The impact of formative and shared or co-assessment on the acquisition of transversal competences in higher education

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Abstract

The use of Formative and Shared or Co-Assessment (fsa) has been shown to improve the motivation, involvement and learning of university students. The aim of this study is to analyse the effect that implementing fsa processes has on university students' perception of their acquisition of transversal competences. The participants in the study were 1,021 students from five Spanish universities taking Degree courses in Primary Education or Physical Education and Sport Science. They all experienced fsa throughout a complete academic year of their courses. For the data collection, a Self-Perception Scale of Transversal Competences was created, which presented adequate values of reliability and validity. Using a transversal design (inter-subjects), inferential statistical analysis was undertaken of the differences in means between the perception of a range of transversal competences before and after having experienced fsa. The results show significant perceived improvements at the end of the course for most of the competences analysed, which indicates, among other thing, the value and importance of this type of assessment for the educational process.

Keywords: formative and shared or co-assessment; transversal competences; higher education; student perception; authentic assessment.

Introduction

If one of the fundamental purposes of higher education is to reflect on the aims of university education and its relationship to wider society, then the role that assessment fulfils within that education is of equal importance (Bullock and Wilder, 2016). Assessment in universities can be divided into two main levels: (a) a macro level, related to structural, legal and economic issues; (b) a micro level, related to different ways of understanding and achieving teaching and learning (Raaper, 2017). For the latter, lecturers must focus on their subject areas, delivering formative processes for students that are concerned with motivation, autonomous learning and with the transferability of the learning outside the classroom (López-Pastor, 2011, Brown, 2015, Cookson, 2017). This last characteristic leads us to the concept of Authentic Assessment, which refers to the fact that the techniques, instruments and assessment activities adopted are clearly applied in real situations, activities and learning contexts. This is in direct contrast, therefore, to specific and artificial assessment situations, unconnected to real practice or the actual application of the knowledge gained (Hortigüela, Pérez-Pueyo and López-Pastor, 2015). It is important to bear this in mind during every teaching process but particularly so during the initial training of teachers who, a few years later, will have to implement authentic and meaningful methodologies and assessment practices within a school environment. These formative assessment processes therefore need to encompass three main characteristics: authenticity, cognitive challenge and judgement (Villarroel, Bloxham, Bruna, Bruna and Herrera-Seda, 2018).

In addition, a truly formative assessment system must incorporate critical reflection and an active questioning on the part of the student, a process which requires a greater level of commitment from both lecturers and students (López-Pastor and Sicilia-Camacho, 2017). The development of critical and reflective thinking is central to a student's ability to learn, to reflect on what they have learned and to interact with their peers in order to develop a professional identity (Brockbank and McGill, 1999, Bosco and Ferns, 2014). There is a double concept that better explains these processes: Formative and Shared or Co-Assessment (fsa). The concept of formative assessment refers to any assessment whose main purpose is to improve the teaching-learning processes that take place. It enables students to learn more (and/or correct their mistakes) and helps lecturers learn to work better (to improve their teaching practice). Its main purpose, therefore, is not to grade or qualify the student, but to provide information that enables educators to understand how to help students to improve and learn more (Martos-García, Usabiaga and Valencia-Peris, 2017). That is why it is essential to differentiate assessment from grading/qualification, the latter being the determination of a final grade at the end of a process (Smith, 2007). For its part, the concept of "shared or co-assessment" refers to the participation of students in the assessment process, in any of the different formats: self-assessment, peer assessment and shared or co-assessment (Brown and Glasner, 1999, Boud and Falchikov, 2006). However, it is vital to clarify what these concepts are. Falchikov (2005) suggests that "peer assessment" can be undertaken between groups but also at an individual level within groups. Topping (2009) supports this idea, but stresses that this form of assessment must be undertaken between students who share the same status and level. Roberts (2006) takes this notion further, suggesting that peer assessment must incorporate an element of critical reflexion which, if considered appropriate, can then lead to the actual grading of work. On the other hand, "co-assessment" is compared by Falchikov (1986) to "collaborative assessment", as it requires both students and teachers to be jointly involved in the assessment. Falchikov (2005), develops the issue further by highlighting the need for teachers and students to share the responsibility for the assessment criteria, therefore creating truly "participative assessment" (Reynolds and Trehan, 2000). Consequently, the key difference between "peer assessment" and "co-assessment" relates to who is doing the assessing (students only or students and teachers jointly) and the degree of responsibility and participation the parties

have in the process. The concept of "shared assessment" is applied to the dialogue between teacher and pupil (or pupils) which takes place after a self- or peer assessment process during which a joint decision is made. This may be an individual or a collective process depending on the learning activity, process or evidence that is being assessed. All of these concepts are used exclusively in relation to formative assessment processes. When referring to the actual grading of a formative assessment the terms "self-grading" and "dialogic grading" are used.

Fsa in higher education cannot, however, be effective without the implementation of appropriate active and participatory teaching and learning methodologies (Boud and Falchikov, 2006, MEC, Spanish Ministry of Education and Science, 2006a).

