

Learning
Languages
Online in the
age of Mobility

LLOM

ERASMUS+
KEY ACTION
2

INTELLECTUAL OUTPUT 2

Gamification

GAMIFICATION

Intellectual
Output 2:
Gamification

Erasmus+
Key Action 2

LEARNING
LANGUAGES
ONLINE IN THE
AGE OF
MOBILITY

LLOM

Learning Languages Online in the age of Mobility - LLOM

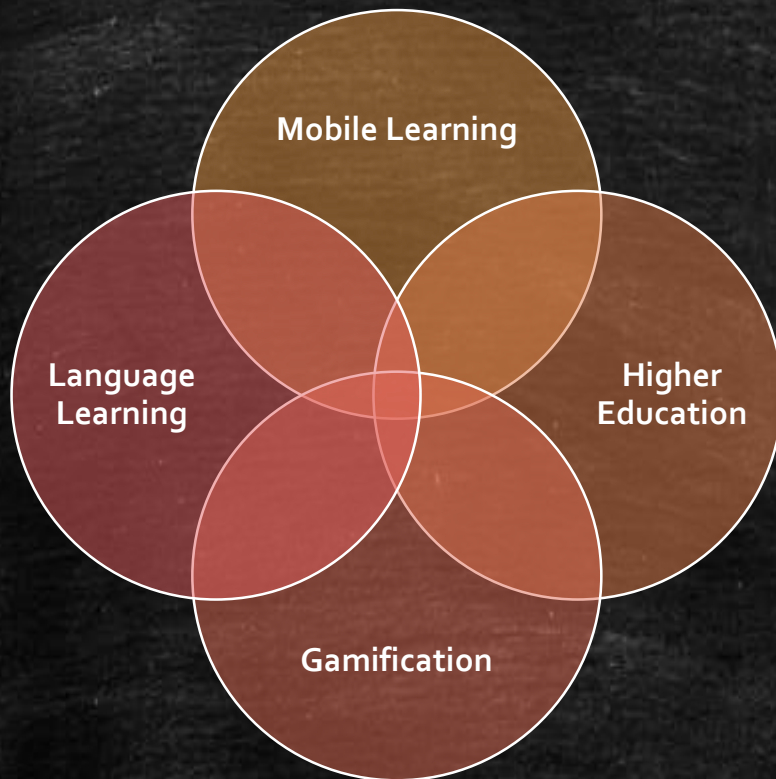


LLOM

- aims to design and offer specific solutions in the context of language learning and teaching at Higher Education Institutions.



Core Concepts of O₂



Core Concepts of 02

Mobile Learning

- possible for students to learn, collaborate, and share ideas among each other with the aid of internet and technology development.
- acceptance by learners and educators is critical to the employments of M-learning systems

Higher Education

- educational Innovation versus Technological Innovation

Gamification

- oversimplification versus footing in modern science
- gamification in business versus gamification within a post-positivist epistemology

Language Learning

- engagement and motivation

02 Gamification in mobile language learning

- The goal of O2 is to explore the latest technical and pedagogical developments related to **gamification in a mobile environment**
- The internal review will be prepared not only from
- **a theoretical perspective** concerning design and implementation of meaningful learning environments but also from
- **a pragmatic perspective** that will analyse the applicability of certain elements for specific language learning contexts.

Research Elements

Gamification in a
mobile
environment

Gamification in
elearning

Gamification in
language learning
(pedagogical
perspective)

Gamification: best
practices

Gamification in
practice

New trends in
gamification

Gamification – approach

educational implications for
integrating the strategy
effectively, current
applications used

Gamification as a concept

motivational theory



technical and pedagogical
developments
related to gamification in a
mobile environment

Gamification
in practice

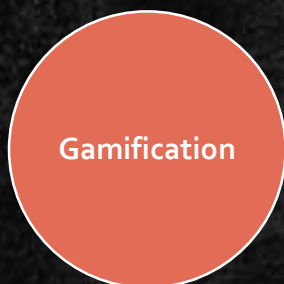
Experts in
gamification

Gamification in a
mobile
environment

Gamification in
elearning

Gamification in
language learning
(pedagogical
perspective)

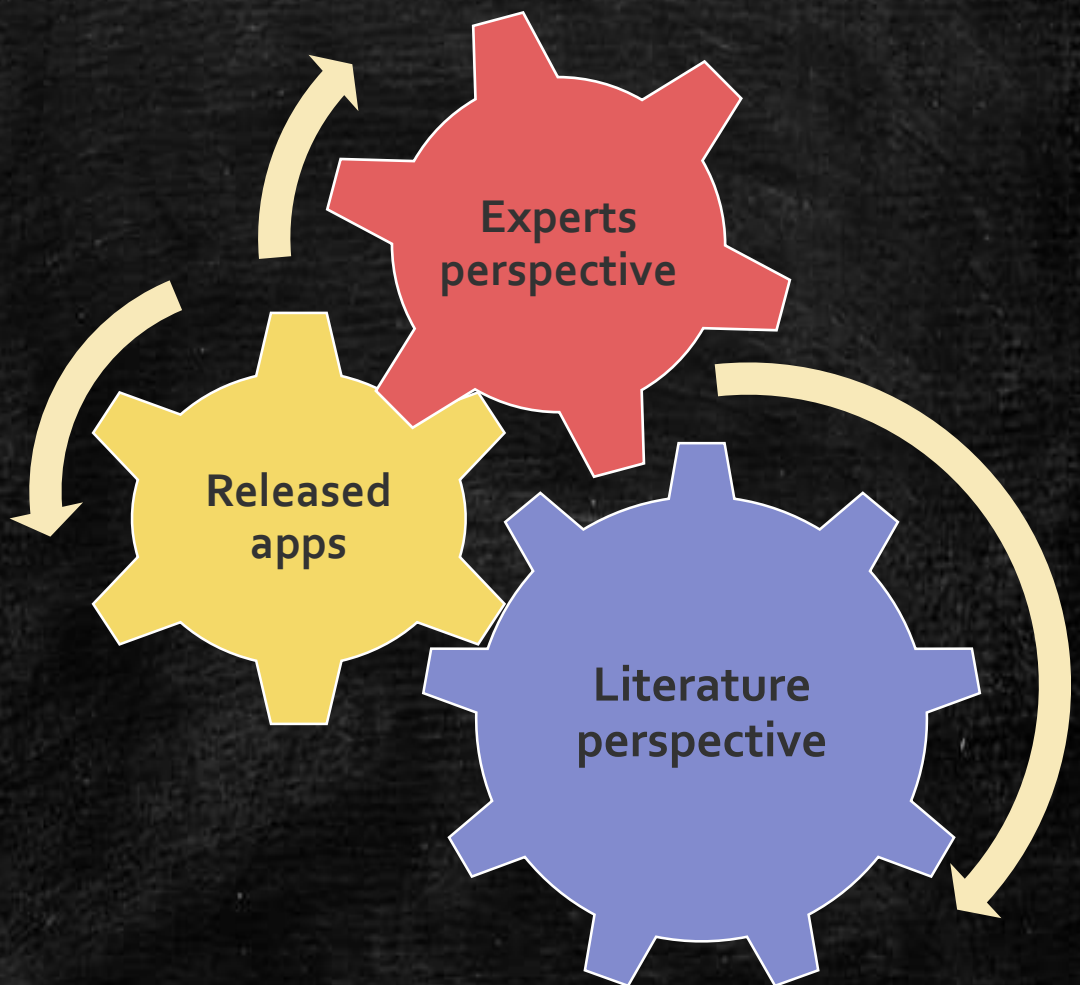
technical and pedagogical developments related to gamification in a mobile environment



Our research aims...

- ...to obtain direct input from experts in the field in order to identify **specific gamification elements** and their **technical feasibility**, that will form the basis for the technical development of the language learning app.

Information sources

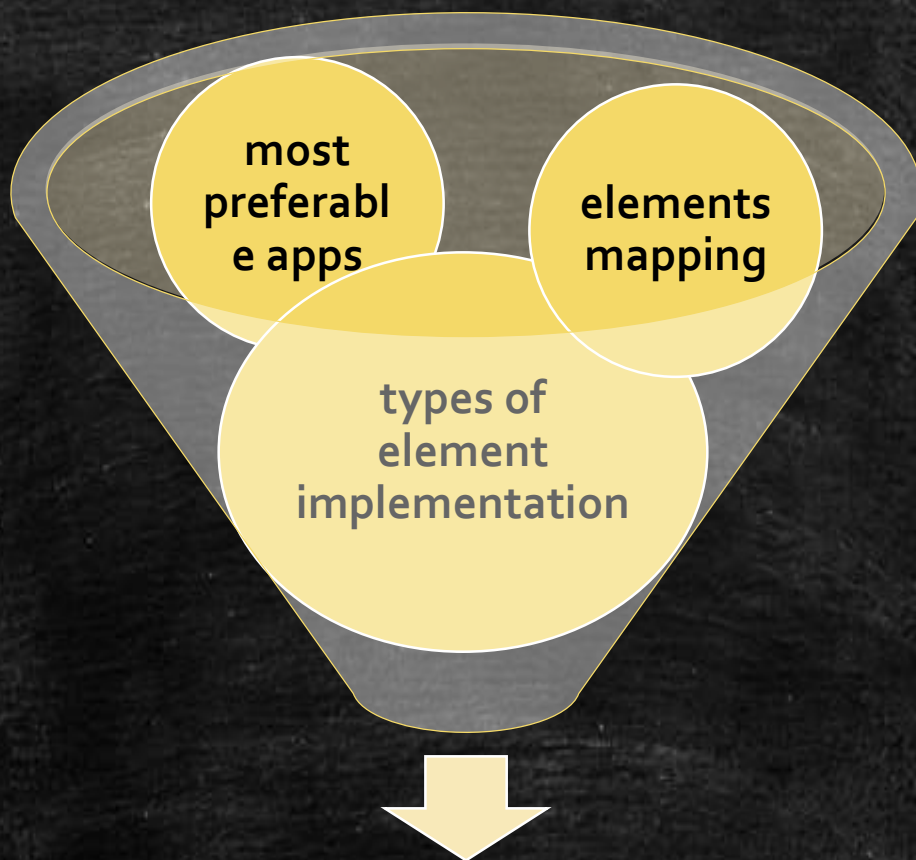


Literature perspective



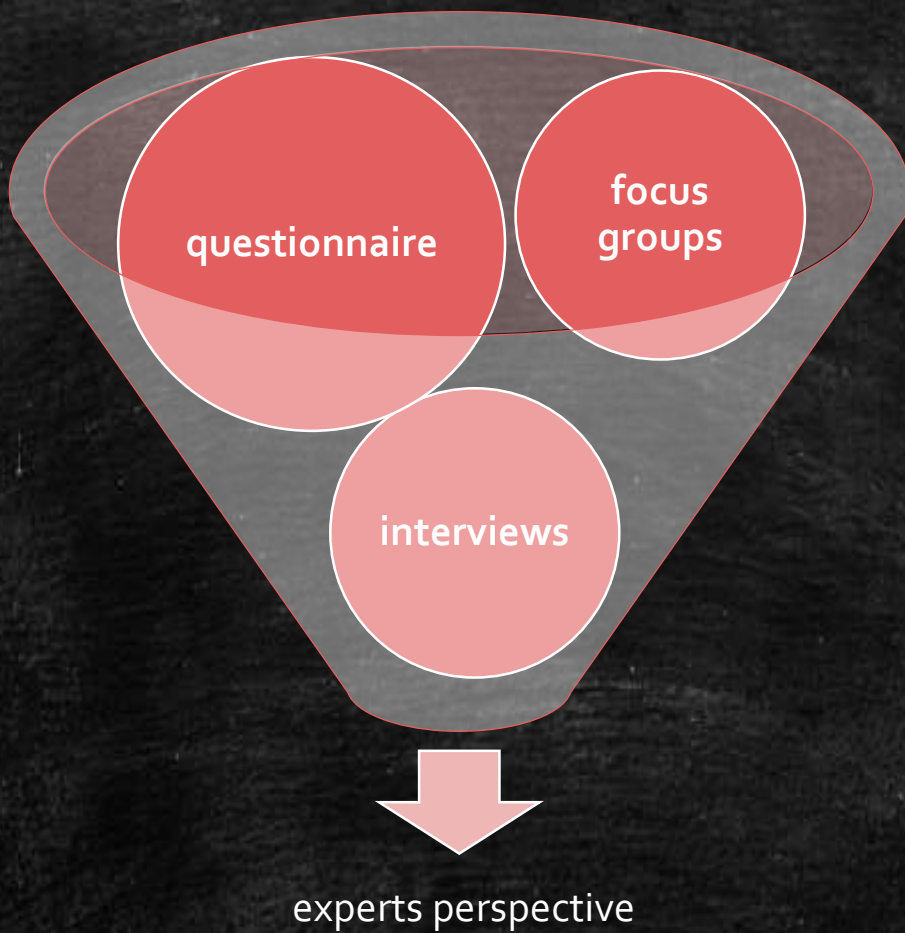
literature perspective

Released apps perspective

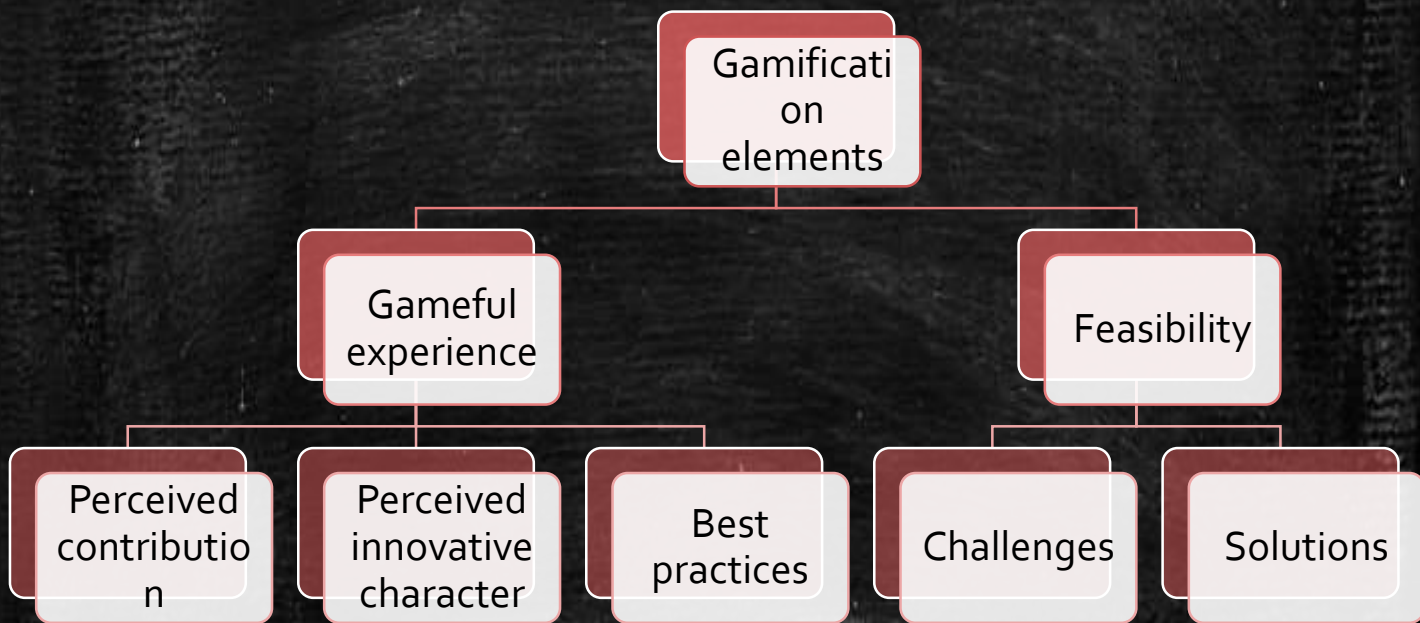


released apps perspective

Experts perspective



Framework





**Learning
Languages
Online in the
age of Mobility
Erasmus+
Key Action 2
Language
Learning APPS**

*LEARNING
LANGUAGES
ONLINE IN THE
AGE OF MOBILITY*

Intellectual Output 2
Erasmus+
Key Action 2
LLOM

LLOM
Gamification
Intellectual Output
2: Gamification

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1. Introduction

Gamification in mobile technologies has emerged as a popular approach for improving user experience, enhancing motivation and keeping users engaged. Numerous gamified apps are developed, both commercially and academically, under various sectors, including health, art, economy, and business.

In the domain of education, the influence and acceptance of gamified learning has been growing since 2013 and a number of mechanics are borrowed from games for use across a variety of subject areas, ranging from science to language and communication (Subhash & Cudney, 2018).

Despite general expectations, applying individual game elements into apps does not per se guarantee a game-like experience (Ferrara, 2013). For this reason, a number of studies have tried to assess gamified mobile apps against core game elements and provide insights into their functionality in specific contexts (e.g., healthcare, fitness, energy sector) (Lister, West, Cannon, Sax, & Brodegard, 2014; Beck, Chitalia, & Rai, 2019; Edwards et al., 2016).

In a similar vein, the present work attempts to provide an overview of the gamified dimension of language learning in mobile environments, focusing on the most popular and top rated apps released so far. We examine to what extent developers integrate gamification components and game elements into language learning apps and how these gamification constructs are shaped when they are transferred into language learning contexts, in particular.

The rest of this work is organized as follows: Section 2 presents the systematic search and selection process of the language learning apps included in this study as well as the game constructs used in the analysis; Section 3 reports the results regarding the most common and under-used game constructs as well as their forms in language learning contexts; finally, Section 4 discusses and concludes this work, tackling the main directions that developers of language learning apps should consider in the future.

