



Reading to Level Up: Gamifying Reading Fluency

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Abstract. Employing game design elements to create an environment for struggling readers to read accurately, with proper speed and right expression might inspire them to continue practising and help their teachers incorporate engaging tools in their instructional repertoire for fluent reading. The EU-funded innovation project GameLet aims at developing digital media-based gamification tools to enhance student motivation in self-directed, individual and cooperative learning phases for reading fluency training. A fictional audio play production is one centrepiece of the developed game concept. This paper specifically focuses on the game design ideas related to the Recording Studio, a particular part of this gamified audio play environment, and discusses mini-games ideas related to this concept as strategies to improve reading fluency. These gamification ideas exemplify the plethora of available opportunities to gamify the acquisition of reading fluency.

Keywords: Reading fluency · Gamification · Educational game design

1 Introduction

Selecting and facilitating effective individual and collaborative methods and tools for fostering reading fluency is crucial for teachers to motivate student interest and attention to reading. Gamifying these tools might inspire students to continue practising and help teachers incorporate engaging tools in their instructional repertoire for training reading fluency. Game-based reading exercises might promote ‘situated learning’ [1] that allows deeper and more meaningful avenues to create, assess, analyse and apply new skills and knowledge.

Focusing on improving the reading skills of schoolchildren by taking a gamified media-supported approach, The European Union funded the interdisciplinary innovation project GameLet which targets “to increase struggling readers’ reading fluency, to foster their multilingualism and to contribute to their media literacy based on the comprehensive integration of digital media in trainings” [2]. The overall project not

only develops gamified multilingual learning environments and materials but also focuses on developing training modules for teachers and contributing to the theoretical discussions in relation to gamification and educational media design [3]. The “meaningful” digital media-based gamification mechanisms applied in GameLet aim at enhancing pupils’ motivation in self-directed, individual and cooperative learning phases for RF training. A fictional audio play production is the centrepiece of the concept designed to encourage pupils to improve their reading and successfully record their role.

This paper focuses on the Recording Studio game design ideas, a particularly important segment of the game environment, and discusses the mini-games under the Recording Studio section concerning gamification ideation techniques and strategies to improve reading fluency.

2 Reading Fluency

When reading, learners have to cope with at least two cognitive tasks - word recognition and comprehension. As LaBerge & Samuels [4] explain, the more attention readers have to pay to word recognition, the less they can give to comprehension. On the contrary, fluent readers who recognise words and sentences effortlessly have more cognitive resources available for text comprehension. They can make connections among the ideas in the text as well as between the text and their background knowledge [5]. Thus, fluency serves as a bridge between word recognition and word comprehension. It is defined by the National Reading Panel [6] as the basic reading skill which enables readers to assign word meanings reliably and quickly at the level of letters, words, sentences and text passages, in order to read aloud texts at an appropriate reading speed and to be able to intonate them in a meaning-oriented way.

Developing an appropriate reading fluency is especially important for struggling readers as they are likely to remain poor readers throughout their lives no matter how bright they are [6]. Effective methods to develop reading accuracy, fluency, as well as comprehension, require students to repeatedly read passages orally with guidance and feedback [6]. However, as effective as such programs may be, our observations indicate that student motivation to engage in these activities fades quickly due to the programs’ monotony [3]. A reading fluency training method that tries to provide an authentic context for the practising of reading skills is the Readers’ Theater. Here, cooperating groups of pupils train their reading fluency using dialogical texts, with the roles of speakers and narrators distributed in the groups. Finