



Motivational Climate, Satisfaction, and Intrinsic Motivation in University Students After the Application of a Gamified Intervention Using Traditional Sports Games

Authors' contribution:

- A) conception and design of the study
- B) acquisition of data
- C) analysis and interpretation of data
- D) manuscript preparation

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Abstract

Gamified learning environments are widely used within the educational context in the subject of Physical Education. The aim of this study was to analyze the perception of the motivational climate, satisfaction, and intrinsic motivation of university students in practical classes according to gender and the type of methodology used. A total of 76 university students aged 20.58 ± 1.69 participated in twelve two-hour practical sessions. The sessions were developed through traditional sport games, which were divided according to the type of methodology used: traditional (TRA, $n=6$) and gamified (GAM, $n=6$). Afterwards, to detect the differences in mean scores obtained for each of the methodologies used, the following tests, if needed, were performed: a non-parametric Friedman's test with a post-hoc Wilcoxon test for pair-wise comparisons, or a two-factor repeated measures with a post-hoc Bonferroni test. Additionally, a Receiver Operating Characteristic curve analysis was performed to determine the cut-off point of the variables studied as a function of the classification of the study participants according to gender. The results showed differences in the perception of motivational climate according to gender in the traditional instructional approach. More specifically, the score for the dimension task climate was higher ($M=4.21 \pm 0.58$) than that recorded for the female students ($M=4.57 \pm 0.45$). In addition, for intrinsic motivation, the male students showed differences between both methodologies, with a higher score in the gamified program in the dimensions competence ($M=3.63 \pm 0.51$) effort-importance ($M=3.57 \pm 0.55$) and tension-pressure ($M=2.92 \pm 0.85$). Finally, there were significant differences between the two methodologies for satisfaction scores with the classes by gender. In each and every dimension that showed significant differences, the scores obtained by the female students were higher than those recorded for the male group in both methodologies. The application of a gamified intervention emerges as a powerful tool that could increase the motivation and satisfaction of students, favoring the teaching-learning process.

Keywords: Traditional sport games, gamification, motivation, satisfaction, physical education.

Introduction

The European Higher Education Area (EHEA) advocates promoting improvement in the quality of teaching at universities. This necessitates a renewal or change in the

teaching-learning (T-L) methodologies for the development of innovative educational methodologies that promote increased involvement and motivation of students in their own learning (Pérez-López et al., 2017; Díaz-Delgado, 2018; García et al., 2019; Sotos-Martínez et al., 2022).

More specifically, within the area of Physical Education (PE), special attention has been given to active methodologies as a means of creating more significant learning (Arufe-Giráldez et al., 2022) that results both in the improvement of social interaction among students and their increased participation (Pérez-López et al., 2017). Among the most common active methodologies utilized in PE, those that incorporate ludic elements within the T-L process stand out, such as Game-Based Learning (GBL) and Gamification (Arufe-Giráldez et al., 2022; Fernández-Rio et al., 2020, 2022; Sotos-Martínez et al., 2022). GBL is the intentional use of games or simulations (non-digital or digital) to achieve specific learning objectives (Wiggins, 2016), with the length of time for their development limited to the duration of the game chosen (Saucedo-Araujo et al., 2020). By contrast, gamification alludes to the use of game design elements in non-gaming contexts (Deterding et al., 2011); namely, the intention to utilize game mechanics, aesthetics, and strategies to increase involvement, motivate action, and promote learning and problem-solving (Kapp, 2021; Saucedo-Araujo et al., 2020), with objectives, development of competences, and acquisition of personal habits and values that are more profound and long-lasting (Saucedo-Araujo et al., 2020). This defines gamification as a powerful tool and/or strategy for motivating and favoring the T-L process from a perspective that is more autonomous and meaningful for students (Pérez-López et al., 2017; Saucedo-Araujo et al., 2020; Sotos-Martínez et al., 2022).