2. Methodology

2.1 Gamification constructs

In order to assess the gamified dimension of language learning apps, essential and well-documented gamification constructs had to be established. To this end, the extraction of gamification constructs was based on the review protocol proposed by Beck, Chitalia, & Rai (2019). In their work, Beck, Chitalia, & Rai (2019) reviewed gamification in mobile energy apps based on two key constructs: a) gamification components and b) game elements. The former come from the work of Hamari, Koivisto and Sarsa (2014) and are focused on the game-like motivational affordances· the latter come from the work of Reeves & Read (2009) and concern design elements used in hedonic games. These gamification components and game elements are presented in Table 1. As Table 1 shows, there exists an overlap between gamification components and game elements, including feedback, leaderboard, levels, and story. Despite this overlap, reviewing the language learning apps based on both gamification components and game elements ensures a more exhaustive coverage of the gamified learning perspective, taking into consideration both the motivational affordances that lead to behavior change and the hedonic game elements that lead to a fun learning experience (Beck, Chitalia, & Rai, 2019).

Table 1: The gamification constructs used in the analysis.

Gamification Components (Hamari, Koivisto, & Sarsa, 2014)	Game elements (Reeves & Read, 2009)
Points	Self-representation with avatars
Leaderboards	Three dimensional environments
Badges/Achievements	Narrative context
Levels	Feedback
Stories/Themes	Reputations (Ranks/Leaderboard and Levels)
Clear goals	Marketplaces and Economies
Feedback	Competition
Rewards	Teams
Progress	Communication systems
Challenge	Time Pressure

2.2 Language Learning Apps Selection

The sample of apps included in this study was collected through a systematic search of language learning apps distributed via Google Play Store until November 2018. Google Play Store was selected because of its larger market share compared to other platforms (IDC, 2018). Additionally, using a single platform establishes a more consistent app selection process as the rules and procedures for reviewing/rating apps within a single platform are steady (Beck, Chitalia, & Rai, 2019). The app selection process consisted of three main steps, i.e., *identification*, *screening*, *selection*, presented as a flow diagram in Figure 1. In particular:

1. *Identification*. In this phase, a search was conducted in the Google Play Store using the keywords "*language learning*". A total of 250 results were retrieved. The list of the identified apps was extracted and stored in a excel spreadsheet. After removing duplicates, 244 apps entered the next phase.

2. *Screening*. In this phase, app names and descriptions were screened as to whether they met specific criteria. The inclusion criteria were: i) Apps for language learning, ii) Apps that were completely free or offered a free trial access to -at least- one learning unit, iii) Apps whose primary target audience is not restricted to children. The identified apps were screened and 10 apps were excluded as i) were irrelevant to language learning ($n = 5$), ii) were language learning apps specifically designed for children ($n = 5$). A total of 234 apps entered the next phase.

3. *Selection*. In order to select the top language learning apps we devised an app preference index based on two variables, namely app ratings and number of reviews. The app rating variable served as an indicator of learners' satisfaction while the number of reviews served as an indicator of app popularity. The app preference index was calculated as the product of these two variables divided by

the aggregated number of reviews from all 234 apps. A higher app index score was indicative of a proportionally higher user preference. Apps were sorted by preference index in descending order and the top 20 apps were selected.

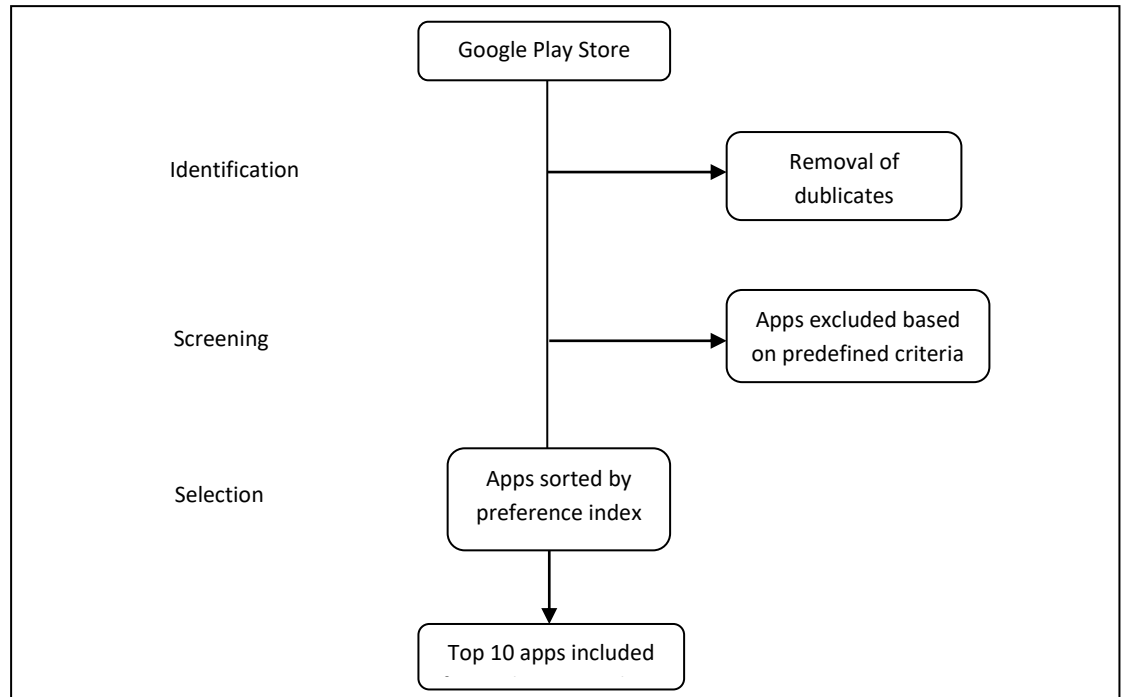


Figure 1: Flow diagram of the app selection process

The final sample was coded against the 10 gamification components as well as the 10 game elements presented in subsection 2.1. The results of this analysis are presented in the following section.

3. Results

3.1. The 20 most preferred language learning apps

3.1.1 Duolingo: Learn Languages Free

Duolingo is a free language learning app which offers courses for English, French, Polish, Spanish, Greek and 23 other language speakers. Courses offered in English cover 33 languages, among which two fictional ones, inspired by cinema and TV shows (High



Valyrian, Klingon). Currently, Spanish is the most popular language course for English speakers, with 21.8 million active learners. A Duolingo course is structured around a number of skills-modules (e.g., food, animals, personal pronouns, past tenses) that user can expand in range (by unlocking more skills-modules) or further deepen (by focusing on specific skills). A premium subscription is available to Duolingo users called Duolingo Plus, which offers an ad-free experience with access to offline lessons.

Google Play Store Link:

<https://play.google.com/store/apps/details?id=com.duolingo>

3.2.2 Learn Languages with Memrise

Memrise is an app for people who want to learn Arabic, Chinese, English, French, Spanish, Italian, Russian, Japanese, German, Korean, Portuguese, Danish, Swedish, Polish, Norwegian, Turkish, Dutch, Icelandic and Mongolian. In Memrise, each lesson consists of two main axes, namely the learn axis (words and phrases, grammar), and the review axis. The latter includes different practice activities including Speed Review, Listening Skills, Difficult Words, Classic Review, Pronunciation and Learn with Locals. Learn with Locals includes over 30,000 native speaker video clips for learning everyday language in context. Users need a Memrise subscription in order to get access to all courses and features.

Google Play Store Link:

<https://play.google.com/store/apps/details?id=com.memrise.android.memrisecompanion>



3.2.3 Babbel – Learn Languages

Babbel is a language learning app for both beginners and advanced learners. It offers interactive lessons for 14 languages, including English, German, French, Italian, Spanish, Portuguese, Turkish, Polish, Dutch, Indonesian, Swedish, Norwegian, Danish,



and Russian. It is structured around 10-15 minutes bite-sized activities, with course vocabulary ranging from business to travel. Users need a subscription in order to get access to all lessons and features.

Google Play Store Link:

<https://play.google.com/store/apps/details?id=com.babbel.mobile.android.en>

3.2.4 Quizlet: Learn Languages & Vocab with Flashcards

Quizlet helps users learn vocabulary, practice pronunciation and test their knowledge in more than 18 foreign languages, including Spanish, French, German and Chinese. Users can create their own flashcards and study sets or they may choose from millions created by other learners. This app also includes Quizlet live, a collaborative classroom game. In Quizlet live students work in groups to answer a set of questions.



Google Play Store Link:

<https://play.google.com/store/apps/details?id=com.quizlet.quizletaandroid>

3.2.5 busuu: Learn Languages - Spanish, English & More

With busuu, users can learn up to 12 languages from beginner's to advanced level. This app contains over 150 different units per language. Available languages include Spanish, German, French, Arabic, Russian, Chinese, Italian, Japanese, Turkish, Portuguese, Polish, and English. In busuu's learning community, learners can have their speaking and writing exercises corrected by native speakers. Busuu also provides a placement test, tips on grammar, speech recognition exercises and offline learning access. Learners can become certified with McGraw-Hill Education. Users can gain access to more features (such as personalized study plans) by purchasing a Premium subscription.



Google Play Store Link:

<https://play.google.com/store/apps/details?id=com.busuu.android>.
[enc](#)

3.2.6 Lingodeer - Learn Japanese, Korean, Chinese, Spanish & French

Lingodeer is a free app for people that want to learn Japanese, Korean, Chinese, Spanish, French, German, Portuguese, Vietnamese and English. LingoDeer's lessons and review exercises train reading, listening, speaking and writing skills in just 10 minutes a day. Lingodeer offers built-in flashcard review system, detailed grammar notes that explain how the language works as well as pleasant and authentic recordings from native speakers.

Google Play Store Link:

<https://play.google.com/store/apps/details?id=com.lingodeer>



3.2.7 Learn Chinese - HelloChinese

HelloChinese is an app for beginners that want to learn Chinese Mandarin to a conversational level. It includes Chinese speech recognition and character handwriting technologies, a bite-sized curriculum and game-based learning activities. Additionally, Hello Chinese offers offline access; the user can download a course and study without internet connection. Users can gain access to more features (such as unlocking more game-based activities) by purchasing a Premium subscription.

Google Play Store Link:

<https://play.google.com/store/apps/details?id=com.hellochinese>



3.2.8 Rosetta Stone: Learn to Speak & Read New Languages

Rosetta Stone is an app that teaches learners how to think in a new language by connecting words to images and helps them refine their pronunciation with its patented speech



recognition technology. Learners may choose from 24 languages, including Spanish, English, French, Japanese, Italian, German, Chinese, Portuguese, Russian, Arabic, Korean, Dutch, Tagalog, Greek, Hebrew, Hindi, Irish, Farsi, Polish, Swedish, Turkish, and Vietnamese. Rosetta Stone offers offline access; the user can download a course and study without internet connection. Users need a subscription in order to get access to all courses and features.

Google Play Store Link:

<https://play.google.com/store/apps/details?id=air.com.rosettastone.mobile.CoursePlayer>

3.2.9 Learn English Words Free

This free app provides a flashcard dictionary with English translations of 10,000 words and phrases accompanied with images and audio. It helps users build a solid English vocabulary for travel, business, dating, study and school with just 10 minutes of study per day. It offers offline access, listening-only mode and a sleep learning function for learning English words while sleeping.



Google Play Store Link:

https://play.google.com/store/apps/details?id=net.languagecourse.vt.en&hl=en_US

3.2.10 Learn 33 Languages Free - Mondly

Mondly includes short lessons, put into themed packs, for up to 33 languages. The user can learn pronunciation from conversations between native speakers as well as engage in conversations with chatbots. Mondly uses speech recognition to listen as the learner pronounces words and phrases, and gives feedback. It also uses intelligent reporting helping learners follow their progress. Users need a Premium subscription in order to get access to all content and features.



Google Play Store Link:

[https://play.google.com/store/apps/details?id=com.atistudios.mon
dly.languages](https://play.google.com/store/apps/details?id=com.atistudios.mon
dly.languages)

3.2.11 Learn Chinese Free - ChineseSkill

ChineseSkill is a free language learning app for Mandarin Chinese beginners. It supports learning Chinese from 8 languages, including English, Spanish, Korean, Japanese, Russian, Vietnamese, Portuguese and Thai. ChineseSkill includes a bite-sized curriculum with over 500 mini-lessons that range from the Chinese alphabet to Chinese grammars and train listening, speaking, reading, and writing skills. It supports Chinese automatic speech assessment, Chinese character handwriting and pinyin tone animation technologies. Additionally, it offers multiple practice modes, gamified lessons and challenges, as well as offline access.



Google Play Store Link:

<https://play.google.com/store/apps/details?id=com.chineseskill>

3.2.12 English Grammar Test

English Grammar Test app is suitable for Intermediate and Upper-Intermediate levels. The test is divided into two levels each one containing 30 tests with 20 exercises. English Grammar Test also offers an English chat through which the user can speak English with thousands of learners around the world. Additionally it provides free daily classes, exercises and lessons via popular social media channels.



Google Play Store Link:

[https://play.google.com/store/apps/details?id=english.grammar.tes
t.app](https://play.google.com/store/apps/details?id=english.grammar.tes
t.app)

3.2.13 Learn Korean Phrases| Korean Translator

The Learn Korean app includes many useful Korean phrases and words under different topics and contexts such as animals, studies, travelling, emergency, driving. Learners can practice their Korean pronunciation by listening words and phrases pronounced by native speakers, recording their own voice and playing it back to compare and contrast. No internet connection is required.



Google Play Store Link:

<https://play.google.com/store/apps/details?id=com.bravolang.korean>

3.2.14 HelloTalk - Chat, Speak & Learn Foreign Languages

HelloTalk is a communication-based, instead of curriculum-based, language learning app for studying and practicing languages with native speakers as chat partners. It connects learners with native speakers of more than 100 languages for free. It features free audio and video calls, translation, transliteration, grammar correction, text to voice and voice recognition. Learners can also share moments with other members and get likes and comments.



Google Play Store Link:

<https://play.google.com/store/apps/details?id=com.hellotalk>

3.2.15 Drops: Learn 31 new languages

Drops is a language learning app for learning vocabulary via minimalistic illustrations and fast paced micro-games. The learner can choose from a wide variety of languages. Drops offers a complete package for free that includes 5 minutes of learning per day and more than 1700 words in 99 topics. Learners can subscribe for a premium account that offers unlimited learning time for achieving much faster progress.



Google Play Store Link:

<https://play.google.com/store/apps/details?id=com.languagedrops.drops.international>

3.2.16 Tandem Language Exchange: Speak & learn languages

This app is based on the Tandem learning method where two people meet in person to teach each other their native languages and to allow a cultural exchange with foreigners. Tandem is a mobile community where users can practice with native speakers and polyglots anytime and anywhere. More specifically, they are matched with language exchange partners so they can teach each other their native languages and commonly used slang. Learners can choose to practice via text, audio or video chat. The learner can subscribe to Tandem Pro, which unlocks all language learning tools and features such as unlimited translations, members nearby, profile visitor insights, add free learning.

Google Play Store Link:

<https://play.google.com/store/apps/details?id=net.tandem>



3.2.17 Speaky Language Exchange

Speaky is a free language exchange app and community that helps people find language partners worldwide. Learners can engage in conversations with language learners whose profile and interests match their expectations. Speaky supports this process by displaying potential language partners that are online and distinguishing native speakers from non-natives. Learners can practice through text chatting, audio messages or voice calls.

Google Play Store Link:

<https://play.google.com/store/apps/details?id=appli.speaky.com>



3.2.18 Learn 50 languages

50languages corresponds to the Common European Framework levels A1 and A2. It is available in over 50 languages and in approximately 3000 language combinations. 50languages contains 100 lessons that provide learners with a basic vocabulary to use in various situations (e.g., in a hotel or restaurant, on a vacation, small talk, getting to know people, shopping, at the doctor, at the bank etc.). Moreover, it combines audio with text for effective



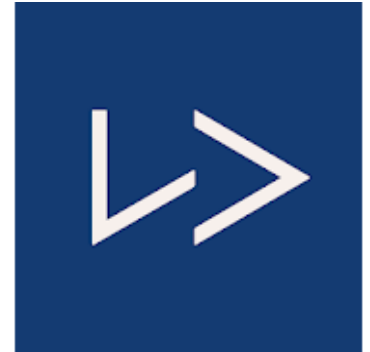
language learning. The user can download the audio files and listen to them anywhere.

Google Play Store Link:

<https://play.google.com/store/apps/details?id=com.goethe.f50languages>

3.2.19 Lingvist: learn a language – fast

Lingvist is an app for learning French, Spanish, German, Russian and English. It combines language courses with the latest research in machine learning. Lingvist learns about the user and then adapts to how s/he learns best in real time. With this app, the user can learn more than 4000 words in real-world contexts, in sentences created by language specialists. Lingvist provides context-aware grammar hints and exercises, native-sounding virtual voice, speech recognition for hands-free learning and progress tracking.



Google Play Store Link:

<https://play.google.com/store/apps/details?id=io.lingvist.android>

3.2.20 Learn Spanish - Español

This app is for people who want to learn Spanish from Spain (castellano) or from Mexico (español), starting from scratch or from a basic to advanced level. It provides learners with the necessary tools, including vocabulary, grammar explanations, reading, exercises and a comprehensive español dictionary. The material is recorded so that learners can focus on the pronunciation and intonation of the new words and sentences. There are two types of accounts: the basic account which is free and provides restricted access to certain parts, and the premium account which offers complete access to all of the content and material.



