# Uso de *Kahoot* como elemento motivador en el proceso enseñanza-aprendizaje

*Use of Kahoot as a motivating element in the teaching-learning process*

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## Resumen

El presente estudio surgió de la necesidad de generar en el alumnado investigado el deseo de aprender mientras se divierten. Las metodologías activas de aprendizaje y, especialmente, la gamificación en la actualidad ha sido muy utilizada; existe en la web un sinfín de herramientas digitales que cumplen con este propósito. El objetivo general de la investigación fue analizar el uso de *Kahoot* como elemento motivador en el proceso enseñanza-aprendizaje. La metodología utilizada en la estructuración de este trabajo fue empírica-analítica de corte descriptivo. Además, se emplearon durante todo el período lectivo 2019-2020 cuestionarios tipo *quiz* para reforzar los temas tratados en cada clase,

mismos que permitieron medir estadísticamente la preferencia del alumnado por el uso de *Kahoot*. La población estuvo determinada por treinta y cinco estudiantes que pertenecieron al segundo semestre de la Carrera de Pedagogía de las Ciencias Experimentales Informática de la Universidad Central del Ecuador (UCE). Los resultados revelaron que el alumnado investigado mostró estar motivado al momento de aprender, así como también al momento de ser evaluados, pues se sentían sin presión para responder. Finalmente, se demostró que *Kahoot* es una herramienta digital que motiva el proceso de enseñanza-aprendizaje incentivando al estudiantado asistir a clases y participar de forma más activa en el aula.

## Palabras clave
Enseñanza-aprendizaje, gamificación, *Kahoot*, motivación.

## Abstract
The present study arose from the need to generate in the investigated students the desire to learn while having fun. Active learning methodologies and, especially, gamification have been widely used nowadays; there is an endless number of digital tools on the web that fulfill this purpose. The general objective of the research was to analyze the use of Kahoot as a motivating element in the teaching-learning process. The methodology used in structuring this work was empirical-analytical and descriptive. In addition, quiz-type questionnaires were used throughout the 2019-2020 school year to reinforce the topics covered in each class, which made it possible to statistically measure the students' preference for the use of Kahoot. The population was determined by thirty-five students who belonged to the second semester of the Pedagogy of Experimental Sciences and Computer Science course at the Central University of Ecuador (UCE). The results revealed that the students investigated showed to be motivated at the moment of learning, as well as at the moment of being evaluated, since they felt no pressure to respond. Finally, it was demonstrated that Kahoot is a digital tool that motivates the teaching-learning process, encouraging students to attend classes and participate more actively in the classroom.

## Keywords
Teaching-learning, gamification, Kahoot, motivation, motivation.

## 1. Introduction
Currently we are connected to the Internet most of our time, even without realizing it, the use of digital devices in different areas of our lives is increasing. The new ways of communicating allow access to information and knowledge, and for this purpose different technological tools are used, although it is not usually taken advantage of as much as it should be, mainly in the educational field.

The education sector is one of the most affected and by not keeping pace with the new advances in information and communication technologies, it is affected in the teaching-learning process. The difficulties that teachers have in adapting to the use of these technological tools is a reality. In this regard, Fonoll et al. (2011) indicate that:

> For classroom teachers, digital technologies are already a change in the way they work. At the very least, it implies methodological changes in their approach to classroom performance. This means that the teacher must adapt the educational content to the needs of the student (p. 36).

In this way, Sánchez considers that the appropriate use of digital tools can motivate students in their learning process. As shown by several studies conducted worldwide (Sánchez, 2015). It is important to pay attention to the distraction of students, both in class and when performing tasks, since students can redirect their attention to other activities that seem more interesting. In this regard, García-Varcárcel, Muñoz-Repiso (2008) indicate that:

> although it is true that the school has, to some extent, embraced the formula of combining entertainment and education, shifting the focus from directed to interactive discourses, it still needs to change and do more research on the use, potentiality and effects of ICT on motivation, communication and learning environments (p. 12).

Thus, it can be determined that there are online educational environments that seek to overcome students' disinterest in learning through games. It is here where gamification as a playful learning technique is presented as an alternative to build knowledge through games.