On the other hand, to be more confident about the impact of one type of methodology or another on the motivation of students (Arufe-Giráldez et al., 2022), it is necessary to study it under the lens of the Self-Determination Theory (SDT) and the Achievement Goal Theory (AGT) (Gutiérrez, 2014; Moreno-Murcia et al., 2013). In this field, AGT is based on trying to facilitate the understanding of different emotional, behavioral, and cognitive variables related to the student's achievements within the area of PE as a school subject. Based on this, two different achievement orientations can be differentiated: ego or task orientation (Gutiérrez, 2014; Méndez-Giménez et al., 2019). Ego orientation follows an approach centered on judging one's ability according to social comparison with others. Thus, success will be synonymous with showing a greater ability in the task to be performed than the other participants (Moreno-Murcia et al., 2007; Sánchez-Alcaraz et al., 2016; Méndez-Giménez et al., 2019). This type of motivational orientation is associated with the triggering of negative effects on the satisfaction or participation of students in different sports activities in PE classes (Sánchez-Alcaraz et al., 2016), which may not only lead to difficulties in adaptation in the classroom, but also feelings of anxiety and/or reductions in effort (Gutiérrez, 2014; Sánchez-Alcaraz et al., 2016). On the other hand, in task or mastery orientation, the assess-

ment of performance is based on one's own learning and mastery (Gutiérrez, 2014; Méndez-Giménez et al., 2019). To further clarify the difference of the latter with respect to the former, the aim of task-orientation is to promote effort, highlighting the mastery of the task and personal improvement, so that PE students tend to consider that the physical and sports activities to be performed fulfill an end in itself. As a result, the motivational climate is generally associated with positive motivational results, such as general improvement, amusement, interest, and personal growth (Granero and Gómez, 2020; Gutiérrez, 2014; Moreno-Murcia et al., 2013). This translates into greater enjoyment, an increase in intrinsic motivation, and an increase in the persistence and participation of students in these types of learning environments (Gutiérrez, 2014).

According to SDT, there are 3 differentiated types of motivation depending on the degree of self-determination: intrinsic motivation (IM), extrinsic motivation (EM), and demotivation (DE) (Escarti & Gutiérrez, 2001; Granero & Gómez, 2020; Moreno-Murcia et al., 2007, 2013; Ryan & Deci, 2000). IM justifies the participation and performance of activities due to personal and inherent reasons as a result of enjoyment, novelty, or satisfaction, implied by the performance of the physical activity itself in the PE classroom. EM is based on the premise of the existence of external or environmental factors as conditioning factors of behavior and participation of students at these ages in the PE classes. Finally, DE is defined as the absence of any type of interest towards the performance of any type of physical-sports activity (Gutiérrez, 2014; Moreno-Murcia et al., 2007, 2013; Ryan & Deci, 2000).

Charchaoui et al. (2019) affirm that it is necessary to know and identify the type of motivation that students present in the classroom, as it will determinate their interest and involvement in PE classes. These authors state that PE classes are an ideal context to promote healthy lifestyle habits associated with the practice of physical activities and sports beyond the classroom, especially taking into account that a large number of adolescents drop out of physical activity or sports practice and there is a higher dropout rate among girls (Amado et al., 2014; Sevil et al., 2015). Based on this, within the context of PE, the gender of the students is a very important differentiating element, given that the degree of satisfaction and interest towards the practice of physical-sports activity vary greatly in PE classes (Moreno-Murcia et al., 2006), decreasing as females become older (Sevil et al., 2015). Moreover, there seems to be a socially stereotyped link that may alter the motivation and participation of students as a function of the content taught (Granero & Gómez, 2020; Knisel et al., 2009; Sevil et al., 2015).

In line with this, Amado et al. (2014) point out that females register lower levels of competence than males during the practice of physical activity and sport. According to the

authors, this could be a consequence of females' belief they must overcome any motor challenge they are given. In fact, the perception of competence may be a trigger that decreases the perception of fun and enjoyment, which in the case of the female gender would lead to a decrease in interest, involvement and, therefore, active participation in the PE classroom.

In light of the theoretical framework presented, the aim of the study was to analyze the perception of the motivational climate, the satisfaction, and intrinsic motivation of students during their practical classes, as a function of gender and the type of methodology utilized for teaching.

Methodology

Participants

The present study utilized a descriptive and cross-sectional design, in which the sample was selected through the use of a non-probabilistic, convenience sampling method (Cubo et al. 2011).

A total of 76 university students participated in the study - 79% were male ($n=60$) and 21% female ($n=16$). The mean age of the participants was 20.58 ± 1.78 in the case of the men and 20.56 ± 1.37 in the case of the women. The study was conducted in accordance with the ethical principles of the Declaration of Helsinki (World Medical Association, 2013). All the students were informed about the characteristics of the study and signed an informed consent form of voluntary participation in the study. Lastly, the study was approved by the Ethics Committees from the participating universities.

