Co-assessment and self-assessment as types of evaluation in an online and offline blended learning

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Abstract

The main objective of this research is to analyze the influence that co-assessment has on the students' learning process and to analyze whether there are differences regarding the teacher's grades (hetero-assessment), the grades awarded by the students (co-assessment), and the grades that the students award themselves (self-assessment). In addition, the attitude of the students when using co-evaluation as a learning system want to find out. When analysing the data collected, it can be seen that the students are satisfied with the use of co-assessment, showing great involvement. Moreover, co-assessment, self-assessment and teacher's marks are positively correlated. Most of the self-assessment marks coincide with the teacher's marks, albeit there are 20% of students who do not coincide.

Keywords: Co-assessment; self-assessment; hetero-assessment; satisfaction; involvement.

1. Introduction

According to Dicheva *et al.* (2015), traditional evaluation methods do not achieve their main objective according to the opinion of the students themselves, which is to teach. Thus, it is suggested that this traditional form of teaching should be superseded and, therefore, replaced by a wide range of more innovative and sophisticated methodologies, something that, on the other hand, seems to be taking place in recent years.

In relation to the above, new assessment modalities are recently being incorporated, such as self-assessment, peer assessment or co-assessment, however, several difficulties are being encountered. The disconnection between a conventional teaching staff and new innovative teaching techniques, together with the institutional inertia of universities, put traditional exams before advanced solutions to the challenges posed by evaluation (Rodríguez *et al.*, 2010).

During the realization of this work, we have found that, although there are numerous research that focus on this topic and develop it in a fairly broad way, there are areas that are still unexplored and that it would be beneficial to address. It could be said that there is a gap in the research that lies in how learning could be improved through the use of co-assessment. Should we provide the student with different exercises so that they can evaluate exercises different from their own? Or should the student evaluate the same exercise to see different response options or that by mere repetition consolidate that learning? (Cavas Toledo *et al.*, 2010).

In this work, as a general objective, we are going to focus on analyzing the influence that co-assessment has on the students' learning process and analyze whether there are differences between the teacher's marks, the marks given by the students (co-assessment), and the grades that students give themselves (self-assessment). With these learning techniques we want to check if the student is capable of acquiring the necessary skills to self-assess, getting a more realistic view of his/her abilities (Valdivia, 2008). In addition, we want to analyze the attitude of students towards the general use of co-assessment and satisfaction and what factors may influence it.

2. Co-assessment and self-assessment in the learning process

Co-assessment, also called peer evaluation, is defined as an evaluation that is carried out jointly between teachers and students, in which reaching a consensus on the assessments provided is paramount (Ruiz and Serra, 2017). Topping (2018) distinguishes two types within peer review. On the one hand, quantitative co-assessment, which consists of providing the student with a numerical grade, without offering feedback and, therefore, the possibility of discovering its errors and improving them in the future. On the other hand,

formative co-assessment consists of giving verbal feedback, where both the teacher and the students intervene so that the evaluated colleague sees her weaknesses and strengths and sees the way in which she can improve her work. In this paper we are going to focus on formative co-assessment.

On the other hand, we also consider self-assessment as an important tool in the learning process. In self-assessment, students assess themselves and in co-assessment, it is the classmates themselves who, following the teacher's instructions, are responsible for carrying out the assessment process. One of the great advantages of these two evaluation methods is that students achieve a great habit of reflection, in which they are able to analyze their own mistakes and, therefore, improve their development (Valero-García and Cerio, 2005). In addition, Topping (2018) states that in the long term they can develop both communication and collaboration skills.

These assessment techniques can also be used online and are much more flexible than if used face-to-face, where we can monitor the activity of the students, and recapitulate a great source of information where we see the progress of each one. In addition, the teacher can also choose two types of online communication: asynchronous, where students do not have to meet simultaneously, that is, there is no temporal coincidence between sender and receiver; and synchronous, when there is online communication, which can be achieved through various software such as Skype or Zoom (Pacheco, 2010). Both types of evaluation are used in the present study.

Other authors maintain that the use of self-assessment accompanied by a support process from the teacher helps to improve relationships between teachers and students, losing the level of verticalization that characterizes traditional teaching and promoting greater commitment and involvement by students (Vidal *et al.*, 2014). In addition, it helps teachers analyze the results obtained on the self-assessment of each student to make a predictive diagnosis and develop learning strategies that are adapted to the group (Vidal Tallet *et al*., 2014).

When Boud and Falchikov (1989) collected several investigations on the self-assessment of students, they realized that the best students scored below the teacher's grade, since they were more realistic. On the other hand, the students with more difficulties were scored above the theacher's grade. Therefore, we pose the following research question:

RQ1: Is there a relationship between the students' self-assessment grade and the teacher's grade (hetero-assessment)?

3. Student behavior on co-assessment: antecedents and consequences

To analyze the attitude of students towards the general use of co-assessment and what factors can influence it, different concepts from the literature have been used that can act as antecedents and consequences. After a review of the literature, it has been observed that the student's behavior towards co-assessment can be influenced by the degree of involvement that the student has (how much effort is made to do the co-assessment), its usefulness for learning, the motivation, the interaction that it allows with colleagues and the final satisfaction with the methodology. Based on an extensive review of the literature, we propose the following hypotheses (see Figure 1):

H1. The degree of student involvement in the co-assessment helps to improve the attitude towards the co-assessment.

H2. The degree of student involvement in the co-assessment has a positive influence on greater student satisfaction.

H3. The perceived usefulness of co-assessment in the learning process positively influences the attitude towards co-assessment.

H4. The perceived usefulness of co-assessment in the learning process has a positive influence on the degree of student involvement in co-assessment.

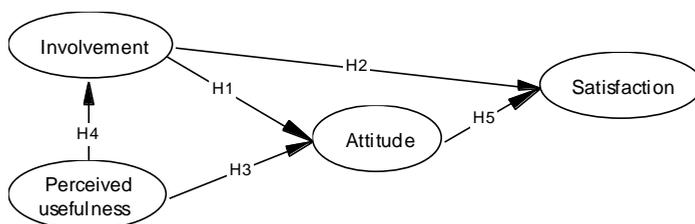*H5. Attitude through the use of peer-assessment positively influences satisfaction.*

Figure 1. Proposed model for studing student behaviour on co-assessment.

4. Methodology

A Web-based survey was distributed by e-mail to students of Marketing and Business Administration from University of Murcia (Spain) in the academic course 2020/2021. We obtained a final sample size of 88 students. The constructs used in our study were adapted from previous studies: satisfaction (Chaiyo and Nokham, 2017), loyalty (Petri *et al.,* 2016), attitude (Huang *et al*., 2012) and usefulness (Rodríguez-Fernández, 2017). Moreover, it also was added questions about involvement and opinion about co-evaluation. Additionally, the data obtained in the survey has been crossed with the data collected from the subjects

under study. Specifically, the grades compiled from an online synchronous communication that has been developed on the Zoom platform have been used, since due to the pandemic the subjects were taught online. Within these grades, we find the qualification of both the teacher and the students on the work of their classmates (co-assessment), as well as a self-assessment grade, that is, the one that the student himself has qualified his work. We also have the final mark of the subject, which includes the continuous evaluation and the final mark of the exam, which has been carried out in person (offline). Regarding the analysis, for developing descriptive analysis we have used the SPSS software, and for testing the proposed model using PLS Structural Equation Modelling, we have used SmartPLS 3.0.

5. Analysis of results

To answer the research question about whether there is a relationship between the students' self-assessment grade and the teacher's grade, a correlation analysis has been carried out and a positive and significant correlation has been obtained between the teacher's grades, the co-assessment mark and the self-assessment mark (r>0, p-value<0.01). On the other hand, if we recode the grades into two groups, the first group called "below average" with grades ranging from 0 to 7.5 and the second group called "above average" with grades from 7.5 to 10, we observe that there is a relationship between the self-assessment marks and the teacher's marks (χ^2=29.42, sig.=0.00). As we can see in Table 1, of the students that the teacher has qualified below the average, 74.3% coincide with his criteria, while there is 25.7% of students who consider that they are above the average on their self-assessment. On the other hand, the students that the teacher has rated above average, we can see that there are 85.1% of students who match their criteria since they have self-rated above average, however, there is 14.9% of students who are above average who have rated themselves below average.

Table 1. Contingency table between recoded self-assessment and teacher's grades.

| | | Hetero-assessment (teacher's grades) | | | | |
		Below average	Above average	Total	Chi-square	p-value
Self-assessment	Below average	74.3%	14.9%	40.2%		
	Above average	25.7%	85.1%	59.8%	29.42	0.00
	Total	100%	100%	100.0%		

In Table 2 we have performed a bivariate analysis, where we can see how there is a significant correlation between satisfaction and self-assessment grades and teacher's grades (p-value<0.05). In addition, the two correlations are positive, being higher in the self-assessment grade variable with a Pearson correlation value of 0.433, while the teacher grade variable obtains a value of 0.222. Therefore, by increasing teacher and self-assessment grades, satisfaction increases, and vice versa. In the variables loyalty, attitude

and usefulness there is only a significant correlation with self-assessment grades, in addition, all these correlations are positive since we obtain a Pearson correlation value of 0.368 in loyalty, 0.363 in attitude and 0.338 in utility, therefore, by increasing the self-assessment grade, loyalty, attitude and usefulness will increase, and vice versa. Finally, we can see a significant and positive correlation between self-assessment and degree involvement and teacher's scores and involvement, with a Pearson correlation value of 0.459 in self-assessment and 0.294 in the teacher's score variable. Therefore, by increasing the self-assessment marks and the teacher's marks, the involvement increases and vice versa.

Table 2. Pearson correlation analysis between grades and behavioral variables.

	Self-assessment grade	Co-assessment grade	Hetero-assessment grade
Satisfaction	0.433^{***}	0.097^{ns}	0.222^{**}
Loyalty	0.368^{***}	-0.030^{ns}	0.152^{ns}
Attitude	0.363^{***}	0.074^{ns}	0.196^{ns}
Usefulness	0.338^{***}	-0.004^{ns}	0.169^{ns}
Involvement	0.459^{***}	0.122^{ns}	0.294^{***}

***p-value<0.01;**p-value<0.05; ns=non-significative.

Subsequently, we have carried out regression to analyze whether the three marks (self-assessment, co-assessment and hetero-assessment) influence satisfaction, loyalty, attitude and usefulness towards these evaluation systems. Table 3 shows only the significant relationships. We can conclude that the higher the grade that the student gets in the self-assessment, the greater the satisfaction, the loyalty (wanting to apply the peer-assessment in the future), the attitude towards the peer-assessment, and the perceived usefulness in learning.

Table 3. Simple linear regressions.

Relationships	Coefficients	p-value
Self-assessment grade → Satisfaction	0.361***	0.002
Self-assessment grade → Loyalty	0.327**	0.016
Self-assessment grade → Attitude	0.278**	0.026
Self-assessment grade → Usefulness	0.273**	0.039

Independent variables: grades; Dependent variables: behavioral variables. ***p-value<0.01; **p-value<0.05

On the other hand, a structural equation modeling (SEM), specifically partial least squares (PLS), is proposed to assess the measurement and structural model. SmartPLS 3.0 software was used to analyze the data. After concluding that the scales used in the study provided sufficient evidence of reliability and validity, we test the structural model. Table 4 shows the hipotheses testing. The results confirm that the perceived usefulness of co-assessment influences the student's involvement and positive attitude towards this system. In turn,

greater involvement and a positive attitude influence greater student satisfaction. However, we have observed that greater student involvement does not influence a more positive attitude towards co-assessment.

Table 4. Hypotheses testing of the proposed model.

Hipotheses	Coefficients	p-value
H1. Involvement → Attitute	0.050^{ns}	0.413
H2. Involvement → Satisfaction	0.178***	0.000
H3. Perceived usefulness → Attitude	0.878***	0.000
H4. Perceived usefulness → Involvement	0.434***	0.002
H5. Attitude → Satisfaction	0.798***	0.000

6. Conclusions

The students state that learning through co-assessment has helped them in their involvement and usefulness in the subject, and they are also satisfied, indicating that they would repeat this learning method again, as shown by their high degree of loyalty.

The mean of the self-assessment, co-assessment and hetero-assessment are very similar, and they are also positively correlated. However, when we analyze the frequency table, we appreciate how difficult it is for students to qualify their classmates as failing, as well as with an outstanding grade. It is also curious how the students' self-assessment grades find it difficult to qualify as outstanding compared to the grades obtained by the teacher (hetero-assessment.

On the other hand, when making the hypotheses to find out if the students score above or below the teacher, we are surprised to observe how approximately 1 out of 5 students who are below the average score above the teacher, a similar case that is repeated with students who are above average, since approximately 1 out of 5 are scored below the teacher's grade.

It should be noted that the analysis of the linear regressions has shown us how involvement in co-assessment helps to improve both the student's attitude and satisfaction, since when the student is involved in new study techniques that help improve their learning, their attitude and satisfaction increases. In addition, as hypotheses 3 and 4 prove, co-evaluation has been useful for them, which has positively influenced their attitude and involvement.

References

Boud, D., & Falchikov, N. (1989). Quantitative studies of student self-assessment in higher education: A critical analysis of findings. *Higher Education*, 18(5), 529-549.

Cavas Toledo, M., Chicano García, F., Luna Valero, F., & Molina Tanco, L. (2011). Autoevaluación y evaluación entre iguales en una asignatura de redes de

ordenadores. *JENUI 2011: XVIII Jornadas de Enseñanza Universitaria de la Informática, 303-310.*

Chaiyo, Y., & Nokham, R. (2017). The effect of Kahoot, Quizizz and Google Forms on the student's perception in the classrooms response system. *2017 International Conference on Digital Arts, Media and Technology (ICDAMT)*, 178-182.

Dicheva, D., Dichev, C., Agre, G., & Angelova, G. (2015). Gamification in education: a systematic mapping study. *Educational Technology & Society*, 18(3), 75-89.

Huang, W. H. D., Hood, D. W., & Yoo, S. J. (2013). Gender divide and acceptance of collaborative Web 2.0 applications for learning in higher education. *The Internet and Higher Education*, 16, 57-65.

Pacheco, A. Q. (2010). Aprendizaje colaborativo e interuniversiario en línea: una experiencia asíncrona y síncrona. *Revista de Lenguas Modernas*, 12, 197-210.

Petri, G., von Wangenheim, C. G., & Borgatto, A. F. (2016). A Large-scale Evaluation of a Model for the Evaluation of Educational Games. *Technical Report INCoD*. Brazilian Institute for Digital Convergence.

Rodríguez, G., Ibarra, M. S., & García Jiménez, E. (2013). Autoevaluación, evaluación entre iguales y coevaluación: conceptualización y práctica en las universidades españolas. *Revista de Investigación en Educación*, 2(11), 198-210.

Rodríguez-Fernández, L. (2017). Smartphones y aprendizaje: el uso de Kahoot en el aula universitaria. *Revista mediterránea de Comunicación*, 8(1), 181-189.

Ruiz, M. Á. G., & Serra, V. Q. (2017). Coevaluación o evaluación compartida en el contexto universitario: la percepción del alumnado de primer curso. *Revista Iberoamericana de Evaluación Educativa*, 10(2), 9-30.

Topping, K. (2018). Using Peer Assessment to Inspire Reflection and Learning (Student Assessment for Educators). New York: Routledge.

Valdivia, I. Á. (2008). La coevaluación como alternativa para mejorar la calidad del aprendizaje de los estudiantes universitarios: valoración de una experiencia. *Revista Interuniversitaria de Formación del Profesorado*, 22(3), 127-140.

Valero-García, M., & de Cerio, L. M. D. (2005). Autoevaluación y co-evaluación: estrategias para facilitar la evaluación continuada. *Actas del Simposio Nacional de Docencia en Informática (SINDI),* 25-32.

Vidal Tallet, L. A., Noda Albelo, A., Báez Pérez, E., Fernández Morín, J., Montell Hernandez, O., & Rodríguez Díaz, E. (2014). La autoevaluación y la coevaluación. Experiencia con estudiantes de 4to año de la carrera de Medicina, en la asignatura Pediatría. *Revista Médica Electrónica*, 36(3), 304-312.