



Kahoot as a data collection tool to work with school age children

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Abstract: This article describes the experience of using the Kahoot platform as a gamified tool for data collection with K-12 students. The context of its use was exploratory research about Global Network Badges, a student reward system designed to encourage participation and motivation. During this research, the challenge of collecting data with children arose, a defying situation for research teams, which led to the use of a Student Response System (SRS). In this context, Kahoot emerged as a playful resource for gathering students' opinions without being invasive in the internal dynamics of the classroom, favoring the researcher's role to go unnoticed, blending in through play and interaction with the participating students. The main contribution of the study is the design of a gamified questionnaire that could be adapted to other similar situations of gathering data from school age students.

Keywords: Kahoot, gamification, data collection methods, research with children.

1 Introduction

Research in education with children is always a challenge for research teams. On the one hand, because of their age, it is necessary to follow a series of ethical procedures to preserve their identity, as well as authorizations from their adults in charge. However, if the study participants are members of the formal educational system, there are also a series of administrative requirements, which require the corresponding institutional permits to carry out the research.

Nonetheless, beyond the ethical and administrative precautions necessary to carry out research in education with children, there is also a methodological challenge: how to capture their attention with dynamics that involve them and motivate their participation, while at the same time being able to record their responses using data collection tools in which the collected data can be systematized and analyzed in an agile and productive manner [Navarro, 2017; Wang and Tahir, 2020].

Because the target audience of the research is children, but also adults, different data collection tools were used for each group.

In the case of students, a data collection tool appropriate to their age is used: Elementary School. Therefore, the focus is on a playful, gamified tool capable of capturing their attention in a fun and entertaining way.

These types of practices that involve playful dynamics and the use of game elements are included in what is known as gamification. When talking about gamification, by definition, it refers to the application of game logic to other contexts, with the aim of invoking the motivating and relaxing experience provided by the game [Hamari *et al.*, 2014].

There is a broad consensus on the definition of gamification as a series of practices that seek to adapt elements of video game design to other areas of daily life [Deterding, 2011], with the aim of encouraging motivation and participation [Ogawa *et al.*, 2015].

Gamification has been a booming field of study in recent years because its logic has been incorporated into multiple aspects of daily life, far beyond the education of children or young people. It is also present in several of the social networks that are available nowadays; in marketing strategies that use widely known trademarks; in employee training for companies; mobile health applications; government procedures; and, of course, in video game development and entertainment [Zichermann, 2011; Sailer *et al.*, 2017].

These logics, which have been incorporated as usual, can be manifested in the following ways: the acquisition of points/miles/currencies when making purchases, which can be exchanged for other goods in the future or deducted from the payment of an upcoming transaction; receiving badges or recognition for achieving goals in relation to daily exercise or nutrition; integrating a leaderboard that provides certain benefits [Tomé Klock *et al.*, 2015].

In fact, this triad known as PBL by its acronym in English (points, badges, leaderboards) is the most common and studied due to its presence in sports applications that measure user performance, marketing strategies, and educational platforms [Larrosa *et al.*, 2023].

However, there are many other elements of the game that manifest themselves in gamified environments. Among the elements most frequently mentioned are the delivery of points, badges, rewards, leaderboards, rankings, levels, campaigns, and progress bars [van Roy *et al.*, 2019; de Santana *et al.*, 2016]. Yet, as Werbach and Hunter [2012] mention, each of these elements separately has a different degree of significance in the effects it generates, determining a specific motivational function. Therefore, just as gamification strategies are present in multiple aspects of our daily lives, it is not surprising that they can also be adapted to educational research, even more so when the focus of the study is school-age children, in which the use of games is incorporated into their daily lives, even in the educational dynamics used at school, or in other areas of training, both formal and non-



Figure 1. Samples of badges from GNB. Examples of characters, shapes, and colorful illustrations available at the platform.

formal.

1.1 Objective

The purpose of this article is to describe a Kahoot application experience as a gamified platform that can be adapted for data collection to work with children.

The article is structured as follows: first, we describe the development process and background of the platform to be studied and Kahoot as a data collection tool; then, we describe the methodology, the sampling frame, and the construction of data collection instruments. Finally, we describe the experience's results and conclusions.