Some of the reasons that justify this statement are: (a) the periods of time dedicated to teaching are being continually reduced; (b) students have constant access to large amounts of information from many sources and devices; (c) the role of the lecturer is increasingly that of a guide and counsellor to training processes rather than a transmitter of knowledge; (d) the tasks students undertake should encourage them to acquire autonomy and self-regulation (Hortigüela, Pérez-Pueyo and López-Pastor, 2015). Combining these types of didactic methodologies with fsa systems is one of the few logical combinations required if the intention is to develop professional skills (Brown and Pickford, 2006). Furthermore, these methodologies must take account of the student's perception of the value of what they are learning, because this impacts on their intrinsic motivation in relation to the learning tasks they are asked to undertake (Kaur, Noman and Awang-Hashim, 2018).

Transversal competences are already referred to in all the programme guides that illustrate university course structures and all lecturers must contribute to their development, irrespective of the degree subject or area of specialization (MEC, 2003). These transversal competences address different thematic axes, ranging from knowledge of a foreign language to teamwork. It is precisely in this "transversality" that the main aim of teaching in higher education is founded, as lecturers work on common axes throughout courses that must have direct transferability to wider society and the world of work (MEC, 2006b). Some of the most common transversal competences are those of analysis and synthesis, organization and planning, communication, collaboration, development of interpersonal skills and the use of information and communication technologies (Larsen, 2013). In relation to these competences, other studies suggest that the four most significant skills that all university students should achieve are: critical capacity, creative capacity, communicative capacity and collaborative capacity (Muñoz, Queupil and Fraser, 2016). The key question seems obvious: How can these competences be acquired without the implementation of coherent methodologies and assessment systems that are directly linked to evidence of learning?

Several studies have been published which show how students consider that the use of fsa systems has a positive influence on their development of professional competences (López-Pastor, 2011, Fraile and Aparicio, 2014, Romero, Castejón, López-Pastor and Fraile, 2017). Rullá, Fernández, Estapè and Marquez (2010) report on a study on the assessment of transversal competences that seems to show the need to establish different assessment methods and instruments for different branches of knowledge. In a broad but detailed study on the assessment of competences in higher education, Cano (2015) collates the results of various international studies that show how graduates actually value transversal competences more highly than specific competencies. In addition, there seems to be a disparity between the competencies required in society/the world of work (decision making, problem solving, management skills), and those in which current university students are being trained. The transversal skills in which students show the least competence are precisely languages, decision making, information technology, leadership and problem solving. This seems to indicate a fairly common situation in higher

education in which every subject or module tends to focus wholly on its specific or core material with little or no concern for considering the wider relevance or transversality of the learning (Velasco, Learreta, Kober and Tan, 2014). To make the relevance and transversality more explicit students need to undertake self-assessment to identify the skills and knowledge they have acquired and understand how they relate to the relevant professional competences required (Ferrandiz-Vindel, 2011).

Recently, Romero, Castejón, López-Pastor and Fraile (2017) analysed the perception of lecturers, students and graduates about the relationship between the use of fsa systems and the acquisition of teaching skills related to communication and the use of ICT in initial teacher training degrees. The results of this study indicate that for all three groups the most relevant element in the assessment process is the lecturer-student interaction and, secondly, competence in interpersonal relationships. In particular, research using Twitter has shown that what the students value most highly are the development of critical thinking, collaboration among peers and their active involvement throughout the process (Abella, Delgado, Ausín and Hortigüela, 2018).

Against this background and acknowledging the existing pedagogical link between assessment and competences, the objective of this current study is to analyse the impact that the use of fsa systems has on the acquisition of transversal competences in higher education. We believe this paper will make a significant contribution to existing literature on the subject in relation to university education for several reasons: (a) the diversity of universities and degree courses analysed in this study concerning the issue of assessment and competencies; and, (b) the inclusion of a unique analysis of transversal competences using a specific and validated scale.

Method

Participants

The data for the study was collected from a sample of 1,021 university students studying at five Spanish universities: University of Valladolid (59%), University of Valencia (13%), University of León (11%), CEU (Center for university studies) University of Vigo (8, 5%) and University of Burgos (8.5%). The data collection was completed at two points: initial or pre-test (at the beginning of the course) with 59% of students and final or post-test (at the end of the course) with the remaining 41% of the participants. The data was collected from students on all four years of the Degree in Primary Education and the Degree in Physical Education and Sport Science, according to the distribution summarised in Table 1.

Table 1. Distribution of participants by Course Year

	Frequency	Percentage
1st Year	230	22.5
2nd Year	356	34.9
3rd Year	288	28.2
4th Year	147	14.4
Total	1021	100.0

For the selection of the sample, we started with non-probabilistic sampling, for accessibility to the students at the universities that were participating in a national research project.

The participating lecturers came from different subject areas but most delivered modules on Initial Teacher Education courses (School Organisation, Teaching Language and Literature, The Psychology of Development, Bodily Expression, etc.). Their professional experience ranged from 7 to 35 years with an average of 14.75 years; the average size of the groups from which they got their data was 33.48 students, the smallest group being 23 and the largest 75 students. All

lecturers involved were experienced in fsa and were members of a professional network for research into innovation in fsa in Higher Education.