One of the components involved in this research is precisely the evaluation on the use of the Kahoot tool, considered as a playful methodology, effective for students. In this regard, Teixes (2015) mentions that "they have grown up among video games and are accustomed to immediate and constant feedback and rewards" (p. 34). These techniques that are used in some education apps such as, for example, Duolingo that uses rewards and achievements to teach languages. On the other hand, Kahoot allows us to implement gamification in all kinds of subjects without focusing on one in particular.

Although gamification increases the intrinsic motivation of the student either by the sense of competition when playing a game or by the atmosphere of companionship, there are some factors that must be taken into account for a correct implementation of gamification in the classroom. Gràcia, Sanlorien and Segués (2017) says that, if the "challenge is very high and the subjective perception is of low self-efficacy, anxiety is created and, on the contrary, if the task is very easy and the idea of self-efficacy or their abilities are high, then the individual is bored" (p. 70). Bringing this concept to the use of Kahoot in the classroom means that the questions provided by this tool should be in line with the level of knowledge of the learner, so that an achievable challenge is posed that in turn produces knowledge, skills and abilities. Kahoot is a digital learning resource that can be used for different purposes, for example: to diagnose knowledge about a topic, to know notable aspects of a unit or to check what was learned, as well as to evaluate the degree of understanding of a reading or to debate about a specific topic (Pintor et al., 2015).

Regarding the structure of the article, section 2 presents the concepts related to the research. Section 3 details the works related to this study. Section 4 indicates the methodology used for the research. Section 5 shows the results of the use of the Kahoot tool. In section 6 the discussions are written. Finally, section 7 states the conclusions.

## 2. Related concepts

### 2.1 *Kahoot*

Nowadays there are tools that facilitate all kinds of tasks, in the case of education, there are facilities to get information, communicate or even do academic work. In the teaching-learning process, there are tools to take exams, send assignments and grade them. Kahoot

as a ludic tool allows implementing a gamification methodology that gives the possibility of taking quizzes in a dynamic way. Gallegos (2015) argues that kahoot is:

> one of the most fun, engaging and innovative free digital tools that a teacher can use to increase the creative climate of their classroom. Generally, a creative climate is characterized by good humor, laughter, the absence of fear of what people will say, an environment of teamwork and an atmosphere of camaraderie; this mix of elements makes the class more enjoyable, less boring and much more motivating (p. 48).

Kahoot was created by Professor Alf Inge Wang, who thought of a comfortable and fun educational environment. This game-based tool is more than a simple online test and has certain features that invite students to participate using any mobile device, in an accessible and easy-to-use way, both for teachers and students. In this regard, Gallegos (2015) states:

> Basically the teacher creates the questions on any topic or in any language, and the students answer the questions in real time from any device, be it cell phone, tablet or computer. The student who responds the fastest wins points, and believe me when I tell you that every time I try this tool, whether with children or adults, learning is activated, people wake up and the predisposition to learn is increased (p. 48).

Based on the above quote, it can be observed that kahoot can be very intuitive in the way it works and can be accessed on different devices. It is evident the increase in motivation of students who receive their classes using this tool, as expressed by teachers who have used the tool, regardless of age or type of subject.

## 2.2 Gamification

There are many concepts of gamification, but for practical purposes it is advisable to use the definition of Teixes (2015) who considers that "gamification is the application of game resources (design, dynamics, elements, etc.) in non-game contexts, in order to modify the behavior of individuals, acting on their motivation, to achieve specific objectives" (p. 18). With this appreciation it is evident that the main utility of gamification is to change or modify behavior, but this must be achieved in a more friendly way and with the voluntary collaboration of people.

To complement this definition and to understand in an easier way, gamification can be defined as a game. The game provokes joy and fun. And by combining these characteristics of happiness with education, it could solve the problem of transforming a task that can be demotivating or boring into a highly motivated and fun activity. Ordás (2018) states:

> Gamification is based on a simple idea: we all like to play games. From there, it introduces elements of games in everyday environments, such as organizations, marketing, health or education, with the aim of creating a new environment that motivates people in these environments to participate in its proposals (p.17).

Thus, the strategy of implementing game elements is used in different areas of knowledge that aim to motivate people to use a certain product, to participate in a campaign or, as in

this case, to learn. In education there is very little innovation unlike other areas such as technology and it is this same technology that provides the facility to create new strategies for learning.