2 Background

For the project called *Global Network Badges (GNB)*, a gamified learning ecosystem to develop transversal skills in the classroom, the GNB tool, developed by Ceibal, the educational agency of the Uruguayan state, was analyzed. The GNB is an SRS whose objective is to make visible the competencies with which the Global Learning Network (GLN) project works. This badge system uses renowned characters from sciences, arts, and culture, as well as historical personalities from various fields of knowledge, through which valuable concepts are represented to explain transversal competencies concepts. These characters offer the possibility of building a narrative from their story in order to represent content of the scholar curriculum (see **Fig. 1**).

During the research, the methodological challenge of how to evaluate the students' appropriation of the concepts that the badges represent was raised. In this context, the possibility of designing a questionnaire with gamified resources emerged, which could be applied to the participating students. The platform chosen was Kahoot due to its quality of being ideal for working with children, given its playful, visual, entertaining, online nature and ease of use by both students and researchers when applying the questionnaire. Kahoot is an educational platform designed to build questionnaires, debates, surveys, and exams, among other possible applications, in which students can interact from any device (mobile, PC, tablet) to participate in the challenges posed. It was developed in 2013 by Professor Alf Inge Wang of the Norwegian University of Science and Technology with the purpose of creating a comfortable, social, and fun educational environment [Navarro, 2017]. Moreover, Kahoot can be used as an evaluation tool, since it makes it possible to save the answers of each student to analyze them afterwards. Likewise, using this potential, for the GNB project it was adapted as a data collection tool, since by storing the responses and offering a very well-structured systematization of the results, it is

very useful for developing questionnaires to collect information.

Contrary to traditional teaching methods in which the focus is on the teacher, and the students have a passive conduct, a different perspective emerges based on the active participation of the student. Students are encouraged to participate directly in the learning process and assume a leading role. This perspective is called active pedagogy [Fullan *et al.*, 2017].

As suggested by Díaz and García [2022], gamification in classrooms is not a totally new method, but gamified mechanics have been integrated into Student Response Systems (SRS), constituting what is called Gamified Student Response Systems (GSRS) such as Quizlet, Socrative, and Kahoot. Motivational aspects of GSRS include competition, leaderboards, achievement badges, reward points, and instant feedback, encouraging students to interact in a playful and participatory mode [Kapp, 2012].

However, an unavoidable question is: why do gamified elements generate such significant engagement? The answer to this question lies in motivation. Studies on motivation have advanced profoundly, and while at the beginning, they briefly distinguish between two major motivational sources: intrinsic motivation/extrinsic motivation, the scope of each one has been greatly specified, and the particular game elements that serve as a trigger in each case have been described.

Among the elements most frequently mentioned are the delivery of points, badges, rewards, leaderboards, rankings, levels, campaigns, and progress bars [Werbach and Hunter, 2012]. However, each of these elements separately has a different degree of significance in the effects it generates, determining a specific motivational function. For example, personalization promotes autonomy, badges aim to establish specific goals to achieve, and leaderboards encourage competition [van Roy *et al.*, 2019].

Therefore, different game elements affect students' motivation in different ways. Hence, when making a more detailed study of the game design elements grouped within what are considered gamified strategies, it is necessary to analyze each separately to quantify their effects. To mention some of them, the use of avatars encourages user personalization; the response time or countdown introduces a climate of risk and integrates emotion; music and sounds generate immersion; photos or images illustrate the topic being discussed and build an aesthetic identity; going through challenges until reaching a final goal indicates a path to follow, with intermediate milestones that reinforce motivation during the path [Tomé Klock *et al.*, 2015]. Notwithstanding, there are few empirical studies that show that learning through gamified experiences triggers motivation to complete tasks or achieve better results. However, there are many studies that claim that gamification in educational environments enhances participation in the activities proposed. These results are obtained when gamification is consistent with the population to which it is applied, to adapt challenges to the level and abilities of the participants, who need to receive a reward of personal realization to avoid anxiety and boredom [Flores *et al.*, 2016]. In this sense, it is necessary to mention that when conducting research whose participants are children, it is essential to take into account the issue of motivation, since their participation in a data collection process is probably not

determined by their own interest, but encouraged by an adult. However, their permanence in the activity has to be driven by some motivational agent, whether intrinsic or extrinsic. What is the difference between intrinsic motivation and extrinsic motivation? The first refers to the tendency of humans to seek novelty and challenge, to extend and exercise their own capabilities, to explore and learn [Souza *et al.*, 2019]. The second refers to the performance of an activity in order to obtain some result and therefore contrasts with the intrinsic motivation that suggests performing an activity for the inherent satisfaction that the activity itself brings [Ryan and Deci, 2000]. Specific examples of each are: intrinsic motivation is manifested when an individual practices a sport, plays a game for fun, or plays a musical instrument; simply for enjoyment and satisfaction. This intrinsically motivated behavior does not require any type of reinforcement. On the other hand, extrinsic motivation is present when interest is directed towards a benefit that does not come from the individual himself but is external, such as, for example: receiving congratulations, a reward, a gift for achieving a goal [Larrosa *et al.*, 2023]. Returning to the experience into focus, data collection is not a motivating source by itself for students. Getting some type of recognition in exchange for participating in the activity can be considered an external motivator. But, as research on motivation suggests, the most genuine motivators are intrinsic ones, since they do not depend on any external reinforcer but rather on just the desire to participate, fun, and enjoyment. Therefore, for this case study, participating in a gamified experience through a playful platform such as Kahoot is a motivating agent by itself, since it constitutes a gaming experience, one of the prototypical cases of intrinsic motivation. Therefore, it is the deepest motivator that can be identified in this experience.

3 Methodology

Data collection for the GNB project was carried out through three sources of information. Firstly, the usage data of the *Logros* platform, the environment in which the GNB is delivered and displayed. Based on badge award statistics, a nationwide mapping was performed, showing the schools and groups in which the use of the tool was most active. From this mapping, a preselection of the groups of students and their teachers was made to apply the data collection instruments (Table 1).

This method of sample selection is called non-probabilistic sampling [Creswell *et al.*, 2007], since it involves selecting cases not randomly, but on the basis of representative cases for the study and rich in content for analysis. This type of sampling is generally associated with limited scope, in-depth studies, with qualitative-based research designs and is focused on the exploration and interpretation of individual experiences and perceptions [Matthews and Ross, 2010].

The selection of participants for the study was carried out by crossing two sources of information. On the one hand, the analytics of the *Logros* platform and the badges delivered. Since the intervention unit on which the work was held was the classroom, and the awarding of badges is mediated by

the group's teacher; based on this information obtained from the platform, those groups were selected in which the use of the tool was more intensive. On the other hand, to complement the information obtained from the platform, qualified informants were used. In this case, they were the teachers who used the tool and the mentors of the GLN territory team, who work directly with classroom teachers throughout the country.

3.1 Sampling Frame

Table 1. Data collected about badges use, from which the groups for the field work were selected.

School	Province	Grades	Groups
1	Durazno	5th, 6th	5th A, 6th A
2	Soriano	4th, 5th, 6th	4th, 5th, 6th
3	Lavalleja	3rd and 4th	3rd, 4th (1)
4	Canelones	4th	4th A, 4th B
5	Maldonado	5th	5th A
6	Flores	4th, 5th	5th A,B, 4th B
Total			12 groups 211 students

The samples are segmented by teachers and students. The aim was not to obtain a representative sample but to ensure that the study was not limited to a single portion of the country. Teachers are considered to be those with in-depth knowledge and active use of the GNB. The selection of participants is based primarily on the knowledge of how to use the platform, so there is no intention to segment samples by other variables such as gender, age, or socioeconomic characteristics of the school location.

The second source of data collection was semi-structured interviews carried out with 6 teachers, one from each of the schools that emerged from the mapping. In turn, semi-structured interviews were conducted with mentors from each of these schools, who are GLN workers whose task is to accompany schools, disseminate the tools available, and train teachers in the technical and pedagogical use of these tools.

The third and final source of information was the questionnaire developed in Kahoot.

3.2 Questionnaire Design

Kahoot was chosen because it is an online platform designed to create quizzes, evaluate student learning, and review concepts, with the particularity that it integrates various elements of game design, such as graphics, music, sound, scoring, leaderboards, etc., with the purpose of promoting the motivation of participants by creating a playful and competitive environment, which increases their commitment [Kapp, 2012]. It is a tool that students know and use often and that meets the requirements of being playful, visual, and capable of collecting and systematizing data in a way that facilitates its subsequent analysis. In particular, the choice of this method is due to the fact that GNB are themselves a gamified tool. For this reason, the dynamics they promote are playful, facilitate participation, exchange, have great visual content, and channel

stories that include curriculum content. Therefore, the realization of group playful activities was ideal, through which data was collected. The questions were presented based on triggering images. These were the badges themselves, to evaluate if they recognize each one, what type of reaction the different characters generate, if they were able to identify the concepts of the GLN associated with each badge, etc.

