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Original Research

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Gamification and Player Profiles Among Faculty in Mexico

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Abstract

Objectives: Analysis of the player profiles of professors is a fruitful line of research because player profiles may influence the design of gamified situations. We studied a sample of 243 university professors in Mexico to analyze the player profiles with which they identify and those they consider most effective didactically in gamified situations.

Method: Descriptive quantitative research was used to analyze the distributions of the responses to a questionnaire given to a group of 243 professors from different Mexican universities. These responses have been statistically analyzed by computing the proportions of player profile choices and applying Pearson's chi-square test of independence to identify significant differences in these choices.

Results: 42.4% of the participants identify as Explorers, the most frequent player profile among the participants. However, about 15.6% of them consider that their player profile is not the most suitable for learning. Player profiles chosen by the Mexican professors diverge from the player profiles of the students described in previous studies. Significant differences by gender, area of knowledge, and previous training in gamification are also identified.

Conclusion: There is a strong gap between the player profiles of the participating professors and the profile that, in their opinion, is most suitable for learning. In addition, it has been identified that gender, area of knowledge, and previous experience in the use of gamification are influential factors in the player profiles of the professors.

Implication for Practice: The training of professors in gamification should be adapted to the specificities of each area of knowledge. This will allow professors to develop pedagogical skills in gamification that will help them adapt gamified didactic situations to the needs of students.

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Keywords: *game, gamification, higher education, player profile, innovation*

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Introduction

In the last ten years, universities have made intense revisions of their teaching methodologies to implement innovative didactic trends and to incorporate technological and digital resources into the teaching–learning process (Antón-Sancho & Sánchez-Calvo, 2022; Yousof, 2020). There are several reasons for this shift, including (a) the growing digitalization of society, which decisively influences the development of educational processes at different levels (Antón-Sancho et al., 2021); (b) the eruption of new pedagogical paradigms that encourage active, open, or gamified methodologies in higher education to respond to competencies demanded by the current globalized labor market (Antón-Sancho et al., 2021; Fernández-Arias et al., 2021); and (c) the health emergency caused by the COVID-19 pandemic, which made it necessary to rethink many teaching methodologies and adapt them to virtual learning environments (Antón-Sancho & Sánchez-Calvo, 2022). Gamification is, in the above context, a methodological perspective that promotes innovative approaches to digital learning environments in higher education (Vergara, Antón-Sancho, et al., 2023).

The origin of gamification lies in the use of serious games and video games as resources to increase the motivation and participation of users in various contexts, including education (Bassanelli et al., 2022). Gamification differs from serious games in that it implies the use of recreational and game-inspired approaches and mechanics with a purpose that exceeds the merely recreational and extends to the development of certain competencies. It increases user motivation or commitment and generates positive and constructive behaviors on the part of the user (Bassanelli et al., 2022; Koivisto & Hamari, 2019). The introduction of gamified strategies has spread since their initial appearance in the 2000s (Marczewski, 2013) in various work and business environments, including education and training (Kim et al., 2018). Educational gamification is the use of gamified resources and didactic strategies in physical or digital learning environments to improve learning, make it more meaningful, and increase student motivation and involvement in learning activities (Al-Alzawi et al., 2016; Rincón-Flores et al., 2019; Vergara et al., 2019). When applied in higher education, gamification helps to increase academic performance, motivation toward learning, and certain transversal competencies, such as social skills and the ability to interact in work groups (Codish & Ravid, 2014). Gamification has been shown to reduce absenteeism (Laskowski & Wojdyga, 2014). Students also highlight enjoyment and satisfaction as benefits of the application of gamification in the classroom (Manzano-León et al., 2021). Some authors have also indicated limitations to the use of gamification in higher education. The main ones have been the danger that game dynamics may divert the learner's attention from learning objectives and that educational action may be limited to pure game development without sufficient formative impact (Yousof, 2020).

In the design of gamified strategies, the choice of player profiles, or the set of characteristics that define the player's personality and condition the player's motivations and the objectives of their actions, plays an important role (Krath & Von Korflesch, 2021). Studies on gamification that focus on analyzing different player profiles show significant associations between player profiles that can be distinguished and the different possibilities of gamified environment designs (Guimarães-Santos et al., 2021), as well as the different learning contents and personality traits of the users (Rodríguez et al., 2022). The influence of the player profile on the training effectiveness of gamified strategies is discussed to some degree in the literature. Some authors have argued that there is no significant influence of player profile on academic performance (Soepriyanto et al.,

2022) or motivation (Park et al., 2021). Others, however, contend that the design of gamified didactic strategies should, to some extent, attend to students' player profiles because designers should include game elements different from those favored by their own player profile in order to achieve better student outcomes (Park et al., 2021). Analysis of the differences between the player profiles of users and designers and the most suitable player profiles for learning is thus relevant for designing gamified curricula.

