

The Language Game

Do Gamified Applications Benefit Secondary Language Learning?

Introduction

Technology has revolutionised education within the past decade. Curriculums that once involved textbooks now consist of interactive applications, thanks to the Digital Age leading to the rise of gamification within these applications. Kevin Werbach and Dan Hunter define gamification as, "the use of game elements and game design techniques in non-game contexts.", and educators have been forced to embrace this new way of learning. One area that has used gamification techniques to its advantage; is foreign language teaching. Gamified applications bring together the excitement of rewards and risks with educational content. Combine this with a smartphone and millions of people now have access to a revolutionary way of learning languages.

Language learning apps are taking the App Store by storm. In 2013, Duolingo was named 'iPhone App of the Year', and a subsequently led to 100 million downloads in the following years. In the 2017 App Store revamp, Apple added a 'Learn a Language' subcategory within the Education section, boosting awareness of the subject. According to the Mobile Ecosystem Forum, research firm Ambient Insight predicts that the value of language learning applications will increase by a staggering 73% by 2019 to reach a value of \$14.5 billion.

I am going to explore how gamified applications benefit a user when they are learning a secondary verbal language. I will take a look into the history behind language learning and computers to establish important context, as well as how the competitive human nature and external motivational cues can work together to form the habits of a successful learner. Throughout this essay I will also touch on the importance of efficiency and the personalisation of information behind learning a language, and whether gamified applications are able to use these to benefit learners, as well as answering the crucial questions:

Does gamification motivate us to reach our goals? Is it an efficient way of learning? Or are we better off sticking to traditional methods that have stood the test of time?

Computers Supercharge Learning

Computer Assisted Language Learning emerged in the 1960s. Defined by Michael Levy as "the search for and study of applications of the computer in language teaching and learning", it enables users to improve their language skills through using online resources and assessments. Essentially, the main aim of CALL is to promote learning languages through computers, and the tools that come with them; the Internet, email, multimedia, games and word processing, to name a few. As the years passed, and CALL evolved, language teachers have found many reasons to use it as an aid in the classroom, and the increasing use of technology in recent years means it is readily available to the teacher, offering a flexible approach to learning. This section will cover the history of CALL, and how it has evolved over time as context to learning through gamification.

CALL emerged in the sixties and was based on a behaviouristic theory of learning. As a bit of historical context, the sixties and seventies saw many technological developments such as the development of BASIC language, the development of the UNIX operating system, the invention of the first Microprocessor and the development of C language. As well as this, Intel released their 8008 processor, Microsoft was formed as a company and Apple released the first mass-market

PC; Apple II. These developments opened the world of computing to a wider audience and ultimately this resulted in a 'boom' in later years.

CALL comprised of drills and practices on mainframe and mini computers, with applications having pre-programmed answers. The computer presented the user with a question, to which they provided a textual response. The computer would then analyse the response and give basic feedback, usually only an indication of if the answer was correct or incorrect. This meant that users learned through imitation and repetition; repeatedly going through the process of answering questions until they got the answer correct. The computer was seen as the teacher, as it provided users with self-paced learning and immediate feedback.

This type of learning focused on accuracy, rather than fluency. To learn the language, the user answered the questions over again until they got them correct. This is a similar method to learning through a textbook - repeatedly reading the paragraph until it is memorised and questions are answered correctly.

By the eighties, CALL became communicative. During this decade, technological developments saw the release of Apple Macintosh, Microsoft Windows and the LaserJet printer by Hewlett-Packard. Crucial to the development of CALL; the TCP/IP Protocol is established leading to the Internet being formed, and word processing was developed. Consequentially, approaches to teaching were changed with the release of these new technologies. Principles of language learning were developed which saw language learning being identified as "the process of discovery, expression and development". The focus on accuracy suddenly shifted, and instead the priority was placed on how the language was used, communicative competence and considering the context of both the language and the conversation.

It emerged that the previous method of learning purely through imitation and repetition didn't leave the learner able to communicate in the language genuinely and through natural language. This is where the focus on the context came into play. Learning activities changed from question and answer to what is known as a 'cloze test'. This is where the user is provided with a text with certain words removed. The user then has to replace the missing word with what they think is appropriate based on their learning. Today this is commonly referred to as a 'fill in the blanks' exercise. Other activities included text reconstruction and paced reading.

Thanks to the introduction of PCs, and the embrace of the communicative approach to language learning, CALL boomed at this stage. Serious educational applications began to emerge and the practice was consistently being adapted by schools and universities as the term 'CALL' was widely used across the UK. The United States initially used the acronym 'CALI', however by the end of the eighties the use of this term faded, and CALL became the dominant term.