Due to these characteristics, Kahoot can be classified as a gamified tool since it integrates game elements into its operating logic, with the aim of being playful, attractive, motivating, and also a form of entertainment. In addition to these qualities inherent in gamified environments, Kahoot has its own characteristics that have made it a widely used tool for education due to its perfect inclusion in a classroom environment and the ease with which educational content can be adapted to its game logic [Caraballo *et al.*, 2017]. Likewise, another benefit of gamified learning environments is that they encourage participation while reducing the fear of making mistakes, which, in many cases, is what stops students from participating in class. In this way, trial-and-error processes are encouraged, promoting students to actively intervene in the classroom [Navarro, 2017].

Moreover, the use of this application is a useful method to observe and analyze the interactions between students, with the game elements that the GNB facilitates. This method favors a variety of approaches, ice-breaking techniques, gets close to those who may be shyer, and removes the researcher from the center of attention, so that they can be integrated into the group and go unnoticed during the activities.

Many of the aforementioned characteristics are part of video game environments, which are so common and widely used by children and adolescents. Therefore, using a tool like Kahoot is perceived by students as participating in a game, which generates a feeling of security among users, since it is a low-risk environment and is perceived as playful, entertaining, and fun, which enables a dose of intrinsic motivation that positions the student in a positive way towards the activity. Given these qualities of Kahoot, it is considered an appropriate tool to channel educational content for students without the pressure of feeling evaluated and allowing the relaxation of playing with their classmates. This fact represents additional motivation as for low-performing students, the classroom environment can feel like a hostile environment, where there is fear of making mistakes, being evaluated, and being mocked. There is evidence that the so-called GSRS improves attention capacity, increases attendance, promotes interaction, and provides opportunities for reflection [Díaz and García, 2022].

Following the logic of Kahoot, were applied questions with two options, multiple choice (Quizzes), ranking and open questions, with a word or phrase. An example is shown above (see Fig 2).

As can be seen in Figure 2, the questions posed are simple, designed to be answered during class time consecutively. In addition, questions have a time limit, which encourages students to focus and pay attention. Despite the time limit, students' answers are not evaluated based on whether they were the fastest, nor is a score or penalty given for correct or incorrect answers. The research team knows the answers in advance and compares them with the information provided by



Figure 2. Multiple choice question screenshot.

the students. In this way, excessive competition between participants and winners or losers is avoided, favoring a pleasant and non-frustrating atmosphere.

3.3 Questionnaire Validation

Instrument validation was carried out applying the Technology Acceptance Model 3 (TAM) based on that developed by Venkatesh and Bala [2008]. According to this model, there are two main determinants when adopting a new technology, these are: perceived usefulness (PU) and perceived ease of use (PEU). When a group of individuals adopts a new technology, predicting their intention can provide valuable and accurate information for its implementation [Kriedeman, 2016]. According to the TAM model, these variables (PU and PEU) focus on the intention to use a technology, which results in its positive adoption. For real and effective adoption, reluctant or innovative users must perceive that the technology is easy to use and useful to apply in their classrooms.

The TAM model indicates that the Behavioral Intention of an individual can predict the behavior of using a technology. The following variables and the constructs defined by the TAM model were taken into account:

Table 2. Variables of the TAM model, used to develop the gamified questionnaire.

	Variables	Description
1	Perceived ease of use	If it's perceived as easy to use
2	Perceived usefulness	If it's perceived as useful
3	Behavioral Intention	Intention for its use

3.4 Questionnaire Application

After the selection of the participants, they were segmented into two large groups: teachers and students. Each teacher is associated with his or her group of students, but the data collection methods for each group are not the same. Since the GNB are aimed at Elementary School Education, it is understood that there must be differentiated tools for children and adults.

For the students, it was proposed to carry out the gamified questionnaire, with a playful spirit adapted to their age. The aim is not to determine the knowledge acquired but rather to study how they perceive the tool works and the motivational reactions it generates. Another dynamic used was to carry out a self-evaluation through the badges. That is, what badge they would give to themselves, what skills represented by the badges they have developed, and how they evidence it.

Another question included was making a ranking of badges according to their preferences.