To date, the ideal player profile with which to design an educational gamification methodology has not been determined. It could be said that all profiles are suitable in the sense that they all help learning since each profile has its own potentially beneficial peculiarities. Designer demographic characteristics, such as age, gender, and previous knowledge of gamification, could influence the way university professors design a gamification methodology. They may also be predisposed to designing curricula based on their own player profiles instead of designing a more general methodology that appeals to any player profile. It is reasonable to assume that the professor who designs a gamified didactic situation might naturally project their own preferred player profile into the gaming situation. For this reason, it is prudent to distinguish between a designer's own player profile and the most suitable player profile for student learning.

This article describes the perceptions of 243 university professors in Mexico about the player profiles with which they identify and the player profile they consider most appropriate for learning. In addition, this study analyzes differences by gender, age, teaching experience, and the nature—private or public—of the university where the professor teaches. The main novelty of the present work consists of analyzing the professors' player profiles, as well as their perceptions of the most favorable player profile for student learning. There is limited literature that addresses this issue; more information that better illuminates how player profiles impact pedagogical design may contribute to increased academic performance (Oliveira et al., 2022).

Literature Review

The incorporation of innovative methodological strategies in the use of digital technologies in Mexico, where this study was developed, is increasingly intense at all educational levels since its entry into the Organization for Economic Cooperation and Development (OECD) in 1994 (Ulfgard & López, 2017). The effectiveness of digital technologies is supported by the results of the Programme for International Student (PISA) Reports, which, in its 2018 edition, placed Mexico among the top countries in the world in terms of the development of global competencies in its student population (Schleicher, 2018). There is growing educational use of resources such as virtual and augmented reality or problem- and project-based learning at all educational levels (Fernández-Arias et al., 2023; Vergara et al., 2021). Educational gamification is one of the most widely used innovative methodologies in higher education in Mexico (Rincón-Flores et al., 2022), and it is mainly implemented through virtual learning environments (Vergara, Antón-Sancho et al., 2023). With the migration of training actions to online or hybrid environments due to the COVID-19 pandemic, gamification is one of the methodological strategies whose use has most increased in Mexico (Rincón-Flores et al., 2022).

In the Latin American region, there is a significant level of application of gamification in higher education in all areas of knowledge, although publications regarding this are mainly limited to engineering and programming education (Rojas-López et al., 2019; Vergara, Antón-Sancho et al., 2023) and science education (Chans & Portuguez-Castro, 2021). The specialized literature demonstrates the influence of educational gamification on the learning process and its relation to more positive attitudes and students' greater interest in learning (Chans & Portuguez-Castro, 2021), students' intrinsic and extrinsic motivation (Park et al., 2021; Rincón-Flores et al., 2022), academic performance (Soepriyanto et al., 2022), and positive behaviors and attitudes towards learning (Koivisto & Hamari, 2019). Improved grades are a prominent academic benefit of gamification, although to a lesser extent than the motivational and attitudinal benefits (Rincón-Flores et al., 2022).

Within educational gamification, player profiles have been established, with Bartle's (1996) being the classic widespread classification. This classification distinguishes four different player profiles. These include (a) Achiever, a player profile that places the greatest importance on winning; (b) Killer, the player who values competition, liking most to have rivals that are difficult to overcome; (c) Socializer, the player whose main motivation in the game is to establish social relationships; and (d) Explorer, the player looking for the game itself to provide interest, thereby encouraging them to continue playing to explore the whole game. Bartle's classification is not the only taxonomy of player profiles in the literature. For example, Ferro et al. (2013) differentiated five possible player profiles that aim to recreate different personality traits of users. The classification developed by Barata et al. (2016) is based more on students' preferences in terms of the pace of academic activity (from the most participatory to the least active in this regard). However, Bartle's model is considered by some authors to be a fundamental classification of player profiles (Ferro et al., 2013; Kocadere & Çağlar, 2018). This model has been used in several research studies (e.g., Kim, 2015; Williams et al., 2008), and its use has been recommended when designing gamified situations (Werbach & Hunter, 2012).

