

The Advantages and Limits of Gamification Mechanisms: A Duolingo Case Study

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Gamification in e-learning has become more popular nowadays, especially with an increasing demand for digital learning during the pandemic. Indeed, the benefits are apparent. Gamification creates engaging and interactive ways of learning and practicing a skill, which contribute to learner motivation. This study aims to examine the limits of gamification in e-learning. If we look closer at its mechanisms, gamified learning is still a challenging method for learners. Too many gamification elements in e-learning could lead to addictive behavior and other psychological issues. So, in attempt to understand and discuss the impacts and limits of those mechanisms in e-learning, we interrogated Duolingo users on their learning experience in the application and their thoughts of in-app gamification elements. The results showed that overall, most of the interviewees felt they had a relatively positive learning experience with Duolingo but showed alternating periods of strong engagement and total disengagement. The Duolingo gamification mechanisms that seem to be the most effective are the progress bar system, the quizzes and the streak system.

Keywords: e-learning, gamification, motivation, limits, user experience, e-learning, digital learning, digitalization, limitations, language

Introduction

With the progress of technology and after two years of living in a pandemic, the education and training methods of both adults and children have changed. Nowadays, companies and schools need to innovate in order to provide some interactive and attractive digital content to their learners.

Formalized teaching delivered electronically is what we call “e-learning” or “digital learning”. Though this new way of teaching is popular and accessible to anyone, it also has its own disadvantages. Usually, users will deplore the lack of interactivity and motivation, two issues which can be compensated by mechanisms coming from games like rewards, points or quizzes. These gamification mechanisms make digital content more attractive and interactive while motivating learners to keep on learning. But what are the limits of gaming mechanisms in e-learning and is it possible that too much gamification harms the learning experience by taking over the user’s attention? Indeed, as we see more and more companies opting for a digital approach when it comes to training, observing and analyzing the impact of gamification in e-learning seems necessary. We also observe a growing number of people learning via apps, especially languages, which is why we have decided to focus our research on Duolingo users only.

According to research on the topic, it would seem that gamification in e-learning, as effective as it is, also has a few limitations. The gaming elements could take over the learning experience and even lead to addictive behaviors which could harm the users’ learning experience. Recent studies tend to show that a balance must be found in the amount of gaming mechanisms used, so that gamification keeps having a positive and effective impact on learners. Hence, we aim to measure in this paper the positive, neutral or negative impact of gamification elements on users. To do so, we interviewed 6 Duolingo users on their use of the platform and their view on the gamification elements found in the app. This paper is structured as follows. In section 1, a literature review on some of the most impactful papers on the topic is conducted. In section 2, we present our methodology for this paper in more detail. In section 3, we present the output of our research, followed by an analysis of these results in section 4. Finally, our conclusion and some limitations and potential leads are given in section 5.

Literature Review

Gamification in education has been developing more and more over the last 20 years. It represents a massive benefit for the motivation of learners, their engagement and their performance. Kapp (2013) defines gamification as the use of “game-based mechanics, aesthetics, and game thinking to engage people, motivate action, promote learning, and solve problems”. For those reasons, gamification is considered to be an appropriate method of learning. Andrade F.R.H et al (2016) showed that there is an increasing number of publications about the impacts of gamification, and especially its benefits. Conversely, the potential negative effects of gamification tend to be overlooked and science has just started to analyze them.

Indeed, with the ubiquity of technology in our daily life, which has also been impacted by the pandemic, teaching has evolved. E-learning has become more common and more accessible for everyone as the internet is expanding. Companies tend to use gamification into their online learning processes. Therefore, gamification elements such as rewards, badges, achievements, experience level, feedback, points, etc. are more present in e-learning. However, recent research suggests that in order to be effective, gamification elements should be tailored to learners. In a study conducted by Tondello et al. (2017), there seems to be a correlation between learner profiles and their preferred type of gamification elements. For instance, the learners who would fall into the “player” category in the context of gamified e-learning tend to be more attracted to a certain type of gamification. According to Bartle's Taxonomy of Player Types (Bartle, 1996), there are four types of players:

- Achievers: They want to complete 100% of the game. They are motivated by collecting items, points, badges and ranks and they want to be able to show those elements to others, for example, by putting their badge collection on display.
- Explorers: Their main goal is to discover and explore games. Gaining experience and having the option to “try again” are both important for them.
- Killers: They want to win the game and defeat the others. Competition is what motivates them the most.
- Socializers: They want to enjoy games through connecting and interacting with others. They are motivated by cooperative features.

This article focuses on the limits of gamification and more especially on specific gamification elements. Indeed, it is important to leverage existing research and to study how different variables can limit the impact of those elements and the benefits of gamification. The following table lists several research articles showing relevant aspects and themes relating to the topic.

