

# revista de eDUCACIÓN

Nº 401 JULY-SEPTEMBER 2023

An alternative teaching and learning methodology at university to counter academic boredom

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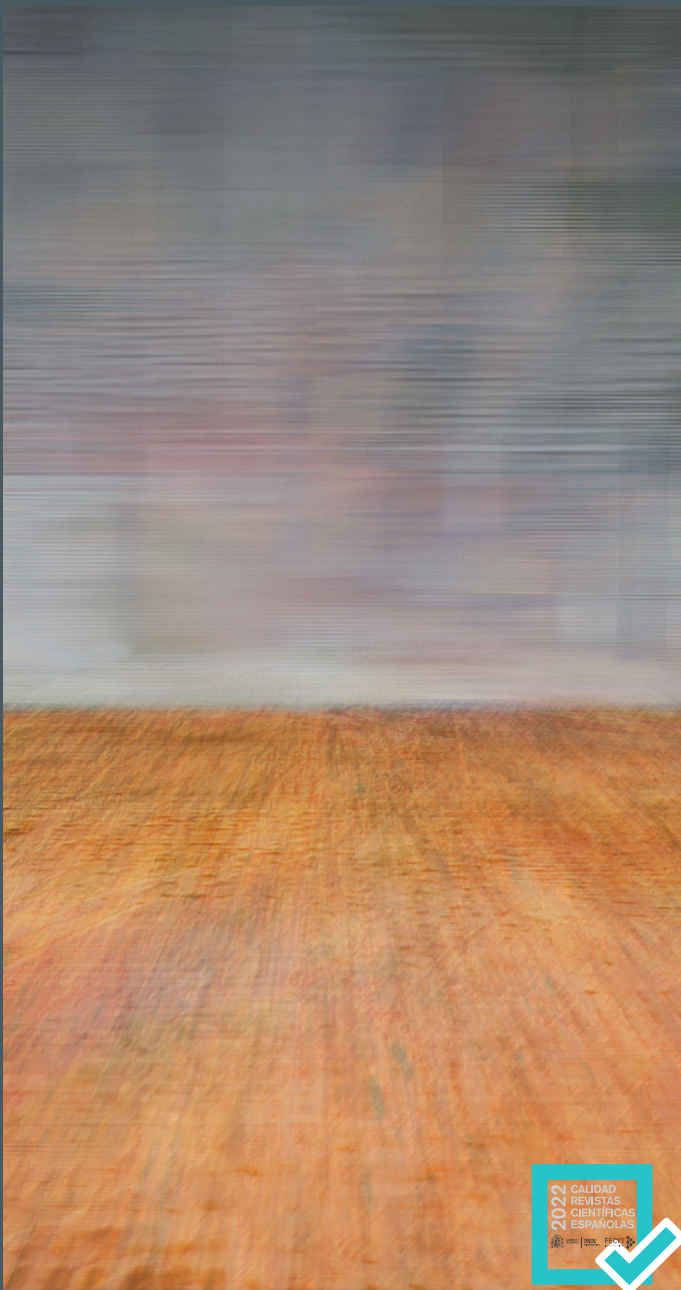
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# **An alternative teaching and learning methodology at university to counter academic boredom**

## **Una nueva metodología de enseñanza y aprendizaje universitarios frente al aburrimiento académico**

<https://doi.org/10.4438/1988-592X-RE-2023-401-585>

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## Abstract

Boredom at university has been shown to interfere with teaching and learning. It is linked to variables such as task importance and complexity, or student's autonomy, which are in turn related to the chosen teaching and learning methodology. The goal of this study is to test the effectiveness of a new methodology based on four principles -shared teaching, flipped classroom, human model of teaching and creative evaluation- on reducing boredom. Three studies were carried out during two academic years -2019/2020 and 2020/2021-, the latter consisting of a replica aimed to test if initial data can be maintained. Method: Participants were third-year psychology students from the Complutense University of Madrid, drawn from 4 groups of the afternoon shift (49 participated in the initial study, 56 in the main study and 73 in the replica), who expressed their views using two evaluation instruments designed specifically for the purpose. Participants in the last two studies attended a total of 45 hours of the same course using the proposed methodology. Results: Results show that students overall get bored in class, with a notable reduction whenever the new methodology was used in both academic years. Conclusions: The replicated methodology fulfils its purpose. Nevertheless, more applications are convenient, enabling the study of the weight of each specific related variable in order to guarantee its correct application in other contexts.

*Keywords:* higher education, teaching methods, teaching, learning, boredom, active learning

## Resumen

El aburrimiento, en la universidad, interfiere de forma negativa en el aprendizaje y la enseñanza. Está relacionado con variables referidas a la importancia o dificultad de la tarea o a la autonomía del estudiantado, a su vez relacionadas con la metodología utilizada. El objetivo de esta investigación fue poner a prueba hasta qué punto una nueva metodología basada en cuatro principios -docencia compartida, aula invertida, modelo humano de docente y evaluación creativa- posibilita la disminución del aburrimiento. Esta investigación consta de tres estudios realizados durante dos cursos -2019/2020 y 2020/2021-, siendo el último una réplica del principal, a fin de poner a prueba la consistencia de los resultados iniciales. Método: Los participantes fueron estudiantes de cuatro grupos del turno de tarde de 3º del Grado de Psicología de la Universidad Complutense de Madrid (49 en el estudio inicial, 56 en el principal y 73 en el de réplica) que manifestaron sus percepciones mediante dos instrumentos de valoración desarrollados ad hoc. En los dos últimos estudios, asistieron a un total de 45 horas de la asignatura en la que se empleó la metodología indicada. Resultados: Los resultados mostraron que se produce aburrimiento en las aulas y que en ambos cursos se ha conseguido una notable reducción del aburrimiento,

gracias a la nueva metodología empleada. Conclusiones: La metodología, replicada, cumple el objetivo de reducir el aburrimiento. Son, no obstante, convenientes más aplicaciones, a fin de estudiar el peso específico de cada una de las variables implicadas y para garantizar su correcta aplicación en otros contextos.

*Palabras clave:* Educación Superior, metodologías docentes, enseñanza, aprendizaje, aburrimiento, aprendizaje activo

## Introduction

Boredom is an unpleasant and lethargic emotion characterized by a perceived lack of stimulation and often accompanied by the urge to escape the situation causing it (Pekrun et al., 2010, 2017; Van-Tilburg & Igou, 2016; Vogel-Walcutt et al., 2012). Research has shown that university classes are more likely to induce feelings of boredom compared to other situations (Chin et al., 2017; Goetz et al., 2019). A study by Mann and Robinson (2009) found that 59% of their students reported feeling bored in at least half of their classes, while 30% reported being bored in all of their classes. This sentiment is also echoed by both students and teachers in the Spanish university system, who frequently cite boredom as a problem (Iglesias-Soilán, 2020).

Despite its high prevalence, the study of academic boredom is relatively new (Sharp et al., 2020). While not all of the educational consequences of boredom are negative (Craven & Frick, 2022), this article will focus on those that are most harmful in the academic context.

Some recent meta-analyses (Camacho-Morles et al., 2021; Tze et al., 2016) show a negative relationship between boredom and academic performance. This study will only examine self-perceived performance, as evaluated by self-report, which is one of the most widely utilized methods of data collection in educational assessments (Lukas & Santiago, 2009).

This negative correlation has also been discovered between boredom and several variables that are of great significance in education, including attention, motivation, learning strategies, cognitive resources, and self-regulation (Eastwood et al., 2012; Goetz et al., 2019; Mann & Robinson, 2009; Nett et al., 2010; Sánchez-Rosas, 2019; Tze et al. 2016).

Hence, many authors have attempted to describe the antecedents of academic boredom. These seem to be more closely linked to the method in which the course is conducted, rather than other factors such as

course contents. The specialized international (Daschmann et al., 2011, 2014) and national (Fernández et al., 2021; Iglesias-Soilán, 2020) literature highlights issues like improper usage of ICT, monotony, or lack of practical relevance. Thus, the teaching and learning methodology utilized in the classroom seems to be associated with the emergence of boredom, and as a result, studying it as a key factor in reducing boredom is critical.

Currently, the lecture is the most commonly used teaching method in university education (Jiménez-Hernández et al., 2020). While its implementation can vary, it is usually characterized by the teacher taking centre stage and delivering content verbally in a one-way manner to a predominantly passive audience (Gatica-Saavedra & Rubí-González, 2021). The lecture method can reduce the perceived value of the content being taught or the activity being carried out. The subjective importance given to an activity and its potential results have been defined as one of the main antecedents of boredom, finding that low perceived value -whether accurate or not- can lead to boredom (Pekrun et al., 2017; Sharp et al., 2016).

Moreover, the absence of feedback may not allow us to know if the difficulty of the activity is appropriate for the classroom as a whole, especially in the current university context with a larger number and diversity of students (Johanns et al., 2017).

Difficulty has also been linked to the emergence of academic boredom, with findings suggesting that a significant imbalance in difficulty -the tasks being either too easy or too challenging- can lead to boredom (Acee et al., 2010; Daschmann et al., 2014; Tze et al., 2014; Westgate & Wilson, 2018).

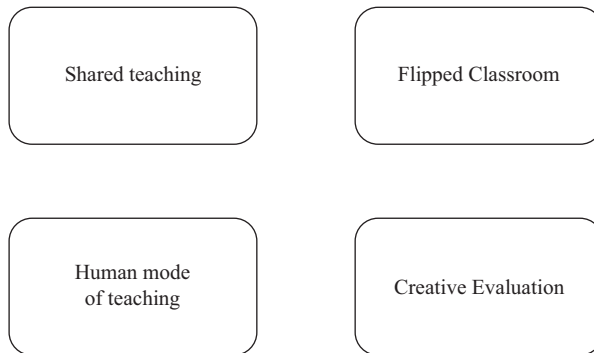
Lecture-based teaching can also reduce students' perceived control, as they are typically confined to following the teacher's instructions with limited opportunities for participation. Perceived control refers to the sense of one's ability to influence the progression and outcome of an activity. Lower perceived control has been linked to higher levels of boredom in this context (Daschmann et al., 2011; Pekrun et al., 2010; Shao et al., 2020).

To address the challenges posed by lecture-based teaching, a new teaching methodology has been developed and tested specifically for university education, with the primary aim of reducing academic boredom.

## New methodology for university teaching and learning

The fundamental pillars of the new methodology are presented in Figure I: (1) shared teaching, (2) flipped classroom, (3) human mode of teaching and (4) creative evaluation (CE).

FIGURE I. The fundamental pillars of the new methodology for university teaching and learning.