Google Play Store Link:

<https://play.google.com/store/apps/details?id=com.wlingua.spanishcourse>

3.2. Gamification components in language learning apps

This subsection presents the results regarding the implementation of gamification components in top language learning apps. As Figure 2 shows, gamification components were incorporated into all 20 apps included in this review. Clear goals, feedback, and progress were the most commonly used gamification components while story/theme was deployed less frequently.

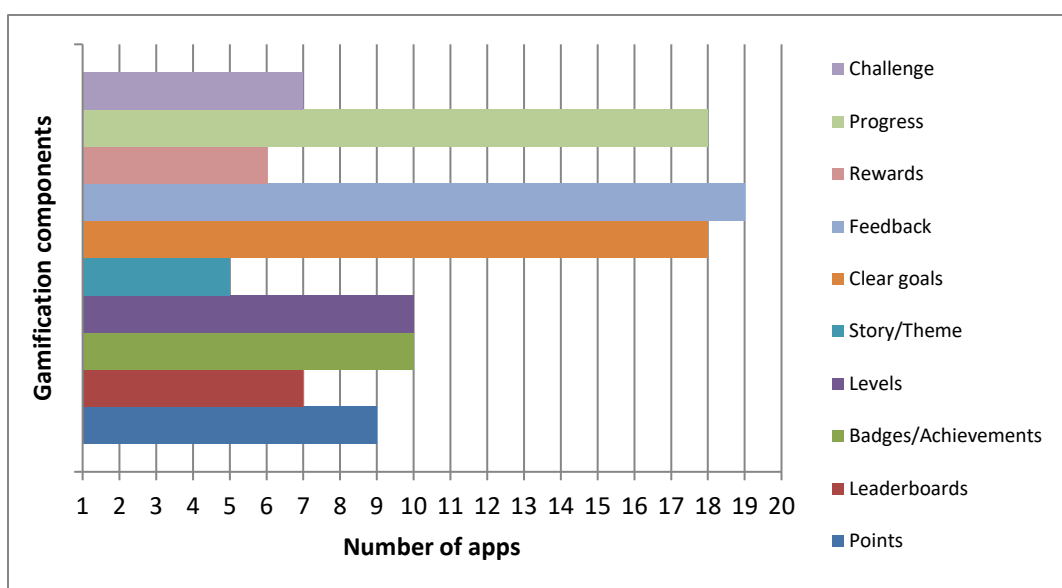
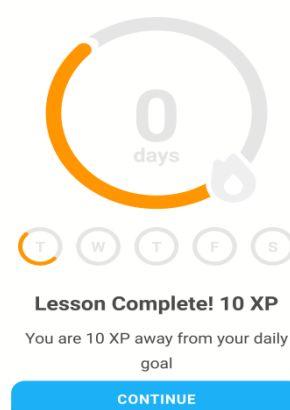
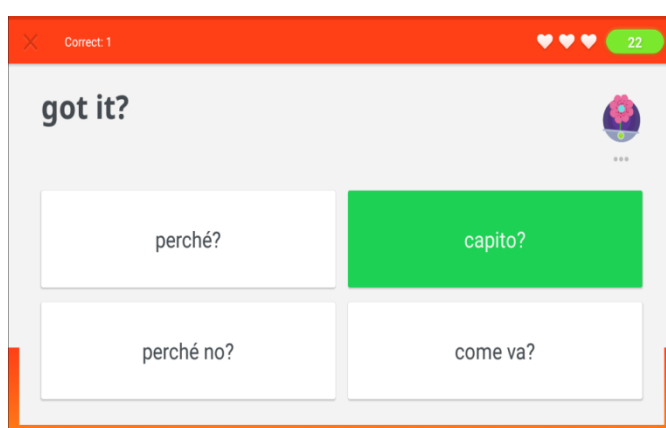


Figure 2: Number of apps using each gamification component.

3.2.1 Points

Points were used in nine (9) out of 20 language learning apps. They were defined either as experience points (XP) or -simple-points, and they were awarded to the learner during a learning activity (Figure 3a) or after an activity or unit was completed (Figure 3b). In the former case, the number of points depended on the performance of the learner (e.g., number of correct answers, answering speed) while in the latter case the number was predefined. In all cases, points functioned as a quantitative measure



of learner's mastery and progression.

3.2.2. Leaderboards

Leaderboards were used in seven (7) out of 20 language learning apps. They took different forms based on three criteria, i.e., the time slot, the metric and the competitors. In particular:

- a) based on the time slot: ranking could be based on learners' daily, weekly, monthly or aggregated performance. Some apps allowed the manipulation of

Figure 3a: Memrise; points awarded during an activity based on answering speed

Figure 3b: Duolingo; points awarded after finishing a lesson

the time slot (Figure 3: Examples of point implementations as predefined (Figure 4b).

- b) based on the metric: learners performance was measured and, accordingly, ranked based on different measures such as (experience) points, amount of time invested in learning with the app, number of words (i.e., vocabulary) learned, number of likes that a learner's peer-reviewed exercise got by fellow learners, number of people invited to join the app. Again, some apps allowed the manipulation of the metric (Figure 4c) while in others the metric was predefined (Figure 4b).

- c) based on the competitors: competitors could be individual learners ranked against the full list of learners or against their friends (Figure 4b), or they could be whole countries based on the performance of their

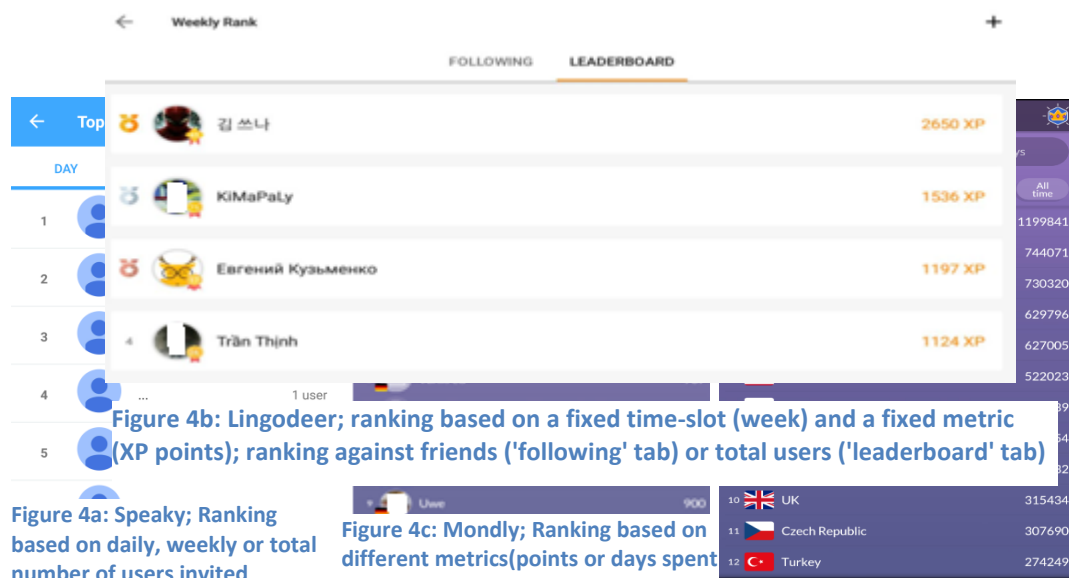


Figure 4b: Lingodeer; ranking based on a fixed time-slot (week) and a fixed metric (XP points); ranking against friends ('following' tab) or total users ('leaderboard' tab)

Figure 4a: Speaky; Ranking based on daily, weekly or total number of users invited

Figure 4c: Mondly; Ranking based on different metrics(points or days spent using the app)

Figure 4d: Mondly; Ranks of countries

learner population (Figure 4d).

3.2.3 Badges/Achievements

Badges/Achievements were used in 10 out of 20 language learning apps. The types of badges/achievements identified can be classified into the following categories:

a. progress-related: this category includes badges/achievements that emphasized on the learning progress that a student makes in the course (Figure 5a), such as the completion of individual lessons or a predefined number of lessons, the number of skills gained as well as the successful fulfillment of the language learning course.

b. performance-related: this category includes badges/achievements that emphasized on learner performance (Figure 5b), such as number of points gathered in a single day, finishing an exercise without any incorrect answers, achieving a predefined number of consecutively correct answers, as well as achieving a high place in the leaderboard.

c. engagement-related: this category includes badges/achievements that emphasized on learner's engagement and dedication to the course (Figure 5c), such as total days spent using the app, studying for a specific number of days in a row or spending a specific amount of time (e.g., 60 minutes) studying, studying in the weekends or late night studying.

d. social-related: this category includes badges/achievements that emphasized on the social dimension of learning (Figure 5d), such as adding friends, publicly sharing scores and achievements, gaining influence as the "*best corrector*" in peer-reviewed activities, inviting many people to join the app.

e. Other: this category includes diverse badges/achievements, such as amount of virtual money spent in the in-game market and voluntary contribution to

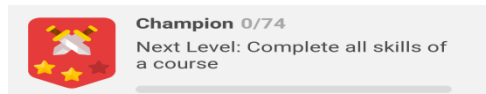


Figure 5a: Duolingo; Learning achievement



Figure 5c: Learn English Words Free; Engagement achievement (full 60 minutes of learning)



Figure 5d: busuu; Social achievement (best corrector trophy)

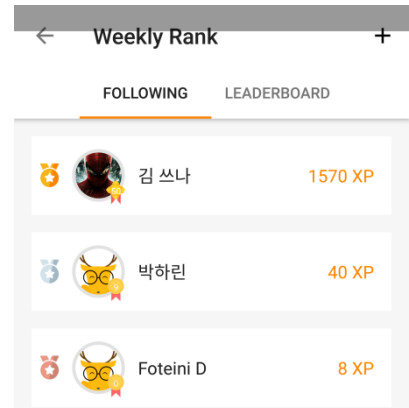


Figure 5b: Lingodeer; Performance achievement (gold, silver and bronze medal for the top three)

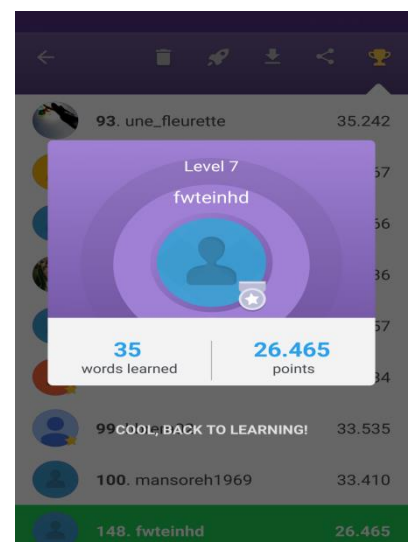
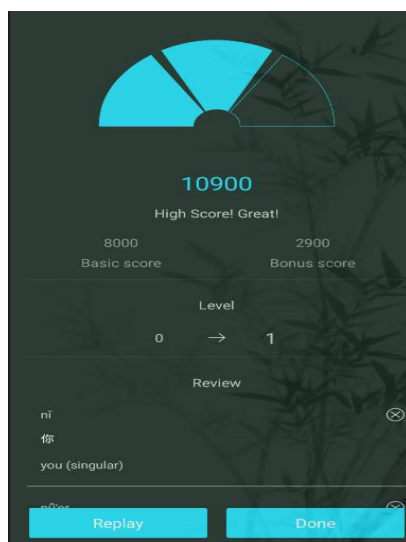
learning n Figure 5: Examples of different achievement categories

3.2.4 Levels

Levels were implemented in 10 out of 20 language learning apps.

Two different types of levels were identified, namely:

- a. Stages: this type of level applies to learning activities and reflects their difficulty, i.e., the higher the level of a learning activity, the more difficult it gets (Figure 6a). As the learner progresses and levels up a learning activity, its content will get harder (e.g., more advanced vocabulary, harder types of exercises like writing instead of multiple choice) and learner has to practice more and/or collect more (experience) points to get to the next level.
- b. Learner level: this type of level applies to the learner and reflects his/her accumulative progression and



mastery in the course (Figure 6b). Learner level can be analogized to character level in games. The higher the learner/character level, the more reputed the learner/character is considered.

3.2.5 Story/Themes

Story/Themes were used in five (5) out of 20 language learning apps. Narration was integrated in three ways, i.e.:

a. Video-stories: this category includes stories presented to the learner through a video (Figure 7a). Stories could be animated or they could be scenes from real-life situations. The learner watches the video, reads or listens the script and produces a digital storytelling artifact by dubbing the video with his/her own voice.

Figure 6a: HelloChinese; the learner collected the points required and the game advanced to a higher level

Figure 6b: Memrise; a level 7 learner

Figure 6: Examples of two different types of levels

b. Short stories: short stories are offered to the learner in written and audio form. The learner reads and/or listens the story and then s/he can re-record the audio story with his/her own voice (Figure 7b).

c. Dialogues in context: The learner can read, listen or repeat dialogues that are set in a context and complete the sentences by filling in the gaps with proper - predefined- words (Figure 7c).

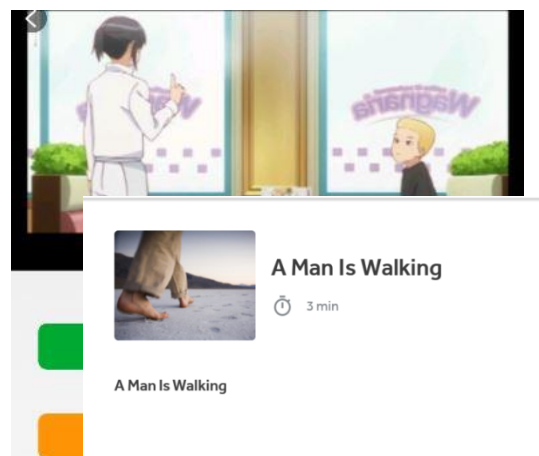


Figure 7a: HelloChinese; animated video about ordering food at a restaurant

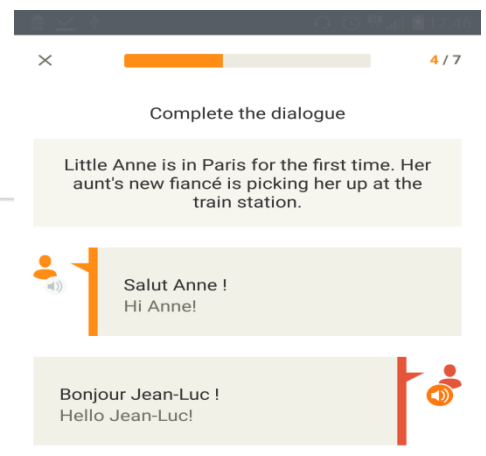
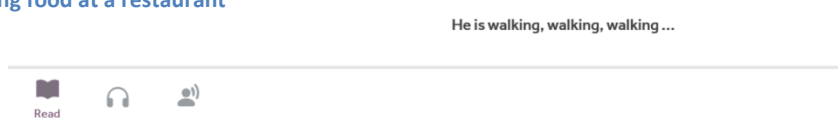


Figure 7c: Babbel; dialogue in context



3.2.6 Clear goals

Clear goals were set in 18 out of 20 language learning apps. Adopting the model of goal types by Tondello, Premasukh, and Nacke (2018), adapted from West, Ebner, and Hastings (2013), three types of goals were identified, i.e., outcome goals, learning goals, and performance goals. In particular:

- a. Learning goals: this type of goals focuses on the development of competence and progress (West, Ebner, & Hastings, 2013). Examples of learning goals in the sample apps include finishing lessons, gaining new skills or advancing skills already possessed, and expanding the vocabulary by learning new words.
- b. Performance goals: this type of goals refers to meeting a particular criterion of achievement on a certain task (West, Ebner, & Hastings, 2013) and, thus,

Figure 7b: Rosetta Stone; a short story

Figure 7: Examples of story/themes in apps

elements like badges, achievements, leaderboards, points, and levels can be helpful in defining performance goals (Tondello, Premasukh, & Nacke, 2018). Examples of performance goals in the sample apps include earning a specific number of points, getting to a specific level and climbing to a specific position in the leaderboard.

- c. Outcome goals: this type of goals was identified in game-based activities, in line with the "*winning the game*" perspective. It refers to secondary goals (such as breaking all eggs to release the chickens - Figure 8a) which, however, are strongly linked to the primary goal of performance; namely, the better your outcome (i.e., broken eggs) is, the more points you collect.

According to Tondello, Premasukh, and Nacke (2018), there are two common strategies for implementing goals into gameful

systems, namely giving the users clear goals to follow or allowing the users to self-set their own goals. Both strategies were identified in the sample apps. Thus, apart from the predetermined goals, nine (9) out of 20 apps also allowed learners to regulate and set their own goals. Two different types of self-set goals were identified in the sample apps:

- a. daily goals: the learner can raise or lower his/her daily performance limit (e.g., minimum number of points or words that has to collect/learn in a single day) (Figure 8b).
- b. review: the learner can mark parts of the learning content (e.g., vocabulary words) based on the perceived degree of learning, in order to focus more on the difficult parts and skip the easy ones (Figure 8c).