### 2.2.1  Gamification as intrinsic motivation

A particularity that is achieved in individuals because of games is the generation of motivation to achieve goals. For Teixes (2015) "intrinsic motivation is the inherent tendency to seek novelty and challenge, to extend and exercise one's capabilities, to explore and learn" (p.22). This human behavior is exploited by gamification and its elements, generating motivation in a natural way.

### 2.2.2.  Characteristics of gamification

Gamification is the application of game principles and elements in a learning environment with the purpose of influencing behavior, increasing motivation and promoting student participation. Gamification is to resort to the use of elements that are part of the structure of the game, is to apply this methodological strategy in a teaching support tool that manages to awaken motivation in students so that their learning processes are meaningful and successful.

> Feedback is about the way to inform the players how far or close they are to reach the goal of the game, it can be in the form of scoring or directly informing the winner.

> Voluntary participation, players must agree both with the objective set and with the rules and feedback, this way the player has a pleasant experience (Teixes 2015, p.27).

### 2.3   Motivation in learning

In the learning process, several factors are taken into account for it to be carried out in the best way. In this regard, Gallardo-Vásquez and Camacho-Herrera (2008) mention that learning is the "change in behavior due to experience that cannot be explained by maturation or innate response tendencies" (p. 23). One of the best ways to achieve this behavioral change in individuals is to motivate them in their learning.

Motivation is a very important factor in the learning process; a motivated student will perform better in his or her skills and development. Gallardo-Vásquez and Camacho-Herrera (2008) say "the term motivation is part of our everyday language and we generally use it to refer to the 'motives' or 'reasons' that explain our behavior or the behavior of others" (p. 9). The desire to learn is something that can be achieved by using different strategies that generate motivation in the learner. Gamification is learner-centered because it can be tailored to the needs of each individual and motivate them to take charge of their own learning.

### 2.3.1   Features defining a motivated activity

For Kim, recognizing the different interests and motivations of participants helps to develop an engaging environment for all learners. In this way, game elements can be incorporated that are more conducive to the involvement and consequent development of all participants in the activity (Kim, 2015).

> Goal- or objective-directed: personal values and interests can be satisfied by fulfilling certain purposes, which is the motivation of an activity.

> Self-regulation: implies the evaluation of the results obtained as well as processes that make it possible to carry out the activity (Gallardo-Vásquez, Camacho-Herrera, 2008, p.10)..

### 2.3.2 Factors influencing motivation

For Kapp, motivation can be intrinsic or extrinsic. Intrinsic motivation occurs when a reward arises from the performance of an activity. Extrinsic motivation fuels behavior performed specifically to obtain an external reward. Intrinsic motivation usually has greater educational value. Well-designed games exhibit both types of motivation (Kapp, 2015).

> Social factors: imitation and competition either alone or between groups are factors that generate great motivation. Didactic factors: rewards, punishments come from external factors such as evaluation results, the context is part of these factors (Gallardo-Vásquez, Camacho-Herrera, 2008, p.18).

## 3. Related work

In 2019, a quasi-experimental research was conducted in Ecuador, where work was done with a group of tenth grade EGB students, through the implementation of the gamification methodology. The results showed that it has an impact on the process of teaching and learning quadratic equations. The authors conclude that an increase of interest of the group was noticed during the development of the classes (Sánchez, 2015).

We also found that, in 2019, in Ecuador, another research was conducted through the implementation of an educational software for learning basic elementary mathematics in the resolution of operations through gamification. The results were that the students were attracted to overcome challenges and levels, in addition to improving cooperation and companionship. The authors conclude that it allows the teacher to reinforce what is learned in class Gutiérrez-Constante and Herrera-Oña (2019).

Another quasi-experimental research we found in Ecuador was conducted in 2017 and involved the participation of fifty pre-intermediate level students (through a diagnosis, in order to subsequently implement gamification). The results proved the effectiveness of gamification as a learning strategy in the written production of the English language. The authors conclude that its use was evidenced as a motivating strategy that promotes learning in a dynamic and joyful way Díaz-Villarruel and Cerda-Solís (2018).

By 2018, a research was conducted in Ecuador that showed gamification as a learning strategy for mathematics support in the topic of polynomials. As a result of this study, an increase in the academic performance of students was found and it was demonstrated that gamification contributed as a learning strategy in mathematics, the authors concluded that the lack of knowledge of these tools makes them to be wasted Pilamunga-Poveda and Quizhpi-Lupercio (2018).

For the year 2018, in Ecuador, a research was conducted on gamification and verbal reasoning of high school students of the Santo Domingo de Guzmán Educational Unit, in the city of Ambato. This research was conducted with a quantitative approach. The results obtained were that gamification helps in the development of verbal reasoning of third year high school students. The authors conclude that verbal reasoning classes are developed in a traditional way with little use of technologies Paez-Quinde and Crespo-Jara (2018).

In 2017, in Ecuador, a research was conducted on patterns in gamification and serious games, applied to education; this was carried out in the Industrial Psychology Career of the Faculty of Human Sciences and Education of the Technical University of Ambato. As a result of this study, it was proved that gamification and serious games, implemented in the learning process, favor mental development and cognitive skills. The authors conclude that students would learn better if they used serious games in the learning process Gómez-Alvarado and Loján-Carrión (2017).

In 2018, in Colombia, a research was conducted at the Pontificia Universidad Javeriana in which two university groups of different careers and semesters were observed. Using gamification methodology to increase student motivation. As a result of this research there was evidence of an increase in the satisfaction, motivation and enthusiasm of the students, which was reflected in their grades. The authors conclude that without realizing it, students were learning significantly (Ardila, 2018).

In 2018, in Peru, a research was conducted at the Universidad César Vallejo. The self-constructive gamification program was implemented to first grade elementary students in Callao. A quantitative approach was used in this study. The results indicated a statistically significant difference in the students' symbolic representation and algorithmic representation skills. The authors conclude that self-constructive gamification was decisive in accepting their hypotheses (Chávez, 2018).

## 4.  Methodology

The present study addressed the use of a digital tool, based on the game, although gamification has been deepened as a playful technique to achieve learning. It was intended to verify the effectiveness of the use of Kahoot in the classroom, for this purpose, an empirical-analytical methodology of descriptive cut was used, measuring through the frequencies of use, the effectiveness of this educational application. The objective of this study was to analyze the use of Kahoot as a motivating element in the teaching-learning process.

Thus, quiz-type questionnaires were used throughout the semester at the end of each class. The investigated group consisted of 35 students of the 2nd semester of the educational technology course, of the Pedagogy of Experimental Sciences and Computer Science Career of the UCE.

The procedure consisted of the teacher designing the questionnaires in Kahoot, based on the contents to be covered in each class and, once the class was over, applying them to the students to evaluate their learning in each session. For their part, the students used their mobile devices to answer the questions, since this digital tool is very flexible. According to Fernández et al. the intuitive graphic interface of the application favors its use, the student perceives it as a game and not as an evaluation system (Fernández et al., 2016, p. 18).  The motivation of the students was evident every time they participated, they answered the questions through the technological devices and this increased the collaboration of the whole group in the activity, without them noticing that they were learning by playing.

A questionnaire consisting of 36 questions was applied to this group, with a scale of 5 possibilities on the Likert scale, to collect the experiences with the use of Kahoot. The instrument was validated by 3 teachers-experts of the career in question, who contributed with their observations to its improvement.

To measure the degree of internal consistency, the Cronbach's alpha reliability coefficient was applied, the resulting value of which was .870, equivalent to good. This analysis attempts to determine the degree to which the items are reciprocally related (Brown, 1980) and is presented below.:

| Alfa of Cronbach | Alfa of Cronbach based on standardised elements | N of elements |
|---|---|---|
| .870 | .950 | 36 |

