Analyse and communicate, in a critical and well-founded way, the value of physical activity and sport and their possibilities of contributing to the development and well-being of people
3.17. Identify and prevent health risks arising from the practice of inappropriate physical activities

Procedure

In order to validate the tool, the results are presented in three subsections. Firstly, the content validity of the questionnaire is carried out through a panel of 14 experts and the pilot completion by 94 graduates. Secondly, the construct validity of the tool and the analysis of its adjustment to the theoretical model is undertaken through confirmatory factor analysis and goodness-of-fit indices. Finally, the internal consistency of the questionnaire was analysed.

To develop the psychometric analysis of the tool, the block of sociodemographic questions was eliminated and the SPSS v. 22 and Lisrel 8.8 programs were used.

Results

The results obtained in relation to the content validity, construct validity and goodness-of-fit, as well as the internal consistency of the questionnaire, are presented below.

Content validity

The content validity of the questionnaire was carried out using the Delphi technique as an effective method for ascertaining the opinions of experts on a specific topic. In this sense, the online questionnaire was sent to a sample of 14 expert judges, who were asked to assess the degree to which they believed that the proposed items, based on the transversal and generic teaching competencies proposed by Salcines-Talledo et al. (2018) and the specific competencies of Physical Education proposed by Palacios et al. (2019), were relevant to measure the tutoring process of FDP and/or THESIS.

Likewise, the questionnaire was administered telematically to a sample of 94 graduates, asking them to indicate their perceptions regarding the understanding of the questions and the answer options.

Once this process was completed and the evaluations of the expert judges and the graduates were collected, several changes were made to the initial version of the tool. Specifically, several of the items proposed were eliminated, in order to narrow down the questionnaire, as they were considered repetitive or not very applicable to the object of study. At the same time, the wording of several items was refined to improve their comprehension. Nevertheless, the tool was rated very positively in terms of its structure, organisation, clarity and length.

Construct validity and the goodness-of-fit analysis of the model

First, four Exploratory Factor Analyses (EFA) were performed to test the psychometric structure of the questionnaire and the structure of each of its subscales separately. In all cases a Varimax rotation was used.

The EFA of the global questionnaire proposes three factors with an explained variance of 58.27% (Table 2). The indicators of the relevance and validity of this analysis presented adequate values (KMO = .96; Chi-square = 13064.9; p = .00).

Table 2.
Rotated factorial matrix

	FACTORS			
Items	F1	F2	F3	Name
1.1.	.677			Transversal skills
1.2.	.674			
1.3.	.723			
1.4.	.628			
1.5.	.610			
1.6.	.675			
1.7.	.744			
1.8.	.727			
1.9.	.704			
1.10.	.597			
1.11.	.681			
1.12.	.617			
2.1.		.652		Generic teaching skills
2.2.		.729		
2.3.		.745		
2.4.		.626		
2.5.		.466		
2.6.		.673		
2.7.		.357		
2.8.		.384		
2.9.		.691		
2.10.		.497		
3.1.			.445	Specific physical education teaching skills
3.2.			.551	
3.3.			.549	
3.4.			.786	
3.5.			.826	
3.6.			.793	
3.7.			.738	
3.8.			.772	
3.9.			.751	
3.10.			.667	
3.11.			.637	
3.12.			.680	
3.13.			.545	
3.14.			.491	
3.15.			.633	
3.16.			.588	
3.17.			.735	

The EFA of each of the subscales proposes a single factor in the three cases, as shown in Table 3 below. In the case of the subscale of Transversal competencies, the explained variance is 52.38%; for the subscale of Generic competencies, the explained variance is 56.22% and an explained variance of 57.69% in the case of the subscale of Specific physical education teaching competencies.