Source: Compiled by author

The first pillar is shared teaching, which relies on the benefits of peer learning (Arco-Tirado et al., 2020; Stigmar, 2016) as, together with the main teacher, there is a teaching assistant - a former student of similar age to the student group who has successfully completed the subject with distinction - (Bolaños Cartujo et al., 2018; Pérez-García et al., 2020).

Although teachers possess a higher level of academic knowledge, they may sometimes experience a certain cultural and cognitive distance from their students (Lockspeiser et al., 2008), which could hinder the correct perception of the difficulty of certain tasks, potentially leading to boredom (Tze et al., 2014). Given the proximity in age of the teaching assistant and their status as a student (or recent graduate), it can be assumed that they are more familiar with the cognitive processes that students may experience - cognitive congruence - (Lockspeiser et al., 2008) and their language - shared language - (Rees et al., 2016), thus contributing to reducing the above-mentioned difficulties (Topping, 2015).

Additionally, the similarity between the teaching assistant and the students fosters a close and familiar atmosphere (Varela et al., 2015), which can enhance motivation, self-directed learning (Stigmar, 2016), and the expression of doubts in the classroom (Topping, 2015).

The second pillar of the new teaching and learning methodology is the flipped classroom approach (Bergmann & Sams, 2014). In a traditional setting, students passively receive content in the classroom (Gatica-Saavedra & Rubí-González, 2021) while practical activities are usually carried out outside the classroom (Strelan et al., 2020). The flipped classroom model shifts this approach by providing basic content before the class, often through instructional videos (Bergmann & Sams, 2014), leading to a more hands-on and active experience in the classroom (Chen et al., 2014).

In the presented methodology, students have access to lecture notes on the virtual campus and are asked to complete a specified amount of required reading before each class. This gives them greater autonomy and allows them to adapt the difficulty level to their needs, as they can decide how much time to invest in each section and whether they need to review the material, adjusting the pace to their needs. This gives students more control over their teaching and learning process, whose relationship with boredom has been noted earlier (Daschmann et al., 2011; Pekrun et al., 2010; Shao et al., 2020).

The flipped classroom approach has been shown to be more effective compared to traditional lecture-based teaching in university settings (Shi et al., 2020), and its effectiveness is further enhanced when combined with other strategies (Strelan et al., 2020).

The third pillar of the new teaching methodology is the human model, which aims to create a pleasant and close learning environment that enhances participation, focus, motivation, learning, and engagement (Varela et al., 2015) by emphasizing aspects of teacher-student communication such as empathy or accessibility (Micari & Calkins, 2021).

The fourth pillar introduces an innovative method of evaluation of the subject that actively engages all students (Rodríguez-Izquierdo, 2014), taking a more formative approach that emphasizes constant feedback for ongoing learning, rather than a purely summative perspective that focuses solely on the final outcome (Rodríguez-Gómez et al., 2012).

This form of evaluation is crucial in the methodology, due to the close relationship between the evaluation method and learning strategies (Argos et al., 2015). Small changes, such as replacing a traditional exam

with an exam that allows the use of lecture notes, can significantly shift the learning focus from memorization to understanding (Johanns et al., 2017). This is important because students who solely rely on memorization without understanding the contents may not see the relevance or value of what they have learned.

This evaluation process is referred to as “creative evaluation” (CE). In this process, each student designs their own evaluation format, which must reflect the relevant course content and the insights they have gained (e.g., reflections). This approach promotes greater adaptation to the individual and fosters autonomy in the learning process. Furthermore, students attend several tutoring sessions, where they share questions and ideas for improvement with their teachers, establishing a feedback dynamic, aligning with the principles of mediated learning as described by Feuerstein et al. (1991) and Feuerstein and Jensen (1980).

The goal of the Creative Evaluation (CE) is to enhance students' sense of control and value in the evaluation process by allowing them to select the format. This approach addresses the issue of boredom in evaluation, which has been previously noted (Daschmann et al., 2011; Pekrun et al., 2010, 2017; Shao et al., 2020; Sharp et al., 2016).

In the CE, the format itself is not assessed. Rather, the evaluation focuses on the conveyed contents, their transformation, and the inclusion of proactive elements such as summaries, examples, and reflections. The correction rubric considers criteria such as clarity, originality, coherence, quality (including attention to detail and rigor), and the significance and viability of the presented content (scientific versus subjective) (Lamont, 2009).

The main objective of this tetradimensional methodology is to reduce boredom. To achieve this goal, an initial study (study 1, boredom assessment), a main study (study 2, implementation of the methodology), and a replicating study (study 3) were conducted. Although replications are infrequent in psychology (Makel et al., 2012), some authors suggest that innovation should be supported by replication data to substantiate the consistency of initial findings (Makel & Plucker, 2014).

The three main research questions that arise from the main objective are materialized in the three studies proposed. The first question is: Does boredom really occur in the evaluated university classrooms? Secondly: Does boredom decrease after the implementation of the new methodology? And thirdly: Are the results of the main study maintained in the replication study?



## Study 1: Boredom Assessment

The objective of this study was to evaluate the prevalence of boredom among students at the Faculty of Psychology of the Complutense University of Madrid. The study also explored potential solutions that students themselves could suggest to alleviate boredom.

### Method

#### Sample

The sample for this study comprised third-year Psychology students from the afternoon group at the Complutense University of Madrid. The sample consisted of 49 students, with 40 (81.63%) females and 9 (18.37%) males. Among the total sample, 35 students were aged between 19 and 21 (71.43%), and 14 were over 21 years old (28.57%).

