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Using Gamified Strategies in Higher Education: Relationship between Intrinsic Motivation and Contextual Variables

Ana López-Martínez [1], Lourdes Meroño [1], María Cánovas-López [1], Antonio García-de-Alcaraz [2,3,*] and Luis Manuel Martínez-Aranda [1,4,*]

[1] Faculty of Sport, Catholic University of Murcia (UCAM), 30107 Murcia, Spain
[2] Faculty of Educational Sciences, University of Almería, 04120 Almería, Spain
[3] SPORT Research Group (CTS-1024), CERNEP Research Center, University of Almería, 04120 Almería, Spain
[4] MALab (Movement Analysis Laboratory) Research Group, Catholic University of Murcia (UCAM), 30107 Murcia, Spain
* Correspondence: antoniogadealse@gmail.com (A.G.-d.-A.); lmmartinez2@ucam.edu (L.M.M.-A.); Tel.: +34-968-27-87-57 (L.M.M.-A.)

Abstract: The application of Information and Communication Technologies in the classroom encourages student learning by increasing their motivation and promoting collaborative teamwork. The aim of this study was to analyze the differences on intrinsic motivation of university students considering contextual variables when working specific contents through digital tools and virtual gamified strategies. Nine hundred and nineteen university students (18–21 years old) participated in the study. A descriptive cross-sectional study was performed considering four different variables: gender, working language, subject nature and academic degree. The applications used were Kahoot and Vevox and student motivation was assessed through an adapted version to the university context of the Intrinsic Motivation Inventory (IMI) Questionnaire. A higher score for bachelor´s degree compared to vocational training for the dimensions interest-enjoyment and effort-importance, together with a lower level in tension-pressure were revealed. Only the effort dimension was different between genders, being higher for female. Practical subjects showed higher values in bachelor´s degree for interest, competence, effort, and lower scores concerning tension-pressure. Finally, the teaching in Spanish revealed better scores in all dimensions compared to English, especially when the subject nature is practical. In line with previous results, university students showed good levels of intrinsic motivation when virtual gamified tools were used.

Keywords: physical education; teaching; gamification; Kahoot; motivation; university student

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1. Introduction

The European Higher Education Area poses the challenge of boosting the quality of teaching through active methodologies supported by digital pedagogy [1]. However, the reality is that nowadays, the traditional model of master class teaching is still present and continues being developed in universities, especially in undergraduate programs or subjects where the theoretical load consumes almost the whole period of teaching time. In this teaching style, the lecturer presents content to students, who directly receive the transferred information sitting in their seats. Additionally, a common circumstance in university institutions is usually the students' lack of motivation, mainly due to their concern for passing the subject rather than learning [2].

However, new educational trends demand active and participative methodologies where students acquire a dynamic approach to their learning. Actually, there is one fact that is becoming more and more prominent: digital technology is becoming an integral aspect of the university students' academic studies [3]. The growing incorporation and evolution of information and communication technologies (ICT) in the educational context demands

new methodological approaches that address the requirements of the techno-pedagogical paradigms [4].

One of the most innovative pedagogical approaches in recent years is gamification [5], which emerges as a tool to motivate content development and student participation in the classroom [6,7]. This methodology is based on gamification as a key element in the teaching-learning process [8], and promotes motivation, engagement and facilitates an effective student learning [9]. In this way, gamification is considered an opportunity to motivate, improve group dynamics, encourage attention, activate reflective criticism and meaningful learning of students [10]. In addition, improving and motivating learning by using different dynamics can be highlighted as advantages for the teaching role [11,12].

Educational gamification may be a tool to provide a user-centered, autonomous, and flexible learning environment, encouraging users to pursue their own goals and engage in deeper-level activities more persistently. It requires the adoption of motivational properties of games into teaching and learning, considering the human desire to communicate and share accomplishments as a means of motivating students to learn [13].

Most studies present gamification as a methodological strategy with a positive influence in the educational context [7,14,15]. In addition, it was shown that the pedagogical use of digitally supported tools is used as effective gamification techniques that motivate the student learning. The aim of these new methodologies is to improve cognitive and communicative skills, as well as to facilitate students' learning and growth processes [16]. Several authors pointed out that this effect seems to be quite immediate, having a substantially positive effect on the initial motivation for the proposed activities [17,18].

Similarly, in addition to cognitive and communicative skills or the learning processes themselves, digital support tools have a positive influence on the academic performance of university students as well, when used for educational purposes [19]. Essentially, students cannot experience successful learning when the motivation to learn is lacking and finding appropriate methods or tools that are highly attractive and can encourage and reinforce learning may be a challenging task for educators.

In this context, as a result of educational transformation driven largely by information and communication technologies (ICT), the integration of game mechanics in the classroom has been used as a strategy to motivate student learning, enhancing the teaching process in the classroom, promoting teamwork, and therefore, improving subsequent academic performance [6,20–22].