Table 3.
Rotated factorial matrix of the subscales

Transversal skills		Generic teaching skills		Specific teaching competencies Physical Education	
Items	F1	Items	F1	Items	F1
1.1	.716	2.1	.731	3.1	.713
1.2	.752	2.2	.812	3.2	.722
1.3	.766	2.3	.801	3.3	.776
1.4	.657	2.4	.808	3.4	.784
1.5	.621	2.5	.659	3.5	.815
1.6	.727	2.6	.797	3.6	.736
1.7	.799	2.7	.708	3.7	.761
1.8	.778	2.8	.706	3.8	.805
1.9	.722	2.9	.793	3.9	.767
1.10	.677	2.10	.660	3.10	.785
1.11	.714			3.11	.778
1.12	.735			3.12	.709
				3.13	.706
				3.14	.723
				3.15	.806
				3.16	.748
				3.17	.767

After these analyses and taking into account the recommendations of Valderrey (2010), items whose factor loadings are less than .4 should be eliminated. However, although several of the items presented in Table 2 are in this situation, they have not been eliminated, considering their theoretical weight, as well as their normal behaviour in the descriptive analyses and that the Cronbach's alpha of the scale does not improve if the item is eliminated.

Once the EFAs had been performed, four Confirmatory Factor Analyses (CFA) were carried out with the Lisrel 8.8 program, in order to check the construct validity of the questionnaire (Figure 1) and the scales. The overall goodness-of-fit indices are also provided, which allow verifying the theoretical model of the tool and the goodness-of-fit indices of each subscale: Transversal competencies; Generic teaching competencies and Specific Physical Education teaching competencies (Table 4). For this purpose, the Maximum Likelihood parameter estimation method is used and the following indicators are taken into account: Goodness of Fit Index (GFI); Comparative Fit Index (CFI); Normalized Fit Index (NFI); Non-Normalized Fit Index (NNFI); Goodness of Fit Index (AGFI); and the Akaike information criterion (AIC).

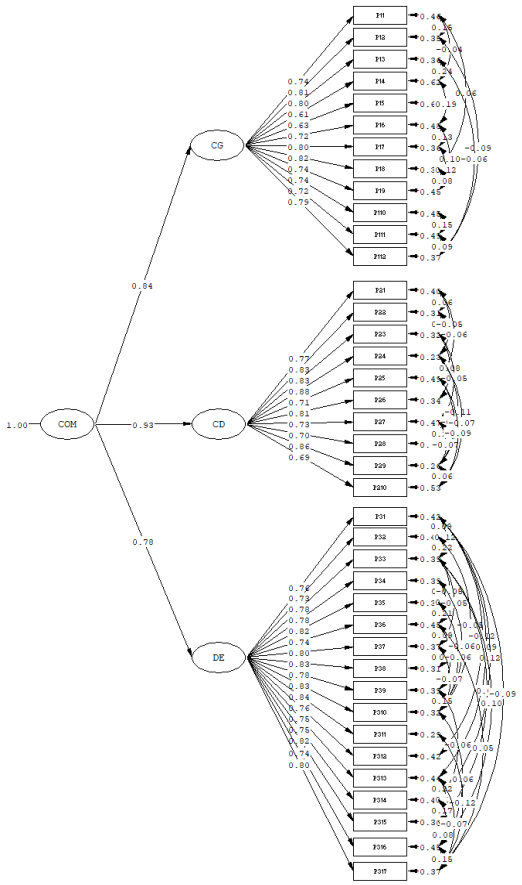

Figure 1. CFA questionnaire

Table 4.
Goodness-of-fit indices of the global questionnaire and of the subscales

Scales	S-B(Chi-squared) (gl) (p)	RMSEA	NFI	NNFI	GFI	CFI	AGFI	AIC
Global questionnaire	2684.34 (640) (p = .000)	.079	.97	.97	.79	.98	.74	1560.00
Transversal Competencies subscale	111.73 (42) (p = .000)	.057	.99	.99	.91	1.00	.85	156.00
Generic teaching competencies subscale	77.07 (28) (p = .000)	.059	.99	.99	.98	1.00	.95	110.00
Specific teaching skills Physical Education subscale	300.00 (98) (p = .000)	.064	.99	.99	.93	.99	.88	306.00

When analysing the data, it can be seen that both the global model composed of three subscales and the model of each independent scale present an adequate fit with NFI and NNFI values above the established minimums (Bentler, 1990). Likewise, the comparative fit indices CFI of Bentler (1990), the goodness-of-fit indices GFI and the AIC indices (Akaike, 1987) also provide optimal values. Finally, the squared mean errors of approximation RMSEA also present adequate values for these types of models (Browne & Cudeck, 1993).