Relevant Research on gamification approach in e-learning

Authors	Short Description	Relevant Results	Main themes
Andrade F.R.H et al (2016)	<p>The negative side of gamification is sometimes overlooked. Therefore, the authors discuss some of the main issues of gamification: off-task behavior, undesired competition, addiction and dependence.</p> <p>The aim of the study is to discuss the potential harms of using game elements and propose a general framework to use gamification in a better way.</p>	Addiction was identified as a potential negative effect of gamification.	Negative effects of gamification
Apostolopoulos A. (2019)	<p>A gamification survey was conducted by TalentLMS to analyze how gamified elements can change the state of training.</p> <p>900 employees were questioned about gamification elements in an app or software they use at work. (43% did not notice any gamification elements and were disqualified from the survey).</p>	<p>According to the survey, rewards are the most motivating gamification elements.</p> <p>89% of recipients said that they would spend more time on an app or software because of gamification elements.</p>	Employee engagement, Gamification elements;
Ding L. et al. (2017)	<p>Aim of the study: Exploring the influence of the gamification approach in online discussions. The authors also discuss the limitations and implications of some game elements (badges, progress bar, thumps-ups and avatars) implemented for this study.</p>	<ul style="list-style-type: none"> Learners seem to be more interested in the game elements directly linked to their grades. They also demonstrated more motivation from their grades and instructor opinion than autonomous motivation (for learning). The gamification approach influenced achievers the most. 	Badges, progress bar, gamification elements, Motivation
Fitz-Walter Z. et al (2014)	<p>Study conducted via a smartphone app built to help students attending the university orientation event. 46 new students participated in this study. The half of them</p>	<p>The results suggest that adding an achievements system did not enhance nor affect the user experience.</p>	Achievements;

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	<p>used a gamified version of the orientation app and the other half used a non-gamified version.</p> <p>Aim of the study: Investigate if the impact of achievements on the app lead to a more positive user experience, greater motivation and behavior change and how students receive the addition of gamification elements.</p>		
Ge Z. (2018)	<p>Aim of this study: Explore the impact of three reward strategies on adult e-learners learning performance in a gamified teaching process.</p> <p>The three reward strategies:</p> <ul style="list-style-type: none"> • forfeit-or-prize reward strategy • prize-only reward strategy • forfeit strategy 	The results showed that the first two strategies have a significantly better impact on e-learners' learning than the third strategy.	Rewards prize and points, Motivation, Performance
Hamari et al. (2019)	<p>Framework created to examine effects of gamification, covering various variables (motivational affordance, psychological and behavioral outcomes).</p>	<p>Overall, gamification has more positive effects but those effects depend greatly on two factors:</p> <ul style="list-style-type: none"> • context in which the gamification has been implemented • users 	Gamification effects
Klein G. (2021)	<p>Examination of design challenges and limitations of gamification in learning environments during the pandemic.</p>	<p>Effectiveness of gamified activities might depend on the environment in which they are used and also on who created them.</p> <p>Lack of game design may negatively affect the user experience and the outcome.</p>	Gamification, pandemic, motivation
Kyewski E. & Krämer N. C (2018)	<p>Aim of the study: To see if badges, received for successful task performance and specific activities within an e-learning course, have an impact on students' motivation and performance.</p> <p>In a field experiment, students were randomly assigned to three different conditions :</p>	<ul style="list-style-type: none"> • Badges have less impact on motivation and performance than is commonly assumed. • Regardless of badge condition, students' motivation 	Badges, motivation, performance

	<ul style="list-style-type: none"> • no badges • badges visible to peers • badges only visible for themselves. 	decreased over time.	
Lavoué et al. (2019)	<p>Despite the effectiveness of gamification, learning environments often fail to engage users. Adapting the gamification elements could be a solution to that.</p> <p>Aim of the study: Prove the relevance of game elements adapted to the learners' profile and propose an approach on how to adapt gaming features.</p>	Adapted gaming elements seem to motivate learners more than not adapted elements, showing its relevance on the increased learners' motivation.	Gamification, adaptation to user profiles
Quoc Dung Phung (2020)	<p>Aim of the study: Explore and understand the negative effect of gamification in e-learning viewed by students.</p> <p>Operated through interviews with open-ended questions.</p>	In terms of negative effects, gamification could make students feel bored, frustrated, confused, helpless, distracted, stressed, lose confidence and want to give up.	Emotional effects of gamification, motivation, engagement
Saleem, A. N. et al. (2021)	Aim of the study: Gather research on gamification and highlight its benefits and its challenges in online education.	"The most common gamification elements used in e-learning and have a powerful effect on the students are points, leaderboards, badge, and level."	Gamification elements

Table 1: Literature review

In conclusion, from the observed and gathered research, we can identify potential variables that can limit gamification in e-learning such as poorly designed gamification elements (Ding et al., Kyewski E. & Krämer N. C), the lack of adaptation of gamification and game elements respective to learners and their "player profile" (Lavoué et al., Ding et al., Fitz-Walter Z. et al.) or side effects from it such as addiction, long-term demotivation, undesired competition, off-task behavior (Quoc Dung Phung, Andrade F.R.H et al.). Those reasons could lead to an ineffective gamification or even create an excessive gamified environment which can negatively affect learners' motivation and engagement.

Methods

For the present research, structured interviews have been conducted among 7 French-speaking persons aged 19 to 33. We prepared a questionnaire beforehand for the interviews to be standardized.