Figure 1. *Alfa of Cronbach*

## 5. Results

In keeping with the responsibility of complying with a scientific process, the study was carried out during the entire semester of classes, so that the results would have a significant weight, once the instrument was applied to collect and analyze the information. It is important to note that in the mid-term and end-of-semester evaluations, some of the questions used in Kahoot were included to corroborate the effectiveness of this application, and the results were quite enlightening at the time of answering the questions assertively by the students of this subject. The following are some of the most important results of this study:
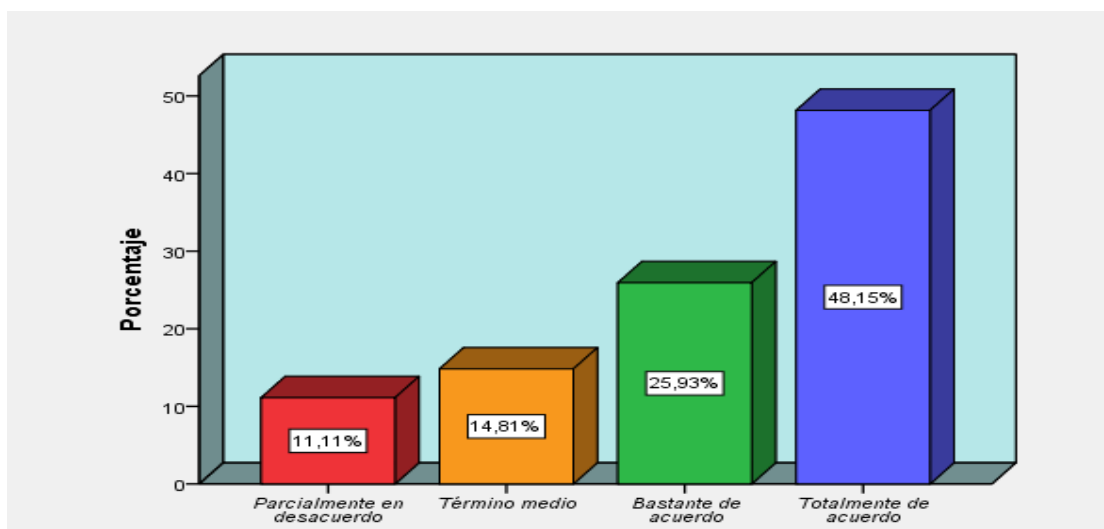


Figure 1. Students' experience using Kahoot on the topics covered in class

For many decades, teachers and researchers have been incorporating different technological resources to improve student learning. Thus, in classrooms we have gone from using radio and TV to computers and mobile devices. Also, overhead projectors were widely used in the past and now we use slides. Castells (2001) states: "Internet makes it possible to work from anywhere (mobile office, portable office, ubiquitous connection...), but work at home is not being developed." (p. 4). In light of the results obtained, we can express that 11.11% of the students stated that they partially agreed, 14.81% expressed
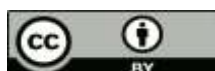
that they moderately agreed, 25.93% stated that they fairly agreed and 48.15% indicated that they totally agreed that Kahoot allowed them to review the topics covered in class. As can be seen, the results of the analysis of the data from the students show a positive attitude towards the use of this digital tool in the teaching-learning process of those investigated.
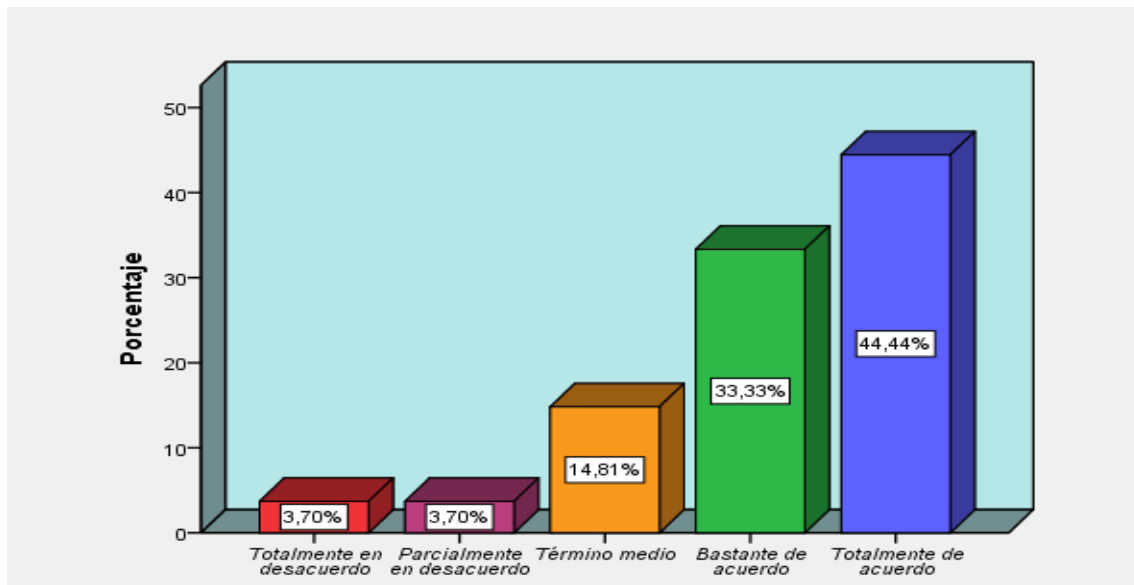