The use of these applications such as Blogger, Piktochart, Genially, Powtoon or ThingLink lead to high levels of intrinsic motivation and academic performance in university students [23]. Another application used in recent years by the teaching community is Kahoot, a tool that not only fosters a fun learning environment, but also challenges students in the learning process [24]. Students who work with this application increase their attendance, homework completion, engagement and academic performance compared to students who do not use it [25]. In addition, Wang & Tahir [26] stated as main conclusion in their literature review about this application that: *"Kahoot! can have a positive effect on learning performance, classroom dynamics, students' and teachers' attitudes, and students' anxiety"*. Thus, it seems that the use of such applications and tools help to build a good learning and motivational environment.

In fact, a well-structured motivational environment with optimal challenges and feedback can be successful in meeting students' competence needs [27]. In order to encourage motivation and participation, gamification in university teaching can be adapted to the social-technological context of the students [28]. Voluntary participation increases with the use of gamification in the classroom compared to courses that do not use this methodology [25]. These results are beneficial when taking into consideration that students' lack of participation is sometimes for reasons such as embarrassment facing the approval of another [29]. When the learner actively participates in acquiring new knowledge, the level of learning and motivation increases [30]. Likewise, the literature shows that students

perceive the integration of ICT in the educational context and digitally supported learning as having positive consequences [31].

Several empirical studies consider that the use of gamification and ICT in higher education has grown, with results showing positive outcomes from these types of games [7,32] and the most improvement in attendance, participation, and motivation [33,34]. In this regard, also provides a rationale for increasing motivation in different subjects and student formats [13]. In addition, gamification facilitates effective learning using game-based-reasoning and mechanics [35], which makes it essential for effective teaching and learning contents that are described by students as "arid" and "boring".

Although there is a large body of research showing the benefits of digital pedagogy, especially in primary and secondary education, more empirical evidence is needed in the university environment [36], where programs and subjects may have different orientations (theoretical vs. practical), genders are becoming more equal in the campus, as well as particular interests, diverse areas of application or different working languages are emerging.

For these reasons, the aim of this study was to analyze the differences on intrinsic motivation of university students between genders, working language, subject nature and academic degree when working specific contents through digital tools and virtual gamified strategies. Therefore, we hypothesized that the motivation would be at a greater undergraduate academic level, when the working language is Spanish as well as when the subject nature is more practical, finding differences between genders as well.

2. Materials and Methods

2.1. Design and Participants

A descriptive cross-sectional study was performed considering four different variables with two categories each: working language (Spanish and English), academic degree type (bachelor´s degree and vocational education and training), subject nature (theoretical and practical) and gender (male and female).

The study population consisted of 919 students (804 males and 115 females between 18 and 21 years of age), belonging to the Bachelor´s Degree in Physical Activity and Sport Sciences (CAFD) (n = 889), or the vocational training course in "Technicians in Teaching and Socio-sports Animation" (TEAS) (n = 30). Both academic levels were considered due to all these students belong to the same institution, the Faculty of Sport, sharing some teaching methodologies and teachers as well. The students participated in the following subjects: Pedagogical Foundations of Sport (Spanish, four groups), Combat and implement Sports (Spanish, four groups; English, one group) and Psychology and Behavioral Analysis in Sports (English, one group) for the Degree in CAFD; as well as Group Dynamization (Spanish, one group) and Methodology of Teaching Physical-Sports Activities (Spanish, one group) for TEAS, with a participation rate of 97%. In addition, and based in the previous distribution, the percentage of the lessons taught in both languages were English (12.9%) and Spanish (87.1%). It is noteworthy that the English level of the students is C1, since is the mandatory minimum level required by this private institution for being enrolled in the academic course in that language, as well as for the teachers.

2.2. Instruments

The use of the mobile application kahoot! was agreed among the teachers involved in the innovation project, mainly based on relevant scientific literature on its use in the university environment. In this regard, Wang et al. [37] conducted a research project at the Norwegian University of Science and Technology (NTNU) in order to explore the effects of several quiz approaches in University classrooms: a traditional non-gamified response system (Clickers), a game-based response system (Kahoot!) and paper-based formative assessment. The results were significantly in favour of adopting Kahoot! as quiz systema. Students were significantly motivated by Kahoot! in comparison to the other two options. Their responses were also indicative of a greater degree of engagement and satisfaction.

Likewise, Martínez-Navarro [38], concluded that kahoot! represents an opportunity for innovative education, increasing student participation, cooperation and interest, breaking with the passivity of conventional lectures. Furthermore, Kahoot! show good a potential for implementation in teaching and learning at higher education level, as it can effectively enhance motivation and commitment, promoting learning and reinforcing knowledge [39].