Sample Size

The calculations for establishing the size of the sample were performed with the G*Power 3.1.9.4 software. The level of significance was set at $\alpha=0.05$. As a result, the sample size (power analysis) revealed that 57 participants would result in a power of 95% (Faul et al., 2007). To avoid possible abandonment, or the elimination of data recorded due to the detection of an abnormal response or abandonment, a decision was made to recruit the largest number of participants possible. Thus, at the start of the study, the sample was composed of a total of 76 subjects.

Instruments

Perception of motivational climate scale (MCS)

To measure changes in the perception of motivational climate, the Perception of Motivational Climate Scale (MCS) questionnaire was utilized (Moreno-Murcia et al., 2007). This questionnaire comprises a total of nine items, four of which are associated with the measurement of ego climate (C_EG) (items 2, 4, 8, and 9), while the rest are related to the task climate (C_TA) (items 1, 3, 5, 6, and 7). All items were assessed through using a Likert-type scale, with scores from 5 to 1, where 5 is equal to "always" and

1 is equal to "never". The instrument utilized obtained optimal reliability values in its validation, with Cronbach's Alpha equal to 0.70 for the factor task climate and 0.80 for the factor ego orientation (Moreno-Murcia et al., 2007).

Physical Activity Class Satisfaction Questionnaire (PACSQ)

To measure and assess the satisfaction of students, the Physical Activity Class Satisfaction Questionnaire (PACSQ) was utilized, validated in Spanish by Sicilia et al. (2014). For its completion, this instrument starts with the phrase: "Indicate your level of satisfaction with the classes with respect to...". After reading the heading, the students had to provide answers to 33 items, which were assessed with a Likert-type scale of 8 responses, in which 1 was equal to "complete disagreement", while 8 was synonymous for being in "complete agreement". These items were grouped according to different dimensions, resulting in 9 factors, such as: i) teaching (TEA) (items 4, 14, 21, and 30); ii) relaxation (REL) (19, 24, and 32); iii) cognitive development (COG) (1, 2, 6, 16, and 28); iv) improvement in health/physical condition (H_PC) (3, 10, 18, 22, and 29); v) interaction with others (I_OTR) (7, 26, and 33); vi) normative success (SUC) (5, 13, and 25); vii) fun and enjoyment (FE) (8, 17, and 23); viii) experience of mastery (EXM) (11, 15, and 27); and ix) recreational experiences (REC) (9, 11, 20, and 31). A global satisfaction index was obtained (SATIS_G), which is the result of the mean value obtained among all the dimensions that shape the questionnaire. Lastly, this instrument showed optimal fit values: $\chi^2=2213.1$; $p=0.001$; $\chi^2/df=4.55$; CFI=0.93; IFI=0.93; RMSEA=0.064 (90%CI=0.062-0.067); SRMR = 0.044.

Intrinsic Motivation Inventory (IMI)

In order to measure the development of intrinsic motivation, the intrinsic motivation inventory (IMI) questionnaire was also utilized (Escarti & Gutiérrez, 2001). The questionnaire is composed of a total of 18 items. These items are grouped into four dimensions, defined as: i) interest-fun (I-F) (items 1, 7, 8, 13, and 17); ii) perception of competence (COMP) (items 2, 9, 14, 16, and 18); iii) effort-importance (EFF-IMP) (items 3, 4, 6, and 12); and iv) tension-pressure (T-P) (items 5, 10, 11, and 15). All items were assessed with a Likert-type scale with scores ranging from 1 to 5, where 1 corresponded to "complete disagreement" and 5 to "complete agreement". Lastly, this instrument showed optimum fit values in its validation, with a Cronbach's alpha equal to 0.78 for the I-F scale, 0.80 for the COMP scale, 0.84 for the EFF-IMP scale, and 0.68 for the T-P factor (McAuley et al., 1989).

Procedure

Before the start of the proposed intervention, a one-hour theoretical familiarization session took place, in which the educator provided an explanation of the me-

chanics and functioning of the practical sessions to be developed. During this session, an explanation was given about the mechanics and completion of the different questionnaires (Cifo et al., 2021). After the introductory session, the practical sessions began, which were structured into 12 practical sessions. These were grouped according to type, such as traditional sessions through direct instruction techniques (TR; $n=6$), and sessions that used an active or emergent methodology through the use of gamification as the main methodological strategy (GAM; $n=6$) (Pérez-López et al., 2017). Each practical session lasted two hours.