Figure 2. Student preference for answering questions via PC, cell phone, or paper

Information and communication technologies (ICT) are a set of elements and techniques that allow information to be manipulated, converted, stored, managed, transmitted and found through the use of computers and software via computer networks (Windschitl and Sahl, 2002). In this sense, we can see that when the students were asked about their preference for answering questions through the PC, cell phone or paper, 3.70% expressed that they totally disagreed, 3.70% expressed that they partially disagreed, 14.81% indicated that they moderately agreed, 33.33% expressed that they fairly agreed, and 44.44% of the students investigated expressed that they totally agreed with the same preference. As we can see, the results are very convincing when expressing a favoritism for the use of ICTs, at the time of making their evaluations, since they have practically lived with them since they were children.
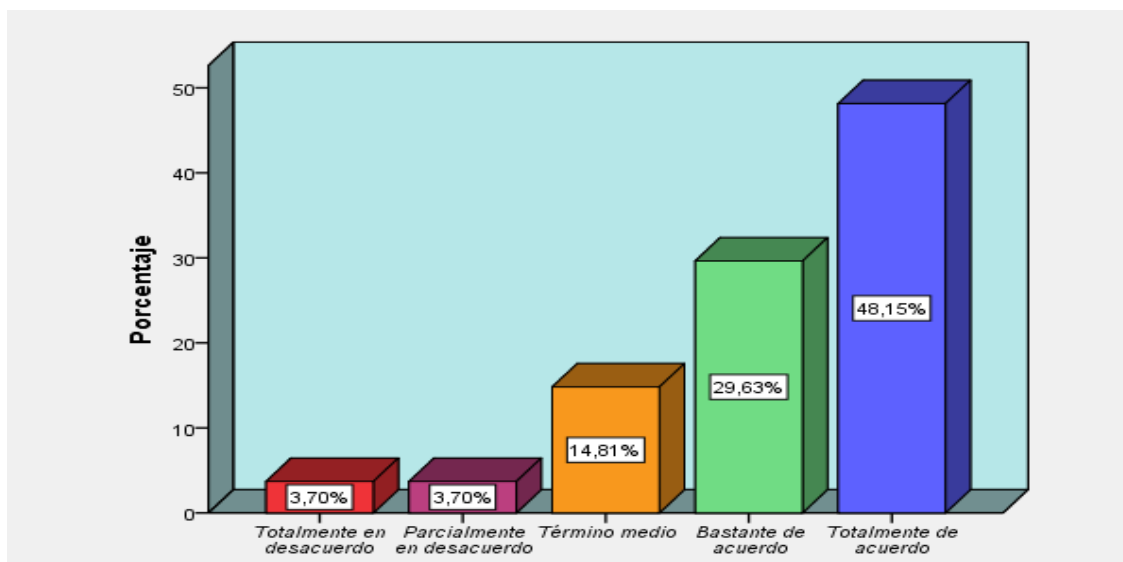
Figure 3. Student motivation to participate in Kahoot question challenges.