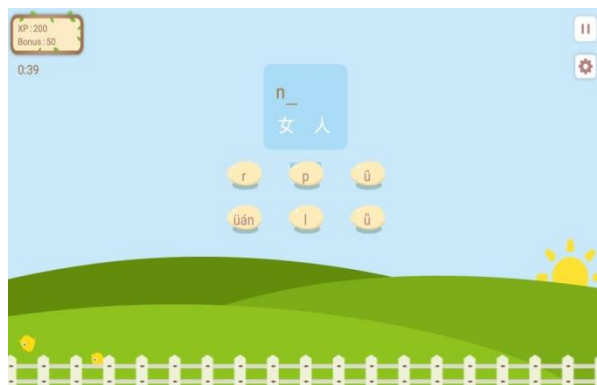


Figure 8a: ChineseSkill; a game-based activity whose goal is to break the eggs and release the chickens

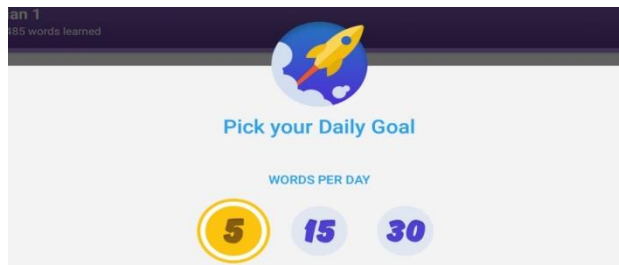
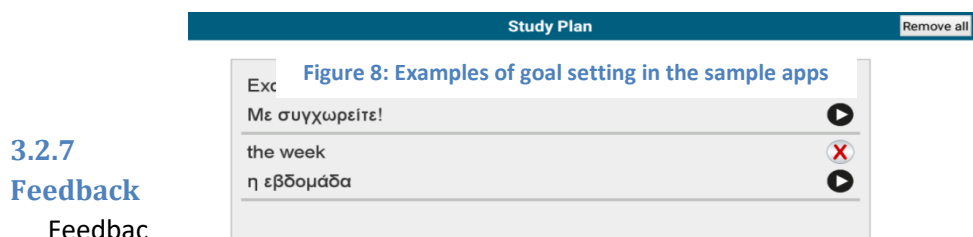


Figure 8b: Memrise; self-setting a daily goal

Figure 8c: Learn 50 languages; marking difficult vocabulary words/phrases to practice them more later



3.2.7 Feedback

Feedback

Feedback was used in 19 out of 20 language learning apps. It took different forms based on four criteria, i.e., the feedback type, the delivery mode, the reviewer and the measure. In particular:

a) feedback type: five different feedback types were identified in the sample apps, i.e., formative, corrective, explanatory, diagnostic, summative. Formative feedback was provided to the learner as an instant response to his/her actions during an activity and informed him/her about the degree of correctness (Figure 9a). Corrective feedback revealed the right answer or guided the learner to the right action/answer, giving him/her hints or prompts when s/he faced difficulties to proceed (Figure 9b). Explanatory feedback not only informed the learner about whether s/he gave a wrong answer but it also explained the reason why the answer was wrong (Figure 9c). Diagnostic feedback was used at the beginning of a course to estimate the starting level of the learner's knowledge and skills (Figure 9d) or at a later time in order to test learner's readiness for new content and skills. Summative feedback was used as an indicator of the learner's accumulative performance and progress. Moreover, summative feedback at the end of lessons/units could inform the decision about whether the learner passed or failed the lesson/unit (Figure 9e).

b) delivery mode: feedback was provided to the learner through text (e.g., "you are correct!"), sound (i.e., system outputs sound A

and sound B each time the learner gives the right and wrong answer, respectively), colour (e.g., right and wrong answers are coloured green and red, respectively) and graphical elements (e.g., characters depicted happy or sad based on learner's performance, rating stars, balloons being released with every right answer).

c) reviewer: feedback was, mainly, provided to the learner by the system; nonetheless, there existed apps that allowed peer feedback (Figure 9f).

d) measure: feedback was provided to the learner as numbers (e.g., points collected or new words learned), accuracy percentages, points in ordinal scales (e.g., 3 in a scale from 1 to 5), descriptive feedback/comments, time needed to complete an activity, number

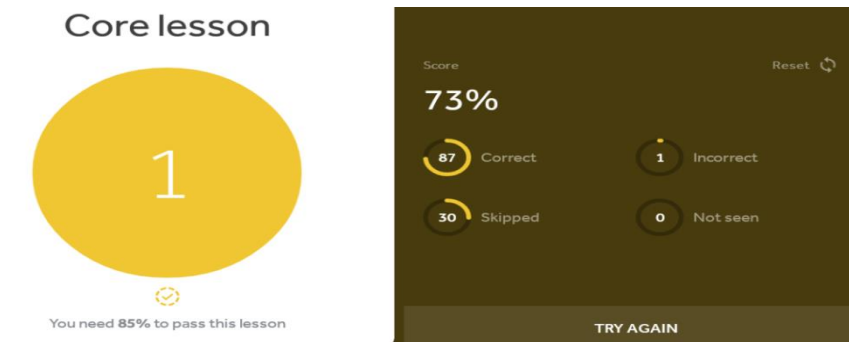


Figure 9e: Rosetta Stone; based on the summative feedback, the learner must repeat the lesson

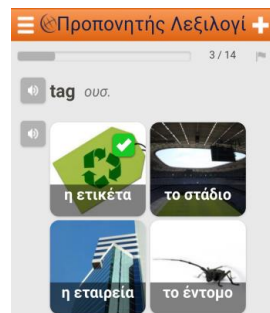


Figure 9a: Learn English Words Free; formative feedback instantly marks the answer as correct of likes/dislikes from fellow learners, etc.



Figure 9d: Speaky; diagnostic feedback about the starting level of the learner's skills

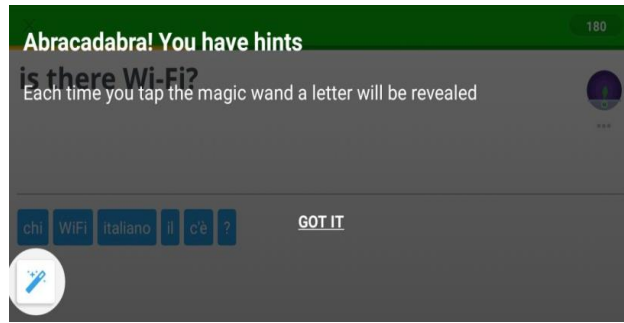


Figure 9b: Memrise; the learner can tap the wand when s/he needs a hint

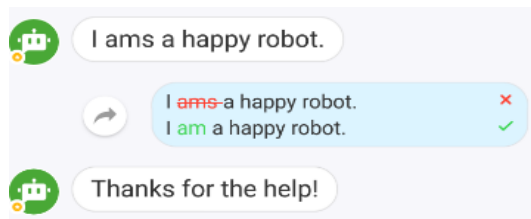


Figure 9f: HelloTalk; the learner may provide feedback to a peer

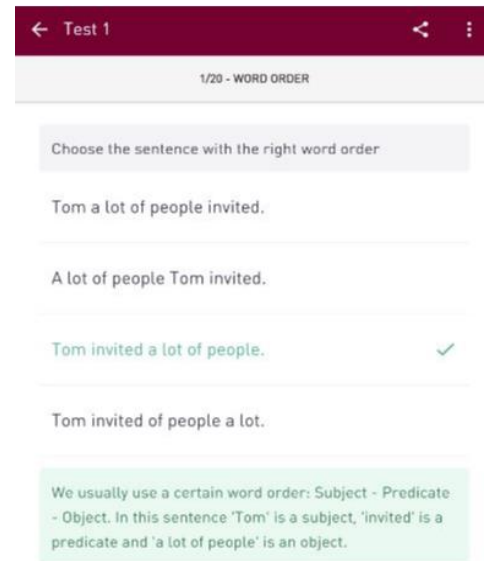


Figure 9c: English Grammar Test; explanatory feedback helps the learner understand why the answer is correct

Figure 9: Examples of feedback types

3.2.8. Rewards

Rewards were used in six (6) out of 20 language learning apps. They were implemented in the form of virtual money, limited access to premium features, extra practice time, power-up items, and bonus points (Figures 10a,10b). Learner could earn a reward as a welcome gift (Figure 10c) or because of a good performance and continuous progress (e.g., achieving his/her daily goal or giving consecutive correct answers). The reward offered could be either



Ξεκλείδωσες ένα δώρο!

Με αυτό το πάγωμα σερί μίας χρήσης, μπορείς να διατηρήσεις το σερί σου, ακόμα και μετά από μία ημέρα αδράνειας.

Figure 10a: Duolingo; gift item for keeping a streak even after a full day of inactivity

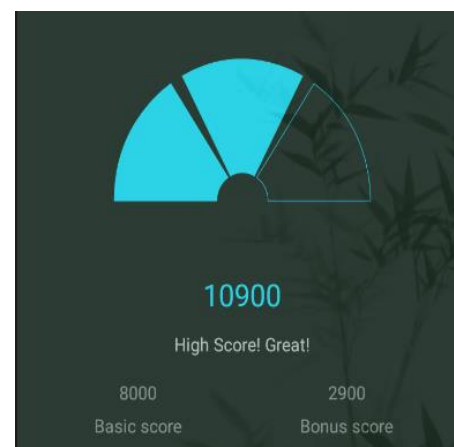


Figure 10b: HelloChinese; bonus score

fixed or randomly chosen (e.g., three chests contain a different and

unknown amount of virtual money, and the learner has to choose one of them as reward - Figure 10d).

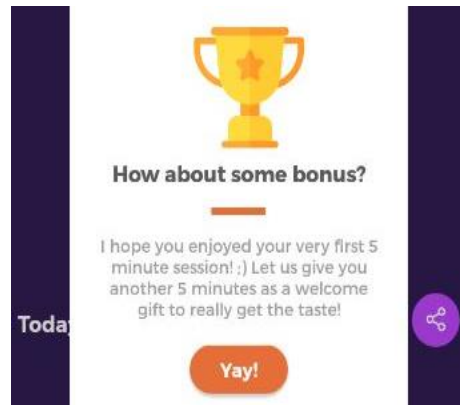


Figure 10c: Drops; extra practice time as a welcome gift



Choose a chest as a reward for meeting your goal!

Figure 10d: Duolingo; choosing a reward at random

Figure 10: Examples of rewards

3.2.9 Progress

Progress was used in 18 out of 20 language learning apps. Progress-related information offered in the sample apps can be classified into three categories:

Learning-related: this category includes information regarding the learning progress of the student and his/her journey towards achieving his/her learning goals (Figure 11a), such as the number and/or sequence of lessons remaining until the course fulfillment, number of times s/he came across specific vocabulary words, which and how many words/skills s/he has already mastered as well as which and how many words/skills remain until achieving a daily goal or completing a lesson or even finishing the language course.

Performance-related: this category includes information regarding the performance progress of the student and his/her journey towards achieving his/her performance goals (Figure 11b), such as (experience) points already earned and amount of points remaining until leveling up, distribution of points across days, actions remaining until earning a badge/achievement.

Time-related: this category includes information regarding the lapse of time as the student pursues his/her learning and performance goals (Figure 11c), such as questions remaining until an

exercise is finished, time passed or left until an activity is over,
number of days spent using the app.

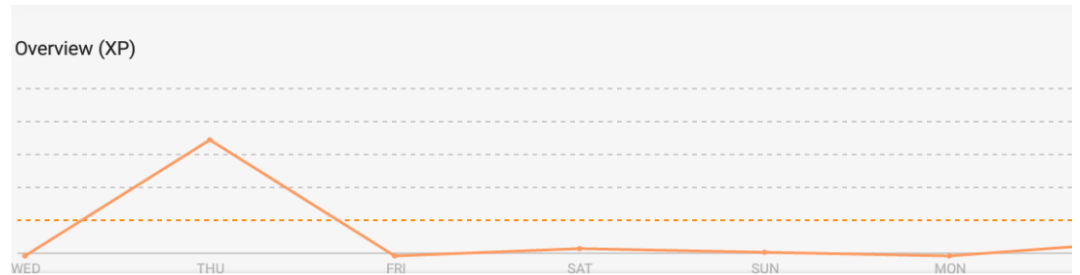


Figure 11b: Performance progress in Lingodeer; distribution of XP points earned across days



Figure 11a: Learning progress in Memrise; vocabulary that the learner has already mastered (flower) / is still learning (bud/stem) / is going to learn (seed)

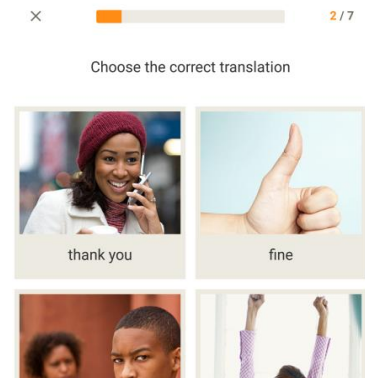


Figure 11c: Babel; The orange progress bar and the numbers at the top right corner show how much is left until the task is over

Figure 11: Learning, performance and time progress

3.2.10 Challenges

Challenges were used in seven (7) out of 20 language learning apps. They were usually implemented in quizzes as well as in game-based activities, and took four different forms, i.e.:

- time constraint: the available time for completing a task is limited (Figure 12a).
- lives: only a limited amount of "mistakes" are allowed (Figure 12a).
- negative score: there exists a penalty (e.g., points are lost, available time is decreased) with every wrong answer.
- strict mode: the learner can select the level of difficulty; for example, tolerant and strict spelling modes are offered.
- special activities: as long as the learner has completed the prerequisite number of lessons, s/he can face a monthly challenge (e.g., a quiz) (Figure 12b).

- f. memory-based: apart from the language-related knowledge and skills, the learner also needs to memorize images in order to solve the task (Figure 12c).



Figure 12a: Memrise; the learner has to give an answer before the red bars reach the top while hearts at the top right corner show the remaining number of tries

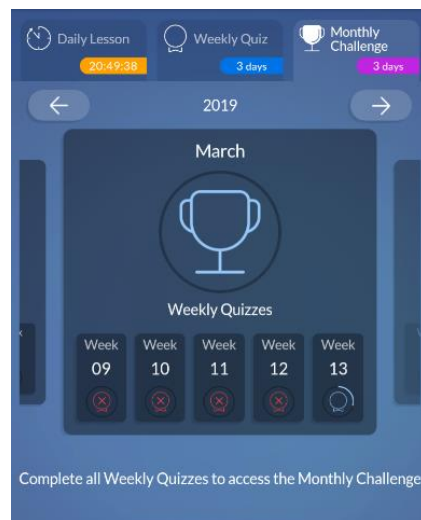


Figure 12b: Mondly; monthly challenge



Figure 12c: Learn 50 languages; the learner has to memorize images in order to find what is missing

Figure 12: Examples of challenges

3.3 Game elements in language learning apps

This subsection presents the results regarding the implementation of game elements in top language learning apps. The total number of apps using each game element is illustrated in Figure 13. Feedback, reputation (i.e., badges/achievements, levels, leaderboards) and narrative context (i.e., story) overlapped with the

gamification components and they were analyzed in the previous subsection. Competition and time-pressure were found in six and three apps, respectively. However, their presence was strongly related to the presence of leaderboards (for competition) and challenges (for time-pressure). Thus, they also did not add any new information. Among the remaining game elements, self-representation with avatars, 3D environments, marketplaces/economies and teams were highly underutilized. In the following subsections, a more detailed description of their implementation is presented.

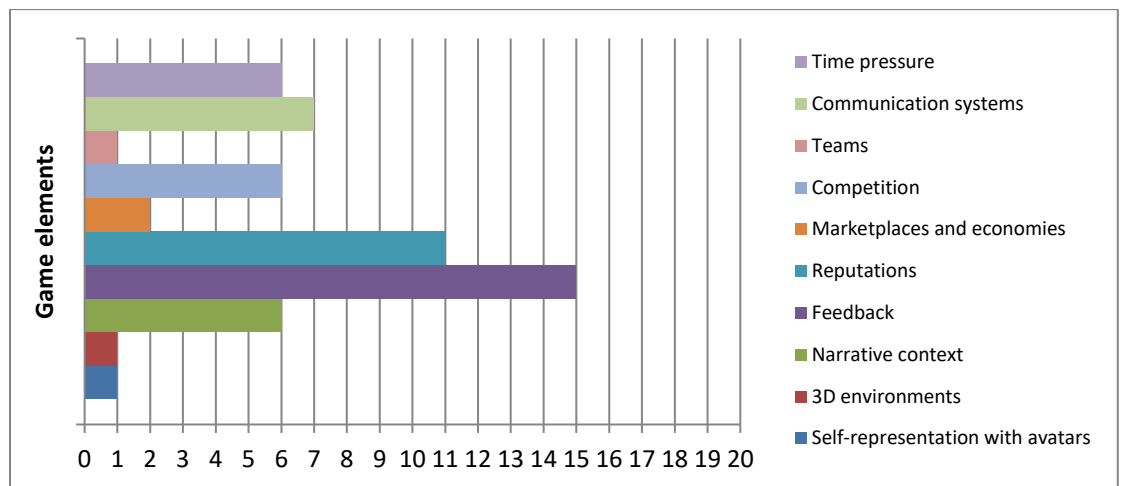


Figure 13: Number of apps using each game element

3.3.1 Self-representation with avatars

Self-representation with avatars was used in one (1) out of 20 language learning apps. Although there existed many cases where apps included a user profile with name or photo, only quizlet offered learners the option for self-representation, by choosing an avatar among various animal characters (Figure 14a). However, there was no opportunity for learners to customize an avatar at will in order to represent themselves as desired. Duolingo offered some customization opportunities through outfits that the learner could use for dressing Duo, the app's mascot (Figure 14b); yet, this customization applied to an external character and not to the learner's self-avatar.