#### Instruments

An *ad-hoc* instrument was developed with the objective of gauging the opinions of students on boredom and potential solutions. It consisted of 2 items, evaluated using a Likert-type scale ranging from 1 to 7, where 1 meant “totally disagree” and 7 meant “totally agree”. The items were: “I have felt bored during my Psychology Degree classes” and “The teaching methods used in my university classes should be revised to incorporate more active and practical approaches, focusing on skill development”. The instrument also included a multiple-response item (“In the event that you have felt boredom, what would be the main causes?”) and an open-ended item where students could propose educational alternatives. The instrument comprised a total of 4 items.

#### Procedure

During the first week of the 2019-2020 academic year, students were given a link or QR code in the classroom that directed them to the online instrument. Descriptive analyses were carried out using SPSS version 25.0.0.1.

## Results

The results of the first item suggest a propensity towards boredom ( $M = 4.59$ ,  $SD = 1.72$ ). The primary reasons reported for boredom in the third item were: (1) the teacher simply reads from slides during classes (76.3%), (2) the teacher does not deliver the content in an engaging manner (75.1%), (3) ineffective communication by the teacher (60.5%), and (4) a perceived lack of practical relevance (58.8%).

Regarding the second item, which concerned the necessity of adopting new teaching and learning approaches, the mean score was 6.37 ( $SD = 1.07$ ).

Out of the 49 participants, 37 responded to the open-ended question - fourth item - highlighting the importance of more practical classes (21), alternative forms of evaluation (13), greater adaptation to diversity (8), increasing opportunities for participation (8), and the teaching of cross-functional skills (6).

## Discussion

As stated in the first research question, a tendency towards boredom has been observed in university classrooms, which is consistent with findings from national and international studies (Chin et al., 2017; Goetz et al., 2019; Iglesias-Soilán, 2020). The values found are far from the supposed "ideal". Given that university studies are voluntary, boredom ratings closer to 1 rather than 4 or 5 would be expected. These levels of boredom are harmful in academic contexts, likely affecting performance, attention or motivation, among other variables (Goetz et al., 2019; Mann & Robinson, 2009; Nett et al., 2010; Sánchez-Rosas, 2019; Tze et al., 2016).

Participants indicate that the main causes of boredom are the teaching methodology and the way content is presented (such as reading from slides, ineffective communication, or unappealing presentations), as well as variables previously identified as antecedents of boredom, such as the perceived lack of practical usefulness (Pekrun et al., 2017; Sharp et al., 2016).

Given this situation, students themselves understand the need for a new methodology, as also reflected in specialized literature (Daschmann et al., 2014; Iglesias-Soilán, 2020; Mann & Robinson, 2009).

The fourth item provided information on the possible components that should make up this new methodology, which appears to be in line with what other authors have pointed out regarding boredom, advocating for a decrease in the classic format of lecture-style teaching (Gatica-Saavedra & Rubí-González, 2021) and traditional exams.

Therefore, the need for more practical activities that develop transversal competencies and facilitate the perception of the value of what is learned (Pekrun et al., 2017; Sharp et al., 2016; Stigmar, 2016), greater adaptation to the diversity of students (Johanns et al., 2017), a change in the way of evaluating, generating greater participation, and giving more control to students over their own learning process (Daschmann et al., 2011; Pekrun et al., 2010; Shao et al., 2020) becomes evident.

## Study 2: Implementation of the Methodology

### Method

This main study implemented the described methodology and evaluated its effectiveness.

### Sample

The study included 56 participants, of whom 43 (76.79%) were female and 13 (23.21%) were male. 46 participants (82.14%) were between 19 and 22 years old, while the remaining 10 participants were over 22 years old (17.86%).

### Instruments

The *ad hoc* instrument consisted of 17 items, including 13 items rated on a Likert-type scale of 1-7. These items were inspired by a Student Evaluation of Teaching (SET) model (Ching, 2018) and included statements such as “I think that creative evaluation helps me develop important transversal skills for my future.” The instrument also included a multiple-response item asking students to indicate the main causes of boredom, two dichotomous response items regarding their preference for the methodology, and a qualitative item soliciting improvement proposals.

## Procedure

The study was conducted with two groups of students taking the same subject, Educational Psychology (EP). In September 2019, the methodology was presented and all doubts were resolved. The subject was then taught using the described methodology with each group until the end of January 2020, with 45 hours of instruction for each group. In the final session, the assessment instrument consisting of 17 items was administered.

Data were analysed using SPSS v.25.0.0.1, including descriptive analyses and mean differences between the initial and main study.

## Results

Table I shows the main results of the first 13 items, plus the multiple response item (Figure II). Next, the results of the dichotomous items and the improvement proposals gathered from the qualitative item are presented.

TABLE I. Descriptive statistics of the 13 items with Likert-type rating scale (1-7) of the main study.

Items of the assessment instrument	Mean	Mode	S.D.
1. I have been bored in Educational Psychology (EP) class.	3.13	3	1.59
2. Generally, I have felt like going to EP class.	4.93	6	1.76
3. Generally, I felt more like going to EP than to other classes in the same course.	4.45	7	2.04
4. My interest in EP is due to the methodology.	5.00	5	1.83
5. I have found the EP class model to be more useful than other models I have experienced during this term.	5.41	7	1.68
6. The EP classes have been practical.	5.46	5	1.35
7. I have acquired transversal competencies during EP.	5.90	7	1.41
8. I believe that Creative Evaluation (CE) provides me with more benefits than other forms of evaluation.	5.55	6	1.65
9. I believe that CE helps me develop other skills important for my future.	5.73	7	1.61
10. I believe that what I have learned through CE will be better retained over time than what I have learned through assessment by exam.	5.79	7	1.46
11. I think that CE is easier (requiring less effort and work) than other types of assessment.	3.14	2	1.86
12. I believe that a human model of teaching favours my learning.	6.50	7	.69

(Continued)

TABLE I. Descriptive statistics of the 13 items with Likert-type rating scale (1-7) of the main study (Continued)

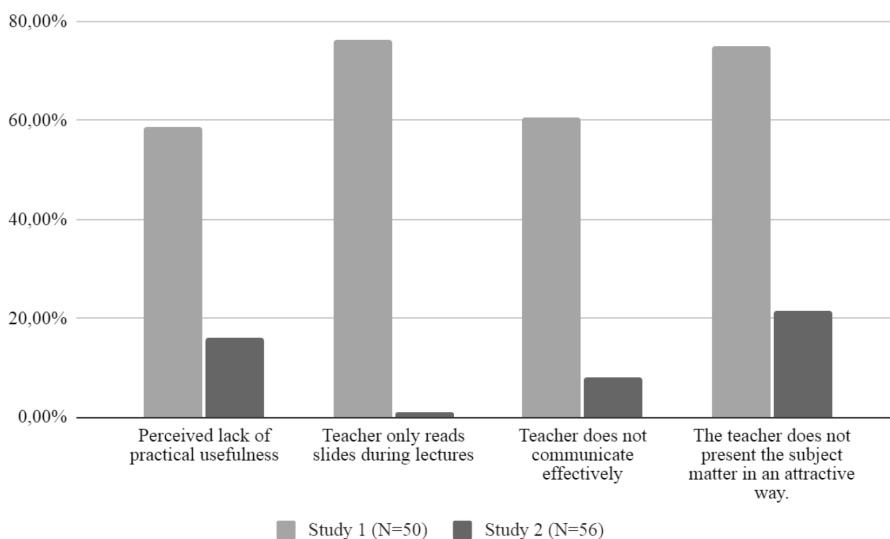
Items of the assessment instrument	Mean	Mode	S.D.
13. I believe that the EP teacher has established a human model (empathy, closeness, respect, understanding...) as opposed to a purely cognitive model (learning concepts, advancement in the subject...).	6.25	7	.98

Source: Compiled by author

First, it is noteworthy that participants showed much higher levels of boredom ( $p < .000$ ,  $d = .816$ ) throughout their studies ( $M_{Study1} = 4.59$ ,  $S.D._{Study1} = 1.72$ ) compared to levels after the application of the new methodology (item 1;  $M_{Study2} = 3.13$ ,  $S.D._{Study2} = 1.59$ ).

Changes in boredom rating levels were also found between baseline and main study (Figure II).

FIGURE II. Opinions on the causes of academic boredom throughout the Psychology Degree versus the new methodology.



Source: Compiled by author

As for the rest of the quantitative items (2-13), there is a high interest in attending the course (items 2 and 3), which is explicitly related to the methodology used (item 4).

Participants perceived the classes as useful (item 5), this being possibly related to their practical nature (item 6), which seemed to foster the development of competencies (item 7).

Regarding the assessment model of the subject, students indicated that CE provided them with more benefits than other types of evaluation (item 8) and that it favoured their learning in different aspects (items 9 and 10), even assuming that CE was not easier than other types of assessment or that it required less effort (item 11).

In addition, students indicated that the relationship model with the faculty was a human model that favoured their learning (items 12 and 13).

Regarding the two dichotomous response items, 91.07% of the students indicated that, if they could choose the evaluation format again, they would opt for CE over a traditional exam. The same value was given for choosing the new methodology again, indicating high satisfaction.

The qualitative item made it possible to collect proposals for improving the methodology. Some students pointed out, as relative problems, the uncertainty caused by the high flexibility (6) and the lack of time to delve into some aspects (5).

## Discussion

The second research question examined whether the new methodology reduced boredom. The findings indicate a significant decrease in boredom after the implementation of the new methodology. Students attribute their increased interest in the subject to the new methodology, which is consistent with both the initial study and existing literature. The results also show a noticeable reduction in the boredom levels previously associated with lectures (Daschmann et al., 2014; Fernández et al., 2021; Iglesias-Soilán, 2020; Mann & Robinson, 2009).

The participants expressed a positive attitude towards the practical nature of the new methodology that enables them to develop transversal competencies. They also appreciated the CE approach, which provides greater adaptability to diverse student needs and enables more control over their learning and evaluation process. These findings are consistent with the feedback obtained from students in the first study and are supported by relevant literature (Acee et al., 2010; Daschmann et al., 2011; Pekrun et al., 2010, 2017; Shao et al., 2020; Sharp et al., 2016; Westgate & Wilson, 2018).

On the other hand, students positively value the human model that they reported having found in the course. This seems to have favoured their learning, as is also reflected in the literature (Varela et al., 2015).

The analysis of the open-ended question revealed areas for improvement, including the uncertainty arising from the flexibility of the new methodology and a perceived lack of time to fully engage with some course content.

The issue of flexibility warrants further investigation, as it is unclear whether the perceived flexibility of the new methodology has been excessive, having a potentially negative impact, or if students are simply not accustomed to this type of learning approach, having experienced more directive academic contexts in the past. Similarly, the identified lack of time could be due to either an insufficient amount of time allocated for course content or an increased interest in the subject matter, prompting students to dedicate more time to the course. These student feedback points require further exploration in future studies.

### **Study 3: Replication**

The primary objective of this study was to replicate the findings of Study 2 and evaluate the consistency of the results.

#### **Method**

##### **Sample**

There were 73 participants in the replication: 58 females (79.5%), 14 males (19.2%) and 1 person who did not indicate their sex. 64 were between 19 and 22 years old (87.7%) and 9 were over 22 years old (12.3%).

##### **Instruments**

The study employed the same instrument as Study 2, with the exclusion of the qualitative item, consisting of 16 items.

## Procedure

The study followed the same procedures as Study 2. Notably, during the academic year in which this study was conducted, classes were delivered on a blended basis, with alternating in-person and online sessions every other week. This arrangement was implemented due to the COVID-19 health measures.

SPSS v.25.0.0.1 was used for data analysis. Descriptive analyses were performed. In addition, the items of Study 2 and 3 were contrasted, using a two-way comparison of means: statistically significant differences and the TOST (Two One-sided Tests) of statistically significant equivalence (Lakens et al., 2018). The Two One-Sided Test (TOST) approach is used to determine an equivalence between two groups by conducting two separate hypothesis tests. The null hypothesis for the first test is that the second measure is lower than the first one, while the null hypothesis for the second test is that the second measure is greater than the first one. Equivalence is established only when both null hypotheses can be rejected with a probability of erroneous rejection of less than  $p < .05$ , indicating a statistically significant equivalence with certain interpretive nuances.

In research, it is common to use statistical tests to identify significant differences, particularly in cases where the goal is to evaluate the effectiveness of an intervention or treatment. A statistically significant result ( $p < .05$ ) suggests that the observed difference is unlikely to have occurred by chance. On the other hand, when there is no statistically significant difference, it is challenging to draw conclusions because the data may be attributable to chance.

In this replication study, one possible outcome is that the data obtained are equivalent to or even better than those in the original study. If the data are equivalent, we would need a statistical test to determine whether the similar values are unlikely ( $p < .05$ ) to have occurred by chance, known as the test for statistically significant equivalence.

If the results are either maintained or improved in the replication study, it will be considered a favourable outcome. Improvement in this case refers to the existence of statistically significant differences that indicate better results than those found in the original study.



## Results

To verify that the conditions were similar to those of the main study, boredom was measured again at the beginning of the course. The replicate participants also indicated high boredom.

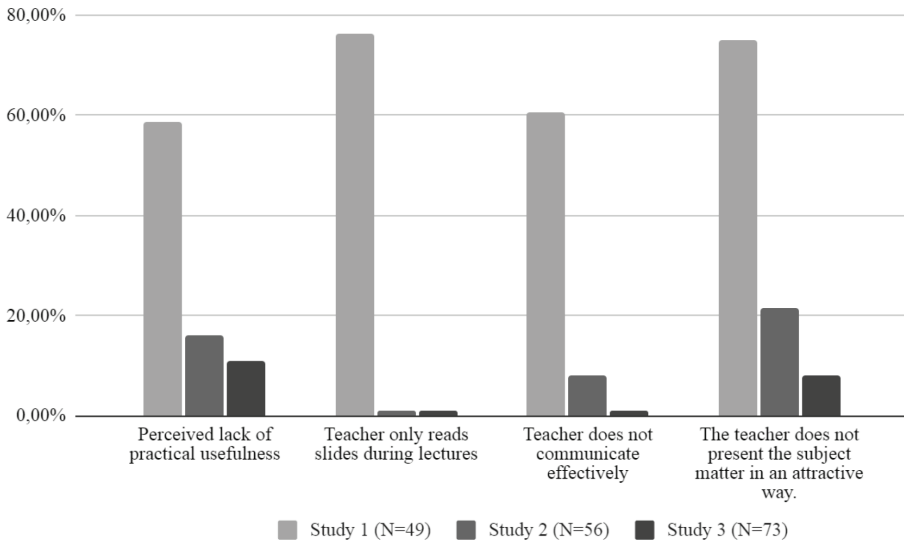
Table II shows the main results of the 13 items with Likert-type rating scales. Next, the multiple-response item referring to the different ratings of the causes of boredom is shown, comparing the three studies (Figure III). Finally, comparisons between the main study and the replication are presented.

TABLE II. Descriptive statistics of the 13 items with Likert-type rating scale (1-7) of the replication.

Assessment instrument items (short form)	Mean	Mode	S.D.
1. I have been bored in EP.	2.56	2	1.20
2. I felt like going to EP.	5.40	7	1.39
3. I have felt more like going to EP than to other classes.	5.26	7	1.58
4. My interest is due to the methodology.	5.47	7	1.45
5. This model is more useful than others.	6.03	7	1.01
6. The classes are practical.	5.55	5	1.03
7. I have acquired competencies.	5.56	6	1.37
8. CE provides more benefits than other evaluations.	6.04	7	1.09
9. I have acquired competencies through CE.	6.03	7	1.07
10. CE promotes learning.	6.12	7	1.28
11. CE is easier than other assessments.	2.27	2	1.57
12. The human model favours my learning.	6.56	7	.73
13. I perceived a human model in EP.	6.41	7	.76

Source: Compiled by author.

FIGURE III. Opinions on the causes of classroom boredom in the three studies.

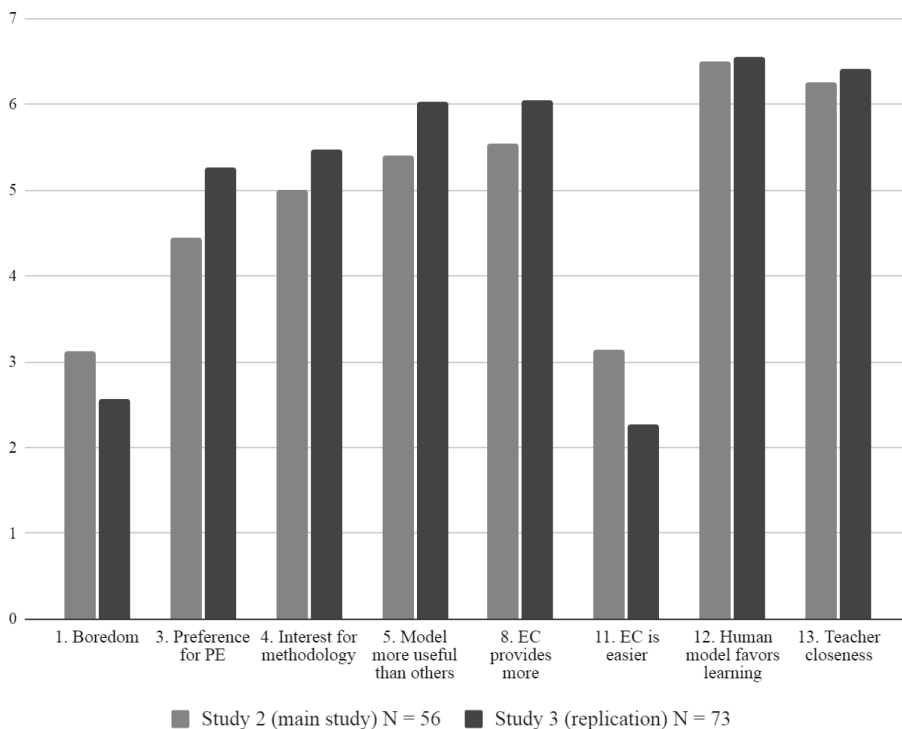


Source: Compiled by author.

The replication study shows a significant decrease in boredom, which may be explained by the evaluation of the perceived causes of boredom compared to the previous studies. The high interest in attending the course (items 2 and 3) is related to the methodology (item 4), which is perceived as useful and practical and promotes the development of transversal competencies (items 5, 6 and 7). Creative Evaluation continues to stand out as a model that enhances learning, despite requiring more work and effort than traditional systems (items 8, 9, 10 and 11). The human relationship model also continues to positively affect learning (items 12 and 13). These findings are consistent with the results of study 2, as shown in Figure IV.

The comparative results of the results of studies 2 and 3, with respect to the positive impact of the methodology, are shown in Table III. The items with favourable -similar or better- results are those that show: (1) statistically significant equivalence (e.g., item 1); (2) statistically significant differences with better results in the replication study (e.g., item 5) or (3) lie in an intermediate situation (e.g., item 2). A result will be considered to be better when the value obtained in the replication is higher, except for items 1 (boredom) and 11 (ease of CE), where a lower value will be better.

FIGURE IV. Descriptive comparison of the means of some of the most relevant items in studies 2 and 3.



<sup>1</sup>Items have been summarized.

<sup>2</sup> Source: Compiled by author.

As can be seen, there is high consistency between the values obtained in studies 2 and 3, with trends of improvement in the replication with respect to the main study. Thus, the vast majority of the results support the maintenance or improvement of the effects in the replication, with the exception of item 7 (transversal competencies).

Regarding the usefulness of the model compared to others (item 5), the results are better in the replication. Regarding CE, participants in the replication perceive it as more difficult than those in the main study, although 84.90% of the participants would choose CE again over a traditional exam (91.07% in study 2).

In addition, 95.9% would again select this methodology over a traditional one (91.07% in study 2).

TABLE III. Favourable results (equivalent or better) from the replication study of the application of the new methodology.