Instruments

The measurement of Transversal Competences in university contexts was carried out using a scale designed and validated specifically for this study, as no other instrument is currently available in Spanish that can provide a solid and reliable measure for these competences. Its construction followed the stages that Carretero-Dios and Pérez (2005) establish as appropriate for this type of research. In an initial phase, a range of documents related to transversal competences were analysed (MEC, 2003; 2006b) in order to establish a broad set of questions related to the relevant competences. These questions were then evaluated by 8 expert judges, all specialists in initial teacher training. After these experts evaluated the questionnaire their comments were analysed, and a first version of the questionnaire was drafted, consisting of a total of 19 items measured using a Likert scale of four alternatives (1=nothing, 4=a lot). This version was applied to a reduced sample of students of similar characteristics to the participants in the study. After reviewing all the items, those deemed less relevant were eliminated and a final version was created, containing 14 questions. This version of the questionnaire presented adequate values of reliability and validity.

Design and procedure

We opted for a cross-sectional study design in which the initial data and the final data were analysed using models of inter-subject mean differences.

The data collection was undertaken by lecturers from the universities that participated in the study and who were members of the National Network for Formative Assessment (NNFA), in a single session and with the consent of all the student participants. All were fully informed of the main objective of the study and assured that all participants and their responses would remain anonymous.

The students who participated in the study were all enrolled on university degree courses that used fsa. The characteristics of this type of assessment are explained in detail in López-Pastor (2009). The following references provided the basis for the research: (a) the assessment is aimed at delivering improvements in three areas (student learning, teaching and the teaching-learning process); (b) constant feed-back is provided on the learning activities and tasks that the students are undertaking (feedback was provided at least every two weeks), most of the time using processes of dialogical teacher-student learning, but often also among the students; (c) continuous assessment processes are used, where the student learning activities serve to provide the grade at the end of the semester, so that in some cases there is no final exam, and in others the final exam provides only a minor part of the final grade (between 20% and 40%). This does not mean that the assessments are used solely to provide a grade, rather that the use of fsa throughout the module leads to a final grading process that is more logical, coherent and defined for the student. Additionally, in every module that formed part of the study the students took decisions about their own assessment, either individually or as part of a group, using self- or peer assessment, followed by assessment in collaboration with their tutor.

Furthermore, in order to ensure the reliability of the intervention carried out by the lecturers, all the participants in the study had previously delivered a final results report which included details of the formative assessment system to be used in their subject. This is a basic requirement for all participants in the National Network for Formative Assessment, which is a nationwide network established in Spain in 2005 to encourage research and innovation focused on fsa in Higher

Education. ().

Every lecturer participating in the study applied the questionnaire to the students in their class at the beginning and again at the end of their module in which fsa was used. The data remained anonymous and confidential and were entered into the analytical programme used to analyse each competence.

Data Analysis

The statistical analyses were carried out using the SPSS 23.0 programme. The original scores of the Transverse Competence Scale were normalized using Box-Cox transformations (Box and Cox, 1964) as a prerequisite for the calculation of subsequent parametric statistics. Given that the main objective of the analysis is to determine if there are significant differences in the acquisition of competences before and after having studied subjects in which fsa was used, we calculated the Student's t-statistic. It was not considered necessary to homogenize the variances of each level of the independent variable (pre- or post-test) in the dependent variable (transversal competences) since with this statistic it is possible to determine within the same calculation if the homogeneity of the variance is achieved and proceed accordingly. The statistical significance in all the calculations was calculated, giving a significance level of $p < 0.01$.

Results

An Exploratory Factor Analysis (EFA) was carried out on the scores of the final scale. The analyses confirmed the validity of the results (KMO, Kaiser-Meyer-Olkin, = .79, Chi-square = 1438.04, sig = .00), and presented a structure of 5 main factors that explain 59.37% of the total variance (Table 2).

Table 2. Rotated component matrix

	Component					Factor
	1	2	3	4	5	
Develop creativity	.68					Creative and
Adapt to new situations	.65					autonomous work
Develop autonomous learning	.61					competences
Develop interpersonal relationship skills		.74				Intra and
Teamwork		.72				interpersonal
Develop intrapersonal skills		.57				competences
Oral and written communication in native language			.66			Reflective and
Critical and reflexive reasoning			.62			critical
Develop an ethical approach			.53			communication
Communication using gestures and body language			.44			competences
Organisation and planning				.81		Metacognitive
Analysing and synthesising				.75		competences
Knowledge of a foreign language					.79	Specific
Use of ICT					.73	competences
Eigenvalues	3.74	1.32	1.18	1.05	1.00	
% Explained variance	26.71	9.48	8.47	7.52	7.18	
% Cumulative explained variance	26.71	36.19	44.66	52.19	59.37	
KMO Test	.79					
Bartlett's Test of Sphericity	Chi-squared = 1438.04 sig = .00					

The first of the factors produces the greatest variance in the scales (27%) and has significant

loadings in three questions related to creativity, adaptation to new situations and to autonomous work. For this reason we refer to it as the *Creative and autonomous work competences* factor. The second factor we have called *Intra and interpersonal skills* since the items with significant loadings are related to team work and related skills. The third factor, which has the largest number of items, concerns *Reflective and critical communication competencies*. A fourth factor has to do with the capacity for organization, planning, analysis and synthesis and is referred to as *Metacognitive competences*. The final factor relates to *Specific competences* such as knowledge of a foreign language or proficiency in ICT and accounts for just over 7% of the total variance of the final scale.