According to Wang, there are some new training and motivation techniques, among others, those based on games in the classroom (game-based learning), used to carry out quizzes and online fun in the classroom, favoring motivation through competition among students (Wang and Lieberoth 2015). This competition among students is overshadowed by teamwork, which in most cases is generated by these tools. Motivation is a very important aspect in the teaching-learning process, which is a characteristic of Kahoot. Thus we have that 3.70% of those investigated express total disagreement, 3.70% express partial disagreement, 14.81% indicate that they agree moderately, 29.63% say that they agree quite a lot and 48.15% indicate that they totally agree in feeling motivated to study and thus participate in the questions through Kahoot. Here again, the results are quite conclusive in indicating where the students' preference is concentrated.
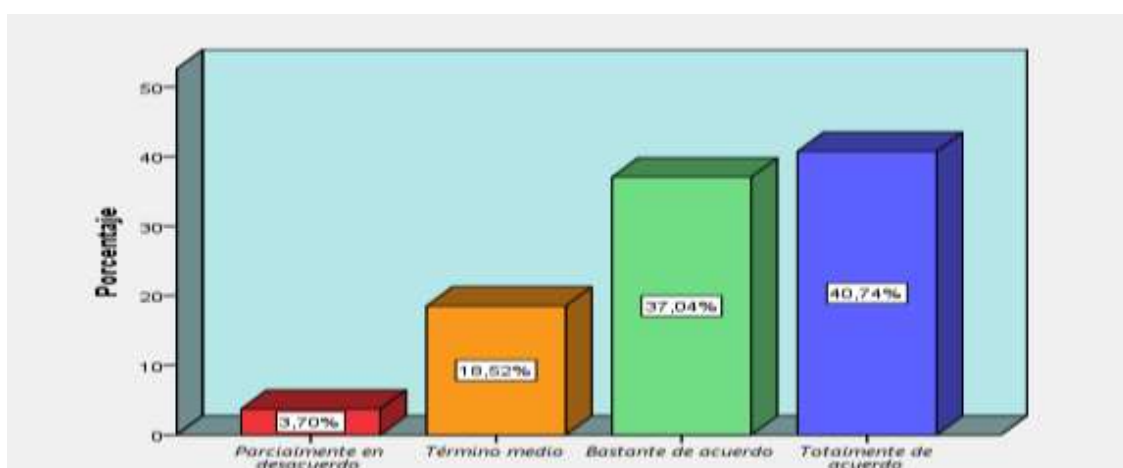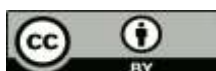


Figure 4. Importance for student learning when using Kahoot

Among others, one of the main advantages of this new way of learning is the active collaboration of the entire student body. The less participative and introverted students, who contribute, but do not stand out from the rest of the class, reappear in the classroom

when they achieve outstanding positions in the score. This learning methodology makes it possible to shorten the "distance" with distant students, a characteristic of student-centered teaching approaches (Salinas, 2004). The students' appreciation of the importance of using Kahoot is evident. And from the results obtained we can see that 3.70% of those investigated express partial disagreement, 18.52% state that they agree moderately, 37.04% indicate that they agree quite a lot and 40.74% express that they totally agree on the importance of using Kahoot for their learning. The results once again indicate the students' preference for the use of this digital tool in their learning, which is not a novelty, since, being an interactive resource, it is very attractive to the students.
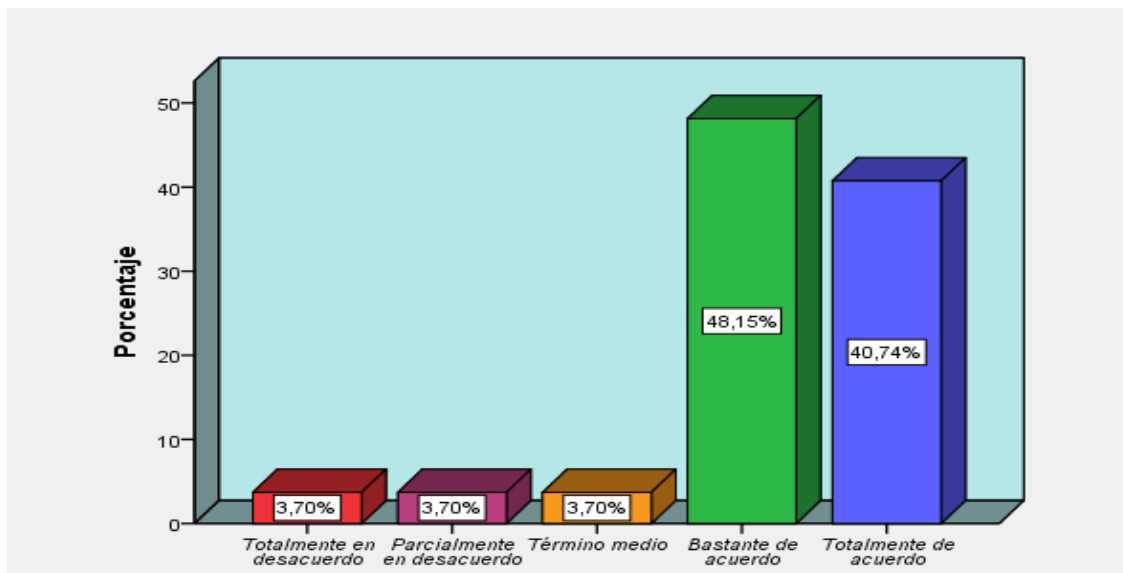