ABBREVIATED ITEMS	STATISTICALLY SIGNIFICANT EQUIVALENCE		IMPROVEMENT WITHOUT REACHING STATISTICAL SIG.	STATISTICALLY SIGNIFICANT FAVOURABLE DIFFERENCES	
	t	P		T	p
1. I have been bored in EP.	t>(107.96)= 4.01 t<(107.96)= -1.51	(.000, .007)*	<i>M<sub>Study 3</sub></i> better Yes	t(107.96)= 1.25	.214
2. I felt like going to EP.	t>(102.56)= 1.09 t<(102.56)= -4.37	(.139, .000)	Yes <sup>1</sup>	t(102.56)= -1.64	.104
3. I have felt more like going to EP than to other classes.	t>(101.16)= 0.25 t<(101.16)= -5.20	(.402, .000)	Yes <sup>1</sup>	t(101.16)= -2.47	.121
4. My interest is due to the methodology.	t>(102.78)= 1.17 t<(102.78)= -4.29	(.123, .000)	Yes <sup>1</sup>	t(102.78)= -1.56	.121
5. This model is more useful than others.	t>(84.88)= 0.22 t<(84.88)= -5.07	(.414, .000)	Yes	t(84.88)= -2.43	.017**
6. The classes are practical.	t>(99.84)= 2.33 t<(99.84)= -3.10	(.101, .001)	Yes <sup>1</sup>	t(99.84)= -0.39	.700
7. I have acquired competencies.	t>(116.93)= 4.14 t<(116.93)= -1.47	(.000, .072)	No	t(116.93)= 1.34	.184
8. The CE provides more benefits than other evaluations.	t>(90.00)= 0.75 t<(90.00)= -4.59	(.226, .000)	Yes <sup>1</sup>	t(90.00)= -1.91	.059
9. I have acquired competencies through CE.	t>(90.36)= 1.49 t<(90.36)= -3.86	(.070, .000)	Yes <sup>1</sup>	t(90.36)= -1.19	.239
10. CE promotes learning.	t>(109.73)= 1.39 t<(109.73)= -4.14	(.083, .000)	Yes <sup>1</sup>	t(109.74)= -1.37	.173
11. CE is easier than other assessments.	t>(106.81)= 5.56 t<(109.73)= 0.06	(.000, .059)	Yes	t(106.81)= 2.81	.006**
12. The human model favours my learning.	t>(121.47)= 2.34 t<(121.47)= -3.33	(.010, .001)*	Yes	t(121.47)= -0.49	.623
13. I perceived a human model in EP.	t>(101.32)= 1.71 t<(101.32)= -3.74	(.046, .000)*	Yes	t(101.32)= -1.02	.311

<sup>1\*</sup> Statistically significant equivalence with  $p < .05$ . <sup>1</sup> Better result in the replication study, without reaching a statistically significant difference. <sup>2\*\*</sup> Statistically significant differences with  $p < .05$  and better result in the replication.

<sup>3</sup> Source: Compiled by author

## Discussion

In relation to the third research question posed - are the results of previous studies maintained? -it is observed that the results initially obtained are maintained in this study or even improved in some cases. The maintenance of the results in a context of blended teaching reflects the adaptability of the methodology to other contexts, maintaining its effectiveness.

Assessments on the causes of boredom and the relevance of the new methodology as an effective means to reduce it are highly consistent, which is in line with findings from previous research (Chin et al., 2017; Daschmann et al., 2014; Goetz et al., 2019; Iglesias-Soilán, 2020; Mann & Robinson, 2009). These results highlight the importance of proposing alternative methodologies to traditional ones (Jiménez-Hernández et al., 2020).

The reasons for the improved results in the replication study compared to the main study are uncertain. Several possibilities exist, such as (1) a comparative effect with other subjects that predominantly rely on lectures and have been more negatively affected by blended teaching, or (2) an enhancement in the application of the methodology. Further research is needed to explore these potential factors.

## Conclusions

The first objective of this study was to investigate the prevalence of boredom in university classrooms, as previous research has highlighted its negative impact on the academic environment (Camacho-Morles et al., 2021; Eastwood et al., 2012; Goetz et al., 2019; Nett et al., 2010; Sánchez-Rosas, 2019; Tze et al. 2016). The findings from the three studies support the existing literature, which shows that boredom is prevalent among the university population (Mann & Robinson, 2009; Iglesias-Soilán, 2020) and that its levels are far from the ideal for effective learning.

According to both the students themselves and the national and international literature, boredom in university classrooms seems to be caused mainly by factors such as a perceived lack of usefulness in the subjects, a perceived lack of control over learning, or difficulty adapting to diversity (Acee et al., 2010; Daschmann et al., 2011, 2014; Pekrun et al., 2010,

2017; Shao et al., 2020; Sharp et al., 2016; Tze et al., 2014; Westgate & Wilson, 2018). These findings indicate a need for a change in teaching and learning methodology to address the issue of boredom in the academic environment.

An alternative methodology was proposed and it has shown high effectiveness in considerably reducing high levels of academic boredom. This methodology is based on four pillars, the individual influence of which remains unknown and requires further research. However, these pillars are believed to have contributed to the success of the methodology.

To ensure the reliability of the initial findings, a replication study was conducted. Replication is a critical component of the scientific process that helps to verify the validity of research results. However, in the social sciences, replication studies are not as common as they should be (Makel et al., 2012; Makel & Plucker, 2014). This is partly due to the *ad novitatem* fallacy, which involves perceiving new research as superior solely because of its novelty, often resulting in its preferential treatment during the peer-review process.

In this case, the replication study has consolidated the results of the main study, showing similarities and even improvements. These findings suggest the need to continue applying and refining the methodology to increase its effectiveness while reducing the required time and resources.

It is important to note that a more rigorous replication would involve professionals other than those who conducted the initial research. Therefore, it is advisable to continue with replications in diverse groups, locations, and subjects, inviting other professionals to evaluate the effectiveness of the methodology. These replications should include additional measures of variables such as boredom and performance, building upon the initial student perception as a first step in the study of these variables. Furthermore, the integration of qualitative data collection techniques would enable exploration of other antecedents and consequences of boredom.

In summary, the challenge at hand is to try to respond to the need to create alternatives for university teaching and learning processes that can better satisfy both teachers and students and reduce the harmful levels of boredom that currently exist in university classrooms. Some of these aspects are already being investigated in a doctoral thesis.

## Acknowledgment

To all the newly joined faculty-researcher team, especially Sandra San José Pérez, whose attention to detail has become indispensable to us.

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