The TR sessions were governed by the use of a traditional teaching method of practical content, with respect to

the directions, resources, and activities to be implemented and presented. However, for the GAM sessions, mechanics were developed through the board game “Guess who”, with the theme being the acquisition of a secret identity of a superhero from the two currently most important publishers: DC Comics and Marvel Comics. Independently of this, for the development of the sessions, traditional games and sports were utilized for the improvement of basic motor skills and physical capacity of the university students (Table 1). Finally, all students participated in both types of sessions (TR and GAM). More specifically, the TR sessions ($n=6$) were developed first and, secondly, to conclude the practical intervention, this same group of students also participated in the GAM sessions ($n=6$) (Figure 1).

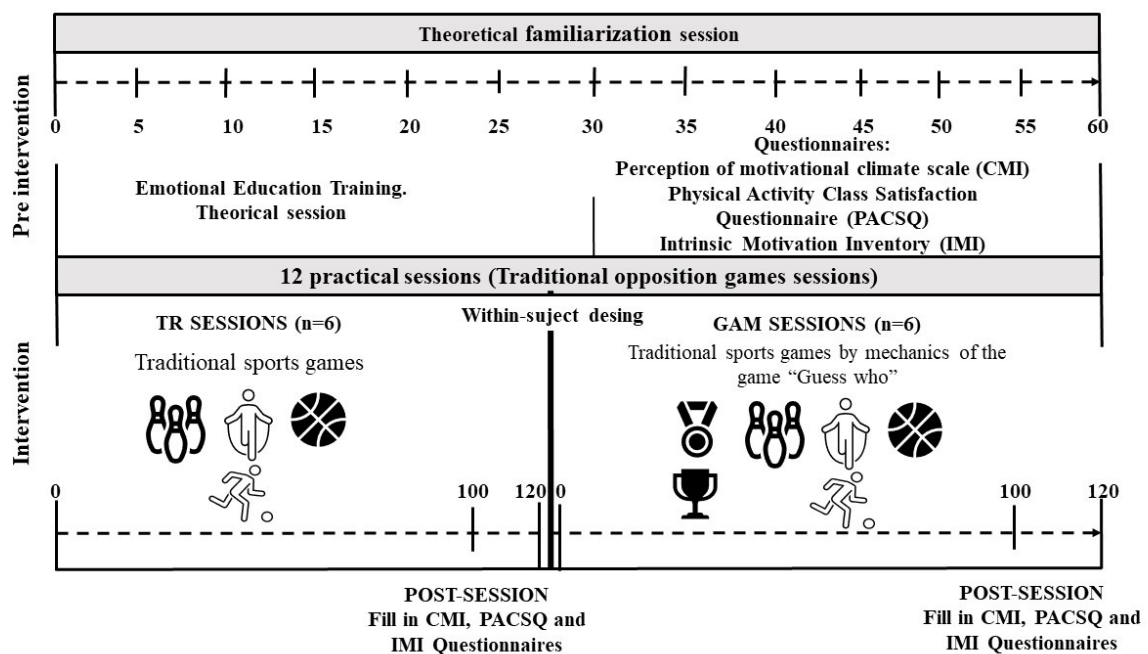


Figure 1. Schematic representation of intervention

Table 1. Example of traditional games/sports played

Type of game		Description
Ind.	Throw, hit, and win	In pairs. Two players facing each other compete to see who is able to throw a tennis ball and hit a mark on the floor, as agreed upon by both of them, the greatest number of times.
Coop.	Pass and win	The dynamics of the previous game are maintained, but now the results between teams are compared. The winning team is the one that manages to make the most passes per round.
Opp.	The little princess	Groups of 5 in a circle. One of the participants plays the role of a prince or guardian, while the rest are thieves. A cone or similar object is placed, which will be the „princess,” is placed in the center of the circle. The prince or guardian will try to protect the princess from being „touched” by the thieves.

Type of game	Description
Coop.-opp. Sitting ball	The players stand in a space of 15 x 15 m. A player in possession of the ball must try to hit the other players. The player with the ball cannot move around the field of play, so must team up with another player to try to catch the others. If a pass is made with a bounce, it means association with a player. If it is an overhand throw, it means that when hit with the ball, the player is caught. The player hit or caught must sit on the ground and becomes part of the active game again if they gain possession of the ball and manage to make a pass to another caught player.