The variation in the number of questions in both the Transversal Competence Scale and its factors makes it difficult to undertake direct comparisons between them, so it was decided to normalize them. The common metric has an average of 5.00 (or very close to this value) and a standard deviation of 2.00 (or very close to this value). In no case were there any changes to the nature of their distributions (Table 3).

Table 3. Descriptive values of the original and normalised scales

	Original values				Normalised values			
	Mean	SD	Asymmetry	Kurtosis	Mean	SD	Asymmetry	Kurtosis
Self-perception of Transversal Competences Scale	42.84	4.86	-.41	-.98	5.00	1.98	.00	-.10
Creative and autonomous work competences	9.49	1.54	-.26	.08	4.99	1.88	-.16	-.34
Intra and interpersonal competences	1.06	1.45	-.54	.23	4.97	1.84	-.28	-.44
Critical communicative competences	12.33	1.77	-.10	-.15	5.00	1.93	-.04	-.20
Metacognitive competences	6.18	1.01	-.43	1.29	5.00	1.82	-.14	.02
Specific competences	4.78	1.37	-.15	-.38	5.00	1.90	.01	-.19

The first comparison between the differences in means corresponding to the values of the pre- and post- Self-Perception of Transversal Competences Scale showed significant differences (Table 4). Specifically, the value for the students' perception of the competences acquired at the end of the teaching-learning process is higher than at the beginning of the course.

Table 4. Pre- and post-test differences in the Transversal Competence Scale

				Homogeneity of variances			
		Mean	**SD**	**F**	**Sig.**	**t**	**Sig. (bilateral)**
Transversal competences scale	Pre-test	4.82	1.93	1.73	.19	-3.42	.00
	Post-test	5.25	2.03				

However, as we have seen above, the Transversal Competence Scale presents a variety of factors, which may be suggesting a less than exact interpretation of what was mentioned above. It is also necessary to analyse whether these pre- and post-test differences are maintained in the 5 factors resulting from the EFA.

Regarding the first factor, related to competences in creative and autonomous work, we again find significant pre- and post-test differences, showing the perception of a greater level of these competences at the end of the teaching-learning processes, based on experience of fsa (Table 5).

Table 5. Differences in mean values of the factor of Creative and autonomous work

| | | Mean | SD | Homogeneity of variances | | t | Sig. |
				F	Sig.		
Creative and autonomous work competences (total)	Pre-test	4.71	1.84	1.14	.29	-5.63	.00
	Post-test	5.38	1.88				

It should also be noted that the competence that increases the most within this factor is the development of creativity, with a mean pre-test value of 2.99, compared to the average post-test value of 3.30 (remembering that these specific competences are measured on a scale of 1 to 4 points). The competence that presents the next highest increases is related to adaptation to new situations (mean pre-test = 3.15 and mean post-test = 3.30), followed by the development of autonomous learning, with smaller increases than the previous ones (mean pre-test = 3.15 and mean post-test = 3.21).

The second of the factors, inter and intrapersonal skills, also presents significant differences pre- and post- the FAS experience (Table 6). Specifically, there is a statistically significant improvement in the acquisition of these competences at the end of the experience.

Table 6. Differences in mean values of the factor Creative and autonomous work competences

| | | Mean | SD. | Homogeneity of variance | | t | Sig. (bilateral) |
				F	Sig.		
Intra and interpersonal competences	Pre-test	4.79	1.80	2.18	.14	-3.65	.00
	Post-test	5.22	1.88				

For this factor, the competence that develops to the greatest degree is that related to teamwork (mean pre-test = 3.40 and mean post-test = 3.58), followed by the factor related to the development of intrapersonal skills (mean pre-test = 3.10 and mean post-test = 3.24); the increases are lower for the development of interpersonal skills (mean pre-test = 3.44 and mean post-test = 3.47).

The differences are again significant for the third factor related to reflective and critical communication. As in the previous cases, the perception of acquisition of these competences increases at the end of the teaching-learning process, based on experiencing fsa (Table 7).

Table 7. Differences in mean values of the factor of Reflective and critical communication competences

| | | Mean | SD | Homogeneity of variances | | t | Sig. (bilateral) |
				F	Sig.		
Reflective and	Pre-test	4.81	1.92	.85	.36	-3.74	.00

| critical communicative competences | Post-test | 5.27 | 1.92 | | | | |

This increase is mainly due to the perception of changes that occur in the capacity to reason critically and reflectively (mean pre-test = 3.08 and mean post-test = 3.24) and in the improvement in oral and written communication competence in Spanish (mean pre-test = 3.13 and mean post-test = 3.32).