When designing an educational intervention based on gamification, it is important to consider the personality traits and interests of students in relation to different player profiles (Krath & Von Korflesch, 2021; Zaric et al., 2018). Studies show significant associations between player profiles and the different possibilities of gamified environment designs (Guimarães-Santos et al., 2021); the effectiveness of gamification-based didactic action is achieved through the engagement of these player profiles (Ardila-Muñoz, 2019). It is foreseeable, for example, that a student who identifies with the achiever profile would likely be more successful with designs that focus on achievement (Ardila-Muñoz, 2019). Thus, when designing gamified environments, the professor can match the environment to the player profiles of their students (Taşkın & Kılıç-Çakmak, 2022).

There are, however, discrepancies in the literature. Soepriyanto et al. (2022) argued that the player profile does not influence academic performance. Likewise, Park et al. (2021) found no significant differences in the motivation of students with different player profiles. But Park et al. (2021) also explained that to seek the best possible student learning in the design of gamified situations, professors should try not to project their own player profiles or adapt the situation exactly to the most frequent player profile within each group of students. Park and colleagues assumed that the preferred player profile of the professors might condition how they design a gamified situation and argued that professor player profiles may not be the most suitable for learning. But, as far as it has been possible to explore, this issue is not sufficiently discussed in the literature. Research demonstrates that university professor player profiles and those of students differ significantly (Kimmitt, 2017). This requires the professor to make additional efforts to adapt the gamified situations to the student player profiles rather than imprinting their own preferences. Some studies indicate that the achiever profile is the predominant player profile among university students (Yildirim et al., 2021).

As far as it has been possible to explore, researchers have not analyzed player profile preferences of university professors, except for the pioneering work of Vergara, Antón-Sancho et al. (2023), who analyzed the player profiles of Latin American engineering professors, and Vergara, Gómez-Vallecillo et al. (2023), who examined player profiles of Latin American professors. Vergara, Antón-Sancho et al. (2023) concluded that most engineering professors are Explorers, followed by Killers, and that the Explorer player profile is also considered the most suitable for learning technical concepts. The higher proportion of Explorers in relation to the rest of the player profiles is even higher among females than it is among males and among older professors than among younger ones, which suggests there are other factors, at least sociological, that influence player profile choices. The approach in the present study adds to the work of Vergara, Antón-Sancho et al. (2023) by providing a comparative analysis of professors from different disciplines regarding their choices of player profiles. Vergara, Antón-Sancho et al. (2023) included professors from the entire Latin American region without comparing by country. One of the limitations of that study is precisely that there could be a bias caused by the influence of the professors' country of origin upon their player profiles. Cultural

differences could influence the player profiles of students and faculty, predisposing them to a specific player profile. This should be explored in further research.

Purpose of the Study, Research Objectives, and Hypotheses

We had three research objectives: (a) analyzing the distributions of the choices of player profile with which Mexican university professors identify and the preferences of player profiles considered more suitable for learning; (b) identifying differences between choice of player profile with which professors identify and those considered more effective for learning; and (c) studying whether the above distributions of choices of player profiles are associated with gender, age, area of knowledge, or previous training and experience in the use of gamification of the participants.

The hypotheses to be tested are the following:

H1: Participants' choices of player profile are evenly distributed among the four possible player profiles, both the choice of the player profile itself and the choice of the player profile most suitable for learning.

H2: Professor gender does not significantly influence the choice of player profile.

H3: Professor age does not significantly influence the choice of player profile.

H4: Professor area of knowledge does not significantly influence player profile choices.

H5: Professor previous experience and training in using gamification does not significantly influence player profile choices.

Methods

Population and Sample

Convenience sampling was used. The two criteria for inclusion were being an active professor at a Mexican university and having attended a training session on gamification given by the authors. We contacted a total of 318 professors, and 243 responded to the questionnaire. We informed participants of the research purposes of their responses and did not collect any data that could identify them, including the university at which the professor teaches. All responses were complete.

Procedures

This study is quantitative and is based on an analysis of the distributions of player profile choices among the participating professors, both their own and the one they considered didactically more effective. Express and informed consent was obtained from the participants, whose responses were voluntary, free, and anonymous. No details of the participants that could lead to their identification were recorded. The procedure was approved by the ethics review board of the Technology, Instruction and Design in Engineering and Education Research Group, from the Catholic University of Ávila (Spain).

Professors attended a training session, held fortnightly between October 2021 and June 2022, during which the authors presented the main concepts of educational gamification and its application in higher education, along with Bartle's classification of player profiles, and gave examples of gamified situations in different areas of knowledge. The training session was a master class and did not involve practical exercises by the attendees. Once the sessions were over, the research instrument questionnaire was sent by email to the registered participants in June 2022. All of them were informed of the study's research purposes. It can be assumed that, when they participated in the study, the professors had sufficient and homogeneous knowledge of the basic

concepts of educational gamification and player profiles, at least from a theoretical standpoint, regardless of whether they had previously applied educational gamification in their classes. The participants received a link to the questionnaire and submitted their answers through GoogleForms™.

Instrumentation

We developed a questionnaire consisting of seven questions, based on previous research by Vergara, Antón-Sancho et al. (2023) and Vergara, Gómez-Vallecillo et al. (2023). The first five are dichotomous or polytomous and are aimed at assessing the explanatory variables. The last two are polytomous, with a single response, and correspond to the choice of player profile with which the individual identifies and the player profile the individual considers most favorable for students achieving learning objectives (explained variables). The choices of player profiles are based on Bartle's taxonomy, which we presented during the training session. The construct was validated by Vergara, Antón-Sancho et al. (2023) and Vergara, Gómez-Vallecillo et al. (2023). Data collection was conducted in June 2022.

We examined the following explanatory variables, which define the sociodemographic and academic profiles of the participants: (a) gender, (b) age, (c) area of knowledge, (d) whether they had received training in educational gamification prior to participating in the study, and (e) whether they had experience in applying educative gamification in their classes. All the variables are categorical. They have been identified in previous literature as possible explanatory variables of player profiles (Vergara, Antón-Sancho et al., 2023; Vergara, Gómez-Vallecillo et al., 2023). The variables measuring gender, training, and previous experience in gamification are dichotomous, while the rest are polytomous. Age was measured in 10-year ranges, from 25 to 75 years. The areas of knowledge considered are those defined in the International Standard Classification of Education (ISCED), within the United Nations Educational, Scientific and Cultural Organization Institute for Statistics (UNESCO Institute of Statistics, 2012). In this classification, Education has been integrated into Social and Legal Sciences, and Health falls under Health Sciences. Specifically, the following areas of knowledge have been distinguished: (a) Arts and Humanities (art, history, philology, and philosophy; hereinafter, Humanities); (b) Pure Sciences (mathematics, physics, chemistry, and natural sciences; hereinafter, Sciences); (c) Health Sciences (medicine and nursing; hereinafter, Health); (d) Social and Legal Sciences (geography, law, politics, economics, communication, sociology, education, and psychology; hereinafter, Social Sciences); and (e) Engineering and Architecture (technical subjects; hereinafter, Engineering). Regarding gamification training, previous training is understood as having taken place prior to the talk given by the authors. The explained variables are the player profile with which the participants identify themselves and the player profile participants consider most effective for learning acquisition, both polytomous variables whose possible values are the four player profiles of Bartle's taxonomy: Achiever, Socializer, Explorer, and Killer.

Analysis

The distributions of the responses to each of the questions assessing the explained variables were computed, both globally and differentiating according to the values of each of the explanatory variables. Since all variables are categorical, the responses have been expressed as percentages of the different player profiles chosen, within each possible value, if any, of each explanatory variable. The appropriate statistical analysis, therefore, consists of studying the dependence of the distribution of each categorical variable analyzed with respect to the distribution of each explanatory variable. This determination of the degree of dependence or independence of the distributions of the responses when differentiating by each explanatory variable and their statistical significance was carried out using Pearson's chi-square test of independence. All tests were carried out at the 0.05 significance level.

Results

Participants

Table 1 contains detailed information on the demographics of the sample. Most participants are women (65%), and most are between 35 and 54 years old (63%). The most represented areas of knowledge are the Social Sciences and Engineering; the least represented are the Sciences and Health. Approximately two thirds of participating professors have used educational gamification in the classroom, although only one third have received specific training on it.