Student motivation was assessed through a survey-type questionnaire. A Spanish and English version of the adapted instrument by Escartí & Gutíerrez [40] for Spanish physical education students, from the original Intrinsic Motivation Inventory (IMI) Questionnaire [41] was adapted to the university academic context.

The IMI consists of a varied number of items from several subscales, which have been shown to be analytically consistent and stable factor analytically across a variety of tasks, conditions and settings. An 18-item version (Table 1) and four subscales were used: interest-enjoyment (INT-ENJ), perceived competence (COMP), effort-importance (EFF-IMP) and tension-pressure (TEN-PRESS). The interest and enjoyment subscale were considered the self-report measure of intrinsic motivation; perceived competence was interpreted as a positive predictor of the self-report and behavioral measures of intrinsic motivation. Tension-pressure was considered a negative predictor of intrinsic motivation. Effort is a separate variable that is relevant to some motivation questions, so is used it its relevant. The general criteria for the inclusion of items in the subscales were a factor loading of at least 0.6 on the appropriate subscale and no cross-loading greater than 0.4. This is why the validity and reliability of the IMI is claimed to be high [41]. For this study, the alpha coefficients for the subscales were 0.82 (tension-pressure), 0.74 (perceived competence), 0.80 (interest-enjoyment) and 0.76 (effort-importance), classified as "very good" (0.70–0.90), with an internal consistence of the overall scale reported with an alpha coefficient of 0.81, defined as "very good" as well.

Table 1. The Intrinsic Motivation Inventory (IMI). (Adapted version to the university academic context of the original Escartí & Gutiérrez [40]).

1. I enjoyed this lesson very much (INT-ENJ)
2. I think I am pretty good in this topic (COMP)
3. I put a lot of effort for to get the best out of myself in learning this lesson (EFF-IMP)
4. It was important to me to do well in this lesson (EFF-IMP)
5. I felt tense at some point during the development of the classes (TEN-PRESS)
6. I tried very hard throughout the classes that have composed this lesson (EFF-IMP)
7. The development and learning of this lesson was fun (INT-ENJ)
8. I would describe this lesson as very interesting (INT-ENJ)
9. I am satisfied with my performance in the classes and the lesson in general terms (COMP)
10. I felt pressured while the classes were going on (TEN-PRESS)
11. I was anxious at some point while classes were taking place (TEN-PRESS)
12. In general, I did not try very hard in this lesson (EFF-IMP)
13. While attending classes, I thought about how well I was doing (INT-ENJ)
14. After each class of this lesson, I felt more and more competent in the subject studied (COMP).
15. I was very relaxed during the development of the classes (TEN-PRESS)
16. I feel very skilled and competent in this subject (COMP)
17. This methodology or way of carrying out the classes did not attract my special attention (INT-ENJ)
18. I could not participate or develop very well the activities proposed throughout the lesson (COMP).

Because the application of this scale was performed in a university academic context, several statements were modified such as "activity" was replaced by "lesson", and "task" was replaced by "Class". An example item was: "I felt tense at some point(s) during the course of the classes" or "I enjoyed this lesson very much overall". The response format for each question was a Likert scale ranging from 1 ("strongly disagree") to 5 ("strongly agree") following the IMI adapted version by Escartí & Gutiérrez [40] and was collected via Google Form.

2.3. Procedures

The data collection was carried out in person under the coordination of researchers with experience in the application of the instrument used. Once authorizations were obtained from the competent university authorities, data collection was carried out continuously during the second semester of the 2019/2020 academic year, during daytime hours and one month after the start of classes, so that students could initially recognize the methodological style of their teacher. Data collection ended at least 15 days before the final exams. This criterion was established to avoid the biases involved in collecting information during the semester evaluation period, because the quality of the data obtained would have been affected by the logical and desirable increase in students' academic dedication to their course assessments.

The protocol followed during data collection was: (a) Use of the Vevox application every teaching day for registering the student´s participation, where two open questions were implemented. The first question was asked after the first 15 min of class, and the second question was applied 15 min before the end of the class; (b) The Kahoot was used once each lesson had been completed. The Kahoot consisted of 15 questions with a maximum response time of 20 s each, and (c) Once the Kahoot was finished, the IMI questionnaire was applied through a Google Form. In general, each evaluative session including the use of kahoot! lasted no longer than 15 min to avoid the potential wear-out effect.

2.4. Statistical Analyses

At the statistical level, a descriptive analysis was carried out for each item belonging to the four different dimensions obtained in the IMI. After a normality test (Kolmogorov-Smirnov), individual pairwise comparisons for two independent groups through Mann–Whitney U test were performed in order to determine the differences between categories for each criterion analyzed (e.g., differences between CAFD and TEAS according to the criterion "academic degree"). Additional and complementary correlations were performed. All statistical tests established a margin of error of less than 5%. Furthermore, the Rosenthal's *r* was calculated to know the effect size in the comparison between dimensions. The thresholds values were set at 0.1, 0.3 and 0.5 for a small, medium or large effect, respectively. Statistical analyses were performed using SPSS® 26.0 (IBM Corporation, Armonk, NY, USA) for Windows.

