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ORIGINAL ARTICLE

Gamification as a challenging response to motivate classes in secondary education in the context of COVID-19

La gamificación como respuesta desafiante para motivar las clases en educación secundaria en el contexto de COVID-19

A gamificação como uma resposta desafiadora para motivar turmas no ensino médio no contexto do COVID-19

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ORIGINAL ARTICLE

KEYWORDS

digital skills, COVID-19, gamification, motivation, pandemic, education, secondary education

ABSTRACT. The objective was to determine the correlation between gamification and motivation. It was developed through quantitative, non-experimental, and correlational research. We worked with a census population of 253 students of regular basic education. To obtain data, the Gamification Observation Guide by García (2020) and the MSLQ Motivation Questionnaire by T. García et al. (1988). The results indicated that there is a very low, significant relationship of 0.025 (p-value = 0.0694> 0.05). It is concluded that gamification is not related to the motivation of the students, most of the teachers, in the development of their classes, do not use digital tools - a necessary element in the delivery of classes at a distance and virtually due to the difficult situation caused by COVID-19. Likewise, teachers suffer from inexperience in handling social networks, videoconferences, and online forms.

PALABRAS CLAVE

competencias digitales, COVID-19, gamificación,

RESUMEN. El objetivo fue determinar la correlación entre la gamificación y la motivación. Se desarrolló mediante la investigación cuantitativa, no experimental y correlacional. Se trabajó con una población censal de 253 estudiantes de educación básica regular. Para la obtención de datos se aplicó la Guía de observación de gamificación de García (2020) y el Cuestionario de motivación MSLQ de T. García et

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motivación, pandemia, educación, educación secundaria

al. (1988). Los resultados indicaron que existe una relación muy baja, significativa de 0.025 (valor de p = 0.0694 > 0.05). Se concluye que la gamificación no se relaciona con la motivación de los estudiantes, la mayoría de los docentes, en el desarrollo de sus clases, no emplean herramientas digitales —elemento necesario en el dictado de clases a distancia y de forma virtual por la difícil situación ocasionada por el COVID-19—. Así mismo, los docentes adolecen de impericia en el manejo de las redes sociales, videoconferencias y formularios online.

PALAVRAS-CHAVE

habilidades digitais, COVID-19, gamificação, motivação, pandemia, educação, ensino médio

RESUMO. O objetivo era determinar a correlação entre gamificação e motivação. Foi desenvolvido por meio de pesquisa quantitativa, não experimental e correlacional. Trabalhamos com uma população censitária de 253 alunos do ensino fundamental regular. Para obter dados, o Guia de Observação de Gamificação de García (2020) e o Questionário de Motivação MSLQ de T. García et al. (1988). Os resultados indicaram que existe uma relação significativa muito baixa de 0,025 (valor p = 0,0694> 0,05). Conclui-se que a gamificação não está relacionada à motivação dos alunos, a maioria dos professores, no desenvolvimento de suas aulas, não utiliza ferramentas digitais - elemento necessário na ministração de aulas a distância e virtualmente devido à difícil situação causado por COVID-19. Da mesma forma, os professores sofrem com a inexperiência no manuseio de redes sociais, videoconferências e formulários online.

1. INTRODUCTION

Students of this digital and virtual age do not learn the same as those belonging to a few decades ago, even less, their level of attention and motivation in class is not permanent or productive. The reasons may be diverse, but from the field of teaching strategies applied by the teacher, gamification could be a challenging solution and response to attract and engage the student in different academic subjects. For a long time, the teacher has dedicated himself to giving master classes, focusing more on knowledge and his professional prestige, from a memorial profile, leaving aside the constructivist currents in which the student, in an active and participatory way, produces and recreates his own learning as stated by García (2019).

In the context of the pandemic generated by COVID-19, teachers had to leave their comfort zone, from traditional teaching to virtual teaching, where adaptation to change and commitment to their vocation to teach unblocked fears, insecurities and inexperience to start using digital tools and make use of social networks as resources for our classes. Teachers have unveiled a new look at technology applied to education; Gamification is an important resource that must be used by teachers to reawaken motivation and connect with the language and worldview of students of this generation, who are digital natives (Fadel et al., 2014).

Digital tools and gamification are allies in this context of virtual distance education caused by COVID-19. The social conjuncture of the pandemic should be taken advantage of to promote virtual education through access to mobile devices and the internet (Vera, 2020). The potential of digital natives and the training —by personal initiative— of teachers, in their self-training and adaptation to virtual teaching, must be part of the solution in this pandemic; Furthermore, educators must actively participate in the various virtual trainings carried out by the Ministry of Education.