Table 1. *Participants*

Characteristic	Value	Percentage (%)
Gender	Men	34.98
	Women	65.02
Age	25 to 34 years old	12.35
	35 to 44 years old	27.98
	45 to 54 years old	35.39
	55 to 64 years old	19.75
	65 to 74 years old	4.53
Area of knowledge	Humanities	21.40
	Sciences	12.76
	Health	13.17
	Social Sciences	30.04
	Engineering	22.63
Previous training in gamification	Yes	36.63
	No	63.37
Previous experience in gamification	Yes	60.91
	No	39.09

Hypothesis 1: Professor Player Profiles and Profiles Considered Most Suitable for Learning

Table 2 shows player profile identification and the profile professors considered best for learning. In general, professors identified most with the Explorer profile, with a difference of more than 15 percentage points between it and the second-most chosen player profile, the Socializer (Table 2). However, among Explorers and Socializers more than 61% of those who identify with the Explorer (slightly more than 26% of the total participants) choose a different player profile as better for learning. Among Socializers, almost 60% prefer other player profiles for learning, with almost 35% opting for the Explorer profile. Those with Killer and Achiever profiles most frequently chose player profiles other than their own as didactically more effective. The Achiever is the player profile with which professors identify the least, and, moreover, only 8.9% of the Achievers think that this is the most didactic player profile. The proportions of player profiles of the professors and those considered better for learning are significantly different, χ^2 (9) = 18.30, $p < 0.05$. Differences between Killers, Explorers, Socializers, and Achievers are significant for the player profiles of the participants, χ^2 (3) = 54.92, $p < 0.05$, and for the player profile considered most suitable for learning, χ^2 (3) = 72.44, $p < 0.05$. The alternative for Hypothesis 1 is confirmed (so participants' choices of player profile are not evenly distributed among the four possible player profiles).

Table 2. *Crosstab of Self-Identified Player Profile and Profile Considered Best for Learning*

		Player profile with which participants identify (%)				
		K	E	S	A	TOTAL
Best player profile for learning (%)	K	7.8	10.3	4.9	0.4	23.5
	E	7.8	16.0	10.3	1.6	35.8
	S	6.6	13.2	12.8	2.1	34.6
	A	1.2	2.9	1.6	0.4	6.2
	TOTAL	23.5	42.4	29.6	4.5	100.0

Note: K = Killer, E = Explorer, S = Socializer, A = Achiever

Hypotheses 2 and 3: Influence of Gender and Age

Table 3 shows by gender the percentages of the professors' choices for player profiles and the player profiles they chose as the best for learning. The frequency of Explorer and Socializer player profiles is higher in women (Table 3). Men and women chose the Explorer profile as the one most effective for learning, although around 8% of men and 6% of women do not identify with it. In general, the difference between the distributions of the player profiles is larger for male Killers and Explorers than for women of the same player profiles, as it is larger for female Socializers than for male. The distributions of the player profiles are different with gender, except in the case of the Achiever profile for the first question and the Explorer profile for the second, where no significant differences by gender are observed (Table 3). This confirms the alternative hypothesis of H2 (so professor gender significantly influences the choice of player profile). Age, on the other hand, does not significantly influence the distribution of responses (Table 4), confirming the null hypothesis H3 (so professor age does not significantly influence the choice of player profile).

Table 3. *Proportions of Player Profiles by Gender*

		Men	Women	χ^2 (3)	Pairwise *p*-value
Player profile with which participants identify (%)	Killer	28.2	20.9	26.91	0.0233*
	Explorer	34.1	36.7		0.0019*
	Socializer	31.8	36.1		0.0011*
	Achiever	5.9	6.3		0.1967
	Total	100	100		
Best player profile for learning (%)	Killer	20.0	25.3	23.98	0.0023*
	Explorer	42.4	42.4		0.7630
	Socializer	31.8	28.5		0.0339*
	Achiever	5.9	3.8		0.0023*
	Total	100	100		

*p <0.05

Table 4. *Proportions of Player Profile Choices by Age*

		25–34 years old	35–44 years old	45–54 years old	55–64 years old	65–74 years old	χ^2 (12)	*p*-value
Player profile with which participants identify (%)	Killer	30.0	30.9	17.4	22.9	9.1	14.19	0.29
	Explorer	30.0	42.6	33.7	35.4	27.3		
	Socializer	33.3	33.7	41.9	37.5	45.5		
	Achiever	6.7	35.4	7.0	4.2	18.2		
	Total	100	100	100	100	100		
Best player profile for learning (%)	Killer	30.0	30.9	22.1	16.7	0.0	14.33	0.28
	Explorer	46.7	38.2	43.0	43.8	45.5		
	Socializer	20.0	27.9	29.1	37.5	36.4		
	Achiever	3.3	2.9	5.8	2.1	18.2		
	Total	100	100	100	100	100		

