

# Duolingo : A Tool to Supplement Language Learning at University

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## Abstract

This paper highlights the underutilisation of educational technologies in English language courses. Duolingo, a free, language-learning platform, is introduced and a proposal is made for how it could be incorporated into English courses. The goal is to call attention to the value Duolingo has in increasing student motivation through gamification.

## Introduction

The introduction of electric power to factories in the 1880s did not yield any immediate benefit in terms of productivity growth. In fact, the transition from the steam engine to electricity did not show any productivity growth until the 1920s. It has been suggested that the reason for this was due to the slow adoption of the new technology by manufactures, as they did not know how to re-structure their factories to take advantage of the efficiency of this new power source (David, 1990). This example parallels the productivity paradox, a term used to describe the slowdown in labour productivity growth in the USA during the 1970s and 80s. In this case, the paradox was that information technology had developed dramatically during this period (by as much as one hundredfold, by some estimates). However, labour productivity growth had fallen from 3% in the 1960s to 1% in the 1990s (David 1990).

English language classrooms are experiencing a similar paradox. In smartphones, students today carry with them technology vastly more powerful than anything I used in my university computer lab as an undergraduate student in the late 1990s. Yet, this technology is being underutilised. For some students, their smartphone has replaced the stand-alone electronic dictionary, but that is the extent of how they use their smartphone to study English. Thankfully, however, free educational technology is becoming available that students enjoy using and find motivating. With this in mind, I would like to introduce Duolingo and propose how it could be incorporated into university English classes.

## What is Duolingo?

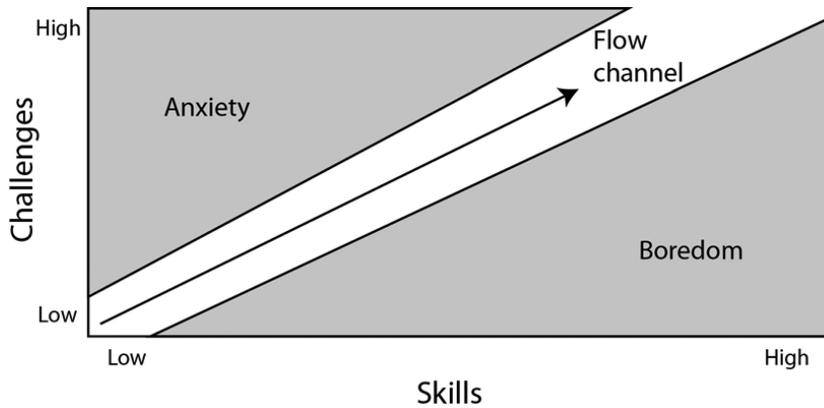
Launched in June 2012, Duolingo is a free, online platform for language learning. There are around 120 million registered users of Duolingo, making it the largest language learning platform in the world (Pajak, 2016). It can be accessed via the platform's website as well as mobile applications (both iOS and Android). As of January 2017, a total of 66 language courses were available across 23 languages. In more detail, 21 courses were available for speakers of English, meaning that the medium of instruction is English. These courses include widely-spoken languages such

as Spanish, French, and German, and lesser-known languages such as Hungarian, Greek, and Romanian. The range of courses is expanding all the time and courses currently in development include Swahili, Czech, and Indonesian, among others. The availability of courses for non-English speakers is more limited. For example, Spanish speakers can take courses in English, French, Brazilian Portuguese, German, Italian, and Catalan, while Russian speakers can learn English, German, French, and Latin American Spanish. English is currently the only course available for Japanese speakers. One technical reason for this is that Japanese presents certain programming difficulties, particularly the fact that the language does not use spaces, which makes it difficult for Duolingo to identify units of meaning within a phrase or sentence.