Drafting the Questionnaire

While preparing the questionnaire, our goal was to target various learning applications. We first listed the most used learning applications by consulting the top applications on Google Play and the Apple store. In order to be comparable, the applications had to use similar gamification mechanisms. We drafted the following table to list the main existing gamification mechanisms. We color coded the cells: red when the mechanism is not present in the application, green when it is present, and white when we did not have the information.

	Learning a foreign language							Learning to code	
	Duolingo	Babbel	LingoDeer	Rosetta Stone	Memrise	Pimsleur	Busuu	Mimo	Codecademy Go
Avatar customization	✓	✗	✓	✗	✓	✓	✗	✗	✗
XP (levels)	✓	✗	✓	✗	✓	✗	✓	✓	✗
Badge system	✓	✗	✓	✗	✓	✗	✗	✓	✓
Random rewards	✓	✗	✗	✗	✗	✗	✗	✓	✗
Expected rewards	✓	✗	✗	✗	✗	✓	✗	✓	✓
Quiz	✓	✓	✓	✓	✓	✓	✓	✓	✗
Scoreboards/Leaderboards	✓	✗	✓	✗	✓	✗	✗	✓	✓
Progress display	✓	✓	✓	✓	✓	✓	✓	✓	✓
VR	✗	✗	✗	✗	✗	✗	✗	✗	✗
Time rewards (streak)	✓	✗	✗	✗	✓	✗	✗	✓	✓
Multiple choice questions	✓	✓	✓	✓	✗	✓	✓	✓	✓
Virtual economy	✓	✗	✗	✗	✗	✗	✗	✓	✗
Flash cards	✗	✗	✗	✗	✓	✓	✗	✗	✗
Notifications	✓	✓	✓	✓	✓	✓	✓	✓	✗

Table 2: Gaming mechanisms in learning apps

Following this table, we decided to ask questions about the most common mechanisms:

- quiz
- scoreboard/ leaderboard
- progress display
- notifications
- streak system

The Questions

Introduction

The first sections consist of introductory questions, which are not directly related to gamification in e-learning, but provide basic information that will help with the analysis of the results.

Question 1: “Which application are you using?”. This question ended up not being relevant anymore since we are only using the results of our interview concerning Duolingo.

Question 2: “Since when have you been using this application?”. This question might show different trends between recent and older users.

Question 3: “At what frequency do you use this application, and for how long?”. This question might show different trends between regular users and those who go on the application more rarely.

Evaluation of satisfaction

Question 4: “Are you satisfied with your learning with this application?”. This question could show a link between learning satisfaction and motivation.

Questions 5 and 6: “What are the advantages of learning with this application?” and “What are the drawbacks of learning with this application?”. These open-ended questions let the respondent speak without limits about the application. If they mention the gamification mechanisms and their motivation, it might be relevant to our research. They might also mention elements that we did not think of beforehand.

Respondent engagement

Question 7: “How did your learning experience go?”. This open-ended question lets the respondent bring up topics that we might not have thought of beforehand.

Question 8: “Did you encounter obstacles while learning? If so, which ones? If not, what helped you to keep going?”. With this question, we want to know more about what might have impeded the learner’s motivation, and what can stimulate it.

Question 9: “Did you drop out? If so, did you start using the application again? Or did you use another application instead?”. This question is meant to let the user tell us why they might have stopped or paused their learning. We also want to know if they preferred another learning application instead.

Gamification mechanisms

Question 10: “The point system keeps you motivated to go to the next step”.

Question 11: “The quizzes help you to evaluate your competencies and knowledge”.

Question 12: “At what frequency do you watch your ranking? Why?”

Question 13: “Does the streak system (logging in every day without interruption gives rewards) encourage you to log in every day to do a module?”

Question 14: “What do you do when you receive a reminder notification?”.

Question 15: “Does the progression bar help you to keep going or to finish a learning unit?”.

While looking for users we would interview, we realized that we could mostly find Duolingo users, and only one Pimsleur user. That led us to focus our research on the gamification mechanisms of Duolingo only. By the time we made this decision, we had already started the interview process, which means that we are not using the Duolingo specific terminology in the questions. For example, we have a question mentioning a generic point system, where Duolingo uses XP (experience points).

Conducting the interviews

For each interview, we met the respondent either in person, or via a video call. All the interviewees were asked the same questions and in the same order. We did not give information about our study, other than the questions that we asked. That way our topic and hypothesis did not have any influence on their answers.

We first asked a series of open-ended questions as well as scaling questions. The open-ended questions give the user the liberty to answer with as many details as they like. When drafting them, we were careful to make sure that the respondent would not know what answer we expected to confirm or infirm our theories. We then asked scaling questions more focused on the motivation mechanisms. The answers are scaled from 0 to 5 with no “neutral” notation (which would be a 2.5 out of 5 mathematically). That way, the interviewees could not give neutral results, which we would not have been able to interpret.

We used an online form that we filled ourselves in order to easily compare the different results. After gathering the results, we analyzed the data.

Results

The questions are classified by 3 main themes: the introduction, to get to know the user’s profile and habits; the satisfaction, to get a holistic view of their motivation to pursue their learning; and the gamification mechanisms, to target the specificities of the effects of gamification on the user.

Introduction

As previously mentioned, all participants use Duolingo. The “Pimsleur” participant’s results were not significant as the application does not use gamification of any sort.

