

Continuous assessment and educational performance: Insights from higher education in economics and business

La evaluación continua y el rendimiento académico: Evidencias en la educación superior en el ámbito de la economía y la empresa

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ABSTRACT

After the consolidation of continuous assessment as a characteristic element of the current university system, the main objective of this article is to analyze the influence of this assessment model on the academic performance of students. In order to meet this objective, a sample of 776

students from seven different subjects related to Economic and Business Sciences from five different study centers belonging to two Spanish universities was used. The main result obtained is that students who have followed the subject through continuous assessment obtain better performance in the subject. Moreover, this superior performance is present among both female and male students. The analysis has suggested the influence of the particular characteristics of the subject, and that the activities corresponding to the continuous evaluation should be adapted. Likewise, it has been verified that the type of assessment selected depends on the student's number of enrollment, but not on the academic year. Thus, by providing empirical evidence, this work contributes to forming a more solid state of the art on the importance of academic assessment.

Keywords. Continuous assessment, academic performance, economic and business sciences, higher education, Bologna process.

RESUMEN

Tras la consolidación de la evaluación continua como un elemento característico del sistema universitario actual, el artículo tiene por objetivo principal analizar la influencia de este modelo de evaluación en el rendimiento académico del alumnado. Para cumplir con este objetivo, se ha contado con una muestra de 776 alumnos de siete asignaturas diferentes relacionadas con las Ciencias Económicas y Empresariales en cinco centros de estudios diferentes pertenecientes a dos universidades españolas. El principal resultado obtenido es que el alumnado que ha seguido la asignatura a través de evaluación continua obtiene un mejor rendimiento en la asignatura. Además, este desempeño superior está presente tanto entre el alumnado femenino como masculino. El análisis ha sugerido la influencia de las características particulares de la asignatura, debiéndose aclimatar las actividades correspondientes a la evaluación continua. Asimismo, se ha constatado que la selección de la evaluación depende del número de matrícula, pero no del curso académico. Así, mediante la aportación de evidencias empíricas, este trabajo contribuye a formar un estado del arte sobre la importancia de la evaluación científica más sólido.

Palabras clave. Evaluación continua; Rendimiento académico; Ciencias Económicas y Empresariales; Universidad; Plan Bolonia.

INTRODUCTION

The European Higher Education Area (EHEA), driven by the Bologna Process, has transformed the European university education landscape. It has redefined teaching and assessment methodologies and placed continuous assessment at the center of the educational process (Florida de la Nuez, Jiménez González, & Santana Martín, 2011). This paradigm shift has sparked growing interest in analyzing the relationship between assessment methods and the academic performance of university students. Consequently, the study of these processes has become a priority for the educational community (Molina Soria, Pascual Arias, & López Pastor, 2020; Monforte García & Fariás Martínez, 2013; Paloposki, Virtanen, & Clavert, 2025; among others).

In a context shaped by new educational trends, including pedagogical innovation, the use of emerging technologies, and a commitment to sustainable practices, ongoing assessment activities have become fundamental elements of continuous evaluation. These activities play a crucial role in the learning process of university students. The activities are important because they provide constant feedback (Johansson et al., 2023). They also facilitate the self-regulation of learning (Monforte-García & Farias-Martinez, 2013) and contribute to the consolidation of knowledge through distributed practice (Day et al., 2018).

Participation in this assessment modality has therefore become a milestone in higher education, as a substantial body of research demonstrates that continuous assessment leads to improved

outcomes in terms of final grades (Fraile et al., 2013), academic performance rates, and success rates (Arribas, 2012). These results have also been confirmed across various disciplines: Natural Sciences (Morales et al., 2017), Social Sciences (Molina Soria, Pascual Arias, & López Pastor, 2020), Economics (Reboredo, 2017), and Business Studies (Ortiz et al., 2020).

However, its effectiveness depends on active student participation. In the absence of such involvement, merely opting for continuous assessment is insufficient to observe statistically significant differences in the final grade (Johansson et al., 2022). This is why this modality is usually preferred by students who are more involved and motivated by the subject. In contrast, final assessment is often chosen by students who are less engaged with the subject (Castejón-Oliva et al., 2011).

Various factors that influence the type of assessment used and students' academic performance have been identified, including student characteristics (Day et al., 2018; Johansson, 2023). However, research in this area is limited, and there are often no conclusive results regarding the influence of factors such as student gender. Therefore, further analysis of the factors that determine the effectiveness of follow-up activities is necessary.

In a scenario where understanding the factors that influence students' academic results and optimizing teaching and learning processes at the university level are paramount, this research aims to analyze the relationship between assessment methods and academic performance. It also seeks to identify other factors that may lead to significant differences in assessment method choice and performance. To this end, a sample of 776 students from seven subjects in the field of economics and business studies at five centers of two universities (the University of Extremadura and the University of Seville) was analyzed over three academic years (2022/2023 to 2024/2025) through statistical inference. Therefore, this research contributes to existing knowledge by offering empirical evidence of the factors that determine the effectiveness of various assessment methods and their implications for teaching practices.

The reasons for selecting different subjects, centers, and universities are motivated by the heterogeneity of the context. This enriches the research by demonstrating the importance of the institutional context on academic performance. Specifically, Spanish universities have different modes of assessment that respond to various pedagogical and organizational needs. The University of Extremadura and the University of Seville have notable differences in their definitions and applications of continuous and global assessments. Notably, the University of Seville does not define continuous assessment as a fixed or strictly defined method (University of Seville, 2010, articles 11 and 12). In contrast, University of Extremadura expressly recognizes it as one of two official methods (University of Extremadura, 2020, article 4.1). University of Extremadura establishes continuous assessment as the default option unless students explicitly request global assessment via the Virtual Campus.

In addition to this introduction, the paper is organized into four sections. Section 2 provides a brief review of the literature on factors that may influence academic performance and establishes the framework for the study. Section 3 explains the methodology used to achieve the objective. Section 4 presents and discusses the results obtained. Finally, Section 5 includes the conclusions, limitations, and future lines of research.

THEORETICAL FRAMEWORK

Background

This section provides a brief review of the literature on the theoretical foundation and the factors that may influence the academic performance of university students, with the aim of outlining the existing background in the area under study. Although the term "continuous assessment" is widely used, it is often misapplied in higher education contexts. Many courses labeled as using continuous assessment actually implement systems composed of two midterm exams or a "pre-final," which

do not reflect the pedagogical essence of true continuous assessment (Day, 2018). Genuine continuous assessment implies an ongoing, formative process integrated with teaching, involving diverse activities that promote learning and provide regular feedback throughout the course (López-Pastor & Sicilia-Camacho, 2017). Research in accounting education shows that only when assessments are sequenced formatively and aligned with instructional goals do students benefit significantly (Curtis, 2011). Thus, if continuous assessment does not have a well-established procedure, it can have a negative impact on academic performance (Fraile et al., 2013).