As a general rule, it is sought that the dynamics with students include clear objectives adapted to their age and specific tasks that ensure active participation, with focus on well-defined goals. At the same time, the fact that of being carried out within the same class group to which they belong makes it easier not to interact with strangers to have used the tool together, which favors the conversation to flow towards a topic that they previously know so the exchange is enriched [Cyr, 2019]. The decision of carrying out group activities with students was taken because it is a method of collecting information that facilitates playful and group dynamics in a fun and relaxed environment where children feel comfortable and based on a participation that is not only oral but also physical, and especially in interaction with peers, where very rich results can be obtained. As Cyr [2017] mentions, the objective of group activities is the analysis of the construction of group meanings. In this case, it is a method that adapts appropriately to the construction that students make about the skills that competencies channel and how these are manifested. Likewise, in the case of exploratory research, its validity is highlighted to delve deeper into a topic in which there is marginal knowledge, such as gamification to channel transversal skills. At the same time, it is a useful method to observe and analyze the interactions between students, with the game elements that the GNB represent and between students and the *Logros* platform.

3.5 Ethical Issues

Within the population in which the data collection was carried out, there are two main groups: on the one hand, adults, and on the other hand, students. In the case of students, because they are age minors and are part of the educational system, authorization was required from the National Public Education Administration (ANEP). The data taken from the digital platforms was treated completely anonymously and confidentially, following Ceibal's data protection policies and current legislation on the matter.

Likewise, in the case of adults, they had to authorize their participation, the processing of information, and the corresponding image rights cessions through informed consent. As in the case of students, it is guaranteed that the information will be treated anonymously and confidentially, that will be processed only by the research team, within the scope of this investigation. For no reason will the information provided be used for other purposes or shared with third parties other than the funding bodies and participating organizations. To guarantee this commitment from the research team, participation by teachers and students is completely voluntary, they were offered to be part of the different stages of data collection, but their acceptance does not mean an irrevocable decision, and may decline their participation in any stage of the process. These considerations have been detailed in the informed consent, including the objectives and scope of the research, the purpose of the information provided by the participants, and the security aspects with which the data will be handled.

The information has been treated and stored with the



Figure 3. Word cloud with open questions results (before cleaning)

greatest professional rigor, in secure, password-protected equipment and at no time has been shared without being anonymized, on the web or sites to which people other than the research team have access. Finally, it is guaranteed that for all stages of the research, all participating institutions, as well as those in which the data were collected, had full knowledge and the corresponding authorization to carry out its different stages. Due to the nature of the information, as well as the institutions in which data was collected, it is understood that approval from an ethics committee is not necessary. The authorizations from the responsible organizations, the University of the Republic, Ceibal, and ANEP guarantee that the study does not violate the ethical standards of information processing, data protection, and the legislation in force in the country.

4 Analysis

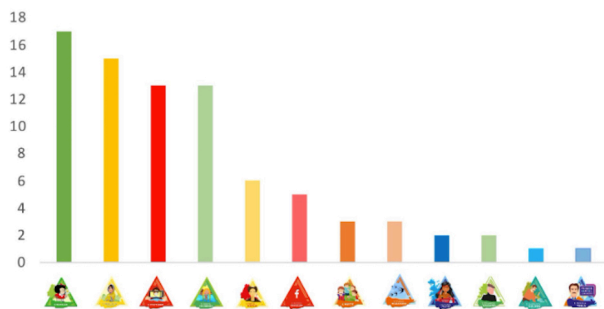
Faced with the challenge of developing an instrument that allows data collection with children at school age and recording it in a systematic way, Kahoot is positioned as a tool capable of presenting questions and evaluating content worked at the classroom, in a playful, entertaining, fun, and motivating way. Given the difficulty of conducting qualitative research with school-age students, this GSRS has many advantages for research teams. On the one hand, the construction of the questionnaire, which makes it possible to integrate music, images of the educational content that is sought to be evaluated, and response time to promote concentration. However, one of the most important elements is the data output provided by the tool. Student responses are grouped according to the questions asked, automatically offering statistics and graphs with students' performance. This easily allows for other data analysis to be applied over the information obtained.

For each question, Kahoot records the answers in a tab, which can be opened and the information extracted, analyzed, or graphed. For example, Figure 3 shows a word cloud made from the students' responses. As can be seen, the data collected by Kahoot need to be cleaned, since there are words in the cloud that are repeated. This is because, since there are open questions, it is possible that spelling or typing errors occur and are reflected in the graphic representation.