3. Results

The student´s participation collected through the VEVOX app in the different subjects during the complete semester was 89.8 ± 6.1% for Pedagogical Foundations of Sport; 91.0 ± 11.7% for Combat and Implement Sports; 95.1 ± 1.6% for Psychology and Behavioral Analysis in Sports (Degree in CAFD); as well as 92.6 ± 4.6% for Group Dynamization and Methodology of Teaching Physical-Sports Activities (TEAS).

Table 2 shows the corresponding values, as well as the inferential tests for each category and criterion according to the degree and gender of the sample analyzed. Regarding degree, a statistically significant higher score was observed for the dimensions interest ($z = -3.945$; $p = 0.001$) and effort ($z = -2.026$; $p = 0.043$), together with a statistically significant lower value in tension ($z = -2.411$; $p = 0.016$) in the undergraduate context (CAFD). The effect size indicated a medium increase for interest ($r = 0.12$), as well as small effect in effort and tension ($r = 0.06$; $r = 0.07$, respectively).

Concerning the gender, only a statistically significant higher value was reported for the effort dimension in females ($z = 1.996$; $p = 0.046$), with a small effect size ($r = 0.06$).

Regarding the analysis of the subject nature according to the degree (Table 3), it was observed that CAFD showed a statistically significant higher score in interest ($z = -9.002$; $p = 0.001$) and perceived competence ($z = -2.479$; $p = 0.013$), as well as a lower score in tension ($z = -3.478$; $p = 0.001$) in the practical subjects. The effect size pointed out

a moderate change for interest (r = 0.29) and tension (r = 0.11), and a small effect in competence (r = 0.08).

Table 2. Questions, dimensions and differences for academic degree and gender.

	Academic Degree		Gender	
	CAFD	**TEAS**	**Male**	**Female**
P1	4.15 ± 0.82	3.85 ± 0.62 *	4.14 ± 0.80	4.05 ± 0.85
P2	3.60 ± 0.91	3.52 ± 0.62	3.62 ± 0.87	3.45 ± 0.94 *
P3	3.96 ± 0.87	3.78 ± 0.86 *	3.94 ± 0.85	3.99 ± 0.95
P4	4.15 ± 0.81	4.13 ± 0.77	4.13 ± 0.81	4.23 ± 0.79
P5	1.96 ± 1.11	2.28 ± 1.17 *	1.98 ± 1.12	2.00 ± 1.14
P6	3.83 ±0.91	3.65 ± 0.78 *	3.79 ± 0.89	3.91 ± 0.93
P7	4.16 ± 0.89	3.85 ± 0.79 *	4.13 ± 0.88	4.14 ± 0.90
P8	4.19 ± 0.83	3.86 ± 0.79 *	4.17 ± 0.82	4.13 ± 0.91
P9	3.91 ± 0.89	3.77 ± 0.81	3.89 ± 0.87	3.94 ± 0.98
P10	1.63 ± 0.98	1.74 ± 0.93	1.66 ± 0.99	1.56 ± 0.91
P11	2.13 ± 1.23	2.34 ± 1.09 *	2.12 ± 1.18	2.27 ± 1.37
P12	3.95 ± 1.13	3.75 ± 1.09	3.91 ± 1.13	4.04 ± 1.07
P13	3.44 ± 1.08	3.05 ± 0.97 *	3.37 ± 1.07	3.56 ± 1.08 *
P14	3.94 ± 0.85	3.74 ± 0.78 *	3.92 ± 0.83	3.92 ± 0.90
P15	2.19 ± 1.00	2.23 ± 0.91	2.13 ± 0.92	2.47 ± 1.24 *
P16	3.68 ± 0.92	3.66 ± 0.63	3.70 ± 0.88	3.58 ± 0.96
P17	3.92 ± 1.23	3.83 ± 0.96	3.87 ± 1.22	4.10 ± 1.15 *
P18	4.18 ± 1.07	4.18 ± 0.83	4.15 ± 1.06	4.29 ± 1.03
Interest	3.97 ± 0.73	3.69 ± 0.59 *	3.94 ± 0.71	3.99 ± 0.77
Competence	3.86 ± 0.69	3.77 ± 0.46	3.86 ± 0.66	3.84 ± 0.74
Effort	3.97 ± 0.72	3.83 ± 0.66 *	3.94 ± 0.70	4.04 ± 0.77 *
Tension	1.98 ± 0.77	2.15 ± 0.72 *	1.97 ± 0.75	2.08 ± 0.83

Note. * $p < 0.05$, between academic degree (CAFD-TEAS) or gender (Male-Female). Descriptive data presented as Mean ± Standard deviation.