From a theoretical standpoint, continuous assessment is aligned with self-determination theory, which emphasizes the role of autonomy, competence, and relatedness in fostering intrinsic motivation and effective learning (Ryan & Deci, 2000). Regular and structured assessment activities provide students with opportunities to regulate their learning, receive timely feedback, and perceive themselves as active agents in their educational process (Broadbent & Poon, 2015). This theoretical framing reinforces the pedagogical value of continuous assessment beyond its evaluative function. Building on this theoretical foundation, the following paragraphs explore how continuous assessment has been applied and evaluated across different scientific fields, providing empirical insights that support or challenge its effectiveness.

In Social Sciences, Molina Soria, Pascual Arias, and López Pastor (2020), based on a sample of 37 students enrolled in the course Expression and Body Communication in Early Childhood Education during the 2019/2020 academic year, demonstrate that academic performance varies depending on the chosen assessment method. They report that all students who followed the continuous assessment route passed the course and, moreover, obtained the highest marks.

In Economics, Reboredo (2017), analyzing a total of 589 students enrolled in the first-year Microeconomics course in the Business Administration and Management (BAM) degree at the University of Santiago de Compostela between the academic years 2009/2010 and 2014/2015, concluded that continuous assessment is a poor predictor of the final exam grade. These results may be explained by students' time allocation decisions once they realize that the course can be passed through only continuous assessment.

However, in Business education, Duán Santomil et al. (2013), through an analysis of student performance following the implementation of new active methodologies in Financial Accounting I, highlight that continuous assessment increases the likelihood of passing compared to single final exam assessment. These authors also assert that intermediate assessments positively impact final performance. These findings were later corroborated by Johansson et al. (2023) and Ortiz et al. (2020), who, after analyzing 1,670 grades from various Financial Accounting courses over three academic years (2014–2015, 2015–2016, and 2016–2017) and a total of 611 students, respectively, emphasized the significant role continuous assessment plays in achieving better final grades.

In Natural Sciences, Monforte-García and Fariás-Martínez (2013), using a sample of 72 students from seven degrees enrolled in Statistical Methods for Decision Making, concluded that continuous assessment yields significantly higher average grades. Similarly, Morales et al. (2022) obtained comparable results after analyzing a sample of 2,397 students from *Statistics* courses across several degree programs at the University of Almería.

In Engineering education, Paloposki, Virtanen, and Clavert (2025), based on a four-year study (2014–2017) of students enrolled in the Thermodynamics and Heat Transfer course, reaffirm that student performance improves under continuous assessment.

These findings underscore the importance of continuous assessment, which many scholars identify as a motivational tool that facilitates learning. This is due to the numerous advantages that make it an effective and beneficial pedagogical strategy. First, it allows for individualized feedback that helps students develop their own learning strategies (Johansson et al., 2023), thus promoting a more autonomous and self-aware learning process. For this reason, students often perceive continuous assessment as a more effective method for developing study habits and becoming aware of their mistakes, thereby taking responsibility for their own learning (Monforte-García &

Farías-Martínez, 2013). Continuous assessment also contributes to improving knowledge retention, as repeated evaluation and the distribution of the study over time allow for more effective consolidation of learning (Day et al., 2018). Moreover, students report that continuous assessment reduces end-of-semester stress and facilitates better workload balance (Paloposki, Virtanen, & Clavert, 2025).

From an empirical perspective, studies have shown that continuous assessment promotes academic achievement when implemented through regular low-stakes activities such as online quizzes (Fuertes-Fuertes et al., 2015), and when supported by digital platforms like Moodle (Merello-Giménez & Zoilo-Grima, 2017). Students' perceptions also play a crucial role: they tend to evaluate continuous assessment positively when it aligns with course objectives and supports metacognitive awareness (Healy et al., 2014), and it has been found to increase engagement and retention in higher education settings (Holmes, 2018; Meer & Chapman, 2014).

Nonetheless, although the continuous assessment is associated with improvements in academic performance, the literature also presents mixed and critical perspectives (Dunn & Mulvenon, 2009; Shute, 2008). Some studies report neutral or statistically insignificant effects of continuous assessment on final exam performance (Bennet, 2011; Hernández, 2012; Poza-Luján et al., 2016). Others raise concerns about potential drawbacks, such as evaluation fatigue caused by frequent or repetitive assignments, and the adoption of surface learning strategies like rote memorization (Gijbels et al., 2005). In addition, flexible assessment schedules may encourage procrastination, particularly among low-performing or less motivated students (Bruinsma & Jansen, 2009). These limitations emphasize the need to implement continuous assessment thoughtfully and avoid reducing it to a bureaucratic accumulation of tasks.

Recent research further highlights that meaningful continuous assessment should transcend grade accumulation and instead foster deep, reflective learning. Models that integrate student self-reflection and metacognitive strategies have been shown to promote long-term engagement and deeper understanding (Rodríguez-Rincón et al., 2024). In this vein, some scholars advocate for a complete transformation of traditional assessment systems in higher education, urging a shift toward models that prioritize learning and personal growth over performance metrics (Perry et al., 2022).

It is also important to note that while continuous assessment scores carry the most weight in explaining final exam results, other factors contribute to predicting students' final academic performance (Morales et al., 2022). For instance, Fageda and Nonell (2014) found that completing a greater number of tasks—either individually or in groups—correlates with better outcomes, with seven being the optimal number of assessments according to Johansson et al. (2022). However, Ortiz et al. (2020) argue that the type of assessment, rather than its frequency, is what truly impacts final grades. Specifically, in-person assessments and practical case studies have been identified as the most effective formats, underscoring the importance of pedagogically sound design in assessment practices.

Furthermore, structural and demographic variables also play a role. Both the mode of instruction (in-person or online) and the time slot of classes (morning or evening) have shown significant effects on performance (Morales et al., 2022). Regarding gender, research consistently indicates that female students achieve higher final grades than their male peers (Day et al., 2018). However, in high-stakes exam contexts, male students tend to outperform females (Montolio & Taberner, 2021), which may be related to differential experiences of test anxiety—often reported more frequently by women, possibly due to higher internal pressure or lower likelihood of men acknowledging anxiety (Núñez Peña et al., 2016).

It is also worth noting the possible importance of other factors such as the university, the faculty, and the subject studied. In this regard, the study by Bruinsma and Jansen (2009) observed differences in academic results depending on the department. In addition, authors such as Fageda and Nonell (2014) also reported such differences according to the area of knowledge, although Morales et al. (2022) state that student performance does not depend significantly on the degree.

Based on the existing background in literature, we assume that there will be a higher academic performance of students who have taken the subject through continuous assessment. Therefore, the first working hypothesis is as follows:

H_1 : There is a significant difference in student performance depending on the mode of evaluation taken.

The second and third central hypotheses of the study assume that the evaluation modality selected depends on the number of enrollments in the subject (H_2) and the academic year in which the student is enrolled (H_3).