Figure 14a: Quizlet; animal characters as avatars

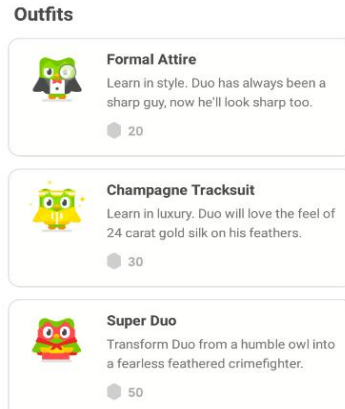


Figure 14b: Duolingo; customizing Duo's outfits

Figure 14: Avatars and customization

3.3.2 3D environments

3D environments were used in one (1) out of 20 language learning apps. Mondly utilized a 3D object in order to visualize the progress in learning new vocabulary words. Specifically, a model of the human brain was developed and every time a lesson was completed, a new neuron was "activated". The learner could tap on an activated neuron and enter into the neural network where a set of words was moving around the 3D neuronal sphere (Figure 15).

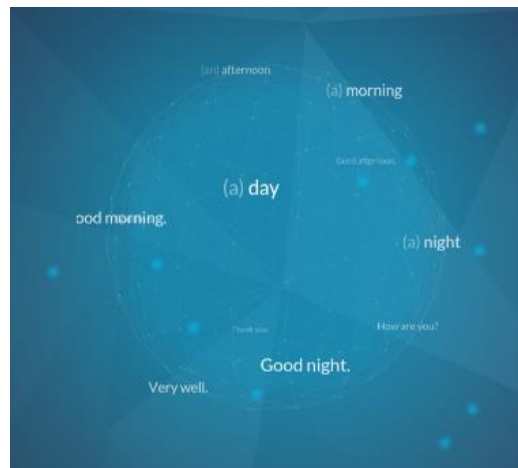


Figure 15: Mondly; 3D neuronal sphere

3.3.3 Marketplaces and economies

Economies were used in two (2) out of 20 language learning apps. Virtual currency functioned either as a reward for good performance and progress or as an alternate form of points for completing lessons. However, what differentiated virtual money from points was its usage for in-app purchases of goods. Goods included power-up items, character outfits as well as unlocking game-based activities (Figure 16a). On the other hand, marketplace (i.e., app only 16b).

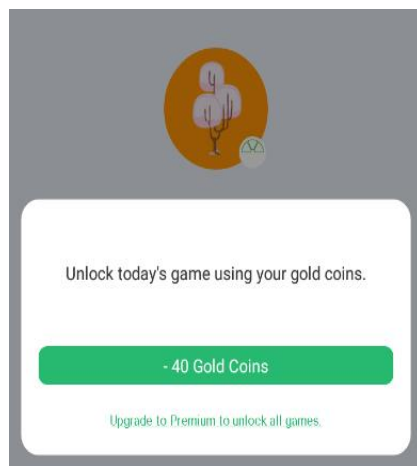


Figure 16a: Hellochinese; purchasing game-based learning activities with gold coins

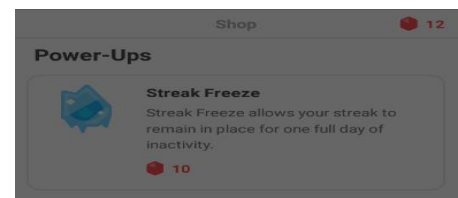
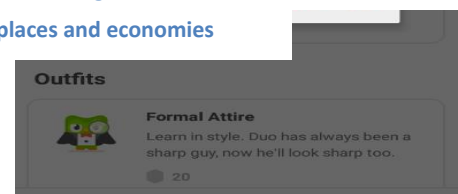


Figure 16b: Duolingo; purchasing items with lingots

Figure 16: Examples of marketplaces and economies



3.3.4 Teams

Teams were used in one (1) out of 20 language learning apps. Quizlet live offered a team play mode in which learners had to work



together to answer a set of questions and win (Figure 17). In this game, all teams get the same questions, however, each team member sees a different set of possible answers. Since only one person per team has the right answer, team members have to communicate and collaborate in order to choose the right answer. Nonetheless, quizlet live is intended for in-classroom use, with a teacher setting the quiz and controlling the whole process. For this reason, it falls short of learning in a mobile environment.

3.3.5. Communication Systems

Communication systems were used in seven (7) out of 20 language learning apps. They were implemented mostly in

Figure 17: Quizlet live; team members work together and race against other teams

communication-based apps like Tandem, Speaky and HelloTalk, and less frequently in curriculum-based apps. They took different forms based on three criteria, i.e., the participants, privacy level, response time, and the media of communication. In particular:

a) participants: interlocutors can be natural people or artificial machines. In the latter case, chatbots allow learners to practice their writing and speaking skills through instant conversations with a bot (i.e., an automated program) (Figure 18a).

b) response time: learners can communicate synchronously through chats or asynchronously through comments/posts (Figure 18b).

c) privacy level: learners can engage in public discussions (e.g., chatrooms) (Figure 18c) or they can communicate in private (Figure 18d).

d) media of communication: learners can communicate through voice or video calls, text messaging via text or voice input, sending images, stickers, cards or doodles (Figure 18e).



Figure 18a: Mondly; discussing with the bot

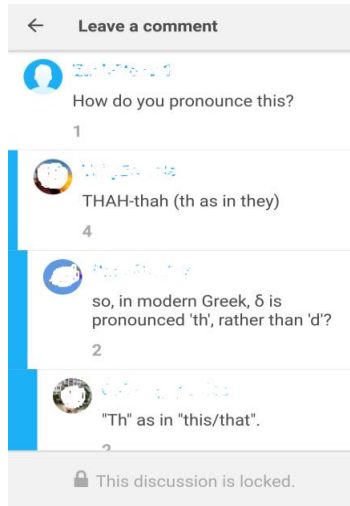


Figure 18b: Duolingo; an asynchronous discussion

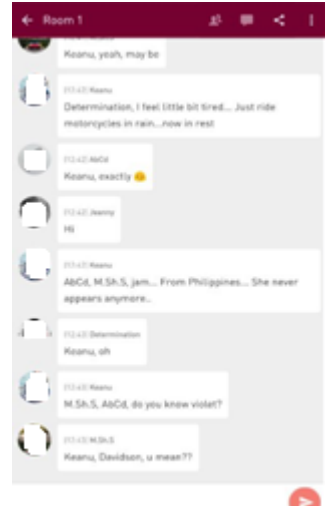


Figure 18c: English Grammar Test; public chatroom

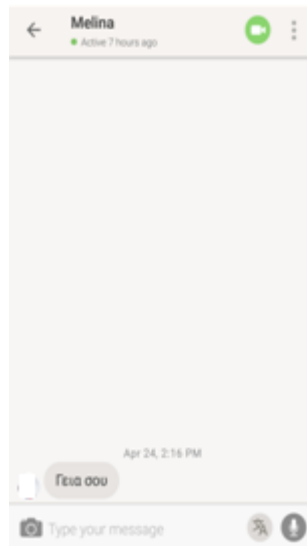


Figure 18d: Tandem; private chat

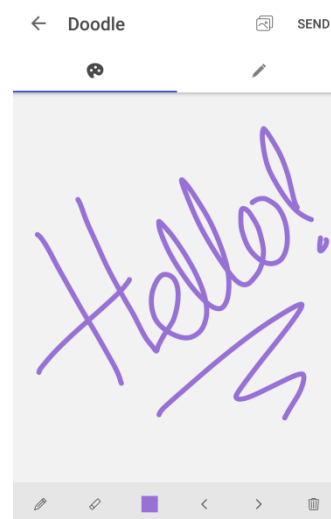


Figure 18e: HelloTalk; communicating through doodles

4. Discussion

This work attempted to explore the gamified dimension of language learning in mobile environments. The most popular and top rated apps released so far were selected and analyzed against well-documented gamification components and game elements. Results of this analysis may provide insights into the ways these gamification constructs are transferred to fit in language learning contexts as well as gamification trends in language learning apps.

Findings suggested that the game-like motivational affordances (i.e., gamification components) were exploited to a greater extent than hedonic game elements. Clear goals, feedback, progress and reputations (including levels, badges/achievements and leaderboards) were the most commonly used gamification constructs. On the other hand, narration and stories, rewards, self-representation with avatars, 3D environments, marketplaces and economies, teams and communication systems were highly underutilized.

Previous studies on gamification reveal that apps tend to over-use external rewards like points, badges and achievements, and ignore other game constructs, such as 3D environments and narrative context (Lister, West, Cannon, Sax, & Brodegard, 2014). Similarly, findings of the present work show that, in the context of language learning, apps were greatly focused on awarding points and reputations (i.e., badges/achievements, levels, ranks in leaderboards); yet, virtual currency as well as marketplaces for buying special goods (such as power-up items) were almost absent. Although external rewards are just a small part of a game-like experience (Ferrara, 2013), language learning app developers could consider to incorporate virtual money, beyond points and achievements, as well as marketplaces for in-app purchases.

Graphics, narration and characters are three elements that contribute to a game-like experience from an aesthetics perspective (Ferrara, 2013). However, their presence in the sample apps was

little. Three-dimensional graphics and self-representation with avatars were used only in one app each. However, there existed no app that allowed customization of avatars. In games, avatar customization, especially cosmetic, increases players' identification with their virtual manifestation (Turkay & Kinzer, 2017). In a similar vein, customizable avatars in language learning apps might enhance learners' feeling towards their in-app presence. Moreover, narration formed only a small part of lessons and, when used, the role of the learner was limited to passive actions (such as listening, watching, reading or providing some -predefined- input words) that had no effect on the story line. However, unlike traditional passive-only media, games depend on the player's actions to move the story forward, have more than one endings (at least two, i.e., winning and losing) and sometimes multiple ways of getting to an ending (Baranowski, Buday, Thompson, & Baranowski, 2008). Thus, learning a foreign language through story-based activities and ensuring that learner's decisions have a narrative impact could offer an advancement in the game-like experience of language learning apps.

Teams and communication systems were also underused in the sample apps. Although many apps allowed competition between learners via leaderboards, there were no possibilities for multi-learner activities in the same way as in multi-player games (namely, multiple players simultaneously engage with or against each other in the same game environment). Thus, moving from learning solo to multi-learner activities (in the sense that multiple learners -either friends or unknowns- simultaneously engage with or against each other in the same language learning activities) could be a step further.

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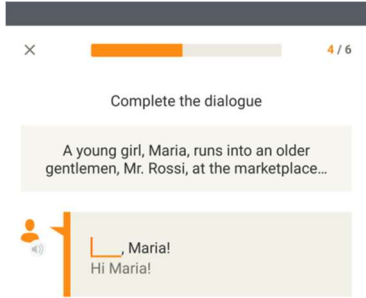

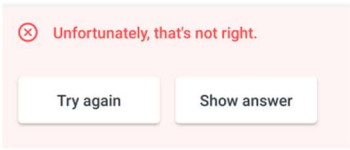

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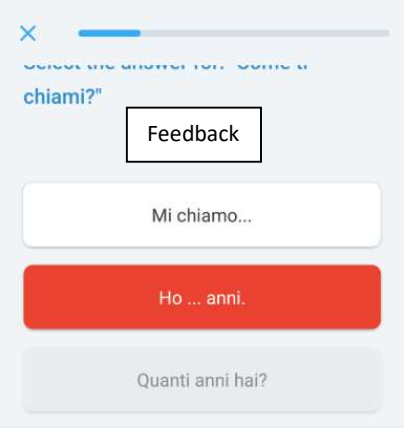
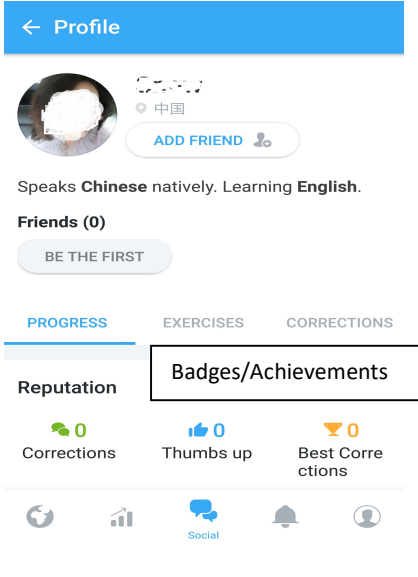
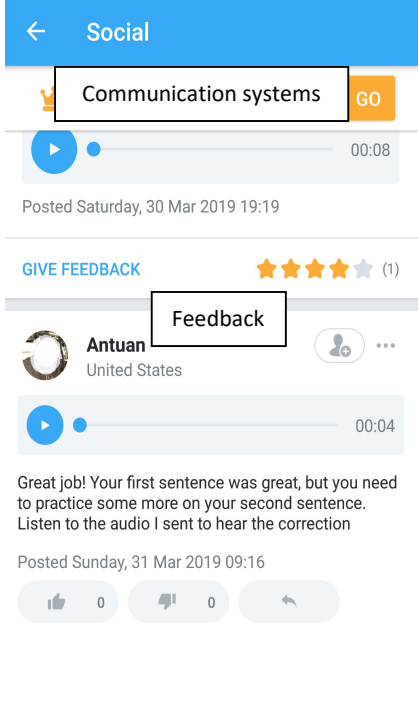
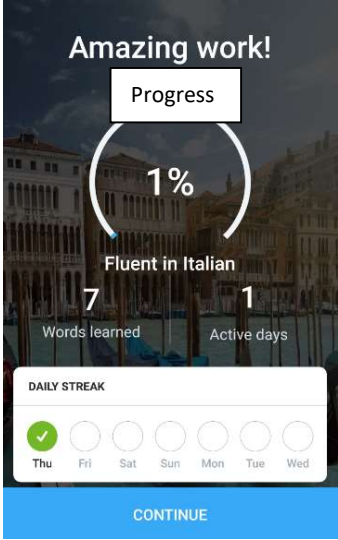
**Learning
Languages
Online in the
age of Mobility
Erasmus+
Key Action 2
Language
Learning APPS**

*LEARNING
LANGUAGES
ONLINE IN THE
AGE OF MOBILITY*

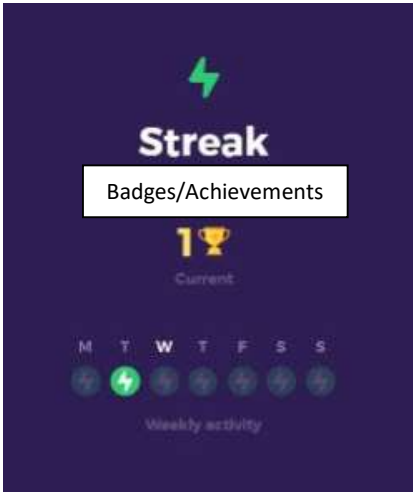
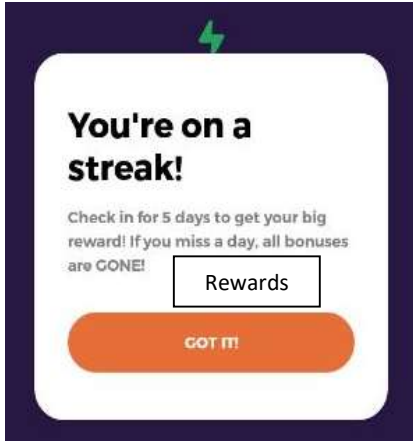

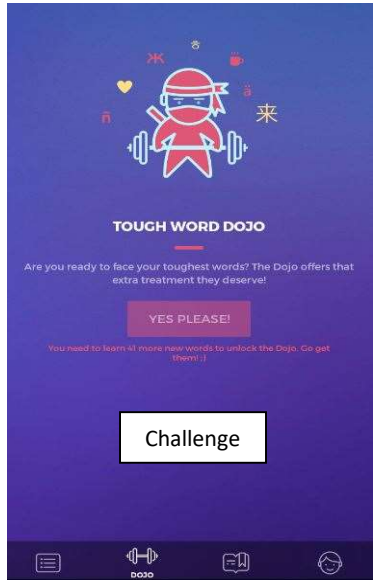

Intellectual Output 2
Erasmus+
Key Action 2
LLOM

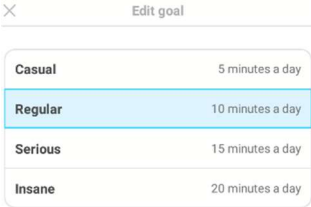
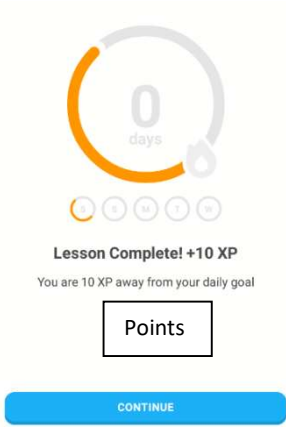
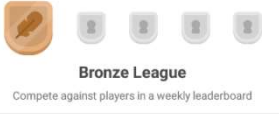
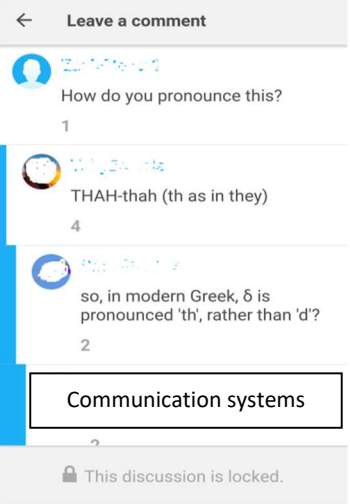

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Gamification
Intellectual Output
2: Gamification