## **Using Duolingo**

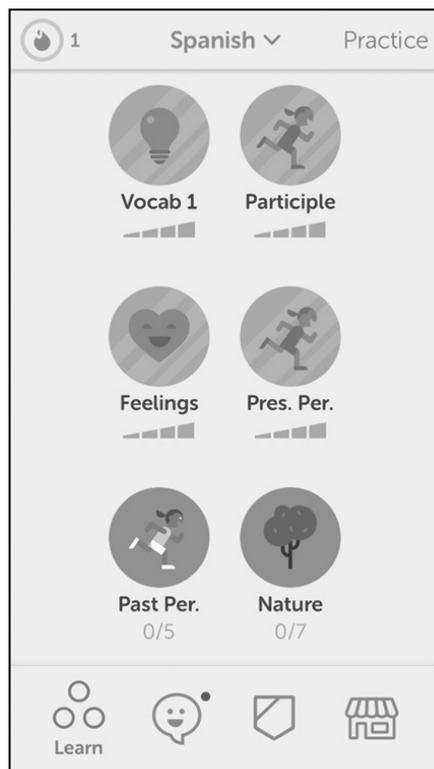
### Placement test and registration

Upon accessing the app or website, a new user of Duolingo must select the language they speak, which will be the medium of instruction. They must then select the language they wish to learn. As mentioned earlier, English is currently the only option for Japanese speakers. The user is then asked about their ability in the language they wish to learn. They can choose to start their Duolingo course as a complete beginner, or they can take a short placement test, which will enable them to start their course at a more advanced stage. The placement test is vital step that should not be skipped. Learners tend to be quite modest about their ability, so they often select the “complete beginner” option, even though they have studied English for many years at school. However, starting a Duolingo course as a complete beginner presents the user with tasks that are too easy. Consequently, the user becomes bored and is not motivated to continue the course. However, by completing the placement test, the user may be able to skip in the region of 20% to 30% of the course. This way, the user immediately starts to learn new grammar and vocabulary, rather than working through basic English that they acquired at school. The placement test ensures that the users are presented with a degree of challenge that corresponds to their ability; insufficient challenge will result in boredom, while an excessive amount of challenge will cause anxiety and frustration. This sweet spot between challenge and ability is known as the flow channel (Csikszentmihalyi, 1997) (See Figure 1).



**Figure 1. Flow diagram : Flow Channel Line.** The diagram shows the state of flow when levels of challenge and skill are balanced.

Following the placement test, the user is placed on the Duolingo skill tree. This is a visual representation of the course content that the user will progress through.



**Figure 2. Duolingo skill tree for native English speakers learning Spanish.**

At this point, the users are asked to create a user profile so that when they return to the programme they can continue from where they finished.

### Skills and lessons

In Duolingo, the term skill is used broadly to cover grammatical items such as present perfect tense and prepositions, as well as topics such as personal belongings and occupations. For each skill in the skill tree, there are between 2 and 10 lessons, depending on the complexity of the skill being learned (See Figure 2). The Duolingo course for Japanese speakers learning English has 56 skills and a total of 298 lessons. To complete a skill, all the lessons for that skill must be completed. To complete a lesson, users must acquire 10 experience points (XP). One XP is gained for answering a question correctly, while one XP is lost for an incorrect answer. Duolingo utilises adaptive learning so that if a user gives an incorrect answer, new questions are automatically generated to give the users the chance to reach 10 XP and thus complete the lesson. XP can also be earned by completing practice lessons, which enable a student to reinforce material they have previously studied. Figure 3, below, shows a section of the skill tree for the English course for native Japanese speakers. The strength bars underneath each skill help the user identify which skills they need to practice; the strength of a skill decays over time, mimicking the forgetting curve and encouraging users to follow spaced repetition in their learning (Greene, 2008).



Figure 3. Duolingo skill tree for native Japanese speakers learning English. Each strength bar (seen below each skill) represents the users' proficiency level for that skill.

### Activities

The range of activities in Duolingo include the following :

- Write a vocabulary item after seeing a picture that represents it.
- Translate a sentence into your native language.
- Translate a sentence into the language being studied.
- Dictation : write a sentence that you hear. There are two speeds, normal and slow. (See Figure 4)
- Pronouncing a sentence. Through voice recognition software, the app can detect whether your pronunciation is correct.
- Match pairs of words.
- Put a series of scrambled words in order.(See Figure 4)
- Choose from three sentences in the target language to see which ones fit the sentence in your native language.

### Gamification in Duolingo

What sets apart Duolingo from traditional methods of language learning is its use of gamification, which can be defined as “the use of game mechanics and experience design to digitally engage and motivate people to achieve their goals”(Burke, 2014). In essence, gamification uses entertaining and engaging elements of games in non-gaming situations, such as learning a language. This is closely tied to the core principals of Duolingo, which are that language learning should be fun and learners should be motivated to return to the platform regularly. Below is a table (Table 1) explaining the different gamification features that have been incorporated into Duolingo.