On the other hand, the disinterest; lack of motivation; the technological facility for students to obtain information immediately; early immersion in video games; rote teaching and the difficulty of teachers to teach great abstract contents of history, both universal and national, in a

tangible and concrete way: the problem of recreating the historical past or imagining geographical spaces, make teaching difficult in the area of Social Sciences (Álvarez, 2020; Carrión, 2018).

Many older teachers reject the use of virtual games as teaching resources and focus more on the use of books; However, due to the emergency context caused by COVID-19, they perceive the importance and need to introduce ICTs in their classes, of which we have experienced their immense potential. For this reason, it is considered that the use of gamified strategies will help to improve student learning due to their high level of motivation, feedback, challenges, direct participation through games and learning assimilated knowledge in a natural way. The question posed, to what extent are gamification and motivation of high school students related? is the target to be determined.

The contribution of this research is to open new thematic fields that improve learning achievements around the competencies of the different academic areas, using gamification strategies with high school students during classes.

With regard to gamification, García (2020) maintains that he obtained a positive relationship of 0.249 and a significance value of $p = 0.017 < 0.05$, concluding the existence of a direct relationship, determining that the greater the use of gamification there is a further development of mathematical skills. On the other hand, according to Illescas et al. (2020), although teachers, when using gamification, consider that its use improves the teaching of mathematics and awakens motivation in students, however, they do not apply it frequently or use it inappropriately; This means that there is a certain degree of ignorance of the playful methodology, so the results are not as expected.

Furthermore, according to Pineda (2019), gamification activities in collaborative learning have a 58% impact on collaborative learning. In addition, Zúñiga (2019) mentions that gamification and video game strategies, with respect to their usefulness, viability and application in the teaching-learning process, show a negative perception of their viability and application due to the lack of resources, continuous training, innovation, infrastructure, technology and time in planning in schools and colleges. In the same way, Iquise and Rivera (2020) state that gamification is beneficial in teaching because it awakens motivation and with it, better learning achievements are obtained. In addition, through the game mechanics, the student can know his progress and compare himself with his peers, since he receives instant feedback and obtains prizes; However, the lack of teacher training and technological infrastructure in schools mean that gamification is little used in the classroom.

For Mite (2020) the use of gamification is favorable in the teaching-learning process; on the other hand, its perception is less favorable in terms of its application, due to the lack of sufficient technology and training. Therefore, it is concluded that the gaze of teachers would change if the use of gamification is promoted in the classroom. Consequently, Morales and Pineida (2020) state that gamification, like the mechanics of challenges and points, also uses competition and reward dynamics, and among the components it uses is free choice and time control. Above all, they conclude that gamification motivates and develops attention and participation, promoting autonomy in learning. Gil and Prieto (2020) concluded that gamification in the learning process

allows students to participate more; are motivated and with better expectations; They understand the content better and are more committed to the course.

One of the first definitions says that "gamification as the use of elements for the design of games, in contexts not related to games" (Deterding et al., 2011, p. 10). The author contributes, making a difference in the definition of the game and the elements of the game design. Also, we have that gamification is "a process related to the thinking of the player and gambling techniques to attract users and solve problems" (Zichermann & Cunningham, 2011, p. 11). These authors contribute that the fact of being able to turn the experience into a game where there are rewards and achievements, in addition, to understand the mechanics of the game that is applicable to any type of problem that you want to solve. This influences the motivation and behavior of people.

When gamification is described, the game is referred to as' a system in which players engage in an abstract challenge, defined by rules, interactivity, and feedback that results in a quantifiable outcome that often elicits an emotional reaction »(Kapp, 2012, p. 7). Likewise, "gamification can become a powerful strategy that promotes education among people and a change in behavior" (Lee et al., 2013, p. 14). In this regard, gamification mechanisms are «the results obtained thanks to the use of certain recreational elements combined with techniques that induce the design of games in a non-recreational contextual situation, therefore, it is also projected towards the improvements of the different skill groups» (Werbach & Hunter, 2012, p. 43).

Among the stimulating factors of gamification are, for Foncubierta and Rodríguez (2016), positive interdependence, which allows teamwork, communication, resolution of challenges and achieving missions, thus strengthening their sense of belonging; the curiosity to learn, discover the history and the challenges of the game is an exciting experience; the protection of self-image and motivation, using an avatar that will be their identity during the game, allowing the student to act without fear and freedom, protecting their self-esteem by using it as their representation; the sense of competition, which stimulates the desire to achieve victory in the game through the score obtained and the ranking of the players; the autonomy of the player, which is seen in the decision-making of each play, and the responsibility of him in the progress when completing the gamified activity, according to his own rhythm and times; and tolerance for error through the repetitions that the player performs to pass and reach a level. This means that they do not give up on the first failure, since the game allows them to try several times and gives feedback, or immediate feedback, which prevents the student from being demotivated and learning from their mistakes (Lamoneda et al., 2020). It also allows you to be informed of his progress, thus identifying his mistakes in order to try again (Oliva, 2016).

According to Werbach and Hunter (2012), gamification has the following dimensions: mechanics, dynamics and components. The mechanical dimension refers to the rules and designs that make up the game, which awaken emotions, challenges and adventures in the player, allowing them to move through the game process; the dynamic dimension refers to the motivation and concern that the players present to face the mechanics of the games; and the components are badges, or collectible badges, which rank and motivate players.

On the benefits of gamification in education: «When we have fun, we release a neurotransmitter called dopamine and its effects have a direct impact on motivation, since it allows us to pay much more attention and interest in what we are doing and, therefore, in learning» (Rodríguez & Santiago, 2015, p. 18). These digital tools and gamified virtual environments are so attractive that it motivates them not to leave the course, to get involved with their learning and improve their academic performance (Ibañez, 2016; Obando et al., 2018). At the same time, he learns in a natural way and assimilates the contents without external pressure, only due to the fluidity of the game's narrative as mentioned by García (2019).

In the same way, "for a long time, the only rewards students have earned have been grades; gamification makes obtaining rewards more frequent" (Ortiz et al., 2018, p. 5).

Employing educational gamification is a resource and an important strategy to improve learning, since "it allows to carry out activities of observation, evaluation, reflection, practice, management, improvement of skills, trial-error and / or problem solving, among others" (Contreras & Eguia, 2017, p. 13). In addition, García (2019) mentions about the «didactic use of educational gamification, ICT can be used, being compatible with Problem-Based Learning or Cooperative Learning» (p.76).

The relationship of historical thought and the use of gamification allows the student to get involved in the imaginative reconstruction of the personal and daily history of the characters. Thus, the motivations, in a historical epoch, include the changes, permanence and consequences of the past in the present. For this, the game must start from a historical problem or a challenge with a series of guidelines to solve it (Sánchez & Colomer, 2018).

The use of video games in education is positive to improve and motivate teaching-learning processes. This admits a virtual interaction with history, working with temporal, spatial, economic, geographical, environmental, architectural, social, artistic and cultural heritage elements; there are various gamified experiences (Cuenca & Jiménez, 2018; Paccotacya et al., 2018; Pascuas et al., 2020). In the same way, (Miranda et al., 2020) mention a series of gamified digital tools where the teacher can create educational materials, allowing a more motivating learning. For example, Socrative, Quizziz and Kahoot, the latter, is a gamified social education web service that reinforces learning through questionnaires (Martínez, 2017).

The importance of gamification and how it may or may not influence motivation should be taken into account. The latter is defined as a "cognitive process that highlights the thoughts of the subjects, their beliefs and emotions as differential elements of it, and that directs us towards the objective or goal of an activity that instigates and maintains it" (Pintrich et al., 2006, p. 16). The dimensions of motivation are assessment, expectations and affection.

The assessment dimension refers to the students' interest in the tasks, content and grades obtained. This dimension has an intrinsic goal orientation, that is, personal motivations, curiosity, security and the student's ability to do their activities; instead, extrinsic goal orientation targets external reasons, such as comparison and competition among classmates. The expectations dimension of motivation mentions the confidence and the good self-concept that the student feels

about their abilities, their success in their jobs, dedication and their good strategies. Finally, the affective dimension of motivation refers to the anxiety and concern of the students that the exams produce them with respect to their grades.

2. METHOD AND MATERIALS

The research presents a quantitative approach, since it was carried out through data collection, numerical and statistical measurement to test theories. Likewise, the design is non-experimental because it lacks a targeted treatment of the variables; rather, the observation of phenomena in their natural space is manifested. It is cross-sectional, since, at a given and unique moment, the data were collected. Regarding the level of research, this is of a simple correlational type and its purpose was to observe the relationship between gamification and motivation (Hernández et al., 2014).

Regarding the sample, 253 male students of regular basic education from a public educational institution were studied. The method was hypothetical deductive, since, starting from a theoretical contribution, an empirical validation was attempted. In addition, for data collection, the survey technique was used and the instrument was the questionnaire.

On the other hand, the instrument used was the Observation Guide by García (2020). This instrument obtained a reliability of 0.913 using Cronbach's Alpha, demonstrating high reliability, therefore, the validity of the judgment of the three experts was acceptable. The instrument used for motivation was the MSLQ questionnaire by T. García et al. (1988). Statistical analysis was performed with SPSS software and the non-parametric test of Spearman's Rho coefficient was used to determine the degree of relationship between the variables.

Some of the questions in the gamification questionnaire in the dynamic dimension were: Do I use technological resources? Do I manipulate technological resources? Am I curious about learning to handle technological resources? Do I express frustration when I can't meet a challenge? Do I express joy when you achieve a challenge? Do I analyze the proposed challenges with the help of technological resources? Do I make strategies to solve challenges? In the mechanical dimension: Do I get points when I can solve challenges? Do I get medals when I achieve a goal? Do I solve challenges virtually? Do I solve more complex missions by completing a level in each challenge? Do I get rewards for winning or beating a level on the educational platforms? In the component dimension: Do I receive information in a game about how progress is being made in solving the questions or problem? Do I play in groups to work together and obtain a common good?

3. RESULTS

The present study obtained as a descriptive result, for the gamification and motivation variables, according to the 253 cases studied, the following: 48 students, representing 19.0%, showed motivation at the medium level; On the other hand, 205, equivalent to 81.0%, showed high-level motivation. Regarding the gamification variable, 16 students, equivalent to 6.3%,

showed a low level; 211 students, representing 83.4%, showed gamification at the intermediate level; and 26 students, equivalent to 10.3%, demonstrated a high-level gamification (see table 1 and figure 1).

Table 1. *Frequency distribution: gamification and motivation.*

			Motivation		
			Medium	High	Total
Gamification	Low	Recuento	1	15	16
		% del total	0,4 %	5,9 %	6,3 %
	Medium	Recuento	45	166	211
		% del total	17,8 %	65,6 %	83,4 %
	High	Recuento	2	24	26
		% del total	0,8 %	9,5 %	10,3 %
Total		Recuento	48	205	253
		% del total	19,0 %	81,0 %	100,0 %

Source: self-made

The descriptive results of the research between the gamification variables in their dimensions of dynamics, mechanics and components, with the variable motivation at the low, medium and high levels are shown and detailed below (see figure 1).

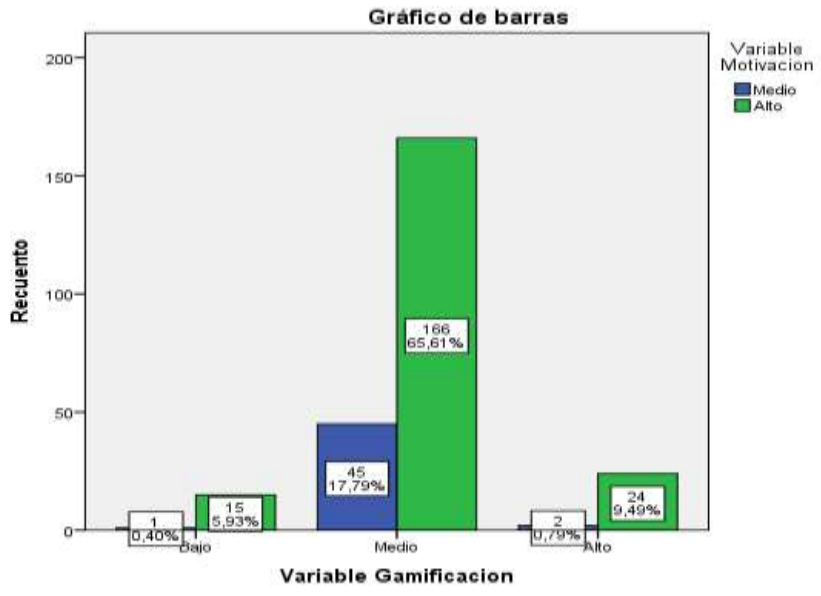

Figure 1. Levels between the variable's gamification and motivation

In the dynamic dimension, with the motivation variable, it was obtained as a descriptive result in the tables, according to the 253 cases studied, that 131 students, who represent 51.8%, demonstrated a high level in the motivation variable and a medium level in the dynamic dimension.

Meanwhile, 68 students equivalent to 26.9% showed a high level in the dynamic dimension and in the motivation variable. In addition, 36 students, who represented 14.2%, obtained a medium level in the dynamic dimension and the motivation variable.

Likewise, for the mechanical dimension with the motivation variable, it was obtained that 131 students, who represented 51.8%, obtained a high level in the motivation variable, but a medium level in the mechanical dimension. Meanwhile, 49 students, equivalent to 19.4%, presented a high level in the motivation variable, and a low level in the mechanical dimension. In addition, 34 students, equivalent to 13.4%, presented an average level, both in the mechanical dimension and in the motivation variable. Finally, 25 students, equivalent to 9.9%, presented a high level in the mechanical dimension and in the motivation variable.

Finally, in the component dimension with the motivation variable, it was obtained, with respect to the 253 cases studied, that 117 students, equivalent to 46.2%, demonstrated a high level in the motivation variable, and a low level in the component dimension. Likewise, 73 students, equivalent to 28.9%, presented a high level in the motivation variable, and a medium level in the component dimension. In addition, 27 students, equivalent to 10.7%, represented a medium level in the motivation variable, but a low level in the component dimension. Finally, 15 students, equivalent to 5.9%, showed a high level in the motivation variable and in the component dimension.

The research had as a general hypothesis: Gamification is significantly related to improving motivation in high school students. The results of the general hypothesis were that gamification is not significantly related to motivation in students of regular basic education: a very low positive Spearman correlation coefficient is indicated between the two variables and, statistically significant, Rho = 0.025, demonstrating the p value = 0.694> 0.05; therefore, it is decided to accept the null hypothesis and reject the alternative hypothesis.

Table 2. *Spearman's Rho correlation coefficient between gamification and motivation.*

			Motivation
Rho de Spearman	Gamification	Coeficiente de correlación	,025
		Sig. (bilateral)	,694
		N	253
	Motivation	Coeficiente de correlación	1,000
		Sig. (bilateral)	.
		N	253

Source: self made

The results of the first specific hypothesis revealed that dynamics are not significantly related to student motivation. A moderate positive Spearman correlation coefficient is indicated

between the dynamic dimension and the motivation variable. Statistically significant, Rho = 0.049, with the value of p = 0.436> 0.05; therefore, the decision is made to accept the null hypothesis and reject the alternative hypothesis.

Regarding the second specific hypothesis, the results showed that mechanics is not significantly related to motivation in students. A very low positive Spearman correlation coefficient is reported between the mechanical dimension and the motivation variable. Statistically significant Rho = 0.002, with the value of p = 0.975> 0.05; therefore, the decision is made to accept the null hypothesis and reject the alternative hypothesis.

Likewise, the results of the third specific hypothesis were that the components are not significantly related to the improvement of student motivation. A low negative Spearman correlation coefficient is indicated, that is, the component dimension is inversely related to the motivation variable. Statistically, it means Rho = - 0.023, being the value of p = 0.715> 0.05; therefore, the decision is made to accept the null hypothesis and reject the alternative hypothesis.

4. DISCUSSION

The main objective of this study has been to measure the level of relationship between gamification and motivation in students of regular basic education.

Regarding the general hypothesis, the results indicate a very low positive Spearman correlation coefficient between the two variables and, statistically, Rho = 0.025, with the value of p = 0.694> 0.05; Therefore, the decision is made to accept the null hypothesis and reject the alternative hypothesis. In this sense, gamification is not significantly related to the improvement of motivation in high school students.

What is mentioned in the previous paragraph is corroborated in the study by Mite (Mite, 2020), where the perception of Guayaquil teachers is not favorable to implement and apply gamification in their classes due to technological insufficiency, lack of knowledge of platforms and virtual tools on gamification.

Similarly, Illescas et al. (2020) argue that in their correlational research, carried out in Azogues, Ecuador, they obtained negative results because they did not apply it frequently and adequately, despite knowing the benefits of gamification. Also, Zúñiga (2019) in his correlational research in Guayas, Ecuador, obtained a positive correlation in the teacher's perception of the usefulness of gamification, and a negative correlation on the viability and application in schools. According to Iquise and Rivera (2020), the lack of training and infrastructure in schools makes teachers use gamification little. All these authors agree that gamification is not related to motivation because the technological and virtual educational reality in Ecuador and Peru has not been implemented in infrastructure, equipment and teacher training for many years and only after the COVID-19 pandemic have ministries of education have begun to invest economically.