To evaluate the students' appropriation of the concepts that each of the badges represents, the following question was asked: *What do you think this badge represents?* (Fig. 2). Fig. 5 was created based on their responses, and it shows that some badges have a better right guess rate than others. In this sense, several hypotheses arouse, which have to do with the

Table 3. All of the questions deployed at the questionnaire and type of each one.

#	Question	Type
1	Which of these badges did you receive?	Multiple choice
2	How did you receive it?	Survey
3	Would you prefer to receive it in paper or digitally?	Survey
4	How did you feel when you receive it?	Word cloud
5	When was delivered, did you tell anyone? To whom?	Word cloud
6	What do you think this badge represents - Eduardo Galeano	Multiple choice
7	What do you think this badge represents - Greta Thunberg	Multiple choice
8	What do you think this badge represents - Mafalda	Multiple choice
9	Order the badges, from the one you like most to the one you like less	Puzzle
10	Imagine you have to give you a badge to yourself, which one would you choose, why?	Open question

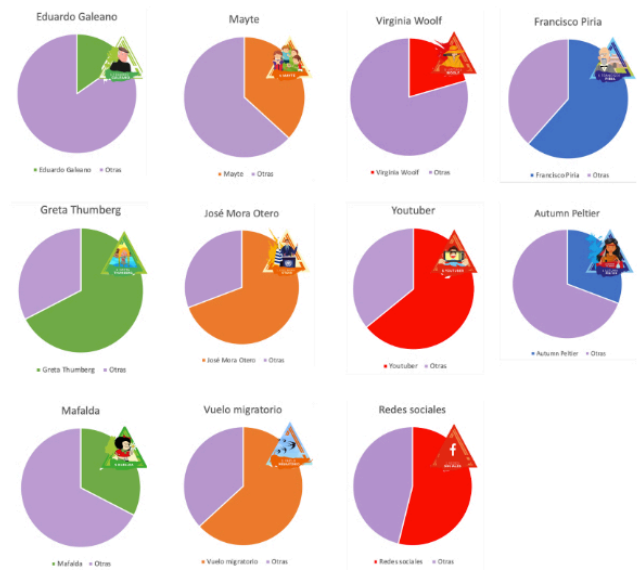
**Figure 4.** Results of the question: What badge would you award to yourself? among 4th grade students.

fact that some characters are more linked to the daily lives of students, are part of their cultural consumption and therefore they feel identified with them. In other cases, the choice is determined by the design of the badge, which awakens their interest and aesthetic taste.

In the case of the other badges mentioned (Mafalda, Malala, Greta, and Frida), interpretation of the results has to do with the fact that the concepts they transmit are more accessible for their age and cognitive development than other more complex concepts associated with other competencies. This is because they transmit clear ideas, are easy to assimilate, and are accessible to be channeled among Elementary School students.

When asked: *What badge would you award to yourself?* the five most chosen badges are Mafalda, Malala, Youtuber, Greta, and Frida (Fig. 4). This fact is significant because it suggests that among the students, the figure of the character, their story, and the daily link they have with their cultural consumption are stronger, rather than the concept they transmit, and not necessarily the content of the competency to which they refer. This is clear for the Youtuber and Social Networks badges, which are the most used, the most chosen by students, and with which it is easier for them to identify what they represent. This is because, despite their age, these are elements that are part of their daily lives and with which they regularly interact.

As for aesthetic identification, some badges simply convey a taste for the character's design. However, a gender identification is also evident, since, when segmenting the preferences of girls or boys, when asked: *What badge would you award to yourself?*, in the case of girls, it manifests a

**Figure 5.** Frequency of right guesses when students must recognize, from the image, the meaning of a particular badge, for 4th year students.

tendency to choose female characters (6).