The nineties rolled around and saw the introduction of audio CDs, the CD-ROM, Windows 3.0 by Bill Gates and Microsoft, the Multimedia PC (MPC) was introduced with the addition of CD-ROM drives and sound cards. These new technological developments enabled users to make use of a variety of multimedia to teach language for communicative purposes.

CALL became integrative with a humanistic approach to language learning. Learners focused on the use of meaningful and authentic learning materials, and contextualised materials continued to be in use from the previous decade. The main focus of CALL changed again, with the main aim now being fluency over accuracy. Uschi Felix notes this as being "a shift away from language usage to language use".

This advanced allowed the material available to learners to include a variety of multimedia elements alongside the text, including video, sound, images and animation; all of which can help the learner to become more fluent and understand the material at a greater depth. This was based on a communicative approach to language teaching, as it built on the student's motivation and encouraged the students to interact with the materials through the computer, thus giving a more authentic learning environment. CALL enabled learners to set their own learning path and navigate through the material at their own pace.

With this new-found humanistic approach to learning, CALL, ultimately, began considering the learner. No longer were learners just 'users' of the computer. Now the material was meaningful and somewhat personalised to consider the context they were learning in and their learning styles. Uschi Felix stated that at this stage, CALL included "tasks relevant to students' real life interests and experiences". The role of the teacher also changed, with them becoming facilitators to the material on the computer, rather than the sole source of the information. Similarly with the introduction of email, the World Wide Web and video conferencing, learners now had "direct communication around the globe", and were able to communicate with other students and their teachers. They now had the ability to share files through the newly developed FTP which introduced a collaborative learning environment and a dynamic curriculum.

More recently in the 2010s, CALL has continued to evolve with the introduction of gamification. The developments of the nineties are still largely at play this decade and continue to develop to become more interactive. This is where the gamified applications came in. The development of coding languages and frameworks throughout the years means that the World Wide Web is booming increasingly interactive, therefore CALL applications are following suit. It is important to note here that, in contrast to previous decades, not all CALL applications have become gamified. Some applications still follow the same approach as what was the norm in the nineties.

With the emerging Web 2.0, users have access to online learning platforms which provide real-time feedback, and oftentimes this feedback is personalised to show the user their specific mistakes and how they can fix them. Alongside this, the Internet provides instant access to native speakers through social media, video-conferencing applications such as Skype and, more specifically, language learning mobile apps such as Duolingo. These native speakers often play a role in bringing a natural language element to these resources through one-on-one lessons or providing written content and correcting exercises completed by the learners.

Suddenly gamification made learning a second language seem achievable to the average person, and it became a hit, with Duolingo boasting a massive 200 million active users.

Competition Equals Motivation

As per Kevin Werbach and Dan Hunter's definition of gamification, it works by using game elements to motivate the user. These methods include collecting points and losing lives, to 'hook' the user into continuing to learn languages through playing the game.

Gabe Zichermann and Christopher Cunningham touch on how "intrinsic motivation is better than extrinsic rewards" in their book *Gamification by Design*. Rather than exclusively using external rewards to create motivation in players, it is crucial that the player's internal motivation works alongside the rewards for the user to achieve the end goal. On the other hand, they state that we cannot rely solely on the player's "intrinsic motivation", because "we don't get the desired results", but rather if the motivation is created externally, then we go from "from hoping it happens to a structure and process for making it happen." In other words, if we give the user an external motivator; competitiveness and rewards, and use it to enhance their internal motivation to learn, then instead of hoping the user reaches the end goal of learning the language, there is a system in place to ensure they actually reach it.

The goal is to bring out the competitive nature of the user. This competitive personality trait will "contribute positive in successfully learning" a second language. Nir Eyal suggests in *Hooked*: "there are three ingredients required to initiate any and all behaviours: the user must have sufficient motivation; the user must have the ability to complete the desired action; and a trigger must be present." Bringing these "ingredients" together, and adding another; investment, comprises what is known as the Hook Model. The Hook Model creates habit-forming behaviours in users by bringing them through a looping cycle which consists of the three elements; a trigger, an action and a reward, as well as a final added element of investment.

We can apply this Hook Model to Duolingo; a gamified language learning app, to see a successful implementation, and therefore evidence of why the app works so well. I'm going to refer my own

experience of using the app to learn the Irish language; Gaeilge, as well as French. For reference, I downloaded the app on to my iPhone 7 and used it over the period of several months.