H_2 : Participation in continuous assessment depends on the number of enrollments in the subject.

H_3 : The evaluation modality selected is affected by the academic year in which the student is enrolled.

To complete the study, five secondary hypotheses underlie this first hypothesis. The first one states that continuous assessment is beneficial for both female and male students (H_{1A}), while the second sub-hypothesis assumes that the best students throughout the follow-up activities pertaining to continuous assessment are those who obtain a better performance in the subject (H_{1B}).

H_{1A} : *The selection of the continuous assessment modality is beneficial for the academic performance of both female and male students.*

H_{1B} : *The grades obtained during continuous assessment predict student performance.*

Given the spatial heterogeneity of the sample analyzed, it is assumed that the academic performance of continuous assessment students is affected by the university where they study (H_{1C}), their faculty (H_{1D}) and the subject itself (H_{1E}).

H_{1C} : The performance of students participating in continuous assessment varies depending on the university where they are enrolled.

H_{1D} : The performance of students participating in the continuous assessment varies depending on the center where they are enrolled.

H_{1E} : The performance of students participating in the continuous assessment is influenced by the degree taken.

METHODOLOGY

Study framework

This study is based on the subjects taught in five faculties within two different universities in which three teachers have participated. At the University of Extremadura, the subjects *Financial Accounting I*, *Strategic Management*, *Strategic Management I* and *Introduction to Accounting*, taught at the Faculty of Economics and Business Sciences, have been included in the study; *Mathematics* is taught at the Faculty of Business and Tourism and at the Faculty of Law. At the University of Seville, the subjects *Statistics* taught in the Faculty of Economics and Business Sciences, and *Statistics I*, in the Faculty of Tourism and Finance, have been considered. To mitigate the potential risk of heterogeneity in the sample, the teachers responsible for teaching the subjects under study agreed on a similar number of activities and a uniform distribution of activities to be carried out remotely and physically in the classroom. Table 1 below shows the number of students taken into consideration for the analysis, disaggregated by subject and academic year.

There are four subjects taken into consideration in this study corresponding to the Faculty of Economics and Business Administration of the University of Extremadura. However, *Financial Accounting I* and *Introduction to Accounting* are similar with some small differences derived from the degree in which they are taught. While *Introduction to Accounting* is taught in the Economics, *Financial Accounting I* is studied in the BAM Management degree and the double degree BAM-Law. On the other hand, the subject *Strategic Management I* is taught in the degree of BAM, while *Strategic Management* is studied in the degree of Labor Relations and Human Resources, being specially designed for the expected competencies among the students of this degree.

Table 1. Students analyzed by subject and academic year

		Academic year			Total
		2022/2023	2023/2024	2024/2025	
FCEyE ¹	Financial Accounting I	73(44)	98(51)	110(67)	281(162)
	Introduction to Accounting	44(30)	32(19)	45(28)	121(77)
	Strategic Management	24(18)	-	-	24(18)
	Strategic Management I	29(26)	-	41(33)	70(59)
FEFT ²	Mathematics	-	140(132)	-	140(132)
FD ³		-	49(49)	-	49(49)
FCEYE ⁴	Statistics	-	-	56(40)	56(40)
FTyF ⁵	Statistics I	-	-	35(23)	35(23)
Total		170(118)	319(251)	287(191)	776(560)

Note: the students who have taken the course through continuous assessment in brackets.

Regarding the subjects, in *Financial Accounting I* and *Introduction to Accounting* eight follow-up activities were carried out throughout the four-month period. The first two have been conducted remotely, focused on theoretical content, and delivered through the virtual campus of the subject. The remaining six have an eminently practical character, were carried out in class with the supervision of the teaching staff and could have been done individually or in pairs (at the students' choice). In any case, the activities did not count towards the final grade, serving only to improve the students' learning. The evaluation of both subjects consisted of two eliminatory tests. The first one consisted of 15 multiple-choice questions, with only one correct answer, and a practical case related to the material learned throughout the course.

In the case of the subjects *Strategic Management I* and *Strategic Management*, eight follow-up activities have also been carried out throughout the continuous evaluation. However, in this case the qualification of these activities contributed 20% to the final grade of the course. The eight activities carried out were:

- The completion of five case studies, individually or in pairs, carried out in class and under the supervision of the teaching staff.
- Participation in two seminars given by private companies, public administrations and non-profit organizations in which they present the practical application of the theoretical content seen in the course during their usual activities.
- Writing and defense, individually or in pairs, of a case study related to the theoretical content of the course.

¹ Faculty of Economic and Business Sciences, belonging to University of Extremadura (Spain).

² Faculty of Business and Tourism, belonging to University of Extremadura (Spain).

³ Faculty of Laws, belonging to University of Extremadura (Spain).

⁴ Faculty of Economics Sciences, belonging to University of Seville (Spain).

⁵ Faculty of Tourism and Finance, belonging to University of Seville (Spain).

The remaining 80% of the grade comes from a final exam, type test, consisting of 40 questions of which only one option is correct and incorrect answers are penalized.

In relation to the rest of the centers of the University of Extremadura (Faculty of Business, Finance and Tourism and the Faculty of Law), the subject *Mathematics* has been taught in several degrees: BAM, double degree in BAM and Tourism, and double degree in Law-BAM. The subject has the particularity of being shared with other centers such as the Faculty of Economics and Business Sciences or the University Center of Plasencia. This circumstance forces it to adapt its development to different teaching realities as it is taught in groups of 15 students as well as in groups of 80, and the approach to certain contents depends on the specific grade to which it is addressed. That is why, although the teaching plan offers clear guidelines for evaluation, the possibility of adaptation to each reality is contemplated. Attention is paid to the evaluation of the subject as six continuous evaluation activities were carried out. Four of them consisted of questionnaires developed in the classroom, through Virtual Campus, that weighted 15% of the continuous evaluation grade.

In addition, at the University of Seville, although the *Statistics* course taught in the Marketing and Market Research degree (at the Faculty of Economics and Business Sciences) and the *Statistics I* course taught in the Finance and Accounting degree (at the Faculty of Tourism and Finance) have the same content in their teaching plans, they differ in the evaluation system. During the four-month period, in both subjects the students carried out a total of five exercises in the classroom individually, consisting of answering 10-question theoretical-practical test-type exercises of a theoretical-practical nature, which do not carry any weight in the final grade, although they were useful for the students to study the subject progressively, a fact that facilitates the acquisition of concepts. The final grade, in both cases, could be obtained in two ways: (i) a single final exam consisting of a theoretical and a practical exercise with a weighting of 40% and 60%, respectively, or (ii) by taking three exams, one for each block of the subject. These previously mentioned exams had the same structure as the final exam, two parts, one theoretical and one practical with a weighting of 40% and 60%, respectively. The grade of each of these exams had a different weighting in the final exam. Specifically, the first and third exams were weighed 35% each, and the second 30%, with a weighted arithmetic average of five points being required to pass. However, in the *Statistics* course, three points were required in each exam, without the need to achieve a minimum score in each part of the exam in order to obtain an average. Meanwhile, in the subject of *Statistics I*, a minimum grade of three points was required in the theoretical part of each exam and a minimum of a weighted mark of four points in each of them. All the subjects under analysis were of a compulsory nature with a duration of 6 ECTS credits. Table 2 shows a summary of the characteristics of the seven subjects analyzed.

Table 2. Summary of the subjects analyzed.

Subject	Semester	ECTS Credits	Type of course	Number of activities
Financial Accountings I	2	6	Compulsory	8
Introduction to Accounting	2	6	Compulsory	8
Mathematics	1	6	Compulsory	6
Statistics	2	6	Compulsory	5
Statistics I	4	6	Compulsory	5
Strategic Management	6	6	Compulsory	8
Strategic Management I	6	6	Compulsory	8

Method

In order to meet the objective set out in this article, and to corroborate the different hypotheses of the work indicated above, the difference between the samples of students who attended the ordinary exam in the academic years 2022/2023, 2023/2024 and 2024/2025 was contrasted. In the case of H_1 , H_2 and H_3 the whole group of students has been taken into consideration. That is, both those who have taken the course by continuous assessment and those who have taken the course as a whole (776). On the other hand, to contrast the rest of the hypotheses (H_{1A} , H_{1B} , H_{1C} , H_{1D} and H_{1E}), only the students who have opted for participation in the course through continuous assessment have been required (560). The sample size is notably higher than other existing works in the academic literature (Matamoros-Becerra, 2023; Molina Soria, Pascual Arias, & López Pastor, 2020; Monforte-García & Farias-Martínez, 2013; Reboredo, 2017), allowing us to obtain relevant results in order to contribute to the knowledge of the impact of continuous assessment on university academic performance.

The dependent variable of H_1 -and of the sub-hypotheses H_{1A} , H_{1B} , H_{1C} , H_{1D} and H_{1E} - has been operationalized as the grade obtained in the exam belonging to the ordinary call once the grades obtained in the continuous assessment activities have been discounted. To point out that, in order to comply with H_{1B} , the students participating in continuous assessment have been divided into quartiles according to the grades obtained during the continuous assessment.

On the other hand, the dependent variable in the case of H_2 and H_3 (participation in continuous assessment) has taken the value 0 in the case that the student has chosen to select the global assessment modality and 1 if has chosen to follow the course through continuous assessment. In the case of the subjects *Financial Accounting I* and *Introduction to Accounting*, those students who, *de facto*, have opted for this type of evaluation have been operationalized as continuous evaluation students. This fact has been specified in the students who have delivered, at least, 70% of the activities requested throughout the period. This distinction has been made because the students in this case belong to the first year and are unaware of the nuances involved in one evaluation model or another in most cases. In *Statistics* and *Statistics I*, students who have completed at least 60% of the test-type exercises carried out during the four-month period have been considered as continuous assessment students.

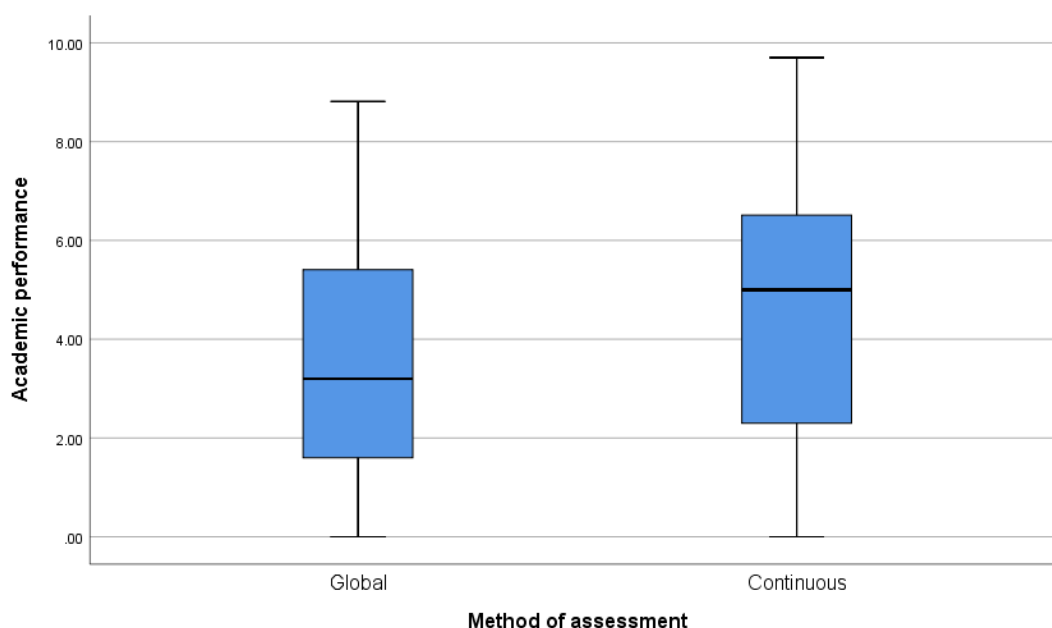
To check whether the test to be carried out should be parametric or nonparametric, the normality and homoscedasticity conditions were checked. The Shapiro-Wilk test was chosen if the sample is smaller than 50, or Kolmogorov-Smirnov in the case of sample sizes larger than 50 (Rubio Hurtado & Berlanga Silvestre, 2012). Homoscedasticity has been tested through Levene's test based on the mean.

By virtue of the results shown in Table A1, in the annexes, none of the hypotheses meet the conditions for carrying out a parametric test. For this reason, and because these are causal hypotheses with independent samples, the Mann-Whitney U test was chosen for H_1 , H_{1A} and H_{1C} , and the Kruskal-Wallis H test for H_{1B} , H_{1D} , H_{1E} , H_2 and H_3 (Cubo Delgado et al., 2011; Wilcoxon, 1945). To carry out each of the contrasts mentioned above, the statistical program Statistical Package for the Social Sciences, in its 31st version, was chosen because of its versatility, diffusion and simple interface (Nie et al., 1970).

RESULTS

Moving on to the verification of the first hypothesis of the study, Figure 1 shows - descriptively - that students belonging to the continuous assessment have a markedly higher performance than those belonging to the global assessment. Both the mean score and the median (taken as a reference in the aforementioned Figure 1) are higher.

Figure 1. Academic performance depending on the method of assessment (H_1)



By virtue of Table 3, it can be seen that the difference in the grade obtained depending on the assessment method taken is statistically significant with $\alpha=0.05$ as a reference. Throughout this paper it will be asserted that there is a significant difference always taking into consideration $\alpha=0.05$. Therefore, we are in a position to accept the central hypothesis of the study (H_1) and affirm that the assessment method matters, with the continuous assessment students obtaining a higher performance than those belonging to the global assessment in average terms.

