A Serious Game to learn English: The case of Bethe1Challenge

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Abstract

It is a current trend in English language teaching research, to study the use of mobile games and technology. However, there is lack of research about how to implement those strategies in settings such as the Colombian high Schools. This article reports a case study aimed at exploring students' perceptions towards the use of the Serious Game Bethe1Challenge supported with gamified classroom activities, used in a high school during pandemic times. To complement this study, interviews, a pre-test and post-test were implemented and analyzed. Although constraints related to the game were discovered, in the end the tests and interviews revealed that the students perceived Bethe1Challenge as an entertaining, fun, and enjoyable game that motivates and improves English learning.

Keywords: *Serious Games, Gamification, Educational Technology, English Language Learning.*

1 Introduction

Scholars around the world have demonstrated that the use of multimodal, interactive materials, games, and technology (mobile devices, among others) have significant impact in students' learning processes, such activities promote motivation, and acceptance of m-learning [1]-[5]. Their results suggests that these kind of materials in the English classes allows students to explore more possibilities to learn a language. It is also suggested that teachers should start transforming their teaching process, the goal is to promote an interactive perspective by using technology [2], [3].

The National Ministry of Education (MEN) in Colombia, has been recently developing different teaching materials to reinforce English learning in this country. Some examples of their projects include: the project Bunny Bonnita, the English for Colombia-ECO program, the didactic material My ABC English Kit, the school textbooks Way to go for 6th, 7th and 8th grade and English, please! for 9th, 10th and 11th grade. Although these strategies use videos, audios, and other interactive and printed tools, none of them were designed as a specific educational game.

Additionally, most students and teachers are resistant to use technology during the class, this can be related to the lack of resources provided by the institutions/local authorities/national governments, also to aggravate this issue, some teachers lack the sufficient training to use these types of technologies daily [6]. Furthermore, there is not a real winner when deciding which pedagogic strategies are most effective to support learning, however, creating awareness of the benefits of the use of technological devices in the classroom is a step in the right direction [7]. The future will be embraced by the

integration of technology, one that allows the optimal use of teaching strategies in English as a Foreign Language (EFL) classrooms [6].

Research confirms that from 2009 to 2014, the introduction of mobile computer has supported collaborative learning in elementary education, this study evidenced that the trend was mainly focused on the use of tablet computers and small handheld devices [8]. There is also a recent study [9] that reviews technological improvements between 2014 and 2018. This paper supports the use of new teaching technologies more commonly by students or in classrooms such as the teaching associate robot, corpus, 3D virtual universes, virtual reality, augmented reality, Wikis, WeChat. Research about these tools show a correlation between their usage and an increase in learning; the use of devices makes studying more effective, precise, engaging, motivating, and meaningful for students [9].

Even though all technologies offer many positive angles, it is also supported that there is a disruption from the traditional teaching methods when introducing digital technologies [10]. This entails the invitation to instructors to "rise above the hype, this may cause discomfort and neglection for incorporating contemporary digital technologies, even though they already very much part of our lives, changing to a new system may prove challenging for some, as best fit the innovations to best serve a purpose in their teaching practices too" [10, p.10].

On the topic of games, research shows that the new generation of teachers are eager to integrate gamified activities into their language teaching. The value of these strategies has not been explored to its fullest yet [11], however current research results have shown that the participating students, have enhanced their understanding and awareness of teamwork skills and have fostered their collaborative learning attitudes [12]. The students expressed their enjoyment of these practices, while boasting an increase on their confidence to express themselves in a new language [12].

Mobile Assisted Language Learning (MALL) has considered to integrate gamification into language teaching settings as well. It has been reported that their tools improved oral communication skills, reading strategies, writing abilities, collaboration, among others; the potential for learning with these tools should not be missed [13]. Likewise, game playing can be a powerful implement for autonomy, for example, a long-term language learner will require maintenance, for a new learner, a fun activity can be an entry-point to gain interest in language; the introduction of these tools has the potential to increase motivation [14]. Research also evidences the positive outcomes of gamification and Serious Games (SGs) in students' learning and motivation [6], [15]-[19].

In Colombia, MALL has been implemented mostly on higher education, undergraduates have positive expectations towards using MALL, even while outside the classroom environment [20]. Although the enthusiasm exists, the students seem to also be reluctant to use MALL in the classroom, their fear is that the system will fail due to the lack of supporting infrastructural facilities [20]. Additionally, there is little research regarding the impact of gamification as a teaching strategy to learn English in state schools in Colombia. There has been no evidence on the research on mobile English learning, the truth on these papers and studies still needs to have systematically been evaluated; it is the only way to the empirically prove the real application of MALL implementation projects [21], [22].