The perception of metacognitive competencies, the fourth factor, also increases at the end of the process in a statistically significant way (Table 8).

Table 8. Differences in mean values of the factor of metacognitive competences

| | | Media | DT. | Homogeneity of variance | | t | Sig. (bilateral) |
				F	Sig.		
Metacognitive competences	Pre-test	4.76	1.81	8.56	.00	-4.99	.00
	Post-test	5.33	1.78				

Although the two competences that make up this factor increase throughout the process, they do so to a greater degree for organization and planning (mean pre-test = 3.13 and mean post-test = 3.32); as we have said, the ability to analyse and synthesize information also increases (mean pre-test = 2.94 and mean post-test = 3.05).

Of the five factors that make up the Transversal Competence Scale, the differences are significant and negative in those related to the specific competences (fifth factor). Specifically, the initial values are greater than those at the end of the experience. Not only does the perception of competence in these areas not increase, but it actually decreases. These specific competences had a mean value of 5.36 at the beginning of the experience, but these mean values fall to 4.50 at the end of the course (Table 9).

Table 9. Differences in mean values of the factor of Specific competences

| | | Mean | SD | Homogeneity of variances | | t | Sig. (bilateral) |
				F	Sig.		
Specific competences	Pre-test	5.36	1.83	5.75	.02	7.27	.00
	Post-test	4.50	1.87				

As might be expected, the two competences that make up this fifth factor suffer a setback in the self-perception of their acquisition at the end of the academic year, particularly in terms of knowledge of a foreign language (mean pre-test = 2.24 and mean post-test = 1.78) and to a lesser extent in the use of Information and Communication Technologies (mean pre-test = 2.84 and mean post-test = 2.65).

Discussion

The objective of this study was to analyse the impact of the use of fsa systems on the acquisition of transversal competences in higher education. It has been proven that in four of the five types of competences analysed, significant improvements were seen post-test after conducting fsa processes throughout the academic year.

In relation to the first factor, related to the perceptions of creative and autonomous work

competencies, these increased significantly at the end of the academic year. This demonstrates the impact of this type of assessment on students' decision making, involvement and self-regulation. So that the existing process of feedback between teacher and student throughout the teaching process can help develop autonomy, it must be accompanied by practical resources that the student perceives as useful to subsequent assessments (Hepplestone, Glover, Irwin and Parkin, 2016). In relation to this, Oriol, Mendoza, Covarrubias and Molina (2017) indicate that this support for the development of autonomy, together with self-efficacy, can enhance academic performance. Among all the competences, the one that increased most was the development of creativity. Only by using these strategies can creativity and problem solving be achieved in a variety of contexts (Keller-Mathers, 2011). For a student to be creative they have to be fully aware of what they are learning and be able to generate a variety of alternatives for solving the tasks they are faced with. To achieve this, the methodological and assessment systems employed during their education are key (Wilkin, 2017).

Regarding the second factor, related to inter and intra personal skills, significant improvements were again perceived at the end of the course. It is striking that this increase was higher in perceptions of teamwork skills and intrapersonal skills than in interpersonal skills. This suggests that students work better for and in their own group than with other groups. These data contrast with some results found in international literature, which reflect how feedback between students improves their perception of their acquisition of competence to interact both within a group and with other groups (Jafar, 2016). One could therefore envisage two separate levels of assessment for the improvement of learning; (a) a lower level, aimed at developing awareness and knowledge of the work of the group itself; (b) a higher level, aimed at acknowledging different approaches and knowledge between groups, using peer assessment (Eather, Riley, Miller and Jones, 2017). The results obtained for this factor are felt to be especially relevant, since the acquisition of collaborative competencies and the management of group responsibilities are those that relate most closely to the demands of employment in today's world (Waldron, 2017).

These results also reflect those obtained for the third factor, reflective and critical communication skills, since once again the use of fsa during the course significantly improved students' perception of these competences in comparison to pre-test. These results support findings in other studies, such as Power (2010), which showed how the implementation of authentic assessment practices and the involvement of future teachers in their own assessment correlated with a more critical and reflective perception of their professional identity. However, Mok (2012) cautions that for this reflective component to be acquired students must have some experience of this type of assessment, since it implies they must acquire an ever more active role within their education throughout their course. However, the low level of perception of improvement that the students demonstrated in this study regarding their competence in oral and written communication in their native language is remarkable. This result is difficult to interpret, since most studies that analyse the advantages of fsa in higher education see improvements in oral and written communication for two fundamental reasons: (a) the diversity of assessment procedures and instruments used; (b) the range of feedback channels and ways of recording the learning achieved (Nikolic, Stirling and Ros, 2017).