Table 3. Mann–Whitney U test (H_1)

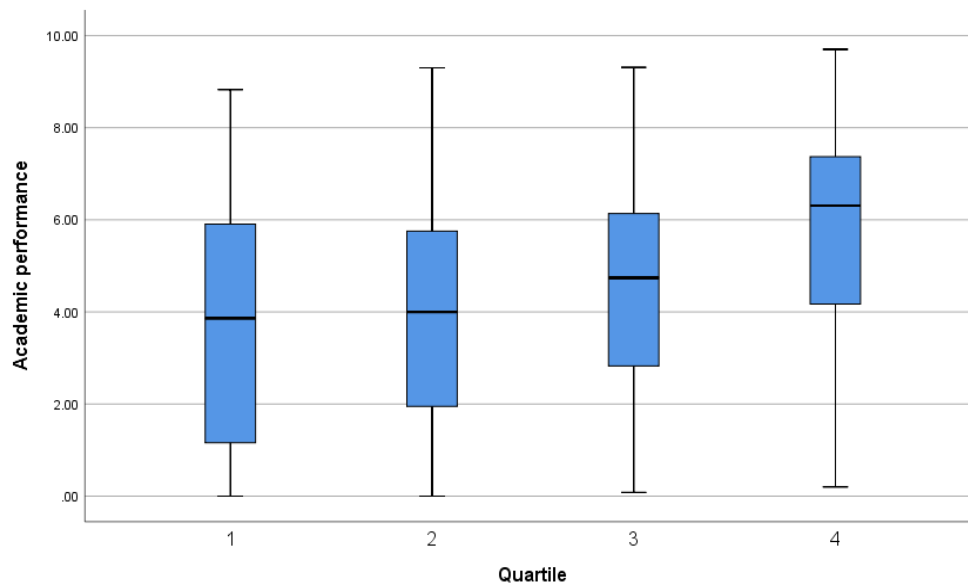
		Global assessment	Continuous assessment	Sig. (bilateral)
Academic performance	Sample	216	560	<0.001*
	Mean	3.5391	4.5113	
	Median	3.2000	5.0000	
	Standard deviation	0.1714	0.1034	

Note: *=Statistical difference at the 5% level ($p < .05$)

Once the positive effect of the continuous assessment method on students' academic performance has been verified, we proceed to check whether this improvement applies to both male and female students. As can be seen in Figure A1 and Figure A2, in the appendix, both male and female students obtain better performance when participating in continuous assessment. This difference is contrasted, through Mann-Whitney U test, as statistically significant (Table A2). Therefore, continuous assessment is a functional model for monitoring the subject regardless of the students' gender.

After finding that the continuous evaluation method is beneficial in the academic performance of students, both female and male, Figure 2 shows that the students with better grades in the follow-up activities carried out during the continuous evaluation (C4) have obtained a better performance than the rest of the students belonging to the continuous evaluation according to their grades and ordered by quartiles (C3, C2 and C1).

Figure 2. Academic performance depending on the marks obtained in continuous assessment (H_{1B})



This significant difference is corroborated by the Kruskal-Wallis H test, the result of which is shown in Table 4 below. In addition, Table A3 (in the appendix) shows the post hoc multiple comparisons following the Scheffe method. As can be seen in the aforementioned table, there is a significant difference but only between the best students in the continuous evaluation (C4) with respect to the rest of the students (C3, C2 and C1).

Table 4. Kruskal-Wallis H test (H_{1B})

		Q1	Q2	Q3	Q4	Sig.
Academic performance	Sample	140	140	140	140	<0.001*
	Mean	3.8067	3.9987	4.5712	5.6770	
	Median	3.8630	4.000	4.7413	6.3063	
	Standard deviation	0.2163	0.9439	0.1820	0.1975	

Note: *=Statistical difference at the 5% level ($p < .05$)

In Figure 3, it can be seen that the continuous assessment students belonging to one of the universities in the sample (University of Seville) have obtained higher grades. However, in the case of students from this university, two outliers are observed with substantially lower scores than expected. The result of the Mann-Whitney U test, shown in Table 5, confirms the aforementioned difference from an inferential perspective.

Figure 3. Academic performance depending on the university (H_{1C})

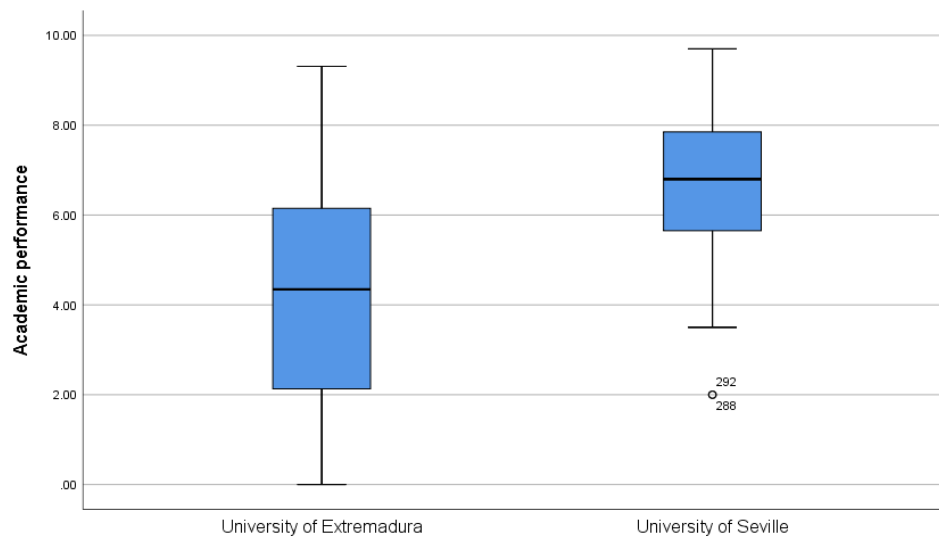


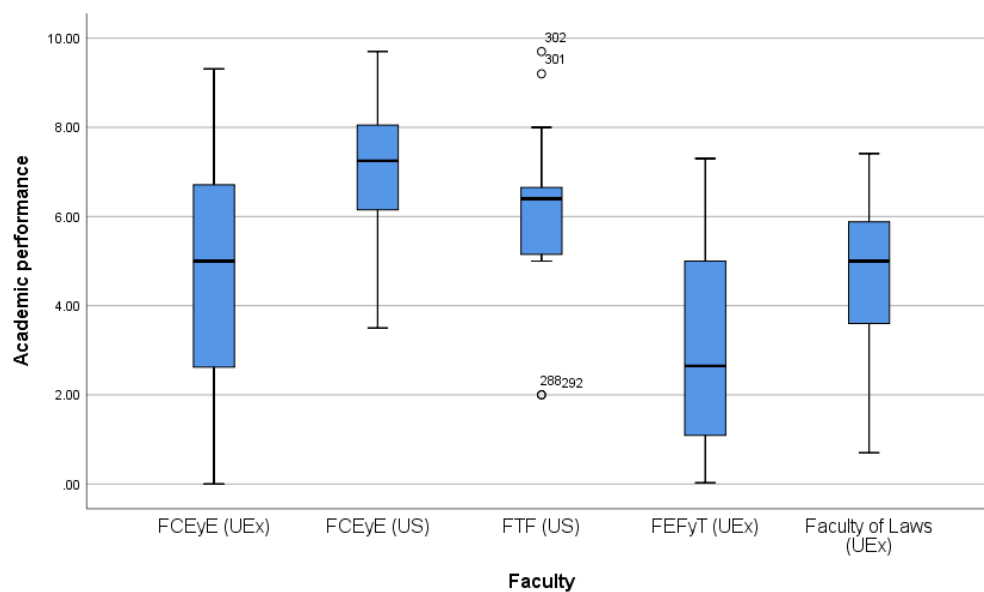
Table 5. Mann-Whitney U test (H_{1C})