Concerning the comparison between degrees in terms of practice, it was observed that CAFD showed a statistically significant higher score in interest (z = −7.180; $p = 0.001$), perceived competence (z = −2.560; $p = 0.010$) and effort (z = −2.233; $p = 0.026$), while a statistically significant lower value was found in tension (z = −3.419; $p = 0.001$). The effect size pointed out a moderate change in all the dimensions: interest (r = 0.31), perceived competence (r = 0.11), effort (r = 0.10) and tension (r = 0.15).

In the analysis of working language and subject nature (Table 4), when the subject was taught in Spanish as a native language, there was a statistically significant higher score in interest (z = −8.318; $p = 0.001$) and perceived competence (z = −2.445; $p = 0.014$), as well as a decrease in tension (z = −2.036; $p = 0.042$) when the subject was practical. The effect size showed a medium change in interest (r = 0.24), and small differences for competence and tension (r = 0.07 in both cases). In contrast, when the subject was taught in English, no statistically significant differences were observed for the different items and dimensions between theoretical or practical subjects.

Concerning the comparison between languages, in terms of the theory, only the effort showed a statistically significant increase favoring to the Spanish language (z = −3.270; $p = 0.001$). Indeed, a medium effect size was observed in this variable (r = 0.14).

Regarding the comparison between languages in terms of practice, many questions showed a statistically significant higher score for Spanish language, where the dimensions interest, competence and effort were also statistically significant higher (z = −2.916; $p = 0.004$; z = −2.698; $p = 0.007$; z = −5.303; $p = 0.001$, respectively). Medium effect sizes were found in interest and competence (r = 0.13 r = 0.12, respectively), while a low effect was observed in effort (r = 0.07).

Table 3. Analysis of the subject nature according to degree programme.

	Academic Degree		
	CAFD		TEAS
	Theory	Practice	Practice
P1	3.94 ± 0.85	4.42 ± 0.71 *	3.85 ± 0.62 [a]
P2	3.61 ± 0.90	3.58 ± 0.92	3.52 ± 0.62
P3	3.93 ± 0.88	4.01 ± 0.86	3.78 ± 0.86 [a]
P4	4.11 ± 0.84	4.20 ± 0.78	4.13 ± 0.77
P5	2.04 ± 1.12	1.85 ± 1.09 *	2.28 ± 1.17 [a]
P6	3.83 ± 0.91	3.82 ± 0.91	3.65 ± 0.78 [a]
P7	3.89 ± 0.92	4.49 ± 0.71 *	3.85 ± 0.79 [a]
P8	3.99 ± 0.85	4.45 ± 0.73 *	3.86 ± 0.79 [a]
P9	3.80 ± 0.93	4.06 ± 0.82 *	3.77 ± 0.81 [a]
P10	1.72 ± 0.98	1.52 ± 0.97 *	1.74 ± 0.93 [a]
P11	2.13 ± 1.18	2.12 ± 1.28	2.34 ± 1.09 [a]
P12	3.95 ± 1.13	3.95 ± 1.13	3.75 ± 1.09
P13	3.24 ± 1.08	3.68 ± 1.02 *	3.05 ± 0.97 [a]
P14	3.87 ± 0.88	4.03 ± 0.80 *	3.74 ± 0.78 [a]
P15	2.33 ± 1.03	2.02 ± 0.95 *	2.23 ± 0.91 [a]
P16	3.63 ± 0.92	3.73 ± 0.91	3.66 ± 0.63
P17	3.84 ± 1.20	4.01 ± 1.26 *	3.83 ± 0.96 [a]
P18	4.16 ± 1.07	4.20 ± 1.09	4.18 ± 0.83
Interest	3.78 ± 0.76	4.21 ± 0.61 *	3.69 ± 0.59 [a]
Competence	3.81 ± 0.72	3.92 ± 0.65 *	3.77 ± 0.46 [a]
Effort	3.95 ± 0.74	4.00 ± 0.70	3.83 ± 0.66 [a]
Tension	2.06 ± 0.80	1.88 ± 0.73 *	2.15 ± 0.72 [a]

Note. * $p < 0.05$, between theory and practice in CAFD; [a] $p < 0.05$, between academic degree related to practice; Descriptive data presented as Mean ± Standard deviation.

There is a strong positive correlation between INT_EJE and COMP (0.723), moderate positive correlations between INT_EJE and EFF_IMP (0.586); COMP and EFF_IMP (0.644), as well as a small negative correlation observed between TENS_PRESS and COMP (−0.324) (Table 5).

Table 4. Analysis of subject nature according to working language.