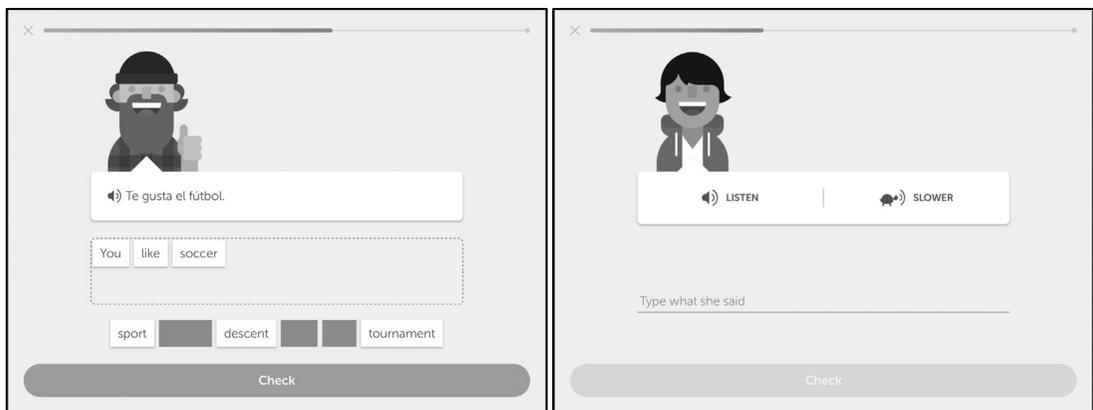
**Table 1. Gamification features found in Duolingo (Duolingo 2017)**

<b>Feature</b>	<b>Purpose</b>
<b>Skill tree</b>	Allows learners to easily visualise their progress through the course and their strength within each skill.
<b>Unlocking lessons</b>	As learners successfully complete lessons, they “unlock” the next lesson. This is a feature commonly seen in video and smartphone games. It also ensures that learners pace their learning.
<b>Points</b>	Experience points (XP) are gained as the learner progresses through the lessons.
<b>Leaderboards</b>	Linking accounts with other learners allows friendly competition.
<b>Gold</b>	The strength of a skill (how well a learner knows the content) is displayed with four bars ; one bar is weak, four bars is strong. Over time, the number of bars will decrease for a skill unless they learner returns and refreshes it by completing a short activity. If this is done, the skill icon becomes gold in colour.

<b>Checkpoint</b>	Placement tests within a course that ensure that learners are where they should be.
<b>Encouragement</b>	Practice reminders can be sent to the learners so that they remember to practice.
<b>Lingots</b>	The virtual currency in Duolingo, which can be spent on power-ups (Streak Freeze—allows your streak to remain in place for one full day of inactivity; Double or Nothing—attempt to double a five lingot wager by maintaining a seven-day streak), and bonus skills such as idioms and proverbs. Lingots are earned by completing levels, completing skills, and maintaining streaks (10 days in a row).
<b>Streak</b>	The number of consecutive days a learner has practiced is recorded and shown as their current streak.
<b>Fluency score</b>	Duolingo's measure of the learner's current fluency in the language they are learning.
<b>Trophy</b>	A trophy awarded when all the skills in a course have been completed.

### User interface

A further feature of Duolingo that should not be underestimated is the user interface. The images used are fun and unthreatening, and the Duolingo mascot is a wise old owl, which acts as your personal coach. The colour scheme is centred around primary colours and there are quiz show-like bell rings for correct answers.



**Figure 4.** Interface to translate a Spanish (study language) sentence into English (native language) using scrambled words [left]. Interface for dictation exercise in the language being studied by an English native speaker [right].

### Duolingo for Schools

In January 2015, Duolingo launched Duolingo for Schools, which allows teachers to create virtual classrooms. The teachers have a unique class code for each of their classrooms, which they share with the students. Once the students have linked their Duolingo accounts to the classroom, the

teacher can then monitor their progress. Via the [www.schools.duolingo.com](http://www.schools.duolingo.com) website, teachers can access a centralised dashboard from where they can see the activity log for each student, which shows the timestamp of when they logged in, which skill they worked on, which lessons they completed and how many XP they gained (See Figure 5).