Learning period

All of our participants have been using Duolingo for a maximum of four years. However, we observed a trend: 66.6% of the interviewees have started their learning less than a year ago. Among the respondents, 33.3% have been using Duolingo for two to four years.

Frequency and duration of learning sessions

Frequency

We observed three distinct frequencies of learning:

Frequency of use

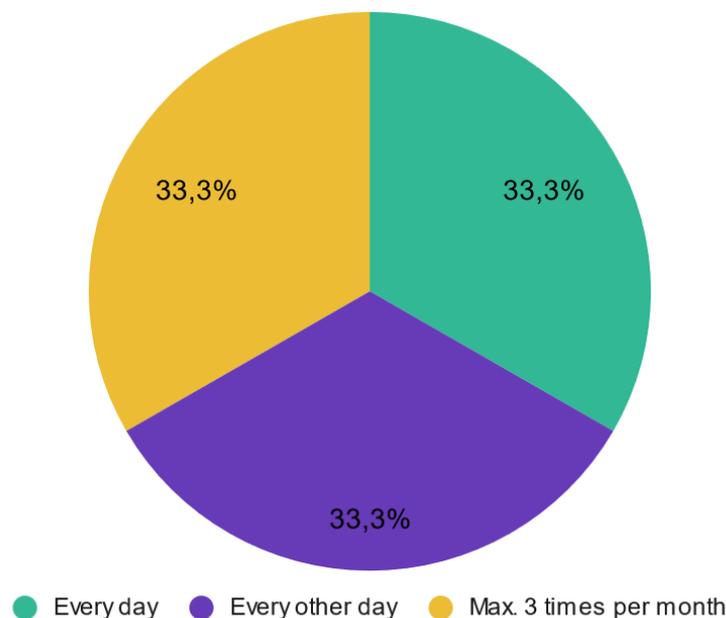


Figure 1: Responses to the frequency of use question

Duration

One third of our interviewees scarcely use Duolingo. The two thirds of our interviewees use Duolingo regularly. All users practice their language skills about 5 to 20 minutes a day to 10 to 45 minutes every two days. The average learning period is about 12 minutes a day.

When a user signs up, the application suggests four types of learning sessions depending on the user's goals:

- Casual, 3 minutes a day
- Regular, 10 minutes a day
- Serious, 15 minutes a day
- Intense, 30 minutes a day

The results we collected show that our interviewees' learning habits tend towards a serious profile.

Evaluation of satisfaction

The answers are rated from zero to five. The results are divided in half: one half of the participants are satisfied with the learning (4 out of 5) and the other half are slightly less satisfied with their learning with Duolingo (3 out of 5).

Advantages and flaws of learning with Duolingo

According to our respondents, learning with the free version of Duolingo has several advantages. Regarding the usage, some users report that the app is flexible: courses can adapt to various learning rhythms with the possibility of irregularity. Secondly, the app's functionalities are easy to understand, and are clearly explained to the user. Half of the participants consider Duolingo to be playful. Visually, the app is colorful and animated, allowing an emphasis on playfulness. A third of our interviewees have noted that the presence of audio content allows them to get a realistic accent and pronunciation of the targeted language. One respondent has listed some gamification elements such as the daily goals and monthly streak as advantages of Duolingo. Another respondent appreciates the presence of an online dictionary.

Despite having many advantages, Duolingo also presents some drawbacks for learners. On the one hand, one of the respondents declares that the gamification of having lessons presented as exercise is an advantage, but on the other hand, a third of the interviewees find the lessons to be redundant and not adapted to the user, with a lack of balance regarding difficulty.

One third of participants indicated that Duolingo lacks access to further explanation on the courses. The courses consist of exercises and for one third of the respondents it would have been better to have more theory in addition to the practice.

Among the respondents, 66.6% have complained about knowledge retention: one third says the app is too intuitive and playful, as the interface is considered to be "childish". The other third regrets an absence of exercises about writing letters and characters when learning Japanese, and one of them indicates that Duolingo lacks oral interactions.

Overall, the user experience is mixed: the playful aspect of Duolingo can be perceived both as an advantage and a disadvantage. The result could be related to the users' age: youngest users tend to appreciate these playful aspects, while oldest users tend not to.

Respondent engagement

The general "Duolingo experience"

Most of our interviewees have reported having a relatively positive learning experience with Duolingo. Half have indicated that their learning is inconsistent: they alternate between periods of strong engagement and total disengagement. These respondents have revealed that the learning process

with Duolingo is slower and less effective than a traditional language course but is less intimidating and requires less daily effort.

The other half considered their learning to be relatively consistent, but one of these respondents also noticed a slower learning process than usual.

Obstacles and reasons to keep on learning

We have noticed a recurring obstacle to learning languages with Duolingo: the absence of courses and learning structure.

Among our participants, one third reports that the absence of courses dampens their learning, particularly the grammar, and that they needed to compensate by learning simultaneously with other language learning content. Another participant regrets the systematic overuse of audio in the courses, which prevented them from committing the written form of the word to memory, instead of the audio or pronunciation only. This method gives a false impression of the learning process.