As a result of the technological advances, the integration of SGs, gamification and technology have gradually become a part of the teaching and learning processes in high schools and universities [7]. One could see that we are now in a different age that requires a different approach to teaching since the traditional and transmissive lectures have slowly become obsolete [10]. Additionally, the integration of digital games into the curriculum is a need of the 21st century, due to its numerous benefits for students' learning [23].

Additionally, as an outcome of the trends in the use of technology, SGs, and gamification for learning, in March of 2020, the MEN in Colombia launched the SG application (app) *Bethe1Challenge*, a strategy to strengthen English language learning processes for students from 6th to 11th grade, whose ages range from 11 to 18 years. This digital game was created with the purpose of offering students a stimulating, exciting and

fun experience and at the same time, it was design as a tool for Colombian teachers to improve their teaching practices.

Studying mobile learning and implementing it as a tool to learn the English language, has led to a deeper understanding of its possibilities and the development of new teaching techniques [24]. Therefore, this article focuses on presenting the results of a case study aimed at exploring students' perceptions towards the use of the SG *Bethe1Challenge*, and additional gamified activities that were implemented during the lockdown. This article will show the methodology implemented, a description of the SG, a description of the strategy used, the results, and the discussion and conclusions of this research.

2 Materials and Methods

This research is framed within a qualitative research paradigm. Qualitative research involves the study, use and collection of empiric materials that describe individuals' behaviours and its meaning, making an emphasis on the conveying of meaning [25]. It serves to explore and understand the meaning that individuals give to social and human issues [26].

Based on qualitative research methods, the methodology of analysis used in this research was a case study. Qualitative case studies are a highly fruitful tool to account for the phenomena that considers the individuals, strategies, and processes in the contexts in which they take place, and the phenomenon is studied in depth [25]. Accordingly, this research is an intrinsic case study because its purpose is not to build a theory, but rather that the case itself is of interest, in which the focus is on the deep analysis of the case and not on the generalization of the results [27]. Those type of cases are usually exploratory, and the researcher is guided by the interest of analysing and knowing more of the singularity of the case, generating vivid descriptions of individuals.

Following the framework for case studies [28], the problem identified was students' demotivation towards English learning during the lockdown caused by the pandemic. This problem and others related to the pandemic situation in this region were stated in recent research carried out in the school context [29]. Considering the different situations students were facing and since the research questions are the axis that gives structure to the case [25], we stated the following question:

> What is the perception of students towards the use of *Bethe1Challenge* game supported with the gamified activities implemented during the pandemic?

For case studies the sample is intentional, and it can be selected through different criteria [25]. Regarding that, the unit of analysis chosen for this case study was 10th grade, group 07, whose age ranged from 15 to 17 years. This group of 33 students was selected because they are part of an English emphasis that the high school offers. Nevertheless, only 19 of them (57%) were chosen for the analysis, because they were the only ones with mobile devices to download and use the SG *Bethe1Challenge*.

The information for the analysis is gathered from a plan organized to answer the research question [25]. The instruments to gather the data are oriented at registering and describing the complexity of the phenomena under study and its context, respecting the perspective of the individuals involved [25]. Thus, the information can be gathered through interviews, observation, and artifacts [28]. For this case, interviews, a pre-test and a post-test were the instruments used to gather data.

Open interviews are implemented to allow participants to express their experiences in a better way, without the influence of the researcher's perspective, in which the categories of answers are generated by the interviewee [26]. For this reason, interviews

were implemented to inquire 10th graders' experience in the use of *Bethe1Challenge*, gather data regarding their perceptions about the SG, and the additional gamified activities used by the researchers in the virtual meetings. The questions used in the interview were:

1. What is your perception regarding the use of the *Bethe1Challenge app?* Why?
2. Do you think your English level improved with the use of the application? Why?
3. What did you liked the most about the app *Bethe1Challenge?*What didn't you like? What would you improve about it?
4. What was the mission or level of the game that you liked the most?
5. What is your perception regarding the gamified activities implemented during the virtual meetings?
6. What was the activity you liked the most during the virtual meeting?
7. Did you feel motivated during the virtual meetings in which gamified activities were implemented?
8. Have other teachers implemented gamified activities in the online classes? If so, describe them.
9. Would you like that other teachers include gamified activities to teach in the class? Why?
10. In your opinion, what is the role of technolgoy in the teaching and learning processes?
11. How often do teachers ask you to use the cellphone during the online class?
12. What do you usually use your cellphone for?