		University of Extremadura	University of Seville	Sig. (bilateral)
Academic performance	Sample	497	63	<0.001*
	Mean	4.2356	6.7048	
	Median	4.3450	6.8000	
	Standard deviation	0.1075	0.2010	

Note: *=Statistical difference at the 5% level ($p < .05$)

However, the results of the contrast of hypotheses H_{1D} and H_{1E} show that the difference does not depend on the University, but on the faculty and, above all, on the subject. Thus, Figure 4 shows for descriptive purposes how, once again, students who have taken the continuous assessment and have been enrolled in centers belonging to the University of Seville obtain better academic results than those enrolled in centers belonging to the University of Extremadura.

Figure 4. Academic performance depending on the faculty (H_{1D})



Among the students of the Faculty of Tourism and Finance there are some outliers with grades both above and below the expected range. These differences in academic performance are shown in Table 6 below. The post-hoc analysis is shown in Table A4 in the appendix.

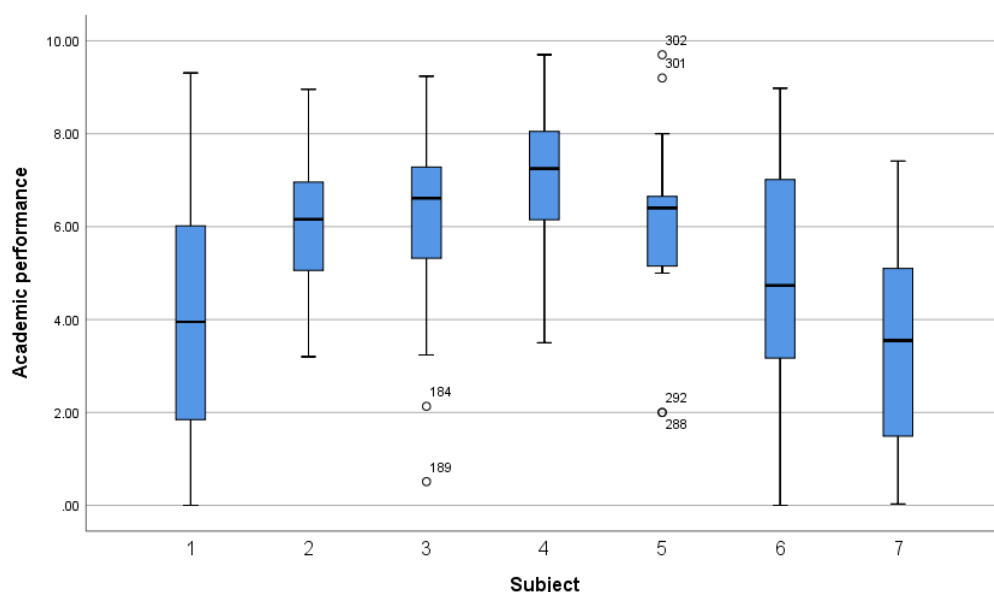
Table 6. Kruskal-Wallis H test (H_{1D})

Faculty	Academic performance				Sig.
	Sample	Mean	Median	Standard deviation	
FCEyE (UEx)	316	4.6872	5.0000	0.1376	<0.001*
FCEyE (US)	40	7.0850	7.2500	0.2160	
FTF (US)	23	6.0435	6.4000	0.3699	
FEFyT (UEx)	132	3.0139	2.6500	0.1779	
Faculty of Laws	49	4.6145	5.0000	0.2496	

Note: *=Statistical difference at the 5% level ($p < .05$)

However, as previously mentioned, the real differences in academic performance lie at the subject level. Figure 5 below shows the disparity in student performance regardless of the university where it was taken and the faculty where it was taught. As in the previous cases, atypical cases are again observed.

Figure 5. Academic performance depending on the subject (H_{1E})



Note: 1: Financial Accountings I (UEx), 2: Strategic Management (UEx), 3: Strategic Management I (UEx), 4: Statistics (US), 5: Statistics I (US), 6: Introduction to Accounting (UEx), 7: Mathematics (UEx).

Once again, the result of the Kruskal-Wallis H test allows us to accept the hypothesis analyzed and confirm that the academic performance of students in continuous assessment varies greatly depending on the specific subject. Table A5, in the appendix, shows in which subjects in particular there is a significant difference after the appropriate post-hoc analysis. As can be seen, there are significant differences between subjects within the same university and even within the same faculty.

Table 7. Kruskal-Wallis H test (H_{1E})

Subject	Academic performance				Sig.
	Sample	Mean	Median	Standard deviation	
Financial Accountings I (UEX)	162	3.9048	3.9500	0.1943	<0.001*
Strategic Management (UEX)	18	6.0143	6.1571	0.3435	
Strategic Management I (UEX)	59	6.2070	6.6125	0.2333	
Statistics (US)	40	7.0850	7.2500	0.2160	
Statistics I (US)	23	6.0435	6.4000	0.3699	
Introduction to Accounting (UEX)	77	4.8587	4.7327	0.2642	
Mathematics (UEX)	181	3.4472	3.5500	0.1552	

Note: *=Statistical difference at the 5% level ($p < .05$)

The research presented in this article has been completed with the verification of the second and third hypothesis in order to verify the incentives for university students to take the continuous assessment. As specified in Table 8, students who have enrolled in the course once or twice tend to choose continuous assessment. In contrast, students who have enrolled for the third time (or more) tend to choose global assessment on average. This difference has been found to be statistically significant according to the aforementioned table. This result could suggest that students who are veterans of the subject already have sufficient material to prepare for it individually without the supervision of the professors through the continuous assessment.