The fourth group of competences in which students perceived significant post-test improvements were the metacognitive ones. Within them, the competences that showed the greatest increase were organization and planning. The fact that university students who experience fsa are more aware of what they learn and have a greater capacity to organize and plan their tasks indicates that the purposes for which the assessment is designed have been fulfilled (Boud and Falchikov, 2006). Meriläinen (2014) asserts that this organizational capacity is directly related to the student's sense of responsibility towards work and their motivation to achieve the tasks set, provided that the workload is not perceived as being too great. Other research, such as that of

Hortigüela and Pérez-Pueyo (2016), shows that metacognition and self-regulation of work are directly related to the perception of usefulness that the student gives to the task they are working on, as well as its transferability to the professional environment. However, this metacognitive capacity is not innate and must be developed through the use of valuable tasks and activities that encourage reflection and problem solving in a collaborative way (Volet and Mansfield, 2006, Harris and Bristow, 2016).

One of the most striking results of this study has been to verify how of the five factors analysed in the Perception of Transversal Competences Scale, the only one in which there have been significant differences with higher values before starting the experience that at the end has been the factor of specific competencies. Both the knowledge of a foreign language and the use of information and communication technologies show decreased post-test values. This may be due to the fact that, although they are cross-disciplinary competences, in many curricula these are competences that are specifically developed in some subjects (languages, new technologies in education, etc.), but to a lesser degree in most other subjects (except in a bilingual curricula). Similar results and interpretations can be found in Romero et al. (2017).

This does not mean that these competences should not be developed through transversality. In fact, studies such as that by Akarawang, Kidrakran and Nuangchalerm (2016), indicate that the use of ICT as a methodological tool in higher education has increased by 30% in the last five years, with positive results for students at both a cognitive and attitude level. In Spain, something similar happens regarding the use of a foreign language, especially English. It is common for many subjects to be offered through programmes that are "English friendly", where the content is partially or wholly taught in English. However, the benefits or changes that this produces in terms of learning and content acquisition have not been studied in depth (Hernández-Nanclares and Jiménez-Muñoz, 2017).

Conclusions

In relation to the objective of this research, we have demonstrated how the use of fsa systems in higher education had a positive influence on the perception of the acquisition of four groups of transversal competences. This result is of clear relevance for the future development of fsa, since its use delivers an improvement in students' perception of their acquisition of competences. As can be seen, our results show a change in students' perception of their acquisition of competences, though not in the acquisition of competences themselves, which is not the key focus of this study. Our study makes a significant contribution to the current literature on the subject of fsa, as no previous study has analysed in such a specific way the relationship between this assessment strategy and the perception of transversal competences at such a wide range of universities.

However, our study is not without its limitations. Among them we would highlight limitations that derive from the design chosen for the research instrument. The use of transversal pre-test/post-test design instruments to measure the changes produced by certain interventions in subjects has received some criticisms because, despite their evident advantages, they do not fully ensure that the effects of the independent variable are the only determinants of the changes produced. Consequently, it is possible that an element of the Hawthorne effect may have occurred in the study in terms of the positive psychological reaction the participants may have had whilst completing the questionnaires, resulting not from the effects of the intervention but from the knowledge that their responses were being analysed.

Another limitation is that this study only records the students' perception of their acquisition of certain competences. It would therefore be of great interest to identify what the lecturers' views are on the competences their students had achieved by the end of the course. Similarly, it would

be useful for future researchers to use a control group that did not experience fsa, in order to identify any differences between the two groups. In addition, the issue of effectiveness of the instrument used in this study to measure the transversal competences offers the possibility of subjecting it to an ad hoc psychometric analysis as part of future potential lines of research.

Despite some limitations, we still consider this study of significant value to all university lecturers interested in implementing assessment methods in their modules or courses that actively involve their students. It is also of value to academic managers and coordinators of degree courses when contemplating and evaluating the positive aspects of establishing these assessment processes within course teaching programmes in order that students acquire competences common to all subjects. To this effect, and although this research sheds much new light on the impact of assessment on the development of competences by students, it remains vital to continue analysing innovative proposals and approaches to assessment based on the transversality of knowledge, as this represents the truly determining factor in the delivery of successful social and professional development.

References

Abella, V., V. Delgado., Ausín, V., and Hortigüela, D. 2018. To tweet or not to tweet: Student perceptions of the use of Twitter on an undergraduate degree course. *Innovations in Education and Teaching International,* e-first doi:10.1080/ 14703297.2018.1444503

Akarawang, C., P. Kidrakran, and P. Nuangchalerm. 2016. "Developing ICT Competency for Thai Teachers through Blended Training". *Journal of Education and Learning,* 10 (1), 15-21.

Bosco, A.M., and S. Ferns. 2014. "Embedding of Authentic Assessment in Work-Integrated Learning Curriculum". *Asia-Pacific Journal of Cooperative Education,* 15 (4), 281-290.

Brown, S. 2015. *Learning, teaching and assessment in higher education: global perspectives.* London: Palgrave Teaching and Learning.

Brown, S., and A. Glasner. 1999. *Assessment Matters in Higher Education.* Buckingham: Open University Press.

Brown, S., and P. Pickford. 2006. *Assessing skills and practice.* London: Routledge.

Boud, D., and N. Falchikov. 2006. "Aligning assessment with long-term learning". *Assessment & Evaluation in Higher Education,* 31 (4), 399-413.