To start, Nir Eyal states “a trigger must be present”. Duolingo sends out push notifications intermittently to remind me to log in and work towards reaching my daily target of ten minutes of activity within the app. I also had emails set up to come through once a week. These acted as reminders to score more points within the app, which was done by completing quizzes. These are examples of external triggers.

Following this, “the user must have the ability to complete the desired action”. I logged on to the app and progressed through lessons and quizzes until at least ten minutes had passed. This is an easy action to complete and one which can be done at any stage within the day. I was then able to see the amount of time I had spent on the app, letting me know whether I can finish for the day or continue to use it for longer.

Thirdly, “the user must have sufficient motivation”. Duolingo creates motivation not only by reaching for the competitive nature within its users to achieve right answers, but by rewarding us. After completing a lesson, I am brought to a screen showing how I am progressing towards my daily targets, be it the length of time or the amount of points, known as ‘XP’. Alongside this, every time I complete a skill, I receive a badge which also shows the strength level.

The final part to the Hook Model is investment. Typically this would come in the form of purchasing extra lessons, however Duolingo is a free app. Therefore, my investment comes in the form of the time spent using the app. The skill strength levels I mentioned previously will drop, so seeing that happen brings back the competitive, and sometimes perfectionist, nature and ‘hooks’ me into using the app again and improving my skills further. Signing up to their email list and participating in their community forums would be further ways to invest in the app.

Now that I have established that the Hook Model is implemented within Duolingo, we can see that they use other methods such as morale-boosting messages throughout the app to give the user the feeling that they are ‘winning’ the game. Bringing this into a real-life situation, this is mirrored in the traditional setting of a classroom; when students get the answers correct to written questions, they get ticks and praising comments. When students are working together to get to the correct answer in, for example, a verbal questioning session, teachers will encourage the students to keep going in that direction, therefore building momentum until the final correct answer is given. It is through this method of being motivated to continue playing the game, that the user will continue to learn the language. This can sometimes be a sub-conscious decision made when engrossed within the game. So not only is this a key difference, and benefit, of learning through gamification rather than a traditional textbook, but it is actually the beginning of a habit forming as noted in Hooked; “Cognitive psychologists define habits as, “automatic behaviours triggered by situational cues:” things we do with little or no conscious thought.”

Language learning apps depend on users reaching the stage of creating a habit out of learning, to thrive. In an article for TechCrunch, Masato Hagiwara and Burr Settles; two research scientists at Duolingo, wrote about the habits of successful learners. Using real data from Duolingo, they explored the type of habits successful users of the app made. This includes the length of time they spent learning per day, stating that “most people who stick with language learning in the long run make sure to spend a few minutes practicing every day or two.” This speaks back to the ‘trigger’ that is present through the app’s daily notifications and email reminders, as well as “the ability to complete the desired action”; in other words, proof that the ten minutes a day recommended by the notifications helps to establish successful habits.

Similarly, Masato and Burr mention the importance of reviewing old material so the “knowledge [will] work its way from your short-term memory into your long-term memory.” We can relate this back to the Hook Model’s investment. Invest your time in learning new materials and revisiting old knowledge and skills, and it will pay off in the long run. Duolingo uses the skill strength meters to indicate when these old skills need to be revisited. This matches a technique done within a traditional classroom setting. Students will be taught skills over the course of a semester or the year, and will then revisit them, sometimes throughout other modules, or when revising for exams. This works in the same way to bring the newly-learned skills into the students’ long-term memory.

Therefore showing that gamified language learning apps use familiar teaching methods, so transitioning from a traditional learning background into using an app isn't so much of a foreign experience in itself.

The Race to Learn

One of the most daunting elements to learning a second language for people is usually the scale of the task at hand; how long will it take to understand the language?

Learners want to be able to achieve, at least basic, fluency quickly and as easily as possible without feeling overwhelmed. Gamified apps today market themselves as solving this problem; using language in their marketing materials to give people a sense of urgency. For example, on Babbel's website, their homepage has a button stating "Start learning now" and a tagline, "Babbel gets you conversational fast". Similarly, Memrise's website asks "What are you waiting for?" Not only do these give a sense of immediacy to users, but it also sets the pace and instills an idea in the users' heads that they will be able to learn the language quickly. Already these websites are providing triggers to create motivation before the apps are even downloaded.

Language learning apps such as Duolingo, Memrise and Babbel are proven to work because of their ability to break the language down into more manageable pieces. For example, rather than looking at the whole topic of grammar, it is broken down into smaller lessons, looking at past, previous and present tenses; one step at a time. Learning iteratively and incrementally means users reach their goals sooner, rather than a process which feels lengthy and unattainable. John Hewson refers to this as the "staging of skills".