On the contrary, the results of Gil and Prieto (2020) differ from the previous ones because in the educational reality of Spain, teachers apply gamification in their classes and consider that they are innovating and improving their professional profile. In addition, they confirm that

gamification has brought positive results to students, since they observe them motivated and participative, this reality is supported in the literature of Foncubierta and Rodríguez (2016). Also, the correlational research of Pineda (2019), carried out on university students from Lima, obtained a significance level of 0.046 between gamification and collaborative learning, as supported by García (2019), finding an incidence between both variables. Thus, it was shown that when students, teachers and schools have sufficient technological resources, they can apply gamification.

As for the first specific objective, which has been to measure the level of relationship between the dynamic dimension and motivation, it was possible to test through the specific hypothesis. The results indicate a moderate positive Spearman correlational coefficient between the dynamic dimension and the motivation variable. Statistically significant, Rho = 0.049, with the value of p = 0.436> 0.05; therefore, the null hypothesis is accepted, and the alternate hypothesis is rejected. In this sense, it is concluded that dynamics are not significantly related to motivation in students. For García (2020), the results differ because he found a positive and weak relationship between the dynamic dimension and mathematical competencies.

As for the second specific objective, which has been to measure the level of relationship between the mechanical dimension and motivation, it was possible to test through the specific hypothesis. The results indicate a very low positive Spearman correlational coefficient between the mechanical dimension and the motivation variable. Statistically significant Rho = 0.002, with the value of p = 0.975> 0.05; therefore, the null hypothesis is accepted and the alternative hypothesis is rejected. In this sense, mechanics is not significantly related to motivation in students.

On the other hand, Gil and Prieto (2020) differ from these results because students in Spain have obtained, as a reward, social recognition or specific prizes in their gamified classes. Along the same lines, Morales and Pineida (2020) mention that, in English classes, teachers use competition and rewards in the same way, as supported by Ortiz et al. (2018). Likewise, García (2020) shows that there is a positive correlation between gamification and mathematical competencies in primary-level students. In both cases, it is because, today, there are more apps and virtual platforms to develop the English language.

As for the third specific objective, which has been to measure the level of relationship between the component dimension and motivation, it was possible to test through the specific hypothesis. The results indicate a low negative Spearman correlational coefficient; therefore, the component dimension is inversely related to the motivation variable. Statistically, it means that Rho = - 0.023, with the value of p = 0.715> 0.05; therefore, the components are not significantly related to the improvement of motivation in students. Morales and Pineida (2020) differ from these results because, in the city of Quito, in English classes the component dimension does develop, giving freedom in the game and controlled time, as supported by Werbach and Hunter (2012). Additionally, students demonstrate more focus, effort, and advancement. Similarly, García (2020) states that in the component dimension a very weak, but statistically significant, positive relationship was obtained.

The aforementioned authors affirm that gamification is related to motivation because in schools in Spain, a country with advanced technological development, teachers have digital skills and their educational authorities are committed to virtual education. Also, in Ecuador and Peru, in some private schools and universities, their directors invest economically in technology and in the market, there are gamified educational software and apps in various academic areas such as English and mathematics, which are being used in these private institutions.

5. CONCLUSIONS

Regarding the general objective, it is concluded that gamification is not significantly related to the improvement of motivation in high school students. This occurs because teachers are just using some digital tools in a forced way due to the context of the COVID-pandemic. 19, they do not have good computers or modern cell phones that allow them to implement gamification and they are not sufficiently trained to start in virtual games. Regarding the first, second and third specific objective, it is concluded that dynamics, mechanics and components are not significantly related to motivation in students. This occurs because, in the classes, elements of the game are not provided that attract their attention and motivate them to participate. Although students can handle some resources, these strengths are not used by teachers. Neither collaborative work, team leadership are encouraged, and immediate feedback is not offered on their mistakes; reasons that do not allow the student to improve. It was also found that teachers do not consider some important components such as achievement levels, ranking or knowledge of the points obtained in the challenge. For adolescents, these elements are important because their friendly environment and their social image are being observed by their peers. Therefore, it is suggested that teachers are encouraged to gamify their classes, because, during the pandemic, a new positive look towards the integration of technology has emerged. To do this, teachers must empower themselves and educate themselves in their digital skills, such as, for example, observing various tutorials on gamified tools. Also, schools are encouraged to invest in technology equipment. In addition, provide training to teachers, because it is, and will be, the global trend and demand in education.

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