Note: Ind.=individual; Coop.=cooperation; Opp.= opposition

Game Dynamics of the “Guess Who” Game

Groups composed of 4 members are created and the publishers mentioned above are randomly assigned to them. After this, each student has to select a fictional character among the superheroes or villains from each of the publishers – DC Comics or Marvel Comics – according to their initial assignment. The character selected must remain completely anonymous to students who are not part of the group during the entire practical intervention.

During the GAM sessions, the students must perform various theoretical and practical activities. In first place, each group has to create an individual profile, as well as a group one, to write down the points obtained per session and per traditional sports game (Figure 2). Both the group and player with the highest score, as well as those chosen as the best player and/or group at the end of the session through a vote, are entitled to ask a question according to the rules of the “Guess who” game.

Character sheet



Name:

Group:

Clan:

Mantis



Character description:

	Best character	Challenges	Others
Sessions /Points			
1			
2			
3			
4			
5			
6			

Figure 2. Example of the individual file



Figure 3. Clues in order of appearance

Aside from the practical activities in the class sessions, participation was established through a chat tool, based on the provision of riddles related to the different characters chosen by the students who participated in the game experience.

With respect to the riddles, the game director, in this case the educator, passively participated through the assumption of a secret character. This was considered as an intermediate challenge, which allowed the mechanics of participation and integration within the Guess Who game to be re-enforced, so that students were able to obtain an extra point when the last session ended. For this, the educator left clues every week, either in person, or through the chat, as riddles (Figure 3).

All the riddles and questions had a clear purpose – to discover the identity of as many characters as possible. For each of the characters discovered, extra points were added to the total already obtained through the practical mechanics of participation in the traditional sports games.

Statistical Analysis

The descriptive data of the different variables of the study are shown as means and standard deviations. The homogeneity and normality of the data were analyzed through Kolmogorov-Smirnov and Levene's tests, respectively. Afterwards, to detect the differences in mean scores obtained in each questionnaire for each of the methodologies used, the following tests, if needed, were performed: a non-parametric Friedman's test with a post-hoc Wilcoxon test for pair-wise comparisons, or a two-factor repeated measures with a post-hoc Bonferroni test for the analysis of the differences between each of the conditions. The effect size (ES) was calculated with Rosenthal's r (Rosenthal, 1991) and η^2 (Tomczack & Tomczack, 2014) [an effect of 0.1 a 0.3 (small); from 0.3 to 0.5 (medium), and >0.5 (large)]. Lastly, a ROC

(Receiver Operating Characteristic) curve analysis was performed to determine the cut-off point of the different variables studied as a function of the classification of the study participants according to gender. The precision of the classification for each set of the cut-off points was assessed by calculating weighted statistics, sensibility, specificity, and area under the curve of the ROC. An area of 1 indicates perfect classification, while an area of 0.5 represents the absence of precision in the classification. ROC values >0.90 were considered excellent, $0.80–0.89$ good, $0.70–0.79$ acceptable, and <0.70 poor (Metz, 1978). A significance level of $p<0.05$ was accepted for all the statistical comparisons. The calculations were performed with the software SPSS Statistics for Windows, version 24.0 (IBM Corp., Armonk, NY, USA) and MedCalc 14.12.0 (Mariakerke, Belgium) for the ROC curves.

Results

Table 2 below shows that for the CMI questionnaire significant differences were found in the session through the TRA methodology for the dimension task climate (C_TA) when comparing the scores obtained as a function of gender ($p=0.027$). The male students showed a higher score ($M=4.21\pm0.58$) than that recorded for the female students ($M=4.57\pm0.45$).

On the other hand, significant differences were observed for the male students ($p<0.05$) in the dimensions of the IMI questionnaire as a function of the type of methodology utilized. More specifically, these differences were observed in the dimensions COMP, EFF-IMP, and T-P, with the mean values recorded by the GAM methodology higher by 9.15% (COMP), 6.09% (EFF-IMP), and 17.84% (T-P), as compared to the values recorded in the TRA methodology.

Next, the results showed significant differences for the dimensions of the PACSQ questionnaire as a function of the methodology selected for teaching the practical sessions and gender ($p<0.05$). When analyzing these scores, differences between men and women were verified for the dimensions REL, COG, S_FC, FE, EXM, REC, and SATI_G ($p<0.05$) of the questionnaire. In each and every dimension, the scores obtained by the female students were higher than those recorded for the male group, with increases of 23.60% (REL), 10.66% (COG), 26.73% (S-FG), 10.21% (FE), 12.37% (EXM), 24.80% (REC), and 12.08% (SATI_G), as compared to the scores recorded in the sessions with the

TRA methodology. Also, when analyzing the scores from the GAM methodology, significant differences were found in the values from the REL, I_OTR, and FE dimensions. Just as in the prior case, females obtained higher scores than males, in each and every dimension, with means of 7.17 ± 1.16 for REL, 6.90 ± 1.78 for I_OTR, and 7.43 ± 0.92 for FE.