Internal Consistency

In order to verify the internal consistency of the questionnaire and of each of the three subscales that comprise it, reliability was analysed using a Cronbachss Alpha test.

Table 5.
Cronbach's alpha questionnaire and subscales

SUBSCALE	Nº Items	Alfa Cronbach
Transversal skills	12	.915
Generic teaching skills	10	.911
Specific physical education teaching skills	17	.954
GLOBAL QUESTIONNAIRE	55	.966

The results show a high reliability of the tool (McMillan & Schumacher, 2005), as the overall α value is greater than .9.

Discussion and conclusions

The competency approach, closely linked to employability (OECD, 2005), has been configured as one of the main changes promoted by the European convergence process in Higher Education institutions (Rodríguez-Esteban & Vieira-Aller, 2009).

In this sense, building assessment tools that allow obtaining information on the level of competency development of the agents involved in the training processes in the university context is of vital importance to obtain accurate and reliable information. Some previous research has already proposed scales and measures both nationally (Aguado et al., 2017; Baena et al., 2015; Dios et al., 2018; Martínez-Mínguez et al., 2022; Moreno-Murcia et al., 2015; Peña-Hita et al., 2018; Salcines-Talledo et al., 2018), as well as international (Arifin et al., 2021; Hernández et al., 2021; Metsäpelto et al., 2021; Senthil-Murugan & Sivasakthi-Rajammal, 2018; Sylvester et al., 2020, Hedeliza & Immar-Jun, 2020), aimed at collecting evidence on competence development. However, this study presents a specific tool that assesses the cross-cutting, generic teaching and subject-specific teaching competencies in Physical Education acquired throughout the training and measured through the FDP and THESIS applicable to students, graduates and teachers.

There is already empirical evidence on the importance of developing competences that allow for more optimal performance of this type of work and how teachers can promote various actions to achieve this, such as seminars or guides (Sonvella-Velasco et al. 2024) and, likewise, broaden training on action research professions.

The structure of this tool is made up of three subscales. First, a subscale that collects evidence on the acquired transversal competencies required of university graduates to meet the different demands as citizens (OECD, 2002). Secondly, a subscale of generic teaching competencies is proposed, including items related to the cognitive and metacognitive skills desirable in teachers, regardless of their specialty (Perrenaud, 2004). And finally, the subscale of specific teaching competencies in Physical Education is provided, related to the specialty itself (Palacios et al., 2019).

Once the content validity of both the questionnaire and the subscales had been assessed very favourably by the participating expert judges, we proceeded to the analysis of construct validity and internal consistency. The data obtained ratify that the tool as a whole adjusts adequately to the theoretical model, once the Exploratory Factor Analysis (EFA) and the Confirmatory Factor Analysis (CFA) were carried out. Likewise, the analysis of internal consistency, by means of Cronbach's alpha test, both for the questionnaire and the subscales, presents values that indicate high reliability.

All the data presented ensure the theoretical and psychometric consistency of the diagnostic evaluation tool and provide a solid and robust instrument for the evaluation of transversal, generic teaching and specific teaching competencies in the subject of Physical Education, measured through the FDP and THESIS. However, some limitations of the study can be found in the length of the questionnaire, which continued to be extensive even with the modifications made after the previous analyses. Similarly, a larger sample of respondents and universities would have been more suitable for this first application of the tool.

Finally, based on the proposal put forward in this study, future lines of research could advance towards an evaluation of the competencies acquired in other end-of-study projects in the international sphere from a global viewpoint, which considers the particularities and specificities of each context.