One third of our participants have not encountered important obstacles while learning languages with Duolingo. However, one of them has found many learning sequences to be too easy for their language level and the other interviewee has found the notifications unpleasant.

Did you drop out? If so, did you start using the application again? Or did you use another application instead?

Five interviewees responded to this question:

Dropping out

- Dropped out
- Dropped out and picked up again with only Duolingo
- Dropped out and picked up again with Duolingo and other supports

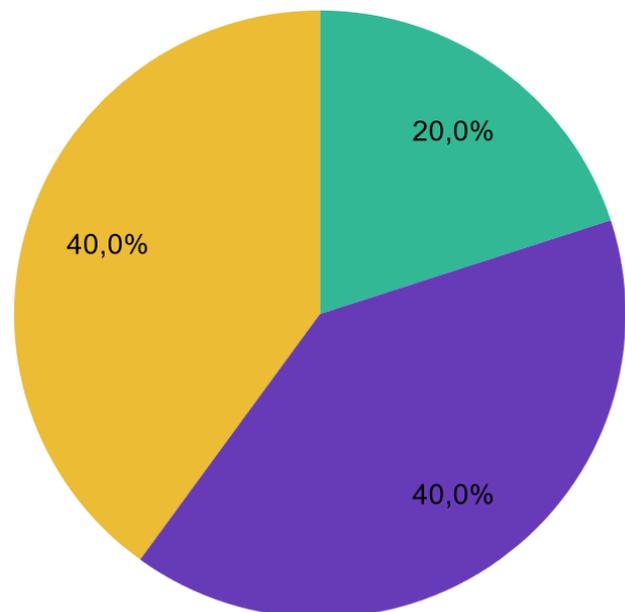


Figure 2: Responses to the question about dropping learning

All of them have dropped out of Duolingo at least at one point. One participant has not been using Duolingo since. Four participants have resumed their language learning in various ways:

- 2 interviewees only use Duolingo periodically
- 2 interviewees combine Duolingo with other applications, such as Babbel, and media such as TV shows, videos, and songs.
- One interviewee has reported using Duolingo to strengthen the vocabulary.

Gamification mechanisms

The point system keeps you motivated to go to the next step.



Figure 3: Responses to the point system perception question

Our participants have rated this assertion from 2 to 5. The average result is 3.5 out of 5. The point system seems to be an effective mechanism to keep motivation to go to the next step.

Does the streak system (logging in every day without interruption gives rewards) encourage you to log in every day to do a module?

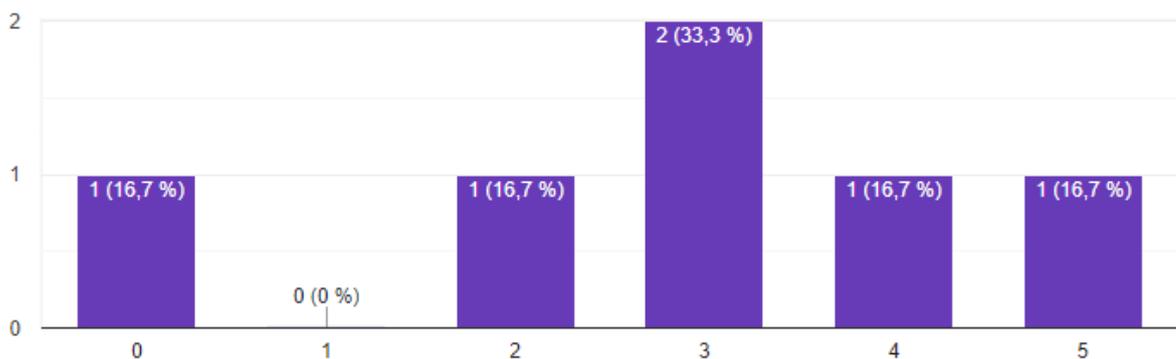


Figure 4: Responses to the streak system perception question

The average result is 2.3 out of 5. The streak system does not seem to encourage users to pursue their learning. However, for two thirds of our participants, the streak system seems relatively effective. Moreover, this result could be explained with the Duolingo system: the application gives the

possibility of keeping the streak active even if the user misses a day to do a module. This “second chance” called “streak freeze” could slow the user’s frequency of learning on the application.

The quizzes help you to evaluate your competencies and knowledge.

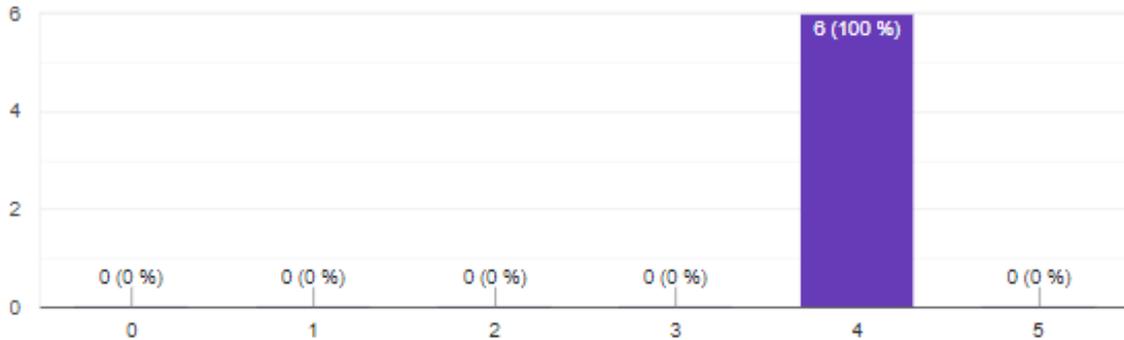


Figure 5: Responses to the question about perception

All the participants rated this question 4 points to 5. Quizzes seem to be an effective method to get an evaluation of the user’s competence and knowledge.