Table 8. Kruskal-Wallis H test (H_2)

Number of tuitions on the subject	Method of assessment				Sig.
	Sample	Mean	Median	Standard deviation	
1	606	0.79	1.00	0.017	<0.001*
2	124	0.53	1.00	0.045	
3	34	0.41	0.00	0.086	
>3	12	0.33	0.00	0.142	

Notes: The evaluation modality is a dichotomous variable, which takes the value 0 if we are faced with a global evaluation choice and 1 if it is a continuous evaluation modality; *=Statistical difference at the 5% level ($p < .05$)

The post-hoc multiple analysis described in Table 9 shows that the only significant difference in the choice of modality lies between the first-time students and the remaining students.

Table 9. Multiple comparison post-hoc (H_2)

		Number of tuitions			
		1	2	3	>3
Number of tuitions	1		*	*	*
	2				
	3				
	>3				

Note: $*=p < .05$

Finally, Table 10 shows the results of testing the third hypothesis. Due to the characteristics of the sample analyzed, it is limited to students in the first, second and third academic years. As can be seen in this table, students in the third and first years are those who, on average (and in this

order), tend to select continuous assessment. This result is quite logical, since third-year students are particularly close to finishing their university studies and, therefore, are more tempted to follow the subject continuously. However, based on the result of the Kruskal-Wallis H test, we are not able to accept the third hypothesis of this study. This result indicates that students perceive the advantages of participating in continuous assessment regardless of the academic year they attend.

Table 10. Kruskal-Wallis H test (H_3)

Academic year	Method of assessment				Sig.
	Sample	Mean	Median	Standard deviation	
1	647	0.71	1	0.018	0.063
2	35	0.66	1	0.081	
3	94	0.82	1	0.040	

Notes: The evaluation modality is a dichotomous variable, which takes the value 0 if we are faced with a global evaluation choice and 1 if it is a continuous evaluation modality; *=Statistical difference at the 5% level ($p < .05$)

Next, to conclude this section, a summary table (Table 11) is provided indicating which hypotheses were confirmed and which were not.

Table 11. Results based on hypotheses

H_1	H_{1A}	H_{1B}	H_{1C}	H_{1D}	H_{1E}	H_2	H_3
✓	✓	✓	✓	✓	✓	✓	X

DISCUSSION AND CONCLUSIONS

A reasonable amount of time has passed since the implementation of the popularly known Bologna Process and the consolidation of the dichotomy between global and continuous assessment models to be able to assess to what extent the new system has been functional and improves student performance.

In order to meet this ambitious objective, data have been collected for seven subjects, in five different faculties belonging to five university centers located in two different Spanish regions. The data correspond to three different academic years (2022/2023, 2023/2024 and 2024/2025) and, in any case, they are subjects within the academic areas of economics and business.

The main conclusion drawn from the study is that monitoring the subject through continuous assessment is useful for the improvement of students' academic performance. This method is functional among both male and female students. Additionally, the best students during continuous evaluation are also the ones who have performed better in the final grade of the subject.

The work has also shown that there are significant differences in the performance of students belonging to the continuous assessment according to the subject. This result should encourage an effort to adjust the follow-up activities that make up the continuous assessment to the specific characteristics of the subject.

In addition, the research has attempted to analyze the underlying reasons for the students' choice of modality. It was found that first-time students are particularly inclined to opt for continuous assessment. As for the year in which the student is enrolled, it has not been observed that this is indicative of the modality followed.

The results obtained are in line with previous studies, which have also found a positive relationship between participation in continuous assessment and academic performance in subjects in the field of Economics (Durán Santomil et al., 2013; Johanson et al., 2023; Ortiz, 2020; Robledo, 2017). However, this study has tried to complete the existing literature with a longitudinal study, including three academic years, and with spatial heterogeneity by including seven subjects

taught in five different centers of two universities located in two different Spanish regions. In any case, the results found do not support the negative aspects of continuous assessment postulated by some authors (Bruinsma & Jansen, 2009; Dunn & Mulvenon, 2009; Gijbels et al., 2005; Shute, 2008). In relation to gender, the study shows the encouraging result that continuous assessment works regardless of gender. Fortunately, this result contradicts some previous studies (Day et al., 2018; Montolio & Taberner, 2021).

This work has various theoretical and practical implications. In terms of the former, it reinforces the self-determination theory, given that continuous assessment satisfies needs that foster intrinsic motivation. This makes learning a more meaningful and engaging experience for students, thereby promoting better academic performance. In turn, in terms of practical implications, it should be noted that the analysis of student characteristics allows the educational offer to be adjusted to the needs and profiles of the student.

However, this paper is not free of possible limitations. The main problem is selection bias, as it is very possible that the students who have taken the course through continuous assessment are the most motivated and interested in the subject. Additionally, it is undeniable that each of the three professors who have taught the subjects under study have their own teaching style, activity design, and assessment standards. Also, only one independent variable has been taken into consideration to corroborate each of the hypotheses, ignoring the individual characteristics of the students (hours of study, family income, place of residence, possible stressful situations, etc.). Potential next steps include completing the sample with university students from other academic fields outside Economics, as well as including variables related to psychological characteristics and the context of the students.

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APPENDIX

Figure A1. Academic performance depending on method of assessment among female students (H_{1A})

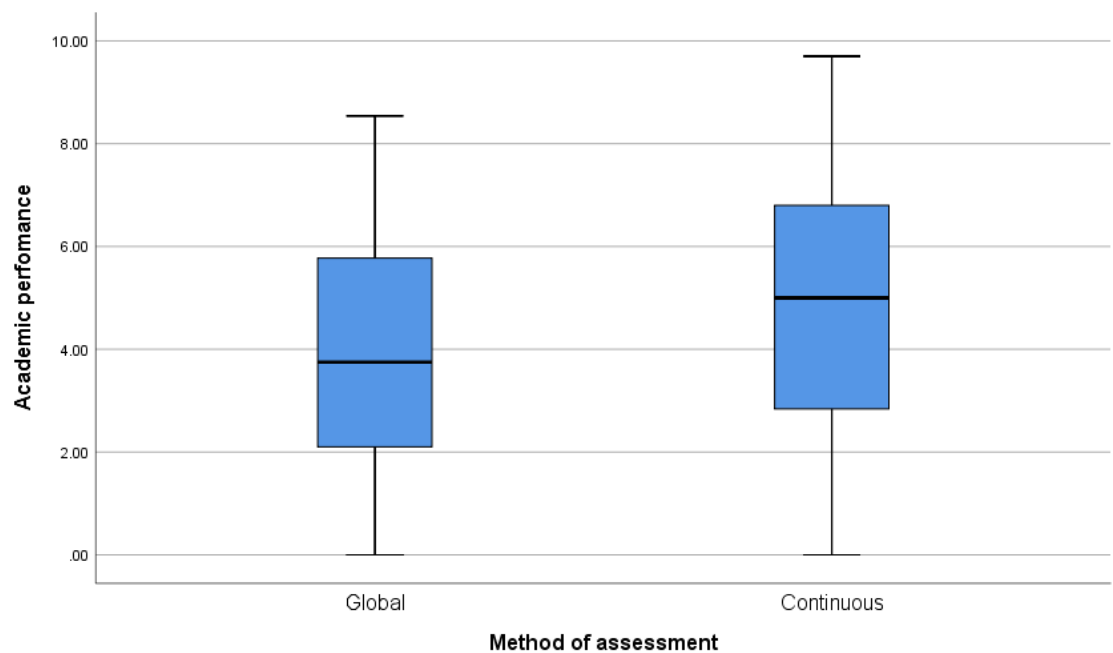


Figure A2. Academic performance depending on method of assessment among male students (H_{1A})

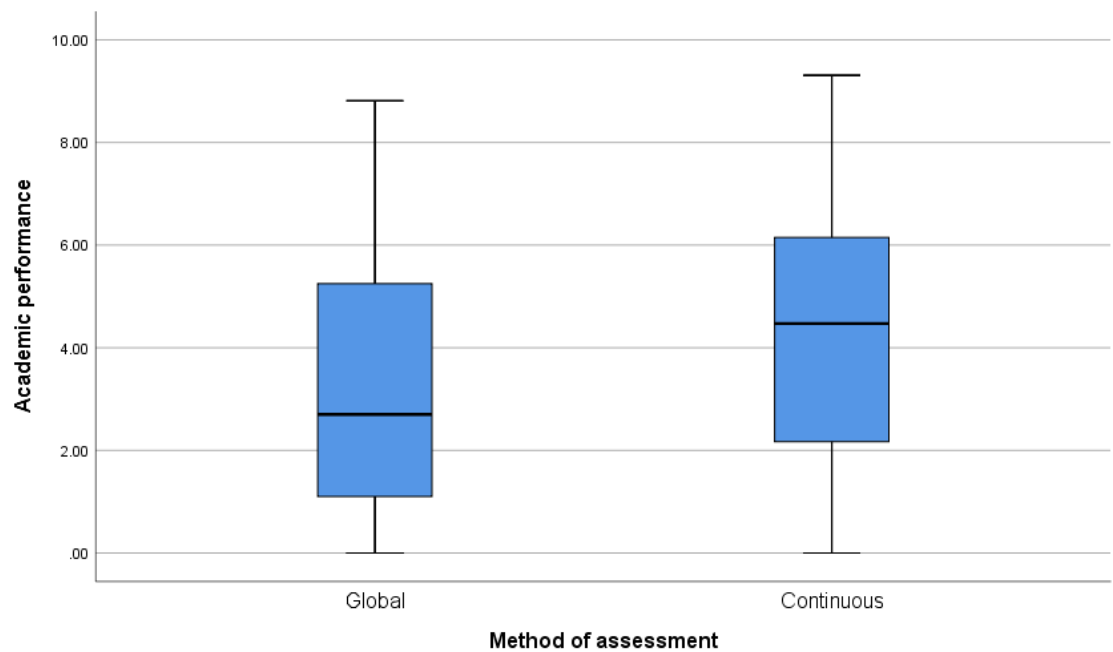


Table A1. Test for normality and homoscedasticity

			Normality test				Homocedasticity		Test
			Test	St.	D.F.	Sig.	F	Sig.	
H_1	Global assessment		KS	0.080	216	0.002	0.087	0.768	U
	Continuous assessment		KS	0.097	560	0.000			
H_{1A}	Female students	Global assessment	KS	0.072	96	0.200	0.183	0.669	U
		Continuous assessment	KS	0.084	271	0.000			
	Male students	Global assessment	KS	0.104	120	0.003	0.269	0.604	U
		Continuous assessment	KS	0.109	289	0.000			
H_{1B}	Q1		KS	0.130	140	0.000	3.798	0.010	H
	Q2		KS	0.133	140	0.000			
	Q3		KS	0.066	140	0.200			
	Q4		KS	0.128	140	0.000			
H_{1C}	University of Extremadura		KS	0.088	497	0.000	26.40	<0.001*	U
	University of Seville		KS	0.095	63	0.200			
H_{1D}	FCEyE (UEx)		KS	0.073	316	0.000	12.067	<0.001*	H
	FCEyE (US)		SW	0.973	40	0.448			
	FEFT (UEx)		SW	0.914	23	0.051			
	FTF (US)		KS	0.153	132	0.000			
	Faculty of Laws (UEx)		SW	0.942	49	0.018			
H_{1E}	Financial Accounting I (UEx)		KS	0.100	162	0.000	9.131	<0.001*	H
	Strategic Management (UEx)		SW	0.971	18	0.815			
	Strategic Management I (UEx)		KS	0.134	59	0.010			
	Statistics (US)		SW	0.973	40	0.448			
	Statistics I (US)		SW	0.914	23	0.051			
	Introduction to Accounting (UEx)		KS	0.083	77	0.200			
	Mathematics (UEx)		KS	0.164	181	0.000			
H_2	Number of tuitions	1	KS	0.485	606	0.000	24.241	<0.001*	H
		2	KS	0.357	124	0.000			
		3	SW	0.626	34	0.000			
		>3	SW	0.608	12	0.000			
H_3	Academic year	1	KS	0.449	647	0.000	15.111	<0.001*	H
		2	SW	0.601	35	0.000			
		3	KS	0.499	94	0.000			

Notes:

St= Statistic; D.F= Degrees of Freedom; H=H de *Kruskal-Wallis*; KS=*Kolmogorov-Smirnov*; SW=*Shapiro-Wilk*; U=U de *Mann-Whitney***Table A2.** Mann–Whitney U test (H_{1A})

		Academic performance				Sig. (bilateral)
		Sample	Mean	Median	Standard deviation	
Female student	Global assessment	96	3.9011	3.7500	0.2474	0.002*
	Continuous assessment	271	4.8145	5.0000	0.1486	
Male student	Global assessment	120	3.2496	2.7000	0.2341	<0.001*
	Continuous assessment	289	4.2311	4.4720	0.1422	

Note: *= $p < .05$

Table A3. Multiple comparison post-hoc (H_{1B})

	Q1	Q2	Q3	Q4
Q1				*
Q2				*
Q3				*
Q4				

Note: *=p <.05

Table A4. Multiple comparison post-hoc (H_{1D})

		Faculty				
		1	2	3	4	5
Faculty	1		*		*	
	2				*	*
	3				*	
	4					*
	5					

Notes: 1= FCEyE (UEx), 2= FCEyE (US), 3= FTF (US), 4=FEFyT (UEx), 5= Faculty of Laws (UEx), *= p <.05

Table A5. Multiple comparison post-hoc (H_{1E})

		Subject						
		1	2	3	4	5	6	7
Subject	1		*	*	*	*	*	
	2							*
	3						*	*
	4						*	*
	5							*
	6							*
	7							

Notes: 1=Financial Accountings I (UEx), 2= Strategic Management (UEx), 3= Strategic Management I (UEx), 4= Statistics (US), 5=Statistics I (US), 6= Introduction to Accounting (UEx), 7= Mathematics (UEx). *=p <.05