Hypothesis 4: Influence of Knowledge Area

Table 5 shows the percentages of each of the player profiles chosen as the best for learning according to professors' areas of knowledge. The Pearson test of independence results indicate no significant differences in self-identified profile by knowledge areas. The overall test for the profile deemed best for learning was statistically significant, χ^2 (12) = 25.20, p <0.05. The choice of the Killer profile as the most effective for learning is much lower in Humanities than in the rest of the areas and notably higher in Health Sciences and Engineering, where the Socializer profile was chosen in a smaller proportion. In Health Sciences the Killer profile is more frequently chosen than the Socializer profile. The highest frequencies of choosing the Killer profile as the best for learning are in Engineering. All these differences are statistically significant (Table 5). This confirms the alternative hypothesis of H4 (so the area of knowledge significantly influences the player profile choices of professors).

Table 5. *Proportions of Best Player Profile for Learning by Areas of Knowledge*

		Humanities	Sciences	Health Sciences	Social Sciences	Engineering	χ^2 (12)	*p*
Best player profile for learning (%)	K	9.6	25.8	31.2	23.3	30.9	25.2	0.036
	E	53.8	35.5	53.1	35.6	38.2		0.057
	S	32.7	32.3	15.6	39.7	20.0		0.001
	A	3.8	6.5	0.0	1.4	10.9		0.147

Note: K = Killer; E = Explorer; S = Socializer; A = Achiever

Hypothesis 5: Influence of Previous Experience and Training

More than half of the participating professors have no previous training, but approximately half have some kind of experience in using educational gamification (Table 6). The vast majority of those who have received some type of training on gamification have put it into practice in the classroom. Of the 36.6% of participants with training, 30.0% have experience, which constitutes over 80% of those with training (Table 6). Pearson's

test of independence confirms that the distributions of participants according to whether they have training and according to whether they have previous experience are independent distributions, χ^2 (1) = 26.30, p <0.05. However, no statistically significant differences in player profile choices were identified based on participants' prior gamification experience or training. Therefore, the alternative hypothesis of H5 is confirmed (so previous experience and training in using gamification significantly influence player profile choices of professors).

Table 6. *Training and Previous Experience in Educational Gamification*

		Has Experience (Yes/No)		
		Yes	No	Total
Has Training (Yes/No)	Yes	30.0	6.6	36.6
	No	30.9	32.5	63.4
	Total	60.9	39.1	100.0

Discussion

Interpretation of Results and Integration into the Literature

Among university professors surveyed as to the player profile with which they identify, the Explorer profile dominates, followed in order by the Socializer, the Killer, and the Achiever. The order of preference of the player profile best for learning is the same, but, in this case, the Explorer has less support, and the Socializer and Achiever are chosen more often. There is, therefore, a proportion of Explorers who believe that their own profile is not the most suitable for learning, that instead, the Socializer or Achiever profile is better suited for learning. This result agrees with those presented by Vergara, Antón-Sancho et al. (2023) and Vergara, Gómez-Vallecillo et al. (2023), who confirmed that there do not seem to be essential differences between the player profiles of Mexican university professors and those of Latin American university professors (Vergara, Gómez-Vallecillo et al., 2023) and engineering professors in general (Vergara, Antón-Sancho et al., 2023). Also, the divergence between the professors' individual player profile and the one they considered best for learning suggests that professors can bias learning environments by overly influencing their own player profile. Indeed, the literature suggests that the player profiles of those who design gamified learning environments have a decisive influence on this design (Hassenzahl et al., 2010). The training of professors in gamification should urge them to avoid the bias caused by their own player profiles (Rodríguez et al., 2022).

The results obtained here on the divergence between professors' own player profiles and those they considered best for learning (almost half of the participants are Explorers, but only about a third of them choose the Explorer player profile as the most suitable for learning) diverge from those obtained in other research on the player profiles of university students, who mostly identify with the Achiever profile (Yildirim et al., 2021). Other studies show that students value gamification mainly for its ability to generate communicative environments (Nurtanto et al., 2021), which would indicate a preference for the Socializer profile. In this sense, the results obtained here suggest the existence of a divergence between the predominant player profiles of professors and students. This supports the idea that it is necessary for professors to overcome the potential bias that can be introduced in the design of gamification by their own preference for player profile.