At what frequency do you check your ranking? Why?

Frequency of checking the ranking

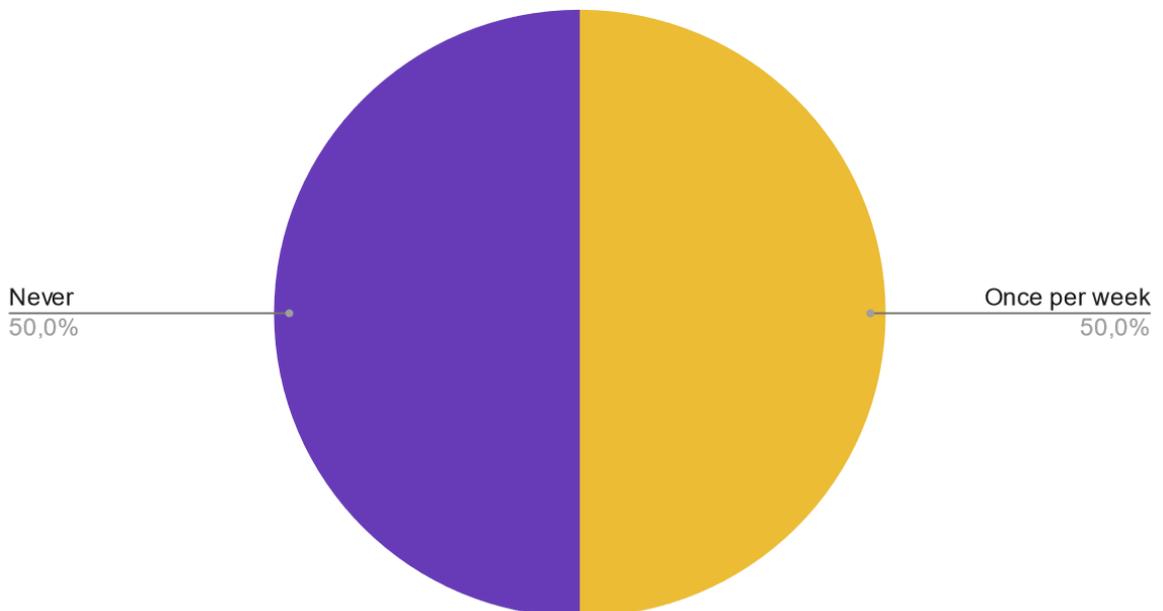


Figure 6: Responses to the ranking check frequency question

Half of the interviewees check their ranking once a week. The other half never watch their ranking. The ranking does not seem to be a strong motivation to pursue language learning for all users. However, among the participants who check ranking once per week, one third of them have been

using Duolingo for years. The ranking could be an effective means of propelling learning on the application in the long run.

What do you do when you receive a reminder notification?

When receiving a reminder notification, one third of the interviewees completely turned off Duolingo's notifications. One third uses Duolingo as soon as they receive the notification and the last third swipes the reminder notification. We observe that the interviewees who have turned off Duolingo's reminder notifications are the users who have given a better satisfaction rating to the application.

Does the progression bar help you to keep going or to finish a learning unit?

Our participants rated this assertion from 0 to 5. One participant gave it a 0 but we observed a trend of 4 and 5 ratings. The average result is 3.5. The progression bar is a relatively effective mechanism to finish a learning unit.