	Language			
	Spanish		English	
	Theory	Practice	Theory	Practice
P1	3.92 ± 0.86	4.35 ± 0.72 *	4.02 ± 0.80	4.11 ± 0.73 [b]
P2	3.59 ± 0.90	3.60 ± 0.87	3.76 ± 0.85	3.34 ± 0.92 *,[b]
P3	3.97 ± 0.87	4.02 ± 0.86	3.70 ± 0.90 [a]	3.64 ± 0.83 [b]
P4	4.15 ± 0.81	4.23 ± 0.77	3.91 ± 0.95 [a]	3.90 ± 0.82 [b]
P5	2.03 ± 1.11	1.90 ± 1.11 *	2.15 ± 1.17	2.10 ± 1.19
P6	3.88 ± 0.89	3.88 ± 0.87	3.51 ± 0.96 [a]	3.24 ± 0.82 [b]
P7	3.88 ± 0.93	4.41 ± 0.75 *	3.91 ± 0.88	4.19 ± 0.86 *,[b]
P8	4.01 ± 0.84	4.40 ± 0.74 *	3.84 ± 0.90	4.01 ± 0.86 [b]
P9	3.84 ± 0.93	4.06 ± 0.80 *	3.55 ± 0.90 [a]	3.69 ± 0.93 [b]
P10	1.66 ± 0.94	1.54 ± 0.93 *	2.04 ± 1.15 [a]	1.73 ± 1.15 *
P11	2.18 ± 1.19	2.23 ± 1.25	1.90 ± 1.13 [a]	1.73 ± 1.13 [b]
P12	3.98 ± 1.14	3.97 ± 1.14	3.77 ± 1.03 [a]	3.59 ± 0.89 [b]
P13	3.23 ± 1.11	3.61 ± 1.05 *	3.29 ± 0.92	3.26 ± 0.93 [b]
P14	3.85 ± 0.89	4.00 ± 0.80 *	3.94 ± 0.82	3.86 ± 0.84
P15	2.34 ± 1.05	2.09 ± 0.97 *	2.27 ± 0.90	1.84 ± 0.73 *
P16	3.64 ± 0.91	3.77 ± 0.84 *	3.61 ± 0.97	3.36 ± 0.96 [b]

Table 4. *Cont.*

	Language			
	Spanish		English	
	Theory	Practice	Theory	Practice
P17	3.86 ± 1.19	3.98 ± 1.25	3.72 ± 1.23	4.01 ± 0.96
P18	4.22 ± 1.03	4.22 ± 1.03	3.82 ± 1.20 [a]	4.03 ± 1.12
Interest	3.78 ± 0.78	4.15 ± 0.64 *	3.76 ± 0.66	3.92 ± 0.60 [b]
Competence	3.83 ± 0.73	3.93 ± 0.60 *	3.73 ± 0.63	3.65 ± 0.73 [b]
Effort	4.00 ± 0.74	4.02 ± 0.70	3.72 ± 0.72 [a]	3.59 ± 0.56 [b]
Tension	2.05 ± 0.78	1.94 ± 0.72 *	2.09 ± 0.88	1.85 ± 0.84

Note. * $p < 0.05$; between theory and practice for each language; [a] $p < 0.05$, between languages in terms of theory; [b] $p < 0.05$, between languages in terms of practice; Descriptive data presented as Mean ± Standard deviation.

Table 5. Correlations between the 4-dimensions of the IMI questionnaire.

		INT_EJE	COMP	EFF_IMP	TEN_PRESS
INT_ENJ	Pearson Correlation	-			
	N	919			
COMP	Pearson Correlation	0.723 **	-		
	Sig. (2-tailed)	<0.001			
	N	919	919		
EFF_IMP	Pearson Correlation	0.586 **	0.644 **	-	
	Sig. (2-tailed)	<0.001	<0.001		
	N	919	919	919	
TEN_PRESS	Pearson Correlation	−0.271 **	−0.324 **	−0.186 **	-
	Sig. (2-tailed)	<0.001	<0.001	<0.001	
	N	919	919	919	919

** Correlation is significant at the 0.01 level (2-tailed).

4. Discussions

The aim of this study was to analyze the differences on intrinsic motivation of university students between four different criteria such as academic degree, gender, subject nature and working language, when working specific contents through digital and virtual gamification. Firstly, the results (Table 2) showed differences between the values related to the academic degree and gender of the participants. Concerning the academic degree, a significant increase was observed in questions related to interest-enjoyment, effort-importance, and perceived competence when the subject was taught at the undergraduate level (CAFD). Students reported that they made an effort throughout the process, enjoyed the lessons and felt competent after the end of the lessons. On the other hand, there was a decrease in the tension-pressure dimension. Additionally, the correlations in Table 5 showed that the dimensions of interest-fun, competence and effort-importance are strongly positively related. Similarly, competence and the stress-pressure dimension are inversely related. This is in line with the results obtained by Hernández-Ramos, Martín-Cilleros & Sánchez-Gómez [42] in his study, where university students showed a higher level of motivation in lessons when the Kahoot tool was used. This could be due to the previously argued benefits of using gamification as a learning method. In this regard, students who experienced an intervention based on gamification achieved higher values of motivation, teamwork and commitment than those who followed a traditional methodology [43]. Along the same lines, gamification promoted an increased participation of university students [44]. In the review conducted by Subhash & Cudney [5], the results confirmed the effectiveness of gamification in improving the attitude, engagement and performance of university students. Likewise, authors such as Sevil et al. [45], agreed with the increase in student interest and participation when gamification-based strategies are used in the classroom, as it allows influencing student behavior and engagement through experiences constructed