Figure 5. Collaborative learning development using Kahoot

Scardamalia and Bereiter (1994) state that "students need to learn deeply and learn how to learn, how to formulate questions and pursue lines of inquiry so that they can construct new knowledge from what they know. Self-knowledge that is discussed in a group motivates the construction of new knowledge" (p. 266). Kahoot provokes collaborative learning when students discuss the results of the questions with the teacher, for this reason it is important for the teacher to plan adequately, not only the questionnaire, but also how it will be used with the students. As can be observed, and in light of the results obtained, 40.74% of the respondents stated that they totally agree that Kahoot motivates collaborative learning. Also, 48.15% of the respondents stated that they strongly agree that Kahoot motivates collaborative learning. On the other hand, 11.10% of the respondents stated that they moderately, partially disagreed and totally disagreed that the ICT resource in question motivates collaborative learning.

## 6. Discusion

The Kahoot software is an important and powerful digital tool that, through game-based learning, allows students to learn new topics or review others they have already learned. Here lies the importance of the use of these ICT resources in the classroom, given the flexibility they present. When analyzing the use of Kahoot as a motivating element in the teaching-learning process, and as could be observed in the results section, this software produces motivation when used in the classroom. Thus Rodriguez (2015) states: "this fact transforms this type of experience into an incentive for class attendance (p. 12).

Also, it can be seen that the results presented in the questionnaire responses regarding the students' preference to answer the evaluation questions through the cell phone, instead of using paper, are mostly positive for this study, since they expose a reality of the students in the classroom. And this is consistent with a series of studies conducted by the United Nations Educational, Scientific and Cultural Organization UNESCO (2013) who have stated that "mobile devices can help instructors use classroom time more effectively" (p. 14).

Regarding the motivation to participate in the Kahoot challenges, the students mostly expressed feeling stimulated when they use it and the challenge it represents to compete and play among peers, but at the same time learning the content covered in class. Several researches have been developed around the game and its effectiveness in the teaching-learning process. In this regard, Guimaraes (2015), exposes us that "learning by playing, solving: designing positive learning experiences" (p. 3). Most students once they have worked with Kahoot consider that this digital tool allows them to learn in a dynamic way thanks to the game. Gamification has been used in several basic, middle and higher education institutions in Spain and Europe in general, with very good results. Rodriguez indicates that Alf Inge Wang, -creator of Kahoot- asserted in the study he executed at Norwegian University of Science and Technology (NTNU) that students who handled this software, assimilated 22% more than students who manipulated different games (Rodriguez, 2017).

Thus we have that the investigated student body, manifested mostly in favor that the use of Kahoot, develops collaborative learning. And this is clear, since the use of gamification as part of the teaching methodology has generated new opportunities for educators and students, allowing them to exchange experiences and knowledge and at the same time have fun.

## 7. Conclusions

Once the study was completed and with the data obtained, we can affirm that Kahoot is indeed a motivating element in the teaching-learning process. Although we suggest to continue investigating other dimensions involved to strengthen the results of this research. We emphasize that, although the data presented in this research through the field study are precise and clear, Kahoot became an important methodological strategy for the teacher, since it encouraged the students not to miss classes. In addition to achieving a more active participation in the classroom.

Among other benefits of using this software, is that it has a variety of important functions within it, since it has multiple strategies to achieve the goal that students learn through the game. It is important to note that the teacher who is inclined to use this software must be competent, digitally speaking, given the different activities to be performed.

It is also important to point out that the teacher must maintain a significant level of leadership to maintain an adequate order in the classroom; sometimes the students' excitement caused by the participation and competition can trigger disorganization and indiscipline in the classroom and the teacher is required to reorganize and redirect the students' attention back to their learning.

## Acknowledgments

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