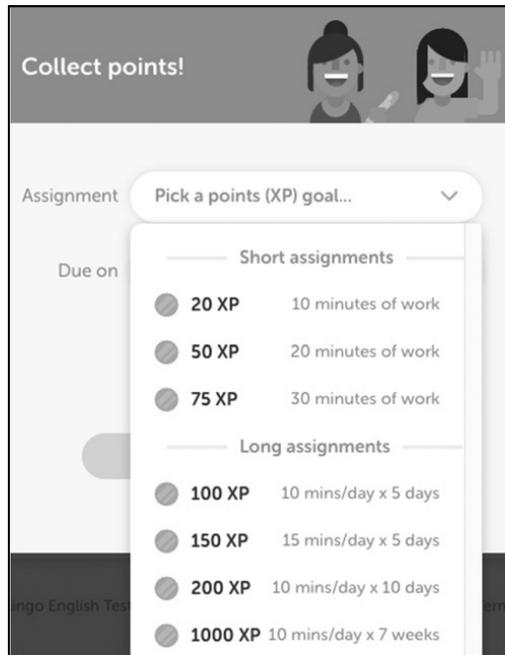
The screenshot shows a teacher's view of a student's activity log. At the top, there is a header with 'Autumn 2016' on the left and 'Learned Educator' on the right. Below this is a profile section with a silhouette of a person and a redacted name. The main content is a table titled 'All time' with the following data:

Timestamp	Skill	Lesson	XP
Dec 21, 2016 9:58 AM	通信	1/3	10 XP
Dec 20, 2016 9:51 AM	スポーツ	Test	40 XP
Dec 20, 2016 9:44 AM	動詞：動名詞	Test	60 XP
Dec 20, 2016 9:40 AM	動詞：動名詞	1/7	10 XP
Dec 19, 2016 12:39 PM	自然	Test	60 XP

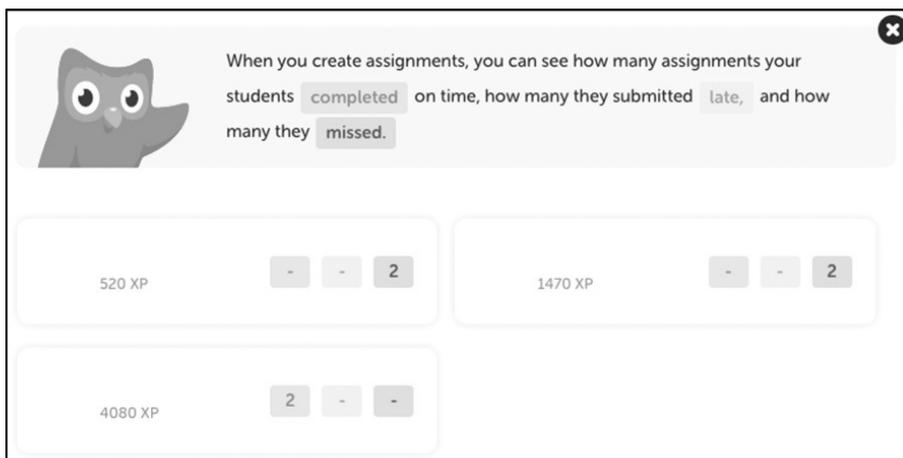
**Figure 5. Japanese student progress dashboard. Teacher’s view of the student’s activity information including log in time, skill, lesson, and XP. The personal details of the student have been omitted.**

### Assignments

Through the dashboard, teachers can also create assignments for their students. These can take the form of completing specific skills, or gaining XP. Completing specific skills is a useful way to help reinforce work done in class. Assignments based on XP have the advantage of helping to motivate students at different levels of ability, as is commonly found in a compulsory English class. Duolingo offers a range of assignments based on XP: short assignments based on time spent using Duolingo (20 XP for 10 minutes of work, 50 XP for 20 minutes of work, etc), and long assignments which require students to return to the platform regularly over a period of days (100 XP for 10 minutes of work per day for 5 days, or 150 XP for 15 minutes of work per day for 5 days) (See Figure 6). The deadline for the long assignments can be set by the teacher, meaning that the student could have seven days to complete five days of work on Duolingo. The benefit of the long assignments is that students are required to study a little each day, so they are engaging with the language regularly, rather than just once a week in class and once when completing a homework assignment. Spaced learning in this way has clear benefits for the learner (Dempster, 1996). The results of the assignments can be easily monitored through the dashboard; teachers can quickly see who has completed the assignments on time and who has not (See Figure 7).