The study findings also suggest, in the absence of more precise results on the student body in Mexico, a strong disconnect between the player profiles of students and those of university professors. This is consistent with the perspective of some previous work (Kimmitt, 2017). There are no studies in the previous literature, as far

as it has been possible to explore, that address potential differences between the player profiles of students and the profiles by which they learn best. However, there are authors who argue that what most moves students to accept gamification is precisely the expectation of learning and academic performance that gamification entails (Chung et al., 2022). This suggests that students consider their own player profile—Achiever, mostly—as well positioned for learning, although it cannot be conclusively determined that no significant differences exist between the player profile they identify with and the one they best value for learning.

Professors' choices of player profiles within each gender follow the general trend. However, women identify with the majority of player profiles (Explorer and Socializer) at a higher rate than men. The differences by gender are significant in Killer, Explorer, and Socializer player profiles. These differences could be due to the existence of differences in the education and training given to men and women, which give rise to different behaviors in adulthood, but the identification of these underlying reasons exceeds the analysis carried out. In contrast, men more frequently choose the Killer profile than they do as the best profile for learning. No significant differences were identified in the distributions of the responses by age. Kimmitt (2017) differentiates player profile choices in university students and finds no significant differences by gender or age, which is partially consistent with the results obtained here for professors. However, here it has been obtained that the frequency of the choices of Killer and Explorer player profiles decreases when the age of participants increases, while the choice of Socializers increases with age, but the choice of the Explorer player profile as the most suitable for learning increases with age. This qualifies Kimmitt's (2017) observations.

The results also show that the subject area of university professors significantly influences their choice of the most appropriate player profile for learning. Significant differences are found between the choice of the Socializer, which is more frequent among professors of Social Sciences, and the Killer, which is more frequent among professors of Engineering and Health Sciences. These results are consistent with those obtained by Vergara, Gómez-Vallecillo et al. (2023) in the region of Latin America. It seems likely that the specific skills necessary for each area of knowledge lead professors to choose the most suitable player profile for learning. For this reason, the Socializer profile, for example, stands out in Social Sciences, whereas the more active profiles, such as Killer, are chosen by engineering professors. This suggests that while all player profiles may be suitable for learning, some may be better than others, depending on the subject content.

In light of these results, there are differences between faculty perceptions of player profiles in Mexico (of all areas of expertise) and player profiles chosen in the specific case of engineering professors from the larger region of Latin America and the Caribbean region, as reported by the literature (Vergara, Antón-Sancho et al., 2023). Although both studies have identified that Explorer is the most frequently chosen player profile in the respective populations of professors, this player type is more frequently chosen among the professors participating in the present study than in the results reported by Vergara, Antón-Sancho et al. (2023). This suggests that knowledge area is indeed a discriminating variable of player profile choice among university professors. This is consistent with the hypothesis testing conducted here on the choice of the most suitable player profile for learning. Another fact supports the previous observation: In the general population of university professors participating in the present study, the second most frequent player profile is Socializer. However, according to Vergara, Antón-Sancho et al. (2023), the second most frequent player profile among engineering professors is Killer. Considering the subset of engineering professors within the participants in the present study, the difference between the second and third most frequent player profiles—Socializer and Killer, respectively—is less than 2 percentage points. But this difference (multipied by 6) reaches the 12 percentage points in the population of engineering professors studied by Vergara, Antón-Sancho et al. (2023) in a population of professors that covers the whole of Latin America. Thus, a significant influence of geographical location on the self-concept of the player profile is suggested in the present article, because the results obtained here for Mexican professors differ (at least in the area of engineering) from the results obtained in general in a population of Latin American professors. At least, the behavior of player profile

choices among engineering professors in Mexico diverges from that of engineering professors in general in the Latin American region. This allows us to identify geographical location as a variable that is likely to be key to the study of player profiles of professors, at least in the engineering area.