Contribuciones de los autores

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References

Aguado, D., González, A., Antúnez, M., & de Dios, T. (2017). Evaluación de competencias transversales en universitarios. Propiedades psicométricas iniciales del cuestionario de competencias transversales. REICE. Revista Iberoamericana sobre Calidad, Eficacia y Cambio en Educación, 15(2), 129-152. https://doi.org/10.15366/reice2017.15.2.007

Akaike, H. (1987). Factor analysis and AIC. Psychometrika. 52, 317-332. https://doi.org/10.1007/BF02294359

Ángel, M.F., Romero, A. & Guerrero, A. (2016). Competencias en Trabajos Fin de Grado: Desarrollo y evaluación. Revista Iberoamericana de Educación, 71(1), 29-44. https://doi.org/10.35362/rie71146

Aparicio-Herguedas, J. L., & Fraile-Aranda, A. (2015). La

evaluación de competencias interpersonales en la formación del profesorado de educación física a través de un programa de expresión corporal. International Journal for 21st Century Education, 2(2), 21-34.

Arifin, M. A., Azizan, F. L., & Shahidan, A. N. (2021). A Needs Study Toward Developing Ma-TVETTCM Instrument to Measure TVET Teacher Competencies. International Journal of Academic Research in Business and Social Sciences, 11(6), 152–158. https://doi.org/10.6007/IJARBSS/v11-i6/10104

Ato, M., López, J.J. & Benavente, A. (2013). Un sistema de clasificación de los diseños de investigación en psicología. Anales de Psicología, 29(3), 1038-1059. https://doi.org/10.6018/analesps.29.3.178511

Baena-Extremera, A.; Gómez-López, M.; Granero-Gallegos, A., & Ortiz-Camacho, M. (2015). Predicting Satisfaction in Physical Education From Motivational Climate and Self-determined Motivation. Journal of Teaching in Physical Education, 34(2), 210-224. https://doi.org/10.1123/jtpe.2013-0165

Bentler, P. M. (1990). Comparative fit indices in structural models. Psychological Bulletin, 107, 238-246. https://doi.org/10.1037/0033-2909.107.2.238

Bonilla-Delgado, I., & Martín, C. (2012). Evaluación de competencias en el Trabajo Fin de Grado en Administración y Dirección de Empresas: una propuesta de la Facultad de Ciencias Sociales de Talavera de la Reina. UCLM. Revista de Formación e Innovación educativa Universitaria, 5(4), 241-253.

Browne, M.W. & Cudeck, R. (1993). Alternative ways of assessing model fit. In: K. A. Bollen & J. S. Long (Eds.), Testing structural equation models. Beverly Hills, CA: Sage, 136-162.

Castejón-Oliva, F. J.; Santos-Pastor, M. L., & Palacios-Picos, A. (2015). Cuestionario sobre metodología y evaluación en formación inicial en educación física. Revista Internacional de Medicina y Ciencias de la Actividad Física y el Deporte, 15(58), 245-267. https://doi.org/10.15366/rimcafd2015.58.004

Chisvert-Tarazona, M. J., Tárraga-Mínguez, R., Ros-Garrido, A., & Palomares Montero, D. (2021). Análisis del Trabajo Fin de Grado en Magisterio, Educación Social y Pedagogía en España. Educación XX1: Revista de la Facultad de Educación, 24(2), 143-166. https://doi.org/10.5944/educxx1.28572

Cobham-Ledgerwood, C. (2022). La planificación curricular basada en competencias, un recurso para procurar la calidad de la educación superior. Saberes APUDEP, 5(1), 420-435.

Corominas, E. (2001). Competencias genéricas en la formación universitaria. Revista de Educación, 325, 299-321.

Cortés-Ibarra, E. F., & Martínez-Clares, P. (2020). Adaptación y validación de un cuestionario para la caracterización de las prácticas evaluativas de los aprendizajes en educación superior PREVAPREDU. Horizontes Pedagógicos, 22(2), 25-36. https://doi.org/10.33881/0123-8264.hop.22202

DESECO – OCDE. (2002). "Definition and Selection of Competencies: Theoretical and Conceptual Foundations". Summary of the final report Key Competencies for a Successful Life and a Well-Functioning Society.