Lastly, the analysis of the ROC curves provided a cut-off value for the different dimensions of the PACSQ and CMI questionnaires as a function of the student's gender. The details for the AUC (area under the curve), as well as the scores obtained for this classification of the students as a function of gender, are shown in Table 3.

Table 3. Area under de curve ROC for the score obtained in the PACSQ and CMS questionnaires as a function of the gender of the students

	PACSQ									
	SATIS_G_	SATIS_G_	REL_	REL_	S_FC_	I_OTR_	FE_	FE_	EXM_	REC_TRA
	TRA	GAM	TRA	GAM	TRA	TRA	TRA	GAM	TRA	
	(n=64)	(n=66)	(n=66)	(n=67)	(n=66)	(n=66)	(n=64)	(n=67)	(n=66)	(n=66)
	Male	Male	Male	Male	Male	Male	Male	Male	Male	Male
ABC	0.7	0.69	0.84	0.78	0.78	0.65	0.69	0.74	0.67	0.83
ES	0.08	0.08	0.05	0.07	0.08	0.07	0.07	0.08	0.08	0.06
95% IC	0.58 to 0.81	0.56 to 0.80	0.73 to 0.92	0.66 to 0.87	0.65 to 0.86	0.52 to 0.76	0.56 to 0.80	0.62 to 0.84	0.54 to 0.78	0.72 to 0.91
p	0.01**	0.02*	<0.01**	<0.01**	<0.01**	0.05*	0.01**	<0.01**	0.03*	<0.01**
IY	0.34	0.44	0.61	0.55	0.48	0.32	0.33	0.37	0.27	0.59
PC	>6.62	>5.59	>6.3	>6.6	>6.6	>6	>6.3	>7.3	>5.6	>7

*Note: Only the significant results are presented. AUC=area under the curve; SE=standard error; CI=confidence interval; YI=Yoiden Index; CP=cutoff point; TRA= traditional methodology; GAM= gamification methodology; SATIS_G=global satisfaction; REL=relaxation; H_PC=improvement in health/physical condition; I_OTR=interaction with others; FE=fun and enjoyment; EXM=experience of mastery; REC=recreational experience ;p=significance; *p<0.05; **p<0.01.*

This analysis of the ROC curves showed cut-off values in the scores obtained after the scoring of the general satisfaction, for both sessions taught with a TRA methodology (6.62), as well as the GAM methodology (5.59), in order to discriminate as a function of the students' gender. On the other hand, when studying these discriminating scores, it was observed that for the relaxation dimension, this score was 6.3 for the TRA sessions, and 6.6 for the GAM ones, for discriminating according to gender. In addition, the TRA sessions showed cut-off values of 6 for the dimension I_OTR, 6.3 for the FE dimension, 5.6 for the EXM dimension, and 7 for the REC dimension; while for the GAM, the cut-off was 7.3 for the dimension FE, for discriminating the male and female students.

Discussion

The aim of the present study was to study the perception of the motivational climate, satisfactions, and intrinsic

motivation shown by students in practical classes, as a function of gender and the type of methodology utilized for teaching the content. In general, within the area of PE, a decrease in the levels of commitment, participation, and motivation was verified by part of the student body, especially the female students (Amado et al., 2014; Charchaoui et al., 2019; Granero & Gómez, 2020; Méndez-Giménez et al., 2019; Knisel et al., 2009; Sánchez-Alcaraz et al., 2016; Sevil et al., 2015). Also, as time passes and the class moves forward, the same authors pointed to a decrease in the task climate. The findings from the present study are not in agreement with this finding, as in both methodologies used in the present study, the scores recorded for the female gender were higher, with differences only observed in the TRA methodology. An explanation for this could be the type of content selected for the development of the sessions. In both cases, the decision was made to present the activities through traditional games and sports, which could eliminate the associated initial