through the game. Similarly, studies carried out in Nordic countries involving hundreds of students [46], reported the benefits associated with the use of game-based e-learning platforms; in particular, they informed that the audio, characteristics and music features of Kahoot! contributed to improve concentration, the classroom environment and dynamics in a positive way. Moreover, Bonde et al. [47] examined the combination of gamified elements with simulations, resulting in an increased motivation and interest level, as well as an improvement in student´s learning effectiveness and competence in comparison with teaching through a conventional model.

Through gamification there is a clear improvement in the emotional perception of the students and a loss of fear in certain content with a medium-high difficulty level. This may be the cause of the decrease in tension perceived by the students in the obtained results [48].

On the other hand, a statistically significant decrease in interest, perceived competence and effort as well as an increase in pressure or tension was revealed when the subject was taught in TEAS compared to CAFD (Tables 2 and 3). In this case, these differences between academic degree within the practical teaching could be related to the group maturity level and background, since CAFD is a very large group with a significant percentage of students with TEAS and other sport-related degrees already completed. Likewise, the CAFD students have a study plan more specific related to sport disciplines and methodologies.

Regarding the gender, male students recorded statistically lower values (Table 2) for questions 13 and 17, related to interest-enjoyment and 15 related to tension-pressure as well as higher values for question 2 concerning perceived competence. Males felt more competent and relaxed during the lessons than females, although they showed less interest or enjoyment compared to female students. These results partially agree with those obtained by Pozo et al. [4], who found lower levels of perceived competence and enjoyment during physical education classes in female students compared to male students. Concerning the perceived competence, this could be due to the lower level of practice of physical activity and, consequently, of skill or ability of women compared to men in carrying out the proposed tasks. On the other hand, the fact of feeling more competent and not having so much pressure to perform activities, possibly affects the interest and effort put into the task to some extent, as evidenced in the results of our study.

Moreover, Gender differences may be influenced or justified by the type of support strategies used in class [49], where the learning process chosen by the student will condition the strengths or weaknesses of such outcomes.

Referring to the analysis of the subject nature (Table 3), in the practical subjects, there were a statistically significant increase in the student interest, perceived competence and a slightly increase in effort dimension, while the tension-pressure decreased in a significant way, compared to the theoretical subjects. In a similar overview, Calderón, Meroño & Mcphail [23] found the positive impact of digital technology approaches on the motivation and perceived competence of university physical education students, with novelty and the active participative role by the student being one of the principles that determine these results. Likewise, Fernández et al. [15] underlined the positive effect of gamification, implemented in the long term, on student motivation and interest, achieving benefits beyond the initial novelty perceived by students. The results demonstrate the positive effect of the application of gamification interventions on the interest and participation of university students [44]. In addition, our results reveal that it is a challenge for teachers to maintain students' motivation, commitment and concentration over time when the subject is more theoretical, possibly due to a less physical involvement and participative role by the student. This could be relevant, due to a lack of motivation could lead sometimes to a negative atmosphere among students, decreasing the interest or effort in the learning process [50].

In the analysis of the working language and subject nature (Table 4), when the subject was taught in Spanish and related to practical contents compared to the English teaching, there was a statistically significant increase in questions related to interest, students'

perceived competence as well as those related to effort dimension. On the contrary, a statistically significant decrease was observed for items related to tension-pressure. Gómez-Ejerique & López-Cantos [16] highlighted the use of new technologies as a training tool to improve students' cognitive and relational communication skills. Moreover, the gamification in lessons can contribute to students' enjoyment of the proposed activities and thus lead to an increase in intrinsic motivation [51], but the design of gamification-based interventions should be adapted to the context of the participants in order to facilitate the perception of psychosocial variables, such as interest and/or perceived competence [14,52]. Actually, it should be considered that the group studying CAFD in English is made up of 100% foreign students, with Middle Eastern countries and India accounting for more than 80%. Hence the importance of adapting to the circumstances and characteristics of the group of students, as cultural changes and contexts, as well as the students' previous experience with non-traditional methodologies, could be relevant factors to be considered and the main reason for these observed differences.

In this line, Dicheva et al. [7] also emphasized the importance of providing gamification experiences based on coherent learning processes adapted to the specific characteristics and environment of the learners. These findings pointed out the importance of designing interventions based on gamification as a practical approach that facilitates the design of authentic learning contexts focused on the students' needs [53].