Box, G. E. P., and D.R. Cox. 1964. An Analysis of Transformations. *Journal of the Royal Statistical Society. Series B (Methodological)*, 26 (2), 211-252

Brockbank, A., and I. McGill. 1999. *Facilitating reflective learning in Higher Education.* Buckingham: Open University Press.

Bullock, G., and N. Wilder. 2016. "The Comprehensiveness of Competing Higher Education Sustainability Assessments". (*International Journal of Sustainability in Higher Education,* 17 (3), 282-304. doi:10.1108/IJSHE-05-2014-0078

Cano, E. 2015. *Evaluación por competencias en educación superior (Assessment by competences in higher education).* Madrid: La Muralla.

Carretero-Dios, H., and C. Pérez. 2005. "Normas para el desarrollo y revisión de estudios instrumentales". (Guidelines for the development and review of instrumental studies) *International Journal of Clinical and Health Psychology*, 5 (3), 521-551

Cookson, C. 2017. "Voices from the East and West: Congruence on the Primary Purpose of Tutor Feedback in Higher Education". *Assessment & Evaluation in Higher Education,* 42 (7), 1168-1179. doi:10.1080/02602938.2016.1236184

Eather, N., N. Riley., D. Miller., and B. Jones. 2017. "Evaluating the Effectiveness of Using Peer-Dialogue Assessment (PDA) for Improving Pre-Service Teachers' Perceived Confidence and Competence to Teach Physical Education". *Australian Journal of Teacher Education,* 42 (1), 69-83.

Falchikov, N. 1986. Product comparisons and process benefits of collaborative peer group and self-assessments. *Assessment & Evaluation in Higher Education*, 11 (2), 144- 166.

Falchikov, N. 2005. *Improving Assessment Through Student Involvement. Practical solutions for aiding learning in higher and further education.* London: Routledge-Falmer.

Ferrandiz-Vindel, I.A. (2011). Students' Self-Assessment: Other Ways to Assess Competences at Higher Education. *Journal of International Education Research,* 7 (5), 49-54.

Fraile, A., and JL. Aparicio. 2014. "Competencias interpersonales que deben estar presentes en la formación inicial del profesorado de educación física". (Interpersonal competences required in the initial education of Physical Education teachers) *Acción, 21,* 11, 25-29.

Harris, G., and D. Bristow. 2016. "The Role of Group Regulation in Student Groups: A Pedagogical Exploration". *e-Journal of Business Education and Scholarship of Teaching,* 10 (2), 47-59.

Hernández-Nanclares, N., and A. Jiménez-Muñoz, A. 2017. "English as a Medium of Instruction: Evidence for Language and Content Targets in Bilingual Education in Economics". *International Journal of Bilingual Education and Bilingualism,* 20 (7), 883-896. doi:10.1080/13670050.2015.1125847

Hepplestone, S., I. Glover., B. Irwin., and H.J. Parkin. 2016. "Setting out the Role of Feedback in the Assessment Process through Both the Student and Tutor Perspective". *Practitioner Research in Higher Education,* 10 (1), 81-90.

Hortigüela, D., A. Pérez-Pueyo., and V. López-Pastor. 2015. "Student involvement and management of students' workload in formative assessment in higher education". *Relieve: revista electrónica de investigación y evaluación educativa,* 21 (1), 1-5. doi: 10.7203/relieve.21.1.5171

Hortigüela, D., and A. Pérez-Pueyo 2016. "Influencia de la regulación del trabajo del alumnado universitario en la implicación hacia las tareas" (The effects of regulating the workload of university students on their involvement in learning tasks). *Psychology, Society and Education,* 8 (1), 39-51.

Jafar, A. 2016. "Student Engagement, Accountability, and Empowerment: A Case Study of Collaborative Course Design". *Teaching Sociology,* 44 (3), 221-232. doi:10.1177/0092055X16644489.

Kaur, A., M, Noman, M., and R. Awang-Hashim. 2018. The Role of Goal Orientations in Students' Perceptions of Classroom Assessment in Higher Education. *Assessment & Evaluation in Higher Education,* 43 (3), 461-472. doi: http://dx.doi.org/10.1080/02602938.2017.1359818

Keller-Mathers, S. 2011. "Building Passion and Potential for Creative Learning in Higher Education". *Collected Essays on Learning and Teaching,* 4 (1), 1-6.

Larsen, V. 2013. "Transversal Knowledge Formations in Professional Bachelor Education Employing Problem Based Learning (PBL)". *Journal of Problem Based Learning in Higher Education,* 1 (1), 53-71.

López-Pastor, V. M. 2009. *Evaluación formativa y compartida en educación superior. Propuestas, técnicas, instrumentos y experiencias* (*Formative and shared assessment in higher education. Proposals, techniques, instruments and experiences*). Madrid: Narcea.

López-Pastor, V. 2011. "Best Practices in Academic Assessment in Higher Education: A Case in Formative and Shared Assessment". *Journal of Technology and Science Education,* 1 (2), 25-39.