Dios, I., Calmaestra, J., & Rodríguez-Hidalgo, A. J. (2018). Validación de la escala de competencias docentes organizacionales y didácticas para educadores. Revista mexicana de investigación educativa, 23(76), 281-302.

Fernandes, D. J., Sotolongo, M., & Martínez, C. C. (2016). La evaluación del desempeño por competencias: percepciones de docentes y estudiantes en la educación superior. Formación universitaria, 9(5), 15-24.
https://doi.org/10.4067/S0718-50062016000500003

García-Martín, J., García, J. N., Inciarte, A. J., Marín, F. V., Sánchez, E. R., & Conde, M. E. (2019). Sistemas de evaluación y metodologías docentes y su incidencia en las competencias genéricas (EMICOG ESTUDIANTES). Revista INFAD de Psicología. International Journal of Developmental and Educational Psychology, 3(1), 337–352. https://doi.org/10.17060/ijodaep.2019.n1.v3.1499

González, A., Conde, Á., Díaz, P., García, N. & Ricoy, C. (2018). Instructors' teaching styles: relation with competences, self-efficacy, and commitment in pre-service teachers. The International Journal of Higher Education Research, 75, 625–642 (2018). https://doi.org/10.1007/s10734-017-0160-y

Hernández, C. A., Gamboa, A. A., & Avendaño, W. R. (2021). Validación de una escala para evaluar competencias investigativas en docente de Básica y Media. Revista Boletín REDIPE, 10(6), 393-406. https://doi.org/10.36260/rbr.v10i6.1335

Hernández, C. A., Jiménez, M., Guadarrama, E., & Rivera, A. E. (2016). La Percepción de la Motivación y Satisfacción de la Tutoría Recibida en Estudios de Posgrado. Formación Universitaria, 9(2), 49-58. https://doi.org/10.4067/S0718-50062016000200006

Hill, M.A., Overton, T., Kitson, R.R., Thompson, C.D., Brookes, R.H., Coppo, P., & Bayley, L. (2022). 'They help us realise what we're actually gaining': The impact on undergraduates and teaching staff of displaying transferable skills badges. Active Learning in Higher Education, 23(1), 17–34. https://doi.org/10.1177/1469787419898023

Hortigüela, D., Palacios, A. & López-Pastor, V. (2018). The impact of formative and shared or co-assessment on the acquisition of transversal competences in higher education. Assessment & Evaluation in Higher Education, 44, 933-945. https://doi.org/10.1080/02602938.2021.2021390

Lera-López, F. (2021). La dirección de Trabajos Fin de Grado: Una perspectiva docente de buenas prácticas. Revista de Innovación y Buenas Prácticas Docentes, 10(2), 117-130.

https://doi.org/10.21071/ripadoc.v10i2.13270

Lleixà, M. T., & Hernández, M. R. (2020). Formación del profesorado en educación física e inclusión del alumnado con pluridiscapacidad. Revista Interuniversitaria De Formación Del Profesorado. Continuación De La Antigua Revista De Escuelas Normales, 3 4(1). https://doi.org/10.47553/rifop.v34i1.76978

Martínez-Mínguez, L., Moya-Prados, L., & Arnáu-Sabatés, L. (2022). Escala ECPP-FIM para evaluar las competencias profesionales psicomotrices en la formación inicial de maestros: evidencias de validez, Retos, 43, 510-520. https://doi.org/10.47197/retos.v43i0.88683

Martón-Lluch, I., Gallardo-Bermell, S., Villanueva-López, JF., & Ordóñez-Ródenas, J. (2018). Diseño de rúbricas para la evaluación de competencias transversales. Aplicación a Trabajos Fin de Grado en ingeniería. En IN-RED 2018. IV Congreso Nacional de Innovación Educativa y Docencia en Red. Editorial Universitat Politècnica de València. 1542-1554. https://doi.org/10.4995/INRED2018.2018.8789

McMillan, J. & Schumacher, S. (2005). Investigación educativa. Madrid: Pearson.