In addition, a pre-test and post-test designed by the MEN and the British Council were applied to the 10th graders. Both tests had 55 questions that were divided into seven parts, as presented in the Table 1.

Table 1. *Information about the Pre-test and post-test.*

Areas assessed	Number of questions
Interactive use of English	6
Lexical knowledge	6
Communicative knowledge	6
Grammar knowledge	10
Literal reading comprehension	9
Inferential reading comprehension	6
Lexical and grammar knowledge	12[1]

[1] Source: designed by the researchers.

In Colombia, MEN provided a scale to classify students' results of the exam in accordance with the SABER 11 test (a standardized test that students in Colombia must take before graduating from high school) and its equivalence with the Common European Framework of Reference (CEFR), assigning students a level of A-, A1, A2, B1 or B+. Due to the low results in English in standardized tests reported every year by the MEN, they added the level A- to indicate that students' results could not be placed in level A1. Additionally, B+ means the student exceeded the most complex questions of the test.

Finally, a triangulation process was carried out to qualitatively analyse the data gathered and a research matrix was used to organize the data in a system of categories. Additionally, a paired sample t-test was conducted to compare students' English level improvement before and after the use of the SG and the participation in the gamified activities. The paired sample t-test was carried out to analyse if there was a considerable difference between both results.

2.1 Bethe1Challenge: The Game

Bethe1Challenge is a Serious Game that was specifically designed to strengthen English language learning processes. The SG is available for mobile phones in Apple Store and Play Store. Once the app is downloaded, the user can create an institutional account (for students

from high school in Colombia only) or a free user account (for anyone who wants to play the game).

After creating the profile, the SG shows a message describing the mission that the user must accomplish. Then, the user becomes the agent chosen to solve the puzzle. The user is required to choose among Beginner, Intermediate or Advanced level, considering his/her English level. The SG offers seven missions to be accomplished in each level (see Figures 1 and 2) and they offer questions related to vocabulary, grammar and reading comprehension tasks in English.

Figure 1. *Illustration of the game for users who have accomplished all the missions.*

Figure 2. *Illustration of the game – Mission 1.*

Additionally, the SG offers a dashboard with learning analytics for teachers to follow students' progress in the development of each mission. The learning analytics provide information about the following variables: progress, performance, and participation of the students. *Progress* is measured from students' percentage of completion of each one of the missions in each level and the time in seconds used to complete each mission. *Performance* is analysed from students' number of correct and incorrect answers in each one of the missions, a general percentage is displayed in the teachers' dashboard. *Participation* is measured from the correlation between the time spent in developing each mission and the time limit proposed by the game to accomplish each mission. A full and detailed description of the SG can be found at Colombia Aprende [30], a web page created by the MEN to upload information related to educational issues in Colombia.

2.2 Methodology description

The strategy consisted in the use of the SG *Bethe1Challenge* accompanied with the development of different written and oral gamified activities using technology such as playing Scavenger Hunt, having students create posters, playing bingo, Tic-Tac-Toe among other gamified activities that were implemented during the online meetings as related in Table 2. The strategy was implemented during one academic term at high school (10 weeks).

Table 2. *Description of the strategy*.

Areas	Activities implemented	Development
Interactive use of English	Use of the SG	Playing Bethe1Challenge during – Week 1 for a period of 1 hour
	Playing Scavenger Hunt using signs and places in the house	Virtual Meeting – Week 1 for a period of 1 hour
	Having students create posters to describe their experience using the SG.	Learning Guide – Week 1, 2 & 3
Lexical knowledge	Use of the SG	Playing Bethe1Challenge – Week 3 for a period of 1 hour.
	Having an online spelling bee contest using word families	Virtual Meeting – Week 3 for a period of 1 hour
Communicative knowledge	Use of the SG	Playing Bethe1Challenge – Week 4 for a period of 1 hour
	Using a TED video to analyse typical responses and idiomatic expressions	Learning Guide – Week 4, 5 & 6
	Playing bingo to find the matches for questions and possible responses	Virtual Meeting – Week 4 for a period of 1 hour
Grammar knowledge	Use of the SG	Playing Bethe1Challenge – Week 5 for a period of 1 hour
	Tic-Tac-Toe game in groups to create sentences with verbs	Virtual Meeting – Week 5 for a period of 1 hour
Literal reading comprehension	Use of the SG	Playing Bethe1Challenge – Week 6 for a period of 1 hour
	Written exercise where students paraphrased a text	Learning Guide – Week 7, 8 & 9
Inferential reading comprehension	Use of the SG	Playing Bethe1Challenge – Week 7 for a period of 1 hour
	Using argumentative texts from a TED video to generate class debates against and for topics close to students' reality	Virtual Meeting – Online Debate – Week 8 for a period of 1 hour
Lexical and grammar knowledge	Use of the SG	Playing Bethe1Challenge – Week 9 for a period of 1 hour
	Having groups compete in a Scattergories game	Virtual Meeting – Week 9 for a period of 1 hour [2]