**Figure 6. Teacher’s interface to create assignments based on experience points (XP). Short Assignment (20–75 XP) or Long Assignment (100–1000 XP).**



**Figure 7. Teacher’s view of the student’s progress using XP in different tasks (520 XP, 1470 XP and 4080 XP) completed in time, completed late, and missed. The personal details of the students have been omitted.**

### **Level-appropriate work**

The key benefit of allocating assignments based on XP rather than skill completion is that students can work at their own level. If two students have very different levels of English ability, a worksheet prepared by the teacher might be very easy for one student and impossibly difficult for the other. In this scenario, neither student is receiving an optimal level of challenge. Ideally, each student should be studying material at a level that matches their ability, thus enabling them to

feel the satisfaction of learning, rather than the frustration of anxiety or boredom. This is related to the debate of growth versus proficiency as a way to measure the student achievement (Ross 2005, Ho et. al. 2009). Instead of gauging the students by a certain threshold (proficiency), Duolingo allows teachers to measure how much a student has improved (growth) regardless of their level. With Duolingo, fifteen minutes of work on advanced material by a high-level student is given the same value as fifteen minutes of work on basic material by a low-level student. The challenge encountered by each student is comparable, and they both gain a sense of achievement from completing their assignments; the high-level student is not bored by the simplicity of the work they have been presented with and the low-level student is not demoralised because they could not complete the work they were assigned.

Using the Duolingo for Schools website, managing assignments is simple for teachers; they can see how many assignments students have completed and how close students are to completing current assignments. Teachers can also see the activity details for the class as a whole, including days active, lessons completed, what stage of the course each student is at in terms of skills completed, as well as the total number of XP earned (See Figure 8). A specific date range can be selected so that the teacher can see what work students have done in the last week, or during the spring vacation, for example. Teachers can download all of this data from the Duolingo website as an Excel file.

Activity details				
Student	Days active	Lessons	Course progress	Points earned
CALL Autumn 2016	2 days	5 lessons	15 skills	520 XP
CALL Autumn 2016	4 days	6 lessons	29 skills	1470 XP
CALL Autumn 2016	36 days	143 lessons	56 skills	4080 XP

**Figure 8. Teacher’s view of the activity details from all students in the class (CALL Autumn 2016). Student names have been removed, but each row represents one student. The student shown by the third row of the table continued using Duolingo after the CALL Autumn 2016 course had finished.**

**How could Duolingo be incorporated into a university class?**

Assigning Duolingo as self-study in the form of weekly “long assignments” could supplement work done in class. Students would be required to complete a certain number of minutes work each day for five days. Low-level students would be able to fill in gaps in their language knowledge that have existed since school, while more advanced students could stretch themselves beyond the material being covered in class, perhaps working on key areas of difficulty that they have identified through using Duolingo. As a guideline, during a 15-week course, 20% of the class

grade could be allocated for 10, week-long Duolingo assignments (2% per assignment). Alternatively, Duolingo could be set as homework for breaks in the academic year, such as summer and spring to help students stay engaged with English.

### **Possible objections**

Implementing a new technology or system into a class must always be done carefully. A potential problem in applying Duolingo in a university class is that students would be required to have access to a device to complete their Duolingo tasks, and not every student has access to a smart-phone or tablet. Fortunately, Duolingo can also be accessed on computers at the university. Students with devices, but no Internet access at home, could use the free university Wi-Fi.

### **Conclusion**

This paper does not propose replacing language classes in their traditional form with an app or website, but rather it puts forward a way of supplementing those classes with material that can challenge and motivate learners of differing abilities. Personalised learning is achievable today using technology that is freely available. Duolingo offers a fun way to cement fundamental vocabulary and grammar, allowing students to feel a sense of achievement irrespective of their level. Mixed-ability classes pose many problems for teachers, and there is a high risk of alienating students by using material that is too advanced or too basic. Duolingo can help students to find their level and gain confidence in their ability to learn. The momentum that this platform can create could encourage students to continue to learn English even when their English class has finished. We can do more for our students than simply playing the textbook CD or DVD. We can provide our students with a sense of learning, enabling them to find the challenge that is right for them. It is time that the productivity paradox in language learning was assigned to history.

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