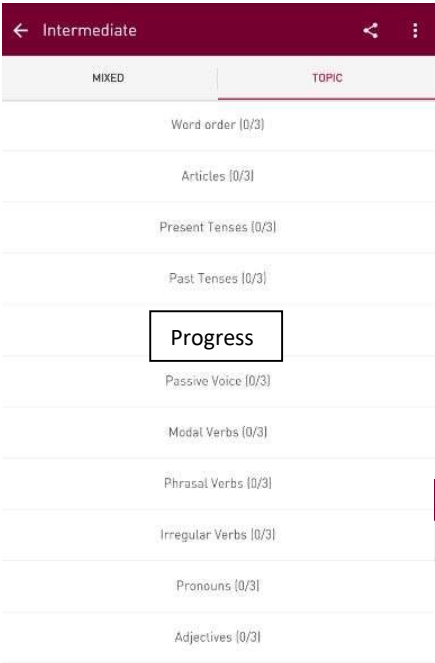
Gamification components & game elements	Yes/No	Some representative examples
Points		    
Leaderboards		
Badges/Achievements		
Levels		
Story/Theme	✓	
Clear goals	✓	
Feedback	✓	
Rewards		
Progress	✓	
Challenge	✓	
Self-representation with avatars		
3D environments		
Marketplaces and economies		
Competition		
Teams		
Communication systems		
Time pressure		

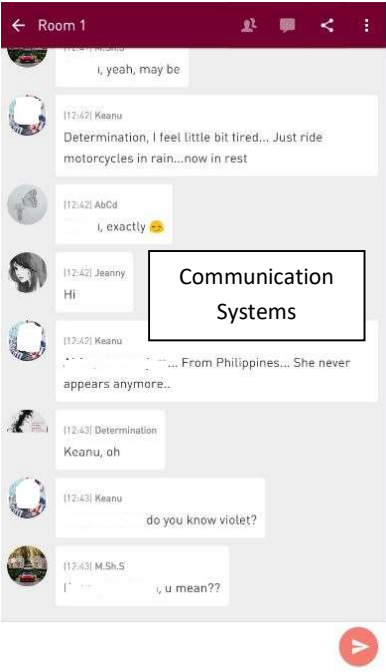
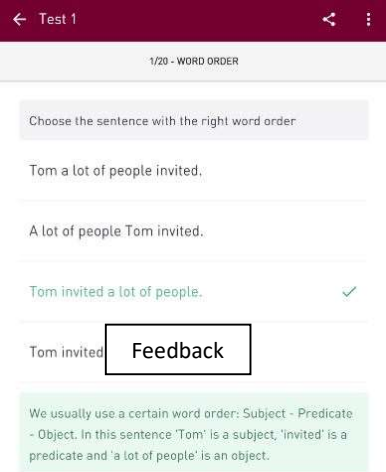
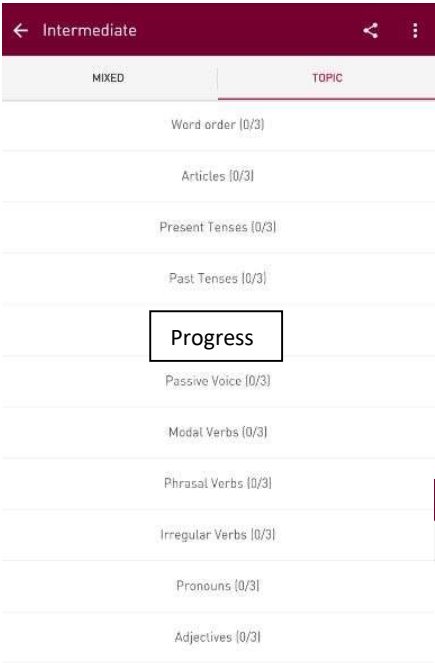
Gamification components & game elements	Yes/No	Some representative examples
Points		   
Leaderboards		
Badges/Achievements	✓	
Levels		
Story/Theme		
Clear goals	✓	
Feedback	✓	
Rewards		
Progress	✓	
Challenge		
Self-representation with avatars		
3D environments		
Marketplaces and economies		
Competition		
Teams		
Communication systems	✓	
Time pressure		

Gamification components & game elements	Yes/No	
Points	✓	
Leaderboards		
Badges/Achievements	✓	
Levels	✓	
Story/Theme and Narration	✓	
Clear goals	✓	
Feedback	✓	
Rewards	✓	
Progress	✓	
Challenge	✓	
Self-representation with avatars		
3D environments		
Marketplaces and economies		
Competition		
Teams		
Communication systems		
Time pressure	✓	

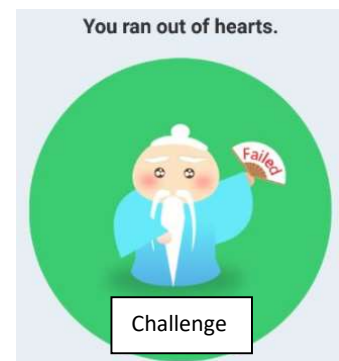
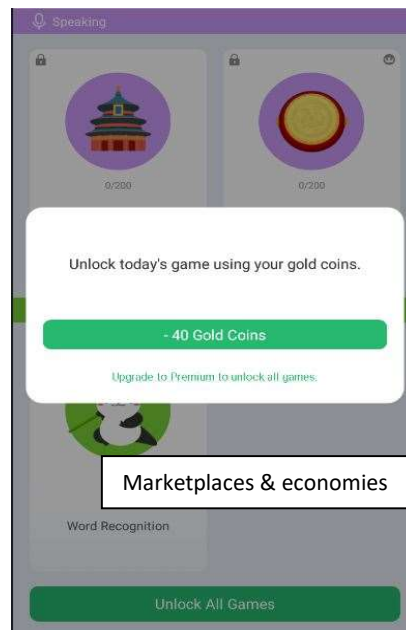
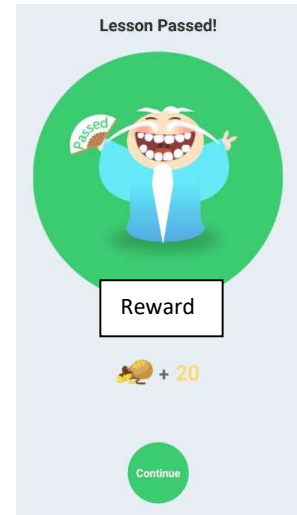
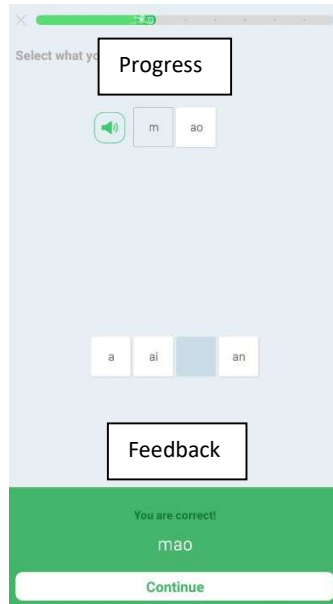
Gamification components & game elements	Yes/No		
Points			
Leaderboards			
Badges/Achievements	✓		
Levels	✓		
Story/Theme and Narration			
Clear goals	✓		
Feedback	✓		
Rewards	✓		
Progress	✓		
Challenge	✓		
Self-representation with avatars			
3D environments			
Marketplaces and economies			
Competition			
Teams			
Communication systems			
Time pressure			
			

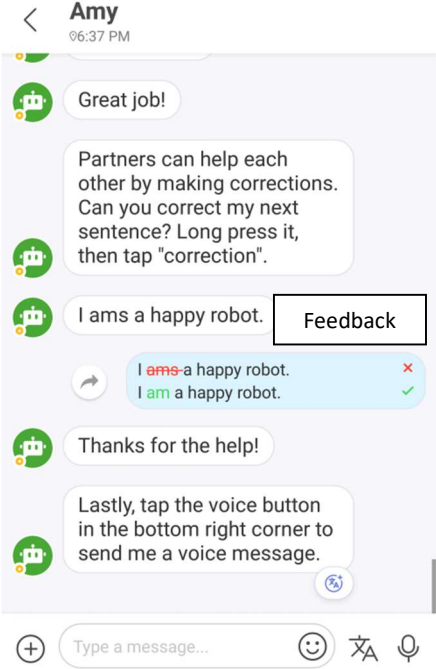
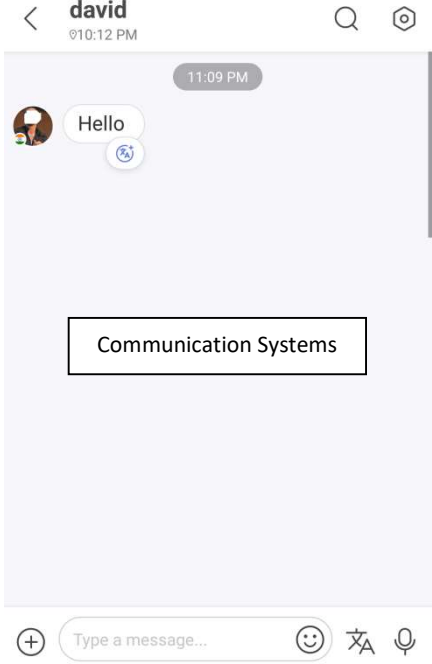
Gamification components & game elements	Yes/No	Some representative examples
Points	✓	    
Leaderboards	✓	
Badges/Achievements	✓	
Levels	✓	
Story/Theme		
Clear goals	✓	
Feedback	✓	
Rewards	✓	
Progress	✓	
Challenge		
Self-representation with avatars		
3D environments		
Marketplaces and economies	✓	
Competition	✓	
Teams		
Communication systems	✓	
Time pressure		


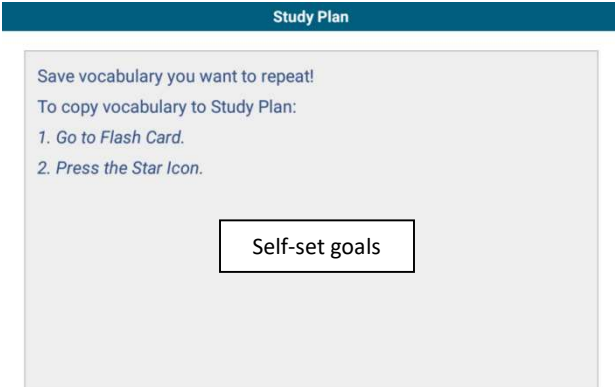

Gamification components & game elements	Yes/No	
Points		
Leaderboards		
Badges/Achievements		
Levels		
Story/Theme and Narration		
Clear goals	✓	
Feedback	✓	
Rewards		
Progress	✓	
Challenge		
Self-representation with avatars		
3D environments		
Marketplaces and economies		
Competition		
Teams		
Communication systems	✓	
Time pressure		

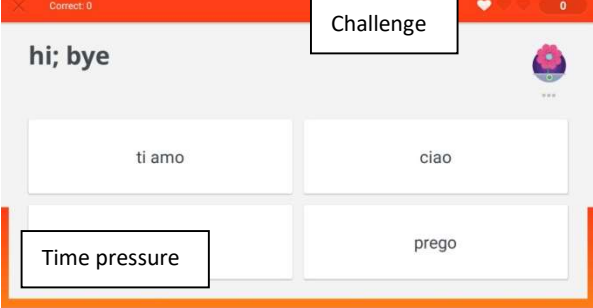
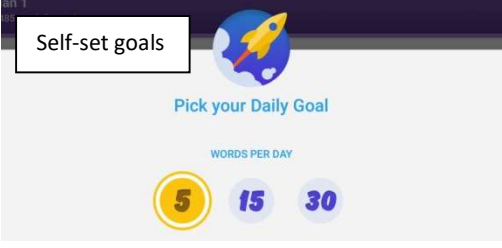
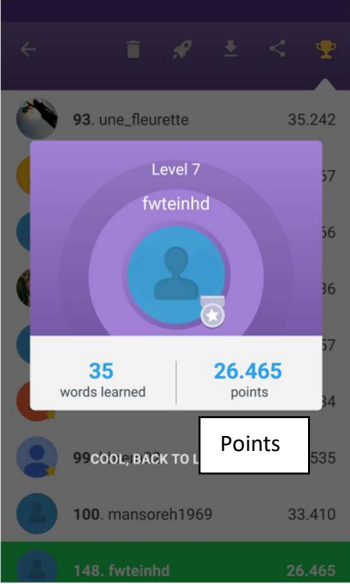
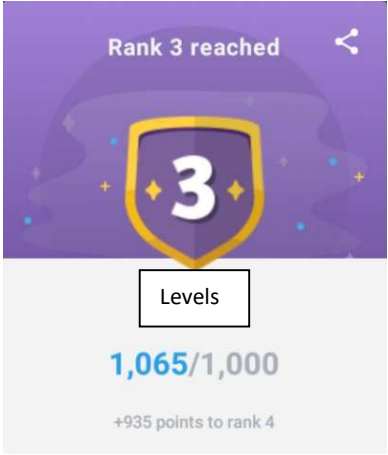


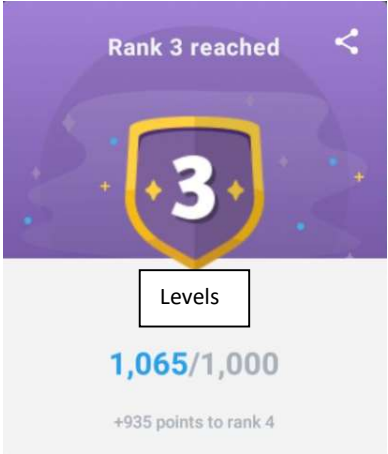
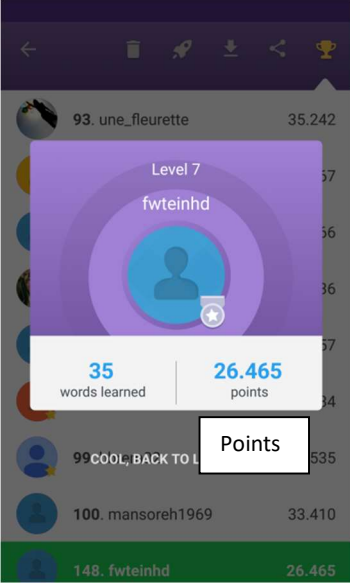
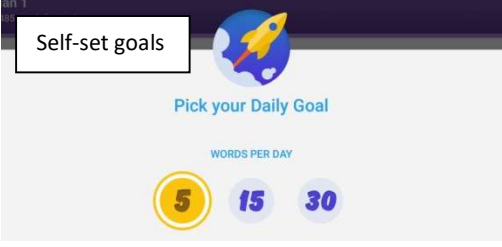
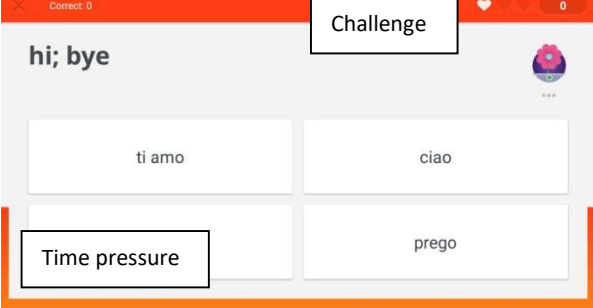
Gamification components & game elements	Yes/No
Points	✓
Leaderboards	
Badges/Achievements	
Levels	✓
Story/Theme and Narration	✓
Clear goals	✓
Feedback	✓
Rewards	✓
Progress	✓
Challenge	✓
Self-representation with avatars	
3D environments	
Marketplaces and economies	✓
Competition	
Teams	
Communication systems	
Time pressure	✓



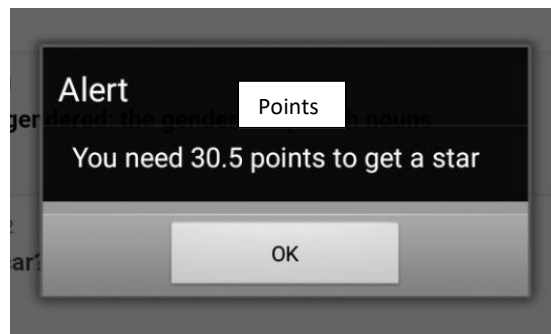
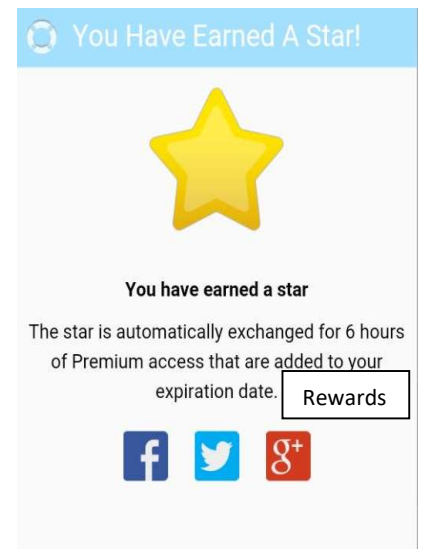
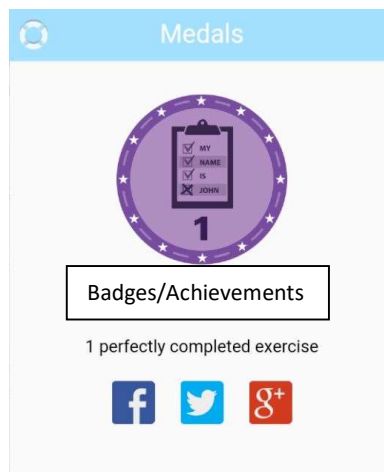
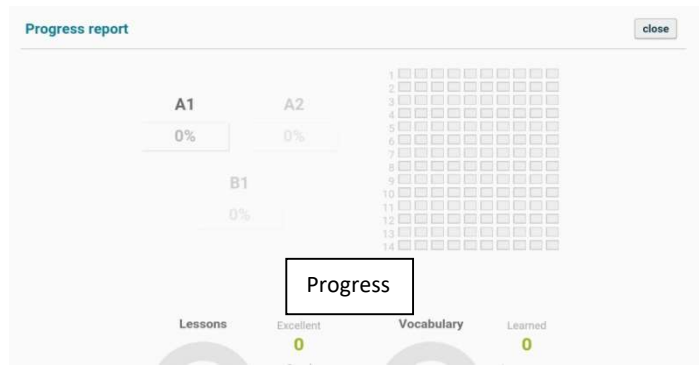
Gamification components & game elements	Yes/No	
Points		 
Leaderboards		
Badges/Achievements		
Levels		
Story/Theme and Narration		
Clear goals		
Feedback	✓	
Rewards		
Progress		
Challenge		
Self-representation with avatars		
3D environments		
Marketplaces and economies		
Competition		
Teams		
Communication systems	✓	
Time pressure		