Current pedagogy must be committed to allowing students greater freedom to expand their thinking outside of the conventional towards collaborative learning methodologies, generating at the same time, optimal learning environments [54]. Gamification in higher education is not directly associated with knowledge and skills, but rather influences students' behavior, increasing their engagement and motivation and thus helping them to improve their knowledge and skills [13]. In this regard, the use of an interactive design methodology enables the observation of the potential value of gamification as an educational tool in higher education and vocational education training as well. Actually, this design of methodological interventions supported by technology and gamified strategies could improve students' cognition, interpersonal communication skills, as well as allows for new learning possibilities.

Taking into consideration all the results and insights discussed previously, we could establish certain practical applications regarding the two apparently most striking issues, such as gender differences and the working language. The intrinsic motivation values are not the same depending on gender and it is known that language influences the student´s motivation in most disciplines.

From this perspective, prior knowledge of the students' interests and orientations can provide a good basis for subsequently planning the gamified teaching activities. Secondly, to encourage collaborative work, if possible, preferably mixed, both in terms of gender and language. Gamification is a very broad concept with enormous possibilities; therefore, we could add the option of gamifying not only through role-playing games, but also through the use of ICT and simulated practices that require multiple users, where the tasks and roles are equitable and interdependent, contributing to autonomy and decision-making. In contrast to more traditional methodologies, collaborative gamified strategies, whereby students interested in a particular topic can invite other students to form a team, would not only provide an inclusive learning experience, but also improve engagement. Teamwork would also improve interactions between students, especially if they are mixed-gender and bilingual. Thirdly, appropriate, functional, easily accessible, understandable and constructive feedback will always help to address imbalances between peer groups, allowing for meaningful learning. Finally, in gamification there are no losers or winners, the participant is guided to progress and problem solving; therefore, rewards and cooperative achievements are a good way to improve participation and interest in the activity itself and the created team.

An important element to consider when teaching international learners is that not only should you concentrate on developing gamification materials adapted to the working

language, but you should also focus on the interests of the learners, being as culturally open as possible. This is one of the most common obstacles for international learners, as communication errors or misunderstandings can be a major barrier, even when using the most innovative methodologies. In this sense, this type of problem can be solved by using gamification, especially through ICT strategies, thanks to its great possibilities of adapting to the needs and contents in an immediate or simultaneous way. The use of technology is also of great help to teachers in assessing students' understanding and overall development.

Therefore, teachers in the higher education level must analyze the environment in which they develop their lessons, in order to use adequate gamified strategies for improving intrinsic/extrinsic motivation and interest in the whole student group, assessing the gender ratio, the subject nature or the working language as very important variables to be considered.

Finally, it is necessary to generate a process of knowledge construction from an experiential and social component through the use of ICTs. A methodological reconversion in the classroom is necessary, starting with the need to improve specific teacher training in the technological area, where the incentive of the educational institution should be present as well. In this way, more interactive and open educational scenarios could be guaranteed in order to increase both, teachers and students´ interest, participation and motivation for the content taught/learned in the classroom.

As limitations, in addition to the persistent and not very motivating traditional teaching methodology in the university environment, interventions based on digital or virtual gamification and the implementation of ICT-based methodologies in the classroom, may be limited by the lack of continuous teacher training in the use of new technologies in the classroom. Some teachers without a developed digital competence consider gamification strategies and tools as a barrier rather than a positive element in the teaching-learning process, mainly due to the time needed to be trained in their use and application.

Moreover, given the number of tools available nowadays, selecting the appropriate platform that really can effectively motivate our students and help them to learn, pay attention, and foster meaningful learning is not an easy task.

Concerning this research in specific, although efforts have been made to standardize gamification processes as much as possible, this process not only depends on the resource (Kahoot in this case), but also on the teacher, the possible question design and the academic content, and so on. Furthermore, the clear gender imbalance is evident, where the number of men is much higher than women, mainly due to the particular characteristics of the degrees taught at the Faculty of Sport. Even though the proportion of women has increased somewhat in some academic years, the imbalance is still quite significant at the faculty.

5. Conclusions

In view of the results, the inclusion of virtual gamified strategies through the use of ICT seems to obtain better results in undergraduate studies, especially in men, in subjects of high practical content and taught in Spanish as a native language, corroborating in this case the previous hypotheses of the study.

The commitment component makes gamification relevant to the context of higher education and a useful tool to engage learners. This may lead to desirable outcomes, for this reason, the aim of these gamified and innovative interventions should be on transforming the academic performance and motivational environment of university students, so that they could obtain maximum benefits, as well as to increase the commitment of those students who are often more concerned about passing rather than learning. In this aspect, especially concerning women and foreign students, knowing their interests and enhancing motivational strategies while increasing their participation with immersive and practical activities is a big challenge for improving the quality of teaching, but also something necessary to alleviate this circumstance.

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