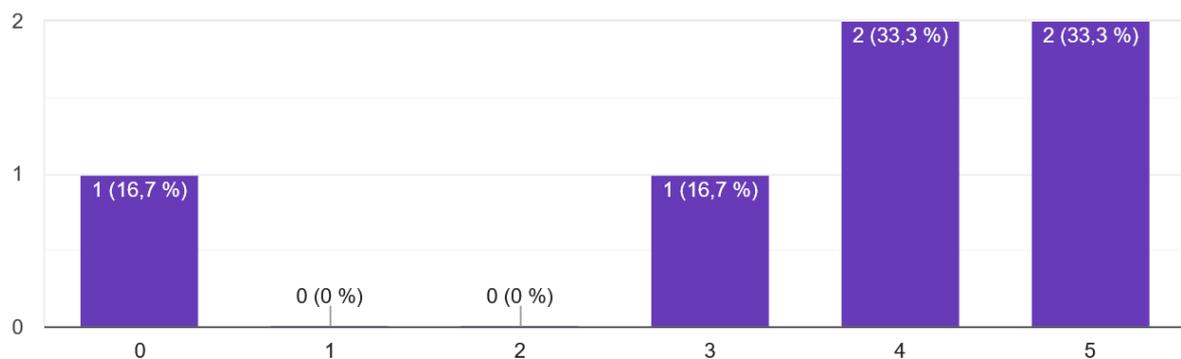


Figure 7: Responses to the progression bar perception question

Discussion

As we found in our research, gamification can be used in teaching to add motivation, fun and interactivity so that learner experience is enhanced. According to previous literature and our results, it seems that gamification does have a neutral to positive effect on learners overall, depending on what gaming mechanisms are implemented. The study showed that the most effective elements of gamification in e-learning are quizzes, streak awards and progress bars. On the contrary, some mechanisms do not seem to work at all, like notifications or leaderboards/ranking boards which do not seem to have been of interest for most of our interviewees. However, they did not seem to bother users either, so we can probably suppose that these mechanisms were neutral to the users and did not raise frustration. The results might suggest that the advantages of gamification in e-learning were effective to measure the learning curve and evolution. Indeed, 2 out of the 3 preferred gaming mechanisms help users better understand where they stand in their learning journey (quizzes to evaluate the knowledge and progress bar to know where the user is within a module).

Another output suggested by our study is that gamification elements do not seem to have a significant impact on learner motivation, as all of our

interviewees declared that they had given up at some point, before sometimes getting back to the application after a variable period of time. Some of them never came back to the app despite the notification system, and another one chose to go on with another app.

Overall, our findings tend to confirm Hamari et al. (2019), in that the positive effects of the gamification mechanisms greatly depend on the individuals and their learner/player profile, as demonstrated by Lavoué et al., Ding et al., Fitz-Walter Z. et al. When a game mechanism fits a learner's player profile, then this gaming element has better chances of resonating and positively affecting the learning journey. On the contrary, when a gaming mechanism is not popular, it might be because it's related to a less common player profile (e.g. "killers" represent 1% of the player profiles vs "socializers" represent 80% of player profiles according to Jacqueline Zenn study).

As mentioned before, the gamification elements used in Duolingo that seem to be the most effective are quizzes, streak awards and progress bars. Those elements are also used for designing addictive video games. The progress bar system, similar to the leveling system, stimulates the users' desire for progression, which in a way pushes them to keep playing. The streak system is a powerful and robust tool which consists of completing repetitive tasks. In addition to offering a reward, this system encourages Duolingo users to log in and "learn" a new lesson every day in order to maintain their streak. This could lead to a new routine that will become a new learning habit. However, a streak could also be considered to be a burden over time and could demotivate the user.

Gaming mechanisms in e-learning also have their limits. The focus of the application is to teach languages through many gaming mechanisms. However, while our results show that gamification has a neutral to relatively positive aspect when learning languages on Duolingo, we noticed that the overuse of gamification could harm the learning experience. Gamification seems to be effective at grabbing the user's attention, but this attention can be lost just as quickly. Their proposal to present exercises at the expense of theoretical courses does not match all users' learning expectations and goals by partially excluding several linguistic aspects. The application's learning structure also does not take the "socializer" player into account (Bartle, 1996), setting aside one on four types of users. In addition, playful aspects such as the use of colors tend to discourage some users who could find the visual approach not fitted to their engagement. The overuse of gamification could impact the credibility of the main function of teaching by prioritizing the design over the content.

Conclusion

The development of technology and the fast-growing spread of the internet have led to many changes in every area of our society. More recently, the COVID-19 pandemic has also accelerated the digitalization of teaching and learning, as half of the global population went into lockdown. As we see more and more offerings in digital learning, it is the perfect moment to take a step back to analyze the performance of e-learning and its methods,

especially the trending ones: gaming mechanisms. Indeed, we have observed a growing tendency to use gamification in e-learning and the literature has already started to measure the impact of this approach.

According to most studies, gamification is a valuable method to gain knowledge and keep the learners motivated throughout their learning experience. It aims to make learning content more interactive and fun, which helps keep the user entertained and engaged. This approach is particularly appreciated in languages, as we see the number of language learning apps like Duolingo emerging in the market (see [table 2](#) for more details).

However, although gamification is proven to push engagement and positively affect users, there are some limitations to this approach. It is important to analyze these potential issues as well, to make sure gamification always has a neutral or positive impact on learners. Indeed, it is important to ensure that learners are not distracted from the initial goal (learning a new language) because of gaming mechanisms (points, rewards).

According to our study, gamification does not seem to have such a negative impact on Duolingo learners. If it seems that gamification elements work better when tailored to the user/player profile of the learner, when these elements are far away from a learner's profile, they will not resonate but do not seem to interfere to a large extent with their learning experience either. So, the limitations observed in our study are that when gamification mechanisms are not fitted to a learner, they will simply ignore them without being disturbed in their learning. We have only observed slight frustration with notifications and the playful aspect, which do not seem to be popular among our panel of users.