Vergara, Gómez-Vallecillo et al. (2023) showed in their study of Latin American professors that gender and age do not significantly influence the distribution of professors' player profiles. In contrast, here it was found that, although age is not influential, gender is. This suggests that the role of gender difference in professors' choice of player profile changes according to the country. It appears that factors influencing the player profile of university professors may depend strongly on geographic location, given that the case of Mexico is far from the results of Vergara, Gómez-Vallecillo et al. (2023) in terms of the influence of gender. Professors' area of knowledge has been shown to influence the distribution of the player profiles chosen by Latin American professors as the best for learning, but not the player profiles with which they identify, which is in line with the results obtained here for the case of Mexico. Both in Vergara, Gómez-Vallecillo et al. (2023) and here, it is shown that Humanities professors most frequently choose the Explorer player profile as the most suitable for learning, followed by Health Sciences professors.

Finally, it was found that neither previous training nor previous experience in the use of gamification significantly influenced professors' choice of their own player profile or their choice of the most suitable player profile for learning. These results are novel in the literature since previous work on player profiles of professors (Vergara, Antón-Sancho et al., 2023; Vergara, Gómez-Vallecillo et al., 2023) had not studied the influence of factors related to training or previous experience. Only Vergara, Antón-Sancho et al. (2023) showed that the level of self-perceived knowledge about gamification does not influence the player profile of engineering professors nor the one chosen as the best for learning. In the present work, this result is extended to professors of all knowledge areas in the region of Mexico. The distinction between training received and experience in the use of gamification was explored instead of simply assessing the level of self-perceived knowledge about gamification.

Limitations of the Study and Lines of Future Research

A limitation is the lack of homogeneity in the distribution of participants by gender, age, and areas of knowledge. A future line of research consists of carrying out a similar study in a population homogeneously distributed by the independent variables, so that the results obtained can be contrasted. The non-application of a gamified activity for professors, to assess which player profile would significantly influence the learning result, is also a limitation of the study. The nature of the sampling, for the sake of convenience, does not ensure that participants have homogeneous levels of digital skills and data handling, which could distort results. It is recommended that an analogous study be conducted by carrying out a sampling process that allows homogenizing this aspect.

It would be interesting to analyze the player profiles of professors and students by means of a comparative correlational study. Likewise, an interesting future line of research consists of carrying out a study contextualized in other countries and, eventually, in other geographical areas. This would allow researchers to identify the possible specificities of the player profiles of Mexican faculty and thus to describe the sociodemographic and cultural factors that may condition the player profile choices described.

Finally, it is recommended that universities intensify faculty training in educational gamification (Araújo & Carvalho, 2022). This training should include the development of competencies in the design of personalized gamified environments adapted to the player profiles of the student body (Taşkın & Kılıç-Çakmak, 2022). The literature suggests that this type of training experience leads to a better perception of gamification by professors and motivates them to use this methodology (Vergara, Antón-Sancho et al., 2023).

Implications for Research and Practice

The results obtained help identify the differences between the player profiles of professors with and without training and experience in the use of gamification strategies, which will help professors design their gamified situations. Likewise, it is recommended that Mexican universities develop ongoing faculty training sessions on gamification that incorporate practical experiences (since it has been proven that experience helps participants to become aware of their own player profiles and elucidates the most effective ones for learning). Professor training should be specifically focused on how to use different player profiles in the design of gamified situations, which will help to eliminate the bias of projecting one's own player profile in the design of learning materials. This training should be specific for professors of each knowledge area.

Conclusions

Overall, there is a significant proportion of professors who understand that their own player profile is not the most suitable for learning. Specifically, a significant percentage of Explorers prefer the roles of Socializer or Achiever for knowledge acquisition. The present study shows the importance of geographic location in the study of the player profile of university professors. In this sense, it is worth noting that the results presented here are specific to Mexico. This conclusion does not come to satisfy the research objectives or hypotheses but arises from the discussion of the results in relation to previous research. The didactic perspective that professors have due to their experience in their respective areas of knowledge also has a decisive influence on the player profile preferences they express for their gamified environment designs.

Additionally, the results show that the gamification experience of Mexican professors does not condition their choice of player profile. This suggests an original contribution to this area of research, namely that the player profile of professors is linked to intrinsic elements of personality, which are difficult to alter through specific training. It is therefore necessary to train professors so that they learn to overcome the gap between their own player profiles and those they consider most suitable for learning. This is a real challenge for the future implementation of educational gamification in higher education. Moreover, given the significant differences among subject areas, training should be specific for professors in each knowledge area. This is reasonable because it is expected that gamified designs should be adjusted to the specificity of the knowledge objects.

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