[2] Source: designed by the researchers.

All the activities were planned considering the areas that the pre-test and post-test assessed. 10th graders played the game during the class time in the morning for a period of 1 hour per week, attended the virtual meetings which were held online once a week for a period of 1 hour, and answered the activities from the learning guide which had deadlines to be presented every three weeks during the 10 weeks of the academic term, as referred in Table 2. The last week of the term was used to give feedback to students. The researchers supported 10th graders during the process through WhatsApp, phone calls and video phone calls.

3 Results

Results will be described following the research question related in the methodology and reporting the data gathered from the interviews, the pre-test and the post-test. Additionally, for clarity, the excerpts from the participants' interviews are reported as "S – Number"; it is important to mention that the number indicates that the excerpt corresponds to one of the 19 participants who were part of the 10th grade students.

3.1 Students' perceptions of the use of the SG Bethe1Challenge and its benefits for language learning

Concerning the use of games, [31] affirm that the most suitable strategy implemented for learning languages is gaming, as it can be easily transformed into a learning activity and a vehicle for content, which can be used inside and outside the classroom. The main findings of this research suggest that 76% of the 10th graders interviewed have a positive perspective of the SG *Bethe1Challenge* (see Figure 3). Nearly all of 10th graders related a positive perspective to the fact of considering the SG entertaining, fun, helpful to practice and learn vocabulary, and a way to learn English in a different manner as it was evidenced in the interviews.

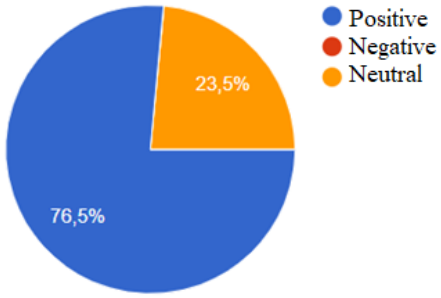

Figure 3. *Students' perception of the use of the SG Bethe1Challenge.*

In accordance with the previous data, the interviews ratify that "the application has a good interface, in which it is easy to interact and develop good activities" (S-12). Another 10th grader commented that "the application itself has a good potential. Its aesthetic and the story are awesome" (S-15), and other three participants confirmed that by saying "It is a very entertaining and versatile app" (S-14), "It is very flashy, colorful and dynamic" (S-18) and "What I liked the most about *Bethe1Challenge* is the interaction that the platform has with the user. It is really well-developed app" (S-6).

As can be seen, most of the 10th graders agreed on the fact that *Bethe1Challenge* is an entertaining, fun, and enjoyable SG, as expressed by [32] students "are more likely to prefer learning and practicing English language in entertaining applications/environments such as gaming, chatting and competing" [32, p.12]. Nonetheless, some of the 10th graders had problems with the SG and could never register. The issues with registration negatively affected students' motivation, even though the researchers encouraged them to keep trying to register and to create a free user account to at least having the chance of playing the game. In the interview the participants reported:

> What I did not like about the app was that I had many issues during the registration process, and that happened to many of my classmates. I even know that some of them never completed the registration. What I would improve from the app is to make its registration process easier and faster (S-9).
>
> I would improve the accessibility of the app because many students could not register (S-12).
>
> What I did not like from the app is that it was not easy to register (S-3).

This was evident in the teachers' dashboard of the SG because it reported that only 42.4% of the 10th graders were able to create an institutional account and 15.1% of them had to register with a free-user account. In total only 57% the students from the English emphasis group had the chance of playing the game. The missing 43% could not be part of this process because they did not have cellphones to download the SG, or if they had the device to download it, they could not complete the registration process due to technical issues. Otherwise, researchers could not create an account on students' behalf since the registration processes are directly managed from the MEN.