Metsäpelto, R. L., Poikkeus, A. M., Heikkilä, M. et al. (2021). A multidimensional adapted process model of teaching. Educational Assessment, Evaluation and Accountability, https://doi.org/10.1007/s11092-021-09373-9

Moreno-Murcia, J. A., Huéscar-Hernández, E., Pintado-Verdú, R., & Marzo-Campos, J. C. (2019). Diseño y validación de la Escala de Apoyo a la Autonomía en educación superior: Relación con la competencia laboral del discente. Revista española de orientación y psicopedagogía, 30(1), 116-130. https://doi.org/10.5944/reop.vol.30.num.1.2019.25197

Moreno-Murcia, J. A., Silveira, Y., & Belando, N. (2015). Questionnaire evaluating teaching competencies in the university environment. Evaluation of teaching competencies in the university. New Approaches In Educational Research, 4-1, 54-61. https://doi.org/10.7821/naer.2015.1.106

Muñoz-San Roque, I., Martín-Alonso, J.F., Prieto-Navarro, L., and Urosa, B. (2016). Autopercepción del nivel de desarrollo de la competencia de aprender a aprender en el contexto universitario: propuesta de un instrumento de evaluación, Revista de Investigación Educativa, 34(2):369. https://doi.org/10.6018/rie.34.2.235881

Navío, A. (2005). Propuestas conceptuales en torno a la competencia
profesional. Revista de Educación, 337, 213-234.

OECD (2005). The definition and selection of key competencies (DeSeCo). Executive Summary.

Ortega-Sánchez, D. & Gómez-Trigueros, I. M. (2019). Massive Open Online Courses in the Initial Training of Social Science Teachers: Experiences, Methodological Conceptions, and Technological Use for Sustainable Development. Sustainability, 11(3). https://doi.org/10.3390/su11030578

OXFAM NOVID (2011). Educadores de calidad: Estudio internacional sobre las competencias y estándares para docentes. Bruselas: Internacional de la Educación.

Palacios-Picos, A., López-Pastor, V., & Fraile-Aranda, A. (2019). Perception Questionnaire of Teaching Competences in Physical Education. Revista Internacional de Medicina y Ciencias de la Actividad Física y el Deporte, 19(75), 445-461. https://doi.org/10.15366/rimcafd2019.75.005

Pegalajar-Palomino, M. C. (2021). La Rúbrica como Instrumento para la Evaluación de Trabajos Fin de Grado. REICE: Revista Iberoamericana sobre Calidad, Eficacia y Cambio en Educación, 19(1), 77-96. https://doi.org/10.15366/reice2021.19.3.005

Peña-Hita, M. Á., Rueda-López, E., & Pegalajar-Palomino, M. D. C. (2018). Posibilidades didácticas de las redes sociales en el desarrollo de competencias de educación superior: Percepciones del alumnado. Píxel-Bit, 53, 239-252. http://hdl.handle.net/11162/169567

Perrenoud, P. (2004). Diez nuevas competencias para enseñar: invitación al viaje (Vol. 196). Barcelona: Graó.

Postmes, L., Bouwmeester, R., de Kleijn, R. & van der Schaaf, M. (2022). Supervisors' untrained postgraduate rubric use for formative and summative purposes. Assessment & Evaluation in Higher Education. https://doi.org/10.1080/02602938.2021.2021390

Prat, M. (2001). El perfil profesional del maestro especialista de Educación Física. Apunts de educación física y deportes, 61, 48-55.