4.1 Limitations

In any research methodology that involves interviews as a method of data collection, emerges the *social desirability bias*. This is a common bias that must be taken into account when conducting surveys, as it can significantly contaminate the information collected. In this case study, this limitation was identified mostly in the interviews with adults, but also, has to be considered when applying the gamified questionnaire, because it is a bias that appears frequently when there are exchanges between people. This bias refers to the tendency of interviewees to present the best version of themselves, and, therefore, avoid speaking openly about certain topics that may be uncomfortable or that expose negative aspects of themselves. In the case of this research, this bias is present to a lesser extent, since the object of research is not a topic of a sensitive nature, as may be other topics in which this bias is decisive, for example: illicit drug use, sexual abuse, domestic violence. However, to a greater or lesser extent, it is also present and must be taken into account. For example, unconventional use of the tool may be underrepresented in the responses of the interviewees, or the recognition

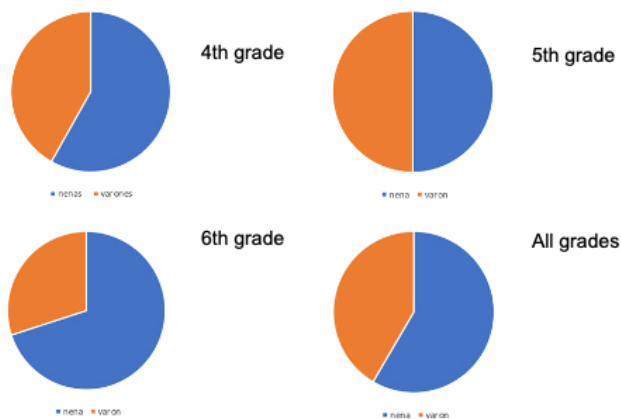


Figure 6. Distribution by gender, regarding preferences for female or male badges.

of a low use of the tool in the classroom, due to not finding it of substantial utility. For this reason, Groves *et al.* [2004] suggest that, to counteract this bias, it is important when applying surveys as a data collection method, to combine the use of other collection methods that they call “objective measures”, among which they cite administrative records, direct observation, statistical data, among others. The function of combining methods is based on the fact that the discourse offered by the interviewee may be affected by his subjectivity and by offering information presented in a positive way. Meanwhile, by using different data sources, the object of study can be approached from various perspectives and contrast the information collected by other sources. This complementary information can help overcome the weakness of the different data sources and fill the gaps that may exist between them. However, it should not be overlooked that the “objective measures” suggested by these authors can overcome the subjectivity that creeps into the interviewee’s discourse, but are also affected by the subjectivity of the interviewer. For this reason, the choice of the data collection method is decisive. While the more direct the data collection method is, the less social desirability bias it will present, methods that involve the direct presence of the interviewer also imply a bias. Groves *et al.* [2004] call this bias the *interviewer bias*. In this case, it refers to the fact that the mere presence of an interviewer can also affect the responses of the interviewees. For this reason, for certain topics, the choice of the interviewer is very important. For example, the authors cite cases in which, when dealing with teenagers, they respond differently depending on the age of the interviewer they are speaking to. In turn, mothers who receive state subsidies declare income more reliably when faced with middle-class interviewers than when faced with interviewers more demographically similar to them (p. 271). Men and women respond differently on issues of gender attitudes, depending on the gender of the interviewer.

In this case, the usage of a playful digital tool dilutes the presence of the researcher, who might be in the classroom conducting the activities, but as the data collection is perceived by students as being participant in a game, the researcher could be considered an equal, another teacher who is taking part in the activities. Other data collection sources

were applied during the extent of the larger investigation: in the case of adults, semi-structured interviews were conducted; and for the data sampling, administrative data from the *Logros* platform was accessed to determine the sampling frame. Nonetheless, for the purpose of this article, only the design and the decisions regarding the gamified questionnaire are described.

In the case of the limitations imposed by the samples in which the study is based, Creswell *et al.* [2007] argue that the use of a methodological design based on a case study helps to generate depth on a topic by analyzing an entire system, including its participants, internal dynamics, tools, and even external influences, based on multiple data sources, which for this study involve observation, interviews, questionnaires, and platform usage data. As the authors mention, a case study does not allow generalizations to be made based on an isolated case, which is why social researchers are reluctant to extend generalizations, especially when contexts differ; but a case study facilitates the analysis of an entire system and its operation, and also allows comparability with other systems with similar characteristics. Therefore, it is important to select a case that is representative of the reality to be analyzed, and that enables the approach through diverse data sources, to delve deeper into its logic from different angles of analysis.