Gamification components & game elements	Yes/No	
Points		
Leaderboards		
Badges/Achievements		
Levels		
Story/Theme and Narration		
Clear goals	✓	
Feedback	✓	
Rewards		
Progress	✓	
Challenge	✓	
Self-representation with avatars		
3D environments		
Marketplaces and economies		
Competition		
Teams		
Communication systems		
Time pressure	✓	

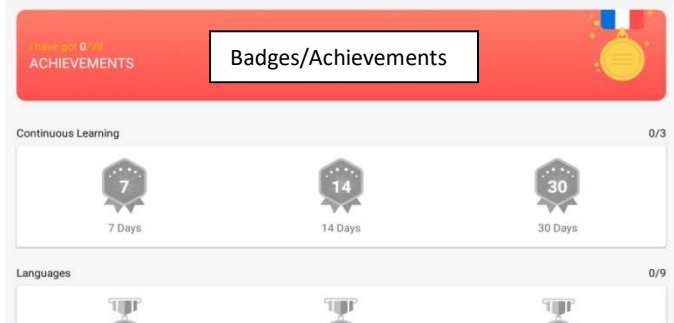
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Leaderboards	✓	
Badges/Achievements	✓	
Levels	✓	
Story/Theme		
Clear goals	✓	
Feedback	✓	
Rewards	✓	
Progress	✓	
Challenge	✓	
Self-representation with avatars		
3D environments		
Marketplaces and economies		
Competition	✓	
Teams		
Communication systems		
Time pressure	✓	

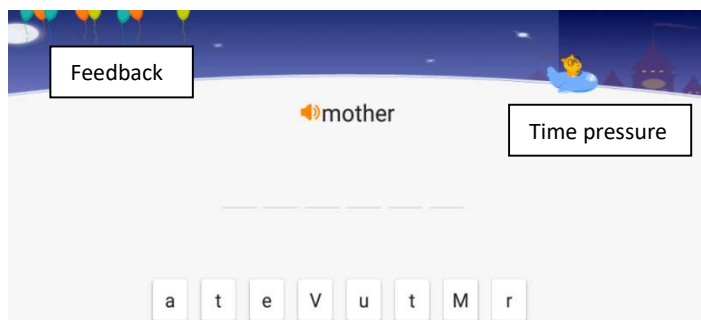
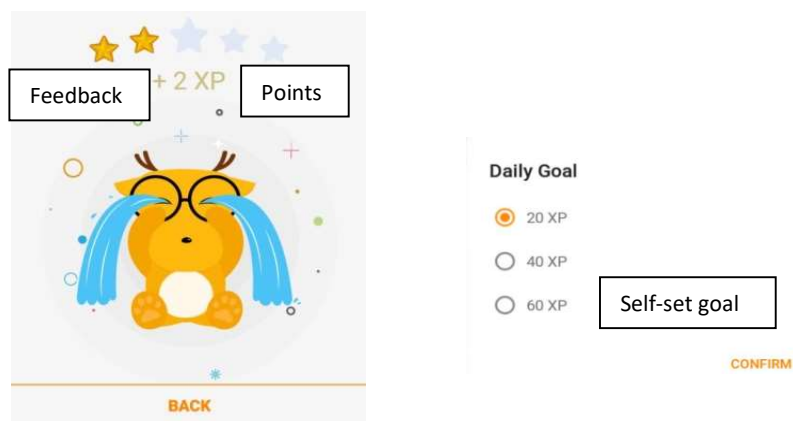


Gamification components & game elements	Yes/No
Points	✓
Leaderboards	
Badges/Achievements	✓
Levels	✓
Story/Theme and Narration	
Clear goals	✓
Feedback	✓
Rewards	✓
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3D environments	
Marketplaces and economies	
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Communication systems	
Time pressure	

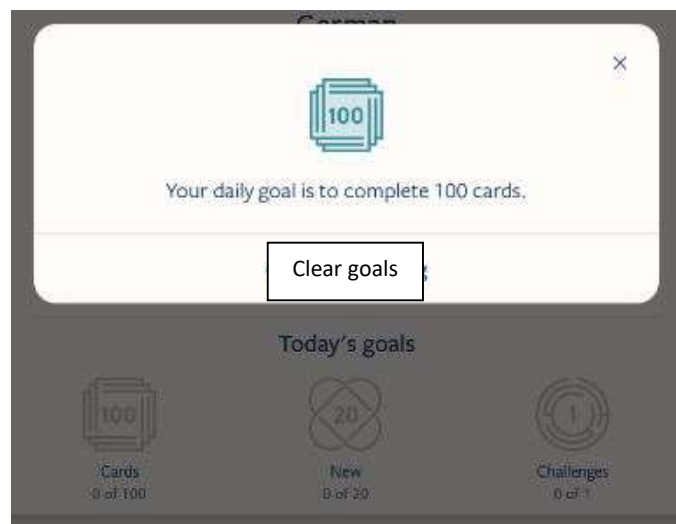
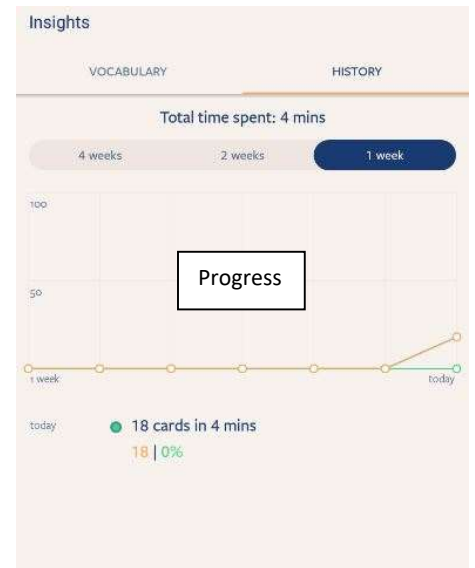
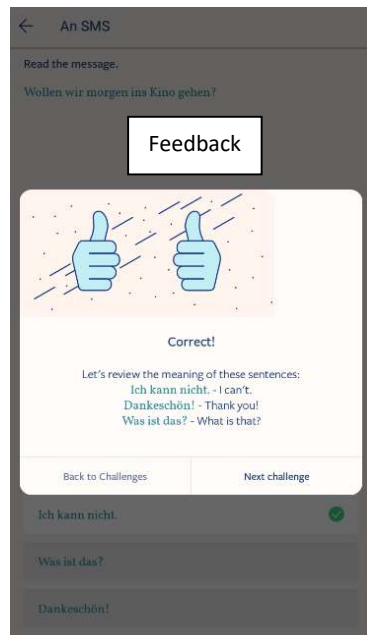


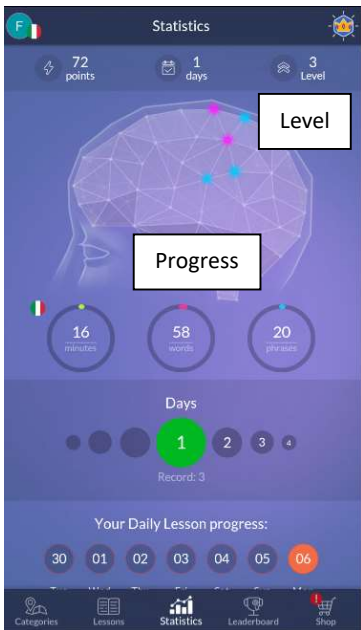
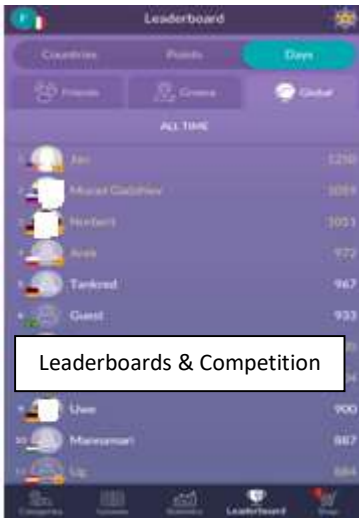
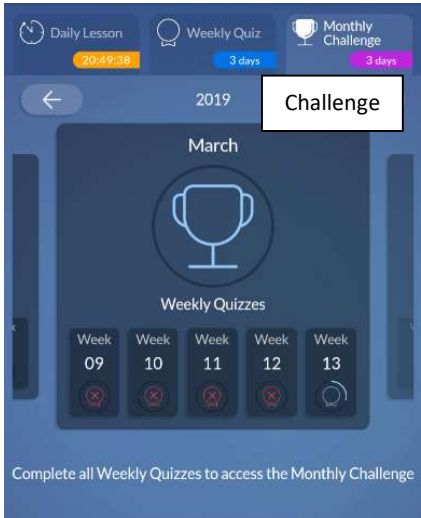
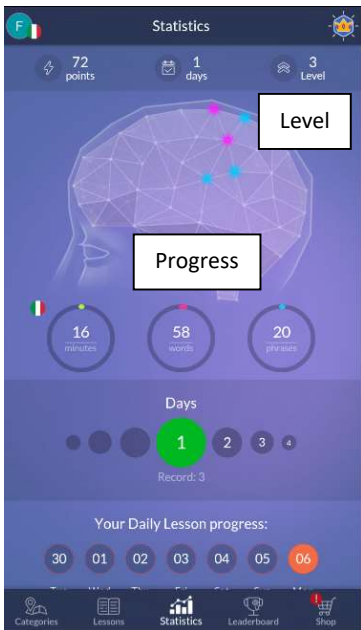


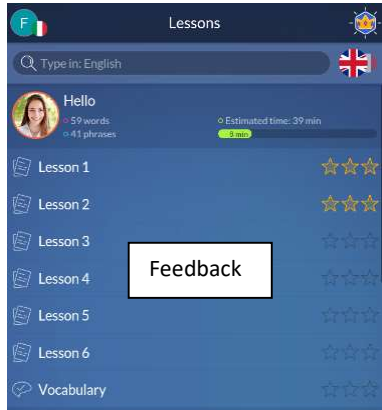


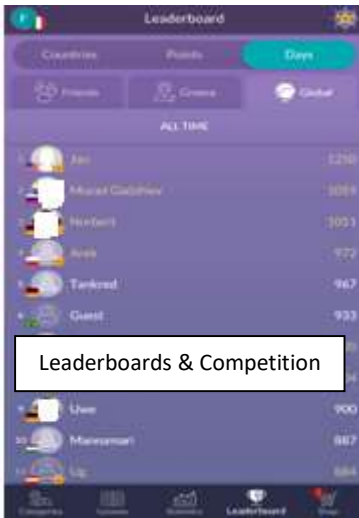

Gamification components and game elements in Lingodeer, along with some indicative examples


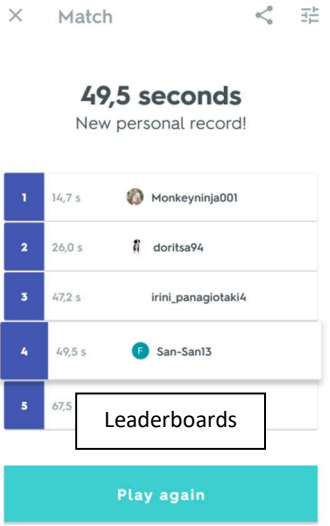

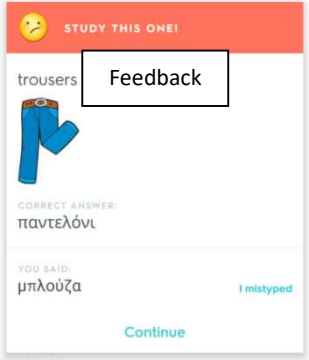

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Leaderboards	✓	
Badges/Achievements	✓	
Levels	✓	
Story/Theme	✓	
Clear goals	✓	
Feedback	✓	
Rewards		
Progress	✓	
Challenge	✓	
Self-representation with avatars		
3D environments		
Marketplaces and economies		
Competition	✓	
Teams		
Communication systems		
Time pressure	✓	

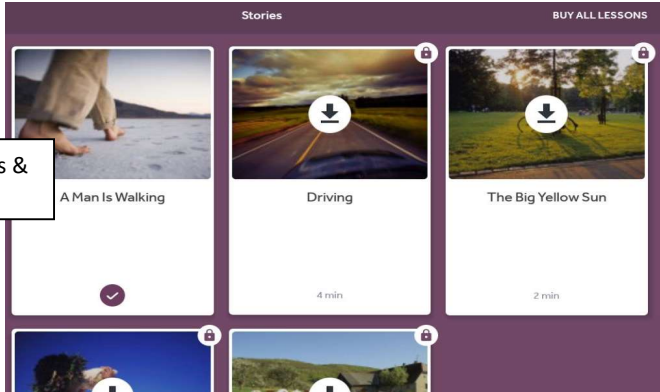
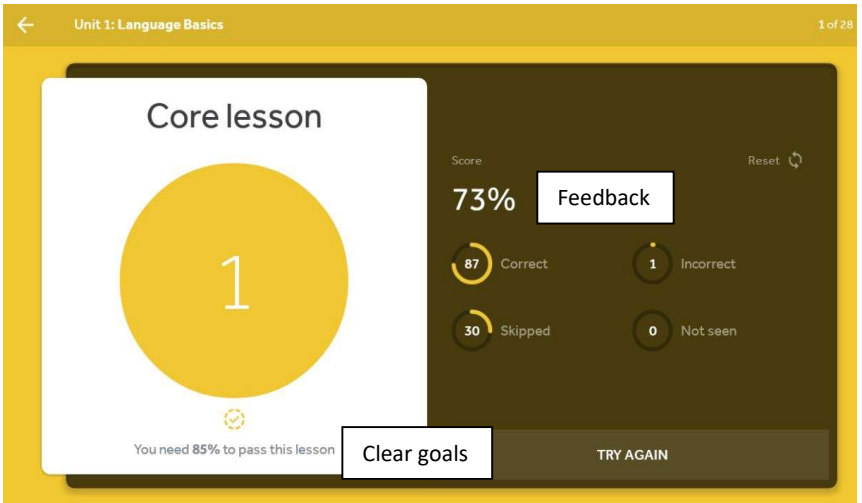


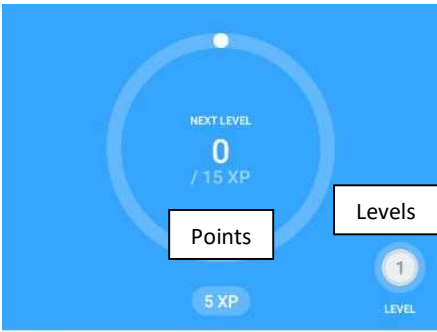


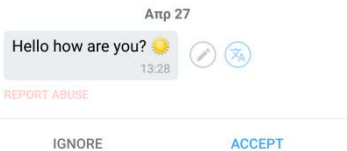

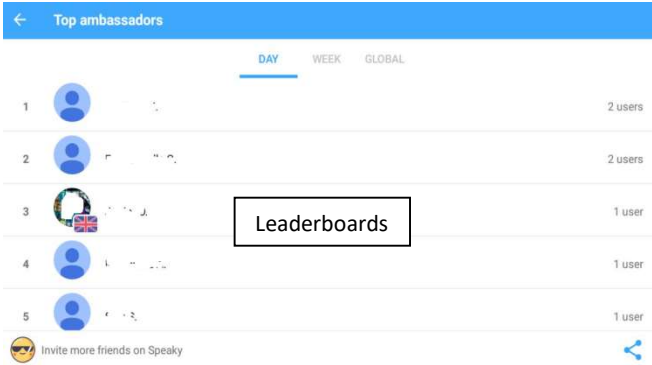
Gamification components & game elements	Yes/No
Points	
Leaderboards	
Badges/Achievements	
Levels	
Story/Theme and Narration	
Clear goals	✓
Feedback	✓
Rewards	
Progress	✓
Challenge	
Self-representation with avatars	
3D environments	
Marketplaces and economies	
Competition	
Teams	
Communication systems	
Time pressure	



Gamification components & game elements	Yes/No	
Points	✓	
Leaderboards	✓	
Badges/Achievements	✓	
Levels	✓	
Story/Theme and Narration		
Clear goals	✓	
Feedback	✓	
Rewards		
Progress	✓	
Challenge	✓	
Self-representation with avatars		
3D environments	✓	
Marketplaces and economies		
Competition	✓	
Teams		
Communication systems	✓	
Time pressure		