Regarding the SG itself, some of the 10th graders suggested there are things they would adapt or modify from it:

> What I did not like was that there were few levels and the activities were too repetitive (S-12).
>
> I would improve the questions system because it is too repetitive in some missions (S-10).
>
> To improve the app I would recommend that it has "jokers" or "hints" because there are some questions in which you get stuck and you do not know the correct answer (S-19).
>
> I did not like the time given to answer each question (S-13).
>
> I did not like that everything was in English and there were some things I did not understand and I guess some things should be explained in Spanish so all people can easily use the app (S-8).
>
> I did not like that there was not a "friendship" system or any cultural exchange activity in which interaction with people who have the same app could happen in the game (S-10)
>
> I would like that it had another type of interaction, not just clicking on the screen for the correct answer (S-16).

As it is supported by [32] "it is important to consider interactivity and entertainment by gaming or contests in order to keep students engaged in such language learning environments" [32, p.12]. S-10 and S-16 support the fact that they have intrinsic motivation towards intercultural exchange activities in which mobile game apps could be a way to implement them. However, the SG itself does not include such kind of activities.

Since the SG was created with the purpose of strengthening English language learning processes, results show that the participants considered they improved their English knowledge while using the SG. As reported by the 10th graders in the interviews, 70.6% of them (see Figure 4) considered they learnt and improved their knowledge of the language.

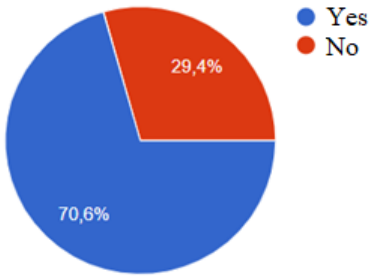

Figure 4. *Students' perception of their learning improvement.*

Some of the 10th graders reported that they had improvements in vocabulary, reading and grammar skills. One of the participants interviewed noted that "What I like the most…was how easy I got to learn vocabulary and unconsciously improve my grammar skills" (S-2). Other two of them complemented highlighting that "I think that what I liked…is that as one progresses in level, the level of difficulty increases, and that is what makes it more interesting, it makes you try harder, to be able to accomplish all the challenges" (S-8) and "I liked that I learnt vocabulary and improved my reading skills in English" (S-19). 10th graders' improvements regarding English language learning can also be more precisely noticed in the pre-test and post-test results (see Table 3).

Table 3. *Information about the Pre-test and post-test.*

Student	Pre – Test Score	Pre – Test Score for Saber 11 Test	Post – Test Score	Post – Test Score for Saber 11 Test
Student 1	A-	47	A1	49
Student 2	B1	76	B+	82
Student 3	A1	51	B1	73
Student 4	A1	56	A2	58
Student 5	A-	47	A1	49
Student 6	B1	73	B1	76
Student 7	A1	51	A1	51
Student 8	A-	45	A1	51
Student 10	A-	42	A2	58
Student 13	A-	27	A-	29
Student 17	A2	58	A2	60
Student 19	A2	64	A2	64[3]

[3] Source: designed by the researchers.

12 out of the 19 students took the test. 7 of them (students 9 and 16 only took the pre-test and students 11, 12, 14, 15 and 18 only took the post test) were not able to present one or both two tests in the schedule assigned due to connectivity issues, so they were excluded from the data and their results were not included in Table 3. As can be appreciated in Table 3, tests results confirm that students improved their level in terms of English knowledge. Additionally, for deeper understanding of those results, a paired samples t-test was conducted, and it was evidenced that there was a considerable difference in the scores obtained in the post test (M = 53.33, SD = 14.73) when comparing them with the pre-test (M = 53.08, SD = 14.09). This improvement 0.25, 95% CI was statistically significant, *t* (11) = -2.67, as can be observed in Table 4. Only two students (S-7 and S-19) got the same result in both tests. Nevertheless, three students (S-2, S-3, and S-10) got a significantly higher result in the post-test comparing it with the result of the pre-test. Overall, 10 students improved their results, evidencing their learning progress.