4.2 Future research

This approach is limited to the scope of Elementary Education since the case study on which the experience is based is aimed at that school level. This fact was by itself an advantage since it limited the research to a population with clear characteristics, similar to others with elements in common, homogeneous and in general terms, closed. However, by the mere fact of being based on a case study, its results cannot be generalized, even more, if the findings are to be projected towards other populations with different characteristics from the target audience of this experience. For this reason, a possible future line of research is to delve into GSRs through badges in other populations, for example: Secondary or Higher Education. Tackle the lack of motivation, awakening the interest of students to participate in educational activities, providing input to teachers to improve their practices; are decisive elements to strengthen the educational system and make the educational paths of students an experience that invites them to attend educational centers and become active participants in their own learning. It would be desirable to implement GSRs that run throughout all public education, i.e., Elementary Education, Secondary Education and even Technical Professional Education. With the nuances of each of these subsystems, which are defined first of all by the age of the students, a reward system adapted to the educational platforms that already exist in each of these educational levels can enhance teaching practices and be an input to improve learning. As in the case of *Logros* platform, research can be replicated in these subsystems to delve deeper into how an incentive system responds to older students, who, despite their age, have playful elements that are effective and even more powerful, since they are not common in these populations, coming from the formal education system.

5 Conclusions

To conclude, it can be argued that Kahoot has virtues that make it an appropriate tool for research with school-age children. Its playful, visual, fun, entertaining nature, which includes gamified elements that promote motivation, captivates students, facilitating the work of research teams to collect data in educational settings. In contrast to traditional teaching methods, such as the lecture, in which the focus is on the teacher and the students attend passively, Kahoot promotes active participation from students, encouraging their motivation and providing spaces for students to be protagonists.

A very useful element is the practicality when constructing the questionnaires, in which images, sounds, countdown, rankings can be integrated, in order to make the tool dynamic. But the advantages are not only for the research teams, because by the very logic of the tool, when asking questions, quizzes, or surveys, students and teachers are also favored, since as other studies reflect, Kahoot also encourages “reviewing, remembering, memorizing” concepts, which favors learning [Díaz and García, 2022]. Wang and Tahir [2020] highlight the fact that Kahoot temporarily turns the classroom into a quiz show, where the teacher is the host and the students are the competitors. As the authors pose, the studies published about GSRS highlight the improvement in classroom dynamics, the better disposition of students to solve problems during class time, the improvement in attendance rates, the more pleasant classroom climate, the best disposition to learning and evaluation.

Besides, Kahoot use is aligned with the purposes of GNB use, because, by the logic of the tool, it favors the focus on the characters that *Logros* platform channels. As Toda *et al.* [2019] suggests, Narrative and Storytelling are important game elements used by game designers when building a game environment. The author defines Narrative as a sequence of events that can be modified in quantitative or qualitative ways (e.g., how the sequence is told or its storytelling) in order to be transmitted to a subject. Tomé Klock *et al.* [2015] mentions that “the use of stories allows the transmission of information and the guidance of the users, creating interactive experiences to engage users”. This gamified element has a calming function directly related to the motivation and purpose of the activity to which it is associated. It can be said that the act of narrating stories merges together the purpose and the meaning, in a constant transformation, establishing a dialogue with the receptor [Palomino, 2015].

However, Kahoot also has negative elements, as it displays a competitive environment among students. These functions can be diminished by not awarding points for correct questions, not creating leaderboards, or even registering participants anonymously, not with their own names, but with nicknames created for the occasion. This fact is not minor since one of the concerns that emerge in gamified environments is the danger of encouraging competition over collaboration, or the exposure of winners’ rankings, which in turn show losers, and, therefore, can affect self-esteem [Navarro, 2017]. Added to this is that poorly designed gamified environments, in which external rewards affect the intrinsic motivation of participants, such as the case of rewards that can be per-

ceived as controlling or penalizing, have a negative effect on the participants and result in rejection towards the activities they promote [Toda *et al.*, 2017]. Therefore, one of the recommendations for instructional designers is that they should consider the capabilities of the audience they are addressing, given that, in the case of activities that are too demanding for a given audience, there is a potential possibility of generating a motivational effect contrary to the desired [Larrosa *et al.*, 2023].

The usefulness of Kahoot as a tool to energize the classroom is widely known and proven. This article seeks to exemplify another function of Kahoot that can favor and simplify the work of researchers in their studies involving children in educational settings by offering a tool that quickly systematizes the information collected while presenting the results in a visually attractive and organized manner.

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Availability of data and materials

Screenshots of the whole gamified questionnaire: <https://drive.google.com/drive/folders/1UvXQ9oZ-jEK6erEy8epP2Jt8L0zhOGEf?usp=sharing>

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