López-Pastor, V., and A. Sicilia-Camacho. 2017. "Formative and Shared Assessment in Higher Education. Lessons Learned and Challenges for the Future". *Assessment & Evaluation in Higher Education,* 42 (1), 77-97. doi:10.1080/02602938.2015.1083535

Martos-García, D., O. Usabiaga., and A. Valencia-Peris. 2017. "Students' Perception on Formative and Shared Assessment: Connecting Two Universities through the Blogosphere". *Journal of New Approaches in Educational Research,* 6 (1), 64-70.

MEC. 2003. *La Integración del Sistema Universitario Español en el Espacio Europeo de Enseñanza Superior. Documento-Marco (The Integration of the Spanish University System within the European Higher Education Area. Document-Framework).* Madrid: MEC.

MEC. 2006a. *Directrices para la elaboración de Títulos Universitarios de Grado y Máster. Propuesta, de 21 de diciembre, de la Secretaría de estado de Universidades e Investigación (Guidelines for the preparation of University Degrees at Undergraduate and Masters level. Proposal, of December 21, of the Secretary of State for Universities and Research).* Madrid: MEC.

MEC. 2006b. *Propuestas para la renovación de las Metodologías Educativas en la Universidad (Proposals for updating Educational Methodologies in Universities).* Madrid: MEC.

Meriläinen, M. 2014. "Factors Affecting Study-Related Burnout among Finnish University Students: Teaching-Learning Environment, Achievement Motivation and the Meaning of Life". *Quality in Higher Education,* 20 (3), 309-329. doi:10.1080/13538322.2014.978136

Mok, J. 2012. "As a Student, I Do Think that the Learning Effectiveness of Electronic Portfolios Depends, to Quite a Large Extent, on the Attitude of Students!". *Electronic Journal of e-Learning,* 10 (4), 407-416.

Muñoz, D.A., J.P. Queupil., and P. Fraser. 2016. "Assessing Collaboration Networks in Educational Research: A Co-Authorship-Based Social Network Analysis Approach". *International Journal of Educational Management,* 30 (3), 416-436. doi:10.1108/IJEM-11-2014-0154

Nikolic, S., D. Stirling., and M. Ros 2017. "Formative assessment to develop oral communication competency using YouTube: self and peer assessment in engineering". *European Journal of Engineering Education,* 1, 1-12.

Oriol, X., Mendoza, M., Covarrubias, C., and V. Molina 2017. "Positive Emotions, Autonomy Support and Academic Performance of University Students: The Mediating Role of Academic Engagement and Self-Efficacy". *Revista de Psicodidáctica,* 22 (1), 12-23.

Power, A. 2010. "Community Engagement as Authentic Learning with Reflection". *Issues in Educational Research,* 20 (1), 57-63.

Raaper, R. 2017. Tracing Assessment Policy Discourses in Neoliberalised Higher Education Settings. *Journal of Education Policy, 32*(3), 322-339. doi:10.1080/02680939.2016.1257160

Reynolds., M., and K. Trehan. 2000. Assessment: a critical perspective. *Studies in Higher Education*, *25*(3), 267-278.

Roberts, T.S. 2006. *Self, Peer and Group Assessment in E-Learning.* Hershey, PA: Information Science Publishing.

Rullá, A., M. Fernández., G. Estapé., and M. Márquez. 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" (The assessment of transversal competences in undergraduate dissertations. A preliminary study on the need and opportunity to establish methods and instruments by subject area). *RED-U,* 8 (1), 74-100. doi:10.4995/redu.2010.6218

Romero, R., Castejón-Oliva, F. J.; López-Pastor, V. M. and Fraile Aranda, A. (2017). Formative Assessment, Communicative Competencies and ICT in Teachers Training. *Comunicar*, 52, 73-82. doi:10.3916/C52-2017-07.

Smith, G. 2007. "How Does Student Performance on Formative Assessments Relate to Learning Assessed by Exams?" *Journal of College Science Teaching,* 36 (7), 28-34.

Topping, K.J. 2009. Peer assessment. *Theory into Practice*, 48, 20-27.

Velasco, P.J., B. Learreta., C. Kober., and I. Tan. 2014. Faculty Perspective on Competency Development in Higher Education: An International Study. *Higher Learning Research Communications,* 4 (4), 85-100.

Villarroel, V., S. Bloxham., D. Bruna., C. Bruna., and C. Herrera-Seda. 2018. Authentic Assessment: Creating a Blueprint for Course Design. *Assessment & Evaluation in Higher Education,* 43 (5), 840-854. doi: http://dx.doi.org/10.1080/02602938.2017.1412396

Volet, S., and C. Mansfield. 2006. "Group Work at University: Significance of Personal Goals in the Regulation Strategies of Students with Positive and Negative Appraisals". *Higher Education Research and Development,* 25 (4), 341-356.

Waldron, R. 2017. "Positionality and Reflexive Interaction: A Critical Internationalist Cultural Studies Approach to Intercultural Collaboration". *Innovations in Education and Teaching International,* 54 (1), 12-19. doi:10.1080/14703297.2016.1156010

Wilkin, C.L. 2017. "Enhancing Critical Thinking: Accounting Students' Perceptions". *Education and Training,* 59 (1), 15-30. doi:10.1108/ET-01-2015-0007