Rekalde-Rodríguez, I. (2011). ¿Cómo afrontar el trabajo fin de grado? Un problema o una oportunidad para culminar con el desarrollo de las competencias. Revista Complutense de Educación, 22(2), 179-193. https://doi.org/10.5209/rev_RCED.2011.v22.n2.38488

Rodríguez Esteban, A., & Vieira Aller, M. J. (2009). La formación en competencias en la universidad: un estudio empírico sobre su tipología. Revista de Investigación Educativa, 27(1), 27–47. Recuperado de https://revistas.um.es/rie/article/view/94261

Romero, C. (2009). Definición de módulos y competencias del maestro con mención en Educación Física. Revista Internacional en Medicina de Ciencias de la Actividad Física y el Deporte, 9(34), 179-200.

Rullán-Ayza, M., Fernández-Rodríguez, M., Estapé-Dubreuil, G., & Marques-Cebrián, M. D. (2010). La evaluación de competencias transversales en la materia trabajos fin de grado. Un estudio preliminar sobre la necesidad y oportunidad de establecer medios e instrumentos por ramas de conocimiento. REDU. Revista de docencia universitaria, 8(1), 74-100. https://doi.org/10.4995/redu.2010.6218

Sáez López, J.M. (2017). Investigación educativa. Fundamentos teóricos, procesos y elementos prácticos. UNED.

Sáiz-Manzanares, M. C., Prieto-Moreno, B., Hoyuelos-Álvaro, F. J., & Cámara-Nebreda, J.M. Validación de una escala de la satisfacción de los estudiantes con los trabajos de fin de titulación. Electronic Journal of Research in Educational Psychology, 17(1), 169-192. https://doi.org/10.25115/ejrep.v17i47.2002

Salcines, I., González-Fernández, N., Ramírez-García, A., & Martínez-Mínguez, L. (2018). Validación de la escala de autopercepción de competencias transversales y profesionales de estudiantes de educación superior. Profesorado, Revista de Curriculum y formación del profesorado, 22(3), 31-51. https://doi.org/10.30827/profesorado.v22i3.7989

Senthil-Murugan, D., & Sivasakthi-Rajammal, T. (2018). Development of "Teaching Competency Scale [TCS] of B. Ed Trainees. Scholarly Research Journal for Humanity Science & English Language, 6(29), 8003 -8011.

Sonlleva Velasco, M., Martínez Scott, S., Asún Dieste, S., & López Pastor, V.M. (2024). Evaluación final y calificación de los Trabajos Fin de Estudios en la Formación del Profesorado de Educación Física: percepciones de los estudiantes (Final evaluation and grading of final projects in Physical Education Teacher Education: students' perceptions). Retos, 51, 791–799. https://doi.org/10.47197/retos.v51.100955

Sylvester, S., Hedeliza, P., & Immar-Jun, G. (2020). Development and validation of a scale on teacher's competence in action research. International Journal of Research Studies in Education, 9(6), 77-85. https://doi.org/10.5861/ijrse.2020.5041

Tejada-Fernández, J. (2005). El trabajo por competencias en el prácticum: cómo organizarlo y cómo evaluarlo. Revista Electrónica de Investigación Educativa, 7(2), 1-31.

Tejada, J., & Ruiz, C. (2016). Evaluación de competencias profesionales en Educación Superior: Retos e implicaciones. Educación XX1, 19(1), 17-38. https://doi.org/10.5944/educxx1.12175

Tuning Project (2007). Educational Structures in Europe. Competences. University of Groninge. University of Deusto. Recuperado de http://www.unideusto.org/tuningeu/competences.html

Valderrey, P. (2010). SPSS 17 Extracción del conocimiento a partir del análisis de datos. Madrid: RA-MA.

Vera, J., & Briones, E. (2015). Perspectiva del alumnado de los procesos de tutorización y evaluación de los trabajos de fin de grado. Cultura y Educación, 27(4), 726–765. https://doi.org/10.1080/11356405.2015.1089391

Villaverde-Caramés, E., Fernández-Villarino, M., Toja-Reboredo, B., & González-Valeiro, M. (2021). Revisión de la literatura sobre las características que definen a un buen docente de Educación Física: consideraciones desde la formación del profesorado. Retos, 41, 471-479. https://doi.org/10.47197/retos.v0i41.84421

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