cultural bias, as these activities are practiced by students indistinctly, without any type of preconceived attributions with respect to a greater or lesser competency in motor performance as a function of gender (Amado et al., 2014; Granero & Gómez, 2020; Saucedo-Araujo et al., 2020; Sevil et al., 2015). This finding is highly relevant, as the ego climate triggers negative effects on the satisfaction with activities performed in PE classes, which may even result in a decrease in participation and effort, as well as potentially creating feelings of anxiety in the students (Sánchez-Alcaraz et al., 2016). At the same time, the task climates are associated with greater intrinsic motivation and a greater feeling of competence, which increases the enjoyment, satisfaction, effort, and interest in the content to be developed within the PE classroom, as well as adherence to the practice of physical activity in both genders, especially females (Charchaoui et al., 2019; Méndez-Giménez et al., 2019; Sánchez-Alcaraz et al., 2016; Sevil et al., 2015). The consequence seems to be evident: these aspects will contribute towards the increase in the involvement of the students with the T-L process (Arufe-Giráldez et al., 2022; Charchaoui et al., 2019; Pérez-López et al., 2017; López & Sotoca, 2019).

Amado et al. (2014), Lauderdale et al. (2015), and Sánchez-Alcaraz et al. (2016) remind us that male students are more likely to have motivation levels that are more closely associated with competitive situations, and therefore more oriented towards ego, than females. However, the findings from the present study are not in agreement with this idea. This could be due to the use of a ludic or game element as an axis of the content to be taught. It has already been demonstrated that these types of activities are associated with greater concentration, effort, and a more self-determined motivation (Pérez-López et al., 2017; López & Sotoca, 2019). Gamification is considered a powerful strategy for motivating and favoring the learning of students, as the educational process seems to acquire greater meaning (Arufe-Giráldez et al., 2022; Fernández-Rio et al., 2020, 2022; Pérez-López et al., 2017; Sotos-Martínez et al., 2022). The results obtained in the present study coincide with the previous one, as significant differences were observed in various dimensions from the IMI questionnaire (COMP, EFF-IMP, and T-P), with higher mean values in the gamified strategy sessions for all three cases in the male gender. These results are in agreement with the findings by Fernández-Rio et al. (2020), in which the students showed higher levels of intrinsic motivation after the application of a gamified experience.

Lastly, with respect to the results found for the satisfaction shown with the different methodologies utilized for teaching classes, the female students obtained higher scores than the males in: the TRA methodology for the dimensions relaxation, cognitive development, improvement in health and physical condition, interaction with

others, fun and enjoyment, experience of mastery, recreational experiences, and global satisfaction; while for the GAM, these were relaxation, interaction with others, and fun and enjoyment. These findings are not in agreement with the literature on the subject, which affirms that the degree of satisfaction and interest towards the practice of physical-sports activities is lower for female students, with the difference increasing as age increases (Charchaoui et al., 2019; Granero & Gómez, 2020; Moreno-Murcia et al., 2006; Knisel et al., 2009; Sevil et al., 2015). In fact, when significant differences were not found, it was observed that the score for task orientation was very similar in both genders, as opposed to the findings by Granero and Gómez (2020), who found it to be higher for males. In fact, these results are indirectly associated with an increase in persistence and participation, both of which are strongly linked with the experience and general satisfaction presented (Gutiérrez, 2014; Moreno-Murcia et al., 2013). On the other hand, this degree of satisfaction and interest may be associated with the reasons the girls expressed when choosing whether or not to perform physical-sports practical activities, such as those associated with the maintenance of better well-being and health, fun and enjoyment, and the possibility of establishing new social relationships (Amado et al., 2014; Gutiérrez, 2014; Sevil et al., 2015; Sotos-Martínez et al., 2022). In line with this, Sánchez-Alcaraz et al. (2016) affirmed that a task climate was associated with a decrease in the anxiety towards failure and stress, increasing the scores associated with relaxation and cognitive development, and generating a greater commitment to the learning. In addition, Fernández-Rio et al. (2022) found that a gamified framework helped students think of the physical education class as more attractive, generating a higher participation with an inherent increase in satisfaction. The authors call attention to these types of interventions, as some evidence has been found that gamified programs, in which students obtain points, badges, and recognition, could decrease intrinsic motivation. These point-based programs could be perceived as a competitive context, which may explain the absence of changes in the intrinsic motivation of females. However, as observed in the results obtained for the GAM in the PACSQ questionnaire, the female student group showed higher levels in the dimensions of relaxation, interaction with others, and fun and enjoyment, which are directly synonymous with an increase in interest and personal improvement for learning (Gutiérrez, 2014; Moreno-Murcia et al., 2013).

Lastly, the ROC curve analysis allowed us to further stress these findings, as different cut-off points were found in various dimensions related to satisfaction in both methodologies. Once again, the explanation could be rooted in the type of content chosen for the development of the sessions, which in both cases was related to tra-

ditional games and sports (Saucedo-Araujo et al., 2020), thus eliminating the cultural bias associated with gender, since there were no pre-conceived attributions around greater or lesser competence in motor development for these activities (Granero & Gómez, 2020; Sevil et al., 2015). In this same analysis, different discriminatory cut-off points were observed as a function of gender, for the general score, and for the dimension of fun and relaxation as a function of the methodology employed.

These results allow us to endorse the great potential derived from the use of gamified methodologies, which constitutes a powerful tool for motivating and favoring the T-L process from a more autonomous and significant perspective for the students, independent of their gender (Arufe-Giráldez et al., 2022; Pérez-López et al., 2017; Saucedo-Araujo et al., 2020; Sotos-Martínez et al., 2022), as well as its use associated with the specific increase of these aspects in females, especially if we take into account that motivation, participation, and adherence to physical-sporting activities was lower for them (Granero & Gómez, 2020; Knisel et al., 2009; Sevil et al., 2015). Finally, the results draw attention to differences in the experience of mastery and recreational experience, only in the TRA sessions and not those related with the GAM. This could be due to the types of activities presented and the previous knowledge of the participants on the matter. This dimension of mastery is associated with the continuous search for improvement by the female students, which could be fed back by the feeling of enjoyment and fun, entailed by the presentation of a novel activity (Gutiérrez, 2014; Saucedo-Araujo et al., 2020). However, this first surprising impact is not present in the GAM, in which the activities to be developed were already known. Nevertheless, the use of gamification for the teaching of content was an important stimulus, as higher scores were observed in aspects such as relaxation, interaction with others, and fun and enjoyment, which is synonymous with greater motivation in females towards the content taught (Arufe-Giráldez et al., 2022; Saucedo-Araujo et al., 2020; Sotos-Martínez et al., 2022). This is in agreement with Fernández-Rio et al. (2020, 2022), who found that the gamification implemented over the long term, beyond the initial effect of novelty, can increase motivation towards the content taught in PE classes.

In accordance with these findings, it could be stated that this intervention has a great potential in application.

Firstly, the fact that this study was carried out with university students in training makes this research a valuable educational experience in itself. These practical proposals make it possible to focus the interventions of educational professionals within the PE sessions, based on contextualised knowledge that supports the understanding of the teaching and learning processes. According to this, as a result of the practical experience gained, it is hoped that university students will be able to improve their training

experience. At the same time, the choice of activities within the educational environment will be favored by a PE oriented according to the current reality and educational needs, which advocate the teaching of content through contextualized tasks in teaching practice that respect and seek appropriate development of students' motor skills according to their preferences and particularities.

Secondly, to the best of our knowledge, this is the first study that considers the ROC curve analysis. In addition, cut-off points have been established to differentiate the degree of satisfaction with classes by gender according to the type of methodology used. These cut-off points could be a useful and inexpensive way to assess the school population, in order to implement intervention strategies, especially in terms of the choice of content and activities to be taught in the classroom, thereby generating task-oriented motivational climates, which will lead to an increase in the level of students' intrinsic motivation in the classroom.

Nevertheless, given the multidimensional and complex nature of the topic, it is important to consider the findings obtained in this article as an initial contribution. In fact, it would be necessary to conduct more studies with a greater variability of contexts, participants, and content, to corroborate the results found in the present study.

Conclusions

As conclusions from the present study, we could affirm that, with respect to female university students, the use of traditional games and sports increased the motivation and satisfaction recorded in the classes. On the other hand, when comparing these traditional games and sports as a function of the methodology implemented for their teaching, the male students manifested a higher level of perception of competence, as well as the effort and importance attributed to the content taught in the gamified experience sessions. All of these findings would allow educators to guide the type of content selected for teaching PE sessions, considering the potential of traditional games and sports, as well as the methodology utilized to facilitate the generation of motivational task climates to promote the intrinsic motivation of students in the classroom.

Ethics Approval and Informed Consent

This research followed the ethical guidelines set out in the Declaration of Helsinki.

Competing Interests

The authors declare that there is no conflict of interest.

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