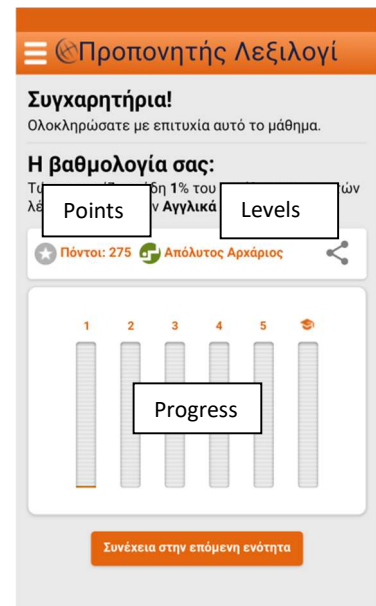
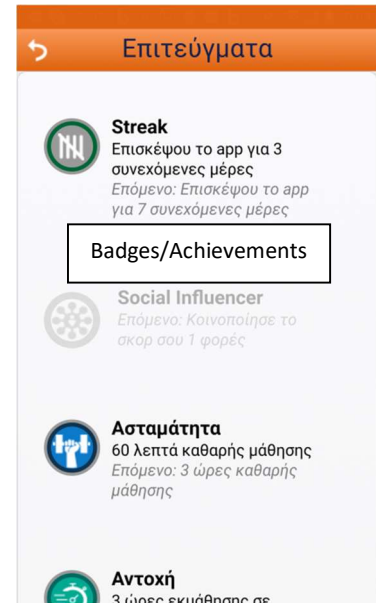
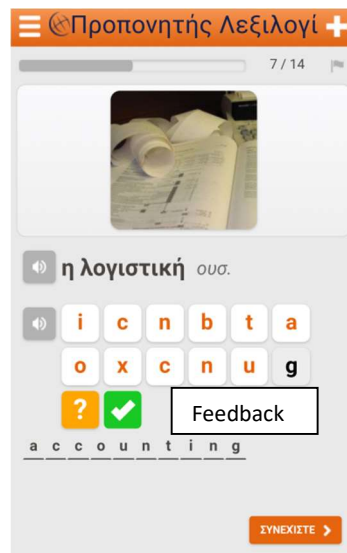
Gamification components & game elements	Yes/No	Some representative examples	
Points			
Leaderboards	✓		
Badges/Achievements			
Levels			
Story/Theme			
Clear goals	✓		
Feedback	✓		
Rewards			
Progress	✓		
Challenge	✓		
Self-representation with avatars	✓		
3D environments			
Marketplaces and economies			
Competition	✓		
Teams	✓		
Communication systems			
Time pressure	✓		
Competition	✓		
Teams	✓		
Communication systems			
Time pressure	✓		
Competition	✓		

Gamification components & game elements	Yes/No	
Points		
Leaderboards		
Badges/Achievements		
Levels		
Story/Theme and Narration	✓	
Clear goals	✓	
Feedback	✓	
Rewards		
Progress	✓	
Challenge		
Self-representation with avatars		
3D environments		
Marketplaces and economies		
Competition		
Teams		
Communication systems		
Time pressure		

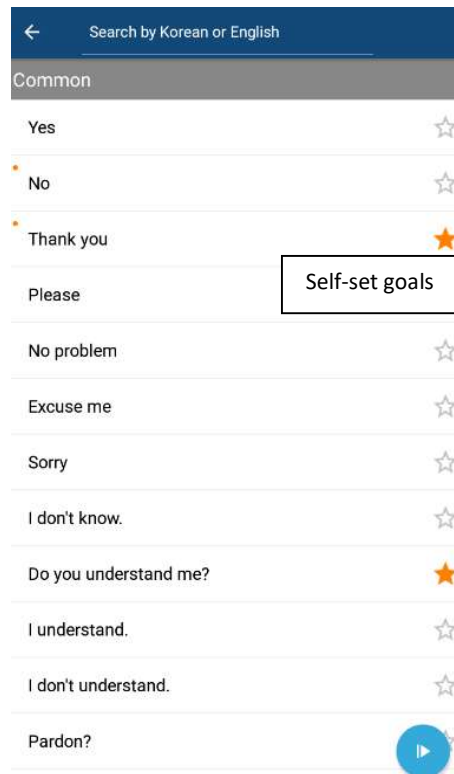
Gamification components & game elements	Yes/No	
Points	✓	     
Leaderboards	✓	
Badges/Achievements	✓	
Levels	✓	
Story/Theme and Narration		
Clear goals	✓	
Feedback	✓	
Rewards		
Progress	✓	
Challenge		
Self-representation with avatars		
3D environments		
Marketplaces and economies		
Competition		
Teams		
Communication systems	✓	
Time pressure		

Gamification components & game elements	Yes/No	
Points		
Leaderboards		
Badges/Achievements		
Levels		
Story/Theme and Narration		
Clear goals		
Feedback	✓	
Rewards		
Progress	✓	
Challenge		
Self-representation with avatars		
3D environments		
Marketplaces and economies		
Competition		
Teams		
Communication systems	✓	
Time pressure		

Gamification components & game elements	Yes/No
Points	✓
Leaderboards	✓
Badges/Achievements	✓
Levels	✓
Story/Theme and Narration	
Clear goals	✓
Feedback	✓
Rewards	
Progress	✓
Challenge	
Self-representation with avatars	
3D environments	
Marketplaces and economies	
Competition	✓
Teams	
Communication systems	
Time pressure	



Gamification components & game elements	Yes/No
Points	
Leaderboards	
Badges/Achievements	
Levels	
Story/Theme and Narration	
Clear goals	✓
Feedback	
Rewards	
Progress	
Challenge	
Self-representation with avatars	
3D environments	
Marketplaces and economies	
Competition	
Teams	
Communication systems	
Time pressure	



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1. Introduction

Gamification can be perceived as an attempt to increase the likelihood for a gameful experience to emerge by imbuing a system with relevant affordances (Huotari & Hamari, 2012). When gamification in educational contexts is considered, enhanced student motivation, engagement, attitudes and performance have been reported as potential benefits (Subhash & Cudney, 2018).

However, these potentialities strongly rely on the quality of the gameful design. Gamification is often misconcepted as a shallow introduction of game elements (especially external rewards like points and badges) into a system, leading to the approach of randomly selecting and combining gamification constructs, that -in turn- results in unmet expectations (Schöbel, Janson, Ernst, & Leimeister, 2017; Ferrara, 2013).

Although design principles found in the literature can be a helpful start, studies on gamification design methods stress the importance of involving gamification specialists with knowledge and experience in order to design solid gamification (Morschheuser, Hassan, Werder, & Hamari, 2018). In this vein, the present chapter seeks to investigate gamification in mobile language learning from a pragmatic perspective, integrating professional knowledge and experiences. Specifically, the aim of this work is to obtain direct input from gamification experts regarding the delivery of gameful experiences and the applicability of different gamification elements for language learning contexts through a mobile environment.

This chapter is organised as follows: Section 2 presents the methodology adopted, including the data collection tool and process; Section 3 reports the results while Section 4 discusses and concludes the knowledge and experience gathered from the experts.

2. Methodology

2.1 Participants

In order to explore gamified mobile language learning from a pragmatic perspective, direct input was drawn from MSc, PhD and postdoctoral researchers, academics and research associates with previous experience in gamification. Specifically, 10 gamification specialists that covered a variety of expertise -including game developers, designers and evaluators- participated in the study.

2.2 Data collection tool & Process

A data collection tool (see Appendix A) was devised in order to identify specific gamification elements and their applicability for language learning contexts. The data collection tool was developed based on two axes, i.e. gameful experience and technical feasibility, comprised of the individual components described in Table 2.1. This tool included both closed-ended and open-ended questions, and was administered to the experts under different forms, namely as a questionnaire, as an interview tool and as a focus-group tool. Specifically, among all ten experts, four filled in the questionnaire ($n = 4$), four participated in a focus group ($n = 4$), and two were individually interviewed ($n = 2$). The gamification elements considered in the data collection tool (presented in Figure 2.1) were adapted from Hamari, Koivisto, & Sarsa (2014) and Reeves & Read (2009), although experts were invited to expand this list with additional elements.

Table 2.1: Description of the data collection tool

Axis	Components	Description
Gameful experience	Perceived contribution	Experts assessed the degree that different gamification elements may contribute to a gameful learning experience
	Perceived innovative character	Experts assessed the novelty degree of different gamification elements; that is, which elements may offer an added value in respect to the apps already released in markets.
	Best practices	Experts were invited to suggest some best practices for successfully integrating different gamification elements into a language learning app.
Feasibility	Challenges	Experts assessed the degree that different gamification elements are technically feasible to be integrated into a language learning app and highlighted potential challenges that may influence their integration.
	Solutions	Experts proposed solutions/recommendations to the potential challenges.

Points	Rewards	Marketplaces and economies (i.e., virtual money and in-app shops)
Reputations (Leaderboards, badges/achievements, levels)	Progress	Competition under rules explicit and enforced
Story/Themes and Narration	Challenge	Teams (multi-player modes)
Clear goals	Self-representation with avatars	Communication systems
Feedback	3D environments	Other?

Figure 2.2: The gamification elements considered in the data collection tool

3. Results

3.1 Gameful Learning Experience

Among the 14 gamification constructs considered, seven (7) were identified as the most essential elements for delivering a gameful learning experience. All experts agreed that the degree of contribution of these seven elements into a gameful learning experience is above average. In particular, Points, Challenge, Reputations (i.e., Achievements/Badges, Levels, Leaderboards) and Clear goals received the highest ratings, closely followed by Story/Themes and Narration, Rewards and Feedback.

Starting with Points, the experts stressed their role as motivators for attaining activities and related personal goals. They argued that Points enhance user enjoyment and engagement, trigger a sense of completion and mastery and promote a better goal understanding. Finally, Points facilitate the integration of other gamification elements such as earning Badges/Achievements and Competition.

Challenge and Rewards were, also, identified as important motivation factors. Specifically, Reward anticipation may sustain user interest and boost their self-confidence. Regarding Challenge, experts argued that too-easy tasks may fail to sustain interest; increasing the difficulty and introducing a Challenge to the user enhances motivation to continue.

Reputations in the form of Achievements/Badges, Levels and Leaderboards were, also, considered to be an important motivation factor. According to the experts, Reputations can serve as a means for keeping track of and provide feedback on user performance and they enhance user's sense of competence. Additionally, Reputations help establish a healthy Competition among users.

Clear goals contribute to a gameful learning experience mainly in two ways, namely, by providing help and guidance as well as by supporting user engagement. Specifically, Clear goals help the user not to get lost while striving to figure out how to proceed. This, in turn, helps the user stay engaged and focused.

Story/Themes and Narration were considered to be an important element for promoting thinking, emotional experiences and social competences. Narration can serve as a scaffold that engage users in a conceptual context and immerse them into the task. Additionally, it may promote a sense of contribution to a larger cause as well as a sense of control over the outcome, enhancing self-efficacy, engagement and the positive feelings experienced. Finally, Narration can be seen as an integration of art and design in the game or app, that triggers user's imagination.

Feedback allows users to track their progress towards goal attainment, so they can adjust their strategy and effort accordingly. In addition, Feedback promotes engagement through supporting users when difficulties are faced.

3.2 Innovative Character

This subsection presents the expert perspective regarding the novelty degree of the 13 gamification elements discussed.

Story/Themes and Narration was chosen by the majority as the most innovative gamification element. Yet, all 14 elements were considered to offer an added value if integrated into a language learning app, including elements already used in the language learning apps released in markets so far (e.g., Points and Reputations).

From the aforementioned it follows that the experts stressed the view that innovative character does not necessarily interrelate with technological advancement and they emphasized more on the gameful experience provided to the user.

3.3 Best Practices

Table 3.1 presents best practices for effectively integrating different gamification elements into a language learning app, as suggested by the experts in the field.

Table 3.1: Best practices for integrating gamification elements into a language learning app

Gamification element	Best practices
Challenge	Challenge should be scaled based on user level; it should be challenging but not too difficult. This helps create a smooth learning curve and keep user engaged. Moreover,

	time-pressure could be employed in order to challenge users and establish a healthy competition among them, as well.
Rewards	Provide users with rewards that are usable in the app and serve a task goal, instead of rewards that are related to accumulating achievements and unlocking badges. Additionally, rewards should be scaled based on user performance.
Clear goals	As with Challenge, Goal difficulty should increase with user's skills so as to always provide activities that are challenging but not impossible to achieve. Goals should be explicit.
Feedback	Feedback should be immediate, explanatory and it should not interrupt the learning process. Additionally, the system should provide tips (e.g., when orthographic accents are not used properly or when more than one answers are possible) and final, reinforcing feedback at the end of tasks. Feedback comments could be humorous.
Levels	Lessons can be grouped into levels. Provide shortcuts: to advance from one level to another, not all lessons need to be completed.
Teams (multi-player modes)	When multi-player modes are employed, two additional elements should be considered: a) Communication Systems, b) Marketplaces and Economies. Communication enhances the multi-playing experience while synthetic currency allows users to trade in the same way as in the real world.
Story/Themes and Narration	Break a story into smaller, connected stages. Introduce the story to the user through a short animation or a text. Learning content could be turned into riddles and/or grouped into thematic categories. Have a final, "ultimate" challenge at the end.

Apart from these element-specific best practices, the following suggestions were also offered:

- Provide the user with the sense of making meaningful choices.
- Establish multiple paths that allow the user to build their own strategies and to develop diverse skills.
- Consider aesthetics: visual stimuli can be employed both for language teaching-learning (with images related to vocabulary) as well as for offering a more pleasant user experience.
- Exploit mobile learning features: Ubiquity, together with other mobile learning features -such as high memory capacity, built-in videocameras, voice recording and geolocation capabilities- may address several language learning needs. Consider context and integrate activities that explore user's place and time (e.g., the user may take a picture of an object in front of them and create an entry with new vocabulary).
- Integrate classic games: Crosswords, Hangman, Navy Battle (for learning alphabet and numbers, e.g., "Ship in Position G8") and Escape Rooms with clues and riddles.
- Consider a blended format where learning activities will take place partly in person and partly online.
- Integrate streaks, fanfare and a supportive mascot.
- Consider a socio-constructivist approach through Teams, Communication Systems and **peer Feedback**.
- Gamification should serve the learning goals and not the other way around.

3.4 Technical Feasibility

This subsection focuses on the potential challenges and drivers that may influence the integration of gamification elements into a language learning app.

Among the 14 gamification elements considered, eight (8) were identified as the most technically feasible, i.e., Points, Rewards, Clear goals, Story/Themes and Narration, Reputation, Progress, Feedback and Challenge. More specifically, all experts agreed that the technical feasibility of these eight (8) elements is above average.

On the other hand, potential barriers were highlighted regarding the integration of **3D environments and Self-representation with Avatars**, namely, more advanced technical requirements and higher development cost. More specifically, the experts pointed out that 3D object development can be a time consuming process that requires many resources.

Additionally, there exists a limitation on the devices that could support a 3D app as more advanced technical requirements, such as higher memory capacity, are needed. Self-representation with Avatars may introduce the same difficulties as 3D environments, when 3D avatars are considered. However, these constraints could be eliminated by using picture-based avatars or 2D avatars.

Although Feedback and Challenge were considered to be technically feasible elements, the experts pointed out the difficulty of personalization in order to individually meet user needs. According with the best practices presented in the previous subsection (see Table 3.1), Challenge should be scaled based on user level. However, properly adjusting the level of difficulty is a challenging task. In a similar vein, there exists a higher difficulty in providing feedback that is uniquely tailored to users. If Challenge and Feedback personalization is to be integrated into a language learning app, Intelligent Language Tutoring Systems (ILTS) could be employed, as suggested by the experts. ILTS would be able to make “intelligent” decisions based on user input, such as determining the placement level of the user based on their performance, identifying areas/skills that require more practice or appropriately scaffolding content. Additionally, an ILTS could include an Natural Language Processing (NLP) pipeline (e.g., tokenization, part-of-speech tagging, lemmatization) in order to interpret text input. This functionality would allow a language learning app to better interpret text input (e.g., the user has typed the correct word but the wrong form or the user has typed the correct words in the sentence but misplaced the adjective).

4. Discussion

This work attempted to explore the gamified dimension of mobile language learning from a pragmatic perspective. To this end, professional knowledge and experience was gathered from experts in the field of gamification through questionnaires, interviews and focus groups, regarding the delivery of a gameful learning experience and the applicability of different gamification elements into language learning contexts. On the one hand, gameful experience was analyzed in terms of: a) the contribution of different gamification elements to a game-like learning experience, b) their novelty degree, and c) best practices for their integration into a language learning app. On the other hand, technical feasibility was investigated in terms of potential challenges and drivers that may influence the integration of the gamification elements considered.

Points, Challenge, Reputations (i.e., Achievements/Badges, Levels, Leaderboards), Clear goals, Story/Themes and Narration, Rewards and Feedback were considered to be the most essential elements for the delivery of a gameful learning experience. Additionally, most experts agreed on the novelty degree of integrating Story/Themes and Narration into a language learning app. In fact, previous studies on gamified apps in various application domains (Lister, West, Cannon, Sax, & Brodegard, 2014) as well as the findings presented in Chapter 2 -regarding the language learning apps released in markets so far- have revealed that Narration is among the elements that tend to be ignored. Thus, the integration of Story/Themes and Narration into a language learning app can offer an added value, as suggested from both the expert and the current market trends perspective. Nonetheless, all 14 elements were considered to offer an added value, including elements already over-used in current language learning apps (e.g., Points and Reputations), indicating that the innovative character does not necessarily interrelate with technological advancement.

In fact, technological complexity may act as a barrier to the integration of an element into a language learning app. Specifically, the experts highlighted advanced technical requirements and higher development cost as potential challenges for the integration of 3D environments. Self-representation with Avatars may introduce the same difficulties as 3D environments - when 3D avatars are considered- yet these constraints could be eliminated by using picture-based avatars or 2D avatars.

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