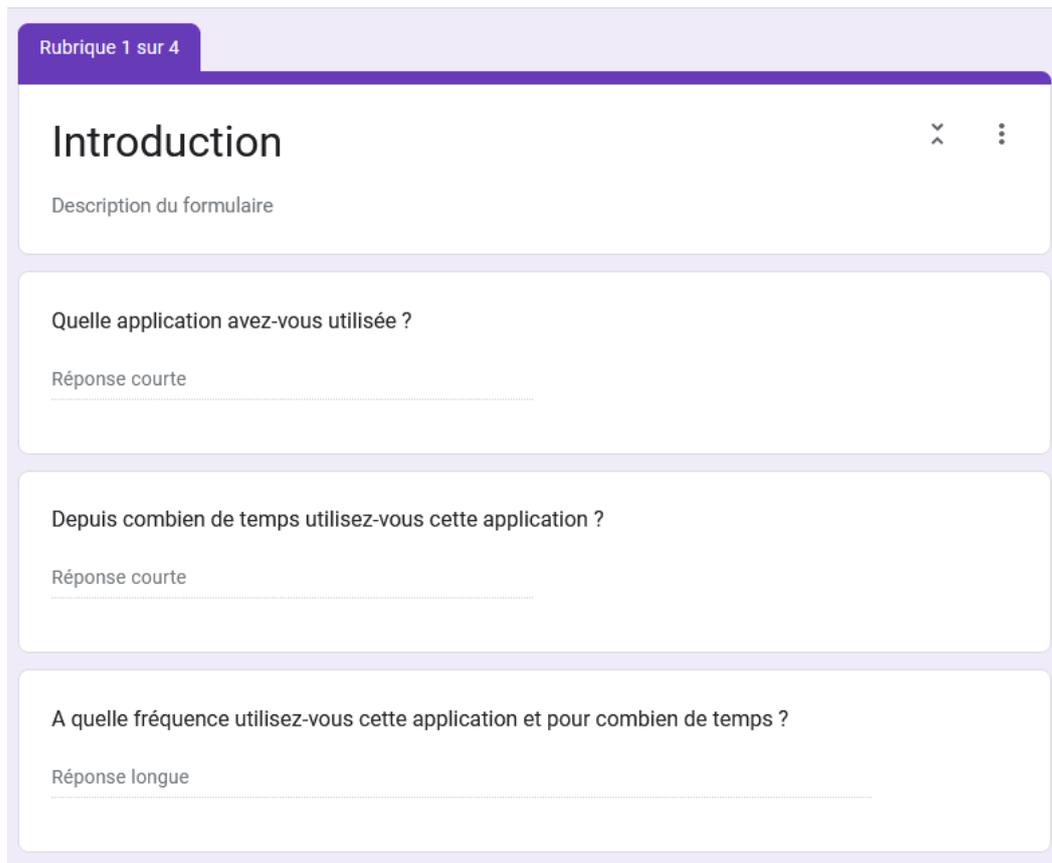
Our study was only conducted with a panel of 6 participants in 2022. Therefore, more studies should be done to establish an empirical investigation of the analyzed gamification elements. Then the results of our study could be compared to others and might be strengthened. In other words; further research is necessary to corroborate this paper.

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Appendix



Rubrique 1 sur 4

Introduction

Description du formulaire

Quelle application avez-vous utilisée ?

Réponse courte

Depuis combien de temps utilisez-vous cette application ?

Réponse courte

A quelle fréquence utilisez-vous cette application et pour combien de temps ?

Réponse longue

Figure 8: Introductory questions

Rubrique 2 sur 4

Satisfaction ✕ ⋮

Description (facultative)

Êtes-vous satisfait-e de votre apprentissage via cette appli ?

0 1 2 3 4 5

Pas du tout Très satisfait

Quels sont les avantages d'un apprentissage via une telle appli ?

Réponse longue

Quels sont les inconvénients d'un tel apprentissage ?

Réponse longue

Figure 9: Questions about the learners' satisfaction

Rubrique 3 sur 4

Engagement ✕ ⋮

Description (facultative)

Comment s'est déroulé votre apprentissage ?

Réponse longue

Avez-vous rencontré des obstacles lors de votre apprentissage ? Si oui lesquels ? Si non, qu'est-ce qui vous a aidé à persévérer ?

Réponse longue

Avez-vous décroché ? Si oui, avez-vous ensuite repris (cours, autre appli, même appli) ? Si oui, avez-vous ensuite repris (cours, autre appli, même appli) ?

Réponse longue

Figure 10: Questions about the learners' engagement

Rubrique 4 sur 4

Mécanismes de motivation ✕ ⋮

Description (facultative)

Le système de points vous motive à passer à l'étape suivante.

0 1 2 3 4 5

Pas du tout Beaucoup

Les quiz vous permettent d'évaluer vos compétences/connaissances.

0 1 2 3 4 5

Pas du tout Beaucoup

Figure 11: Questions about the gamification mechanisms

A quelle fréquence consultez-vous votre classement ? Pourquoi

Tous les jours

Une fois par semaine

Une fois par mois

Autre...

Le système de streak (se connecter tous les jours sans coupure donne des récompenses) vous encourage t-il à vous connecter tous les jours pour faire un module ?

Pas du tout 0 1 2 3 4 5 Beaucoup

Que faites-vous quand vous recevez une notification de rappel ?

Réponse longue

.....

La barre de progression vous motive t-elle à poursuivre/terminer une unité d'apprentissage ?

un peu 0 1 2 3 4 5 beaucoup

Figure 12: Questions about the gamification mechanisms (continued)

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