Table 4. *Paired samples t-test, 95% confidence interval of difference.*

	Pre – Test Score for Saber 11 Test	*Post – Test Score for Saber 11 Test*
Mean	53.08333333	58.33333333
Std. Deviation	14.09	14.73
Variance	184.0833333	205.8787879
N	12	12
Pearson's correlation coefficient	0.882428408	
Degrees of freedom	11	
t	-2.670267453	
P(T<=t) 1-tailed	0.0108918	
Critical value of t (1-tailed)	1.795884819	
P(T<=t) 2-tailed	0.021783599	
Critical value of t (2-tailed)	2.20098516[4]	

[4] Source: designed by the researchers.

[33] suggest that games have a positive impact on students' cognition because they "provide complex systems of rules for players to explore through active experimentation and discovery" [33, p. 3]. This goes in accordance with research studies in this field [2], [7], [14], [17], that have evidenced the learning potential of educational games and SGs to learn English in different contexts and through different means. This was noted by two 10th graders who added: "I now know the importance of video games for learning" (S-12) and

"I have now learnt to use technology in a different way and how I can learn English using an app" (S-13). The SG *Bethe1Challenge* influenced students' English learning and their improvement in the seven areas assessed in both tests is evident.

Finally, a participant highlighted that "never before had there been an application from the Ministry of Education in English or something similar to teach us English" (S-8). This evidences the importance of using *Bethe1Challenge* to fill the gap in the use of SGs for language teaching in Colombia.

3.2 Students' perceptions of the use of gamified activities through technology for language learning

[19] relates that using digital games as an aid to learn in an educational setting is an innovative pedagogical strategy that involves gamification. Though, digital games are not the only way to implement gamification in classroom activities, it can also be used through other strategies. Hence, in addition to the use of *Bethe1Challenge*, online gamified activities were implemented using technology, as related in Table 2. Accordingly, 94,1% of 10th graders' replies during the interview marked a highly positive perspective of the use of online gamified activities such as Scavenger Hunt, Spelling, Bingo, Tic-Tac-Toe, Debate and Scattegories, as is portrayed in Figure 5.

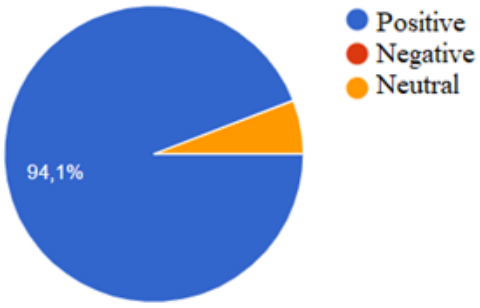

Figure 5. *Students' perception of the use of the gamified activities implemented.*

Results suggest that Scavenger Hunt was the game the participants liked the most (see Figure 6). The use of Scavenger Hunt as a teaching strategy has been reported by studies related to pharmacology, veterinary, marketing, business, finances, among other areas [34]. However, little research reports the use of it for teaching English [35].

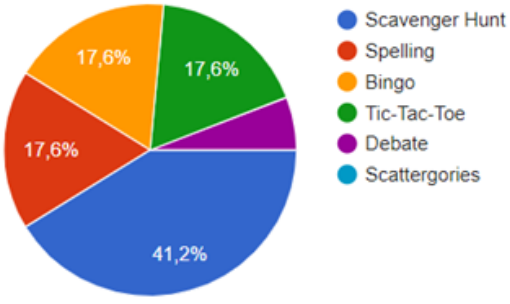

Figure 6. *Students' favorite gamified activities.*

Consequently, 94,1% of the 10th graders expressed they were highly motivated during the virtual sessions (see Figure 7). Their motivation was evidenced when they participated, interacted and responded to the questions asked by the teacher in those sessions. [33] discussed that:

> Gamification can motivate students to engage in the classroom, give teachers better tools to guide and reward students, and get students to bring their full selves to the pursuit of learning. It can show them the ways that education can be a joyful experience [33, p. 4].

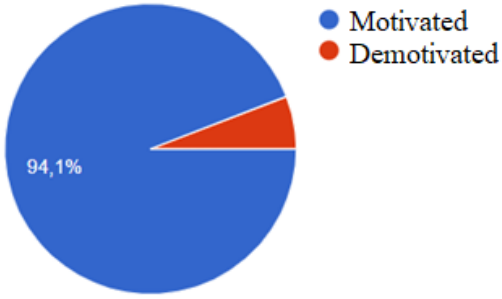

Figure 7. *Students' perceptions of their motivation in the virtual meetings.*

[19] points out that gamification has a potential impact in motivating students and [15] argues that "gamification of learning helps promote learning motivation and makes the educational process more fun" [15, p. 253]. As stated above, 10th graders' motivation was evidenced in their responses and active participation during the virtual meetings.

The positive perspective towards the use of gamification for learning is also supported by [17], who concluded that gamified learning interventions have a positive impact on students' learning, and it varies depending on whether the motivation is intrinsic or extrinsic. [33] also mention that "intuition suggests that gamification may be able to motivate students to learn better and to care more about school" [33, p. 1]. In addition, some 10th graders' responses in the interview remark that the virtual meetings were fun because of the activities implemented:

> The virtual meetings with the teacher was spectacular. I had never had those kinds of virtual meetings before. It was really good, seriously. I would like we could have more classes like that (S-10).
>
> I have never had such as entertaining class, almost all classes during this pandemic have been to explain the learning guidelines...I consider a virtual class must include games because it activates your brain and makes the students be attentive to what is happening, makes it ludic and that all students are focused. The dynamic used made me feel as if I were at that moment at school (S-8).

Other students used words like interesting, fun, dynamic, excellent, unique, adding that it was the first of its kind that they have had during this year. The participants also expressed that they would like to have more classes like that, and that they would like other teachers to use similar strategies:

> Sincerely, I would like that many teachers used these types of games to teach because I consider that they are pedagogic, practical and make us be active in class (S-12).
>
> I would like that more teachers used this kind of strategies. The classes would be more entertaining (S-18).
>
> It would be very good and interesting if more teachers used games to teach, because it is an easier tool in which we can learn online (S-9).
>
> I would like that more teachers teach in that way because we, as students, can be more active in class (S-7).
>
> I would like that more teachers used games to teach because games are more entertaining, and they destress you (S-19).
>
> I would like that more teachers taught using games because it would be a more fun way to learn (S-13).

Despite being aware that the classes were fun, one of the 10th graders highlighted that "many teachers do not teach in that way" (S-10). The previous excerpts corroborate that there is a low use of gamified activities in teaching processes. Research carried out by [36] and [37] assert that there are processes whose potential achievement is more a matter of pedagogy than technology and that a carefully planned methodology is the key to these processes. Regarding this, [38] provide useful information about how to use gamification as an effective intervention strategy.

In the same way, [39] states that "if attitude is a significant indicator of ability, it seems that language teaching professionals are generally capable and confident in their use of technology" [39, p. 184]. This entails that teachers should be formed to use technology in the classroom so they learn how to carefully design and plan their teaching activities and improve them.

3.3 The role of technology during pandemic times

State schools in Colombia are characterized by the few technological resources available for students and teachers. As described by [29] "it was a challenge for teachers to choose mediating elements to interact with students given the needs of the population due to little or no access to the internet" [29, p.238]. Because of the pandemic, the Colombian government had to implement some strategies to slow down the spread of the COVID-19 virus, which revealed the lack of appropriation of technology by teachers and other problems related to the access to technology and connectivity in the Amazon region [29].

As a result of the pandemic "students were exposed to different changes in the way they take classes" [29, p. 238]. Those changes include the switch from face-to-face classes to online classes. In the interviews, 10th graders reported that during face-to-face classes they were not allowed to use their cellphones in class and when possible, teachers only asked them to use the cellphones for the calculator or the translator. Three of the 10th graders added that before the pandemic "teachers did not let us use the smartphones in class" (S-19), "almost all of the teachers banned the use of cellphones" (S-18) and "in face-to-face classes we did not use our cellphones or technology. But I do think it has to be used" (S-12). Even though, online classes forced teachers to ask students to use their cellphones to connect to virtual meetings, answer the learning guides and to do the homework.

Likewise, 10th graders expressed that they regularly use their cellphones to communicate with others, look for things or information of interest, spend their free time, read books, watch documentaries, and/or for entertainment. Similar outcomes were also reported in related studies about students' use of mobile phones [1], [3], [14], [32]. Furthermore, 10th graders' reflections mostly indicated that they see technology as a pivotal tool to make learning easier and to find more information related to school assignments. As can be observed in the following excerpts:

> Technology has the role of making us easier to find the information and to offer us different explanations of the topics we are taught in class (S-19).
>
> Technology is an important base and more nowadays in pandemic times because we have realized that connectivity is the most used way to attend class and it is boosting the learning of technological capacities (S-6).

The pandemic made 10th graders realize that their cellphones are also a tool to do the homework and to attend classes. This group of students became more aware of the role that technology has nowadays and how it can be used for improving language learning. Moreover, 10th graders expressed that technology made them aware of the fact that learning can take place in different contexts, with flexibility, dynamics, interaction, and participation, as appreciated in these excerpts:

> The role of technology in teaching and learning processes is that it allows us to learn in different contexts, with more flexibility in schedules and it gives us more interactive and participative learning (S-9).
>
> Thanks to the pandemic, teachers have asked us to use the cellphones more frequently to receive their instructions about the learning guides. I now know that digital platforms work and are a really dynamic and easy way to learn (S-19).
>
> I think that the role of technology in teaching and learning processes is good and crucial because it facilitates the teaching for teachers and makes it easier for students to understand topics (S-7).
>
> The role of technology…is more valuable during this pandemic (S-8).

> During this quarantine, I have learned that I can use my cellphone to play and learn English (S-18).

Even though 10th graders reported advantages of technology, some drawbacks also came to light in the interviews. The students remarked that "I know technology is vital for all people, but unfortunately, not all the students have access to technological devices to continue with their learning process in pandemic times" (S-10). This was evident in the implementation process because, as reported before, only 57% of the 10th graders could be part of this strategy.

As a result, low internet access drives to inequality issues that need to be addressed by the government agenda. Despite the fact that "the role of technology is to facilitate connectivity" (S-12) as mentioned by one of the 10th graders, not all of them are economically capable of having a technological device at home that allows them to attend online classes. In addition to this, [40] assert that "in the current online teaching process, simply providing teaching resources is not enough" [40, p. 523]. This implies that there is also a need for students to have equal access to connectivity and technological devices to continue their learning process from home.

4 Discussion and conclusions

Based on the results related before, it can be concluded that the SG *Bethe1Challenge*, with the support of gamified activities, was a positive way to expose 10th graders to English language learning during the pandemic times. As supported by [38], short-term gamification experiences can lead to improved learning outcomes. These new strategies for online teaching, proved great value for the 10th graders, especially in English knowledge; the students demonstrated great encouragement, participation, and motivation.

All in all, it can be noticed that *Bethe1Challenge* illustrates that SGs created for educational purposes, have the potential to be an outstanding tool to address these centuries educational needs. Also, it can be claimed that additional gamified activities should be introduced in online teaching to obtain better learning outcomes. It is also worth to note that the positive results might have been influenced by the novelty factor, the integration and use of a SG with additional gamified activities during class changed the standard routine, thus, new strategies should always be considered for future research processes in this area.

There are issues that need to be polished to make this a better experience, the registration process of the SG need to be made easier and faster for users. Additionally, it was mentioned that the in-game tasks were repetitive and boring and there were a lack of hints and clues. Besides, cultural, and intercultural collaborative missions should be included in the SG, to add more depth to the game. With all this on mind it is important to acknowledge the benefits of collaboration in gamification, adding a team mode would be a way to achieve common learning goals, this in hand, could have a positive impact in the learning process [40] [42] as supported by a study [43] that claims that gamification design needs to go beyond assigning points, but rather move towards collaborative activities.

[44] spoke about the major limitation in the use of games "is that educators lack the ability to obtain or create games that meet the desired learning outcomes for a particular context and are appropriate for their learners" [44, p. 1]. Nonetheless, from the results it can be expressed that *Bethe1Challenge* is a step in the right direction, allowing a window in what a future could look with integrated technologies in the teaching practices.

In conclusion, the support process carried out by the researchers made a difference on 10th graders. In this line, it should be the teachers' task to strategically plan and design gamified activities that help compliment the SG, in such way the classroom environment should provide support to students as they play the game. Additionally, a teachers' role is essential in the positive outcome in online teaching processes because, as claimed by [36], the potential achievement of those processes is defined by pedagogy of the class rather than

the technology involved with it. Therefore, it can be said, that the pandemic forced teachers to request the students to use mobile phones for class activities was an unfortunate event with a positive outcome [29]. Nevertheless, equal opportunities need to be given to students, so all of them can easily participate in different learning scenarios and no one is left behind.

Further research should be focused on this topic, especially on testing students' learning improvement and making comparisons between experimental and control groups while using the SG. Further understanding of how many teachers are using *Bethe1Challenge* for teaching, how they are using this app and why there are some teachers who are not using it, would also be vital. A deeper descriptive analysis of teachers' perceptions and methodologies implemented regarding the use of the SG should be carried out. An analysis of the SG from a Game Learning Analytics approach [18] would also be necessary to inquire about the relationship between the Learning Mechanics and Game Mechanics [16].

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