An example of this modular-approach to learning can be found in the Babbel app. The first step to learning a language in Babbel is a series of word-recognition tasks, teaching the user how to read the language. The following steps bring the user into speaking the language by getting them to repeat phrases on screens and writing in the language by 'filling in the blanks' in sentences. Whilst this process is happening, the content is broken down into modules, and with each exercise users focus on specific words, again preventing learners from feeling overwhelmed. This is what William Mackey refers to as the "snowballing technique"; starting off with a small base of knowledge, and slowly continuing to build, add to and develop that knowledge and skills until the end result is reached. In the case of a language learning app, this would be when the user can progress on to the next level. On top of the "snowballing technique", users are continuously earning points with every correct answer through gamification. As this is what the users will be focusing on, it is ensuring that they are learning at a fast pace and continuing to advance throughout each level, making this an efficient process.

John Hewson also stated that the amount of new information a learner can take in dramatically reduces after around twenty minutes, therefore content should be provided in small 'bitesize' lessons to prevent this from happening, and Duolingo does exactly that. Previously we looked at how Duolingo aims to get users to be active on their app for around ten minutes everyday by sending them notifications and emails. The app allows users to pick a daily goal of at least five minutes, and a maximum of twenty minutes. This fits in with the statement made by John Hewson, enabling users to integrate language learning into their day easily, regardless of their situation, which is a crucial element to language learning for adult learners. Children and young people who study languages in school are able to use these apps to further the topics they studied in class, refining their skills and continuing to build their knowledge. Adults, however, will need something that can fit in to a busy day, for example around a full-time job and family life. This is why efficiency is key, and learning a language through an app wouldn't be successful without some flexibility and the ability to learn at a fast pace in small stages.

To understand how apps used modules to break down the content so it becomes more efficient, I used the gamified language learning app Memrise. For reference, I downloaded the app and used it on an iPhone 7 to learn French over the period of a few months.

Memrise stands out from other language learning apps as it takes the gamified experience literally, with the user being assigned an astronaut character, and the user interface in the app is space themed. Users are assigned a level; I started at the beginning so in my case it was 'Level 1', and are then led to a screen with each level displayed on a progress bar. Only the first level is unlocked when beginning, so users must start there and complete each lesson before progressing to the next.

In 'Level 1', users begin with learning the basics, for example 'hello', 'goodbye' and 'how are you?'. I am brought through a series of different question and answer screens with each word until I have answered correctly enough times to be considered skilled in this area. From here the content progresses on in to using these words in a sentence. For example, I was taught the words 'Hello', 'My', 'Your' and 'Name', and then progressed on to learning to use them in a sentence; 'Hello my name is Paige, what is yours?' Having the content broken down into simple vocabulary was easy to grasp as a beginner, then the progression on to the full sentence felt natural and easy to understand. With every correct answer I was awarded points, and when I had enough of these I was able to level up and unlock a 'superpower'. I was shown my skill level by a flower which started out as a seed, then grew into a flower as the skills learned moved into my long-term memory.

This experience demonstrated how the learning process became efficient, as I was somewhat distracted by earning points and unlocking these characters and powers with each passing level. It became a competitive goal, as I wanted to keep unlocking levels to see what character would come next. It goes to show that these apps can appeal to the fun side instilled in all of us, making the learning experience more enjoyable and feel natural.

Teachers Versus Apps

A key element the user considers when finding a suitable language learning app, is if the content that is taught is relevant. Users have different knowledge levels of the language prior to using the app, as well as having their own goals, therefore it is crucial that the content is actually useful to the audience. However, this isn't something apps can currently do, and do it well.

There is some evidence of apps trying to take this into consideration. For example, Memrise and Babbel ask the user are they 'beginners' or 'advanced' prior to delivering the content. This will give users different starting points. However, this does not necessarily mean that users will be starting at the correct point with regards to their previous knowledge. This is where teachers have the advantage. Teachers have the ability to empathise with their students and take into consideration their learning level, age, environment, previous knowledge and any external factors that may affect their ability. They form relationships with their students which will act as a source of motivation. Teachers have the ability to tailor content to fit specific learners' needs, making their experience personalised and more relevant. Babbel does, however, take their learning experience a step further by offering, for example, 'English for Business', which is acknowledging that the learners in this course will be working adults, and therefore the content can be delivered at a higher level.

For example, take adult and child learners. The majority of language learning apps fit their users into one of two categories; beginner or advanced. How would this content be delivered to the child at an advanced level, without using over-complicated language? Similarly, how would an adult receive a beginner's level education of the language, without feeling belittled through use of simplistic language?

This is where teachers step in with the human ability to consider the context of the learner. Alongside this, effective language learning requires the experience of speaking to real native speakers. Pre-recorded clips and chatbots are the closest experience to this an app can provide. In contrast, language teachers are, typically, fluent in the language they're teaching, and can therefore provide this on-demand, and adapt the conversation to fit the context. Not only this, but they can hold conversations with their students, immersing them in real-life situations, or a reenactment of one at the very least.

There are many different models identifying learner types, but the three most widely-accepted types are visual, auditory and kinaesthetic. Visual learners learn best by looking at visual cues, be it colour coded notes, diagrams, making lists or photographs. Auditory learners prefer to hear the information, through a teacher or sound clips. They can listen to others, or themselves, and retain the information easily. Kinaesthetic learners learn best through doing. Simply put, kinaesthetic learners enjoy using their hands, moving around or even just writing information out, at a simple level, over reading or listening.

There are both advantages and setbacks to learning through a teacher, depending on a student's individual learning style. Simply put, teachers, as humans, have the ability to personalise the content based on their audience. Through personal experience, I am a kinaesthetic learner. I find it easier to retain information by doing, and in my language classes, this was usually by drawing pictures throughout my notes that related to the points. As a kinaesthetic learner, the classroom wasn't always the best learning environment for me; sitting stationary and not being able to interact with objects or applications to learn was difficult and therefore a downfall. However, auditory and visual learners could thrive being taught solely by a teacher as they could listen to retain information, or look at the information in a text book or on the board to take it all in. With that being said, there were situations where teachers would create a physical learning environment, with students working collaboratively to complete tasks. This is something an app currently isn't able to achieve.

Another possible disadvantage to learning with a teacher in a classroom setting is that in large groups of students, there will be a combination of all learner types, therefore making it more difficult for teachers to personalise the lesson to suit a specific type of student. Oftentimes it would suit one type more so than the other two. On the other hand, in some lessons teachers will be able to make the lesson more interactive and involve a physical activity or role-playing scenarios. Role-playing is a popular teaching method in secondary language classes and appeals to kinaesthetic learners, and possibly auditory and visual, depending on the scenario.

Applications have the ability to consider all three learning styles, also. Use of colour to highlight different topics or key words, sound clips of native language speakers and the learner interacting with the application means that most apps would cover all three learners at a very basic level. However, a downfall is that levels of efficiency would vary depending on the learner type, for example auditory learners would need majority of the content within the app to be delivered through sound clips or videos. Whereas with kinaesthetic learners, interacting with the app through a game or quiz is more beneficial. There will be drawbacks to both arguments as it is difficult to cater to everyone.

Conclusion

In conclusion, it is evident that gamified applications can be beneficial when learning a secondary language. They provide new sources of motivation, using the psychology behind human behaviour to 'hook' learners into continuing to learn a language, whether that decision is subconscious or realised.

With that being said, I don't think applications should be the sole source of a person's language education. Apps lack the ability to fully personalise their content to ensure it is relevant, and will continue to lack this in the near future. This is where a teacher is more beneficial. We can reflect back to our own education experiences to realise this; be it when a teacher gave us assistance one on one, or when a lesson was adapted to suit the time period it was being taught in.

An article from Vice quotes MIT linguist Suzanne Flynn, saying "language learning apps are "good for learning new vocabulary at best," and don't have "what is needed for true language acquisition to take place—immersion or immersion-like language experiences."" Learners who depend solely on apps for their language education typically learn without exposure to native speakers or collaborative environments. Therefore if the material isn't relevant to their specific goals, they will end up with a knowledge of vocabulary, rather than the ability to hold conversations and confidently read and digest the written language.

Mobile gaming is a booming industry, and has grown substantially over the past five years. Statista, a leading statistics company, estimated that in the United States alone there were over 64 million mobile gamers as of late 2016, and the mobile gaming industry is forecast to grow to a value of \$74.6 billion globally by 2020. Therefore it is clearly no surprise that gamified language learning apps are so successful and boasting users in excess of over 100 million, as people who are already using gaming apps are more likely to give a gamified language learning apps a go.

I have come to the conclusion that gamified apps are a good alternative learning tool for those who don't have access to language education or who simply cannot afford it. Another good use for them would be for learning some basic vocabulary before visiting a foreign country with a different native language. But ultimately, they will be most beneficial to learners who use them as a complimentary tool in their secondary language education, where they have access to native speakers and collaborative environments where human interaction provides depth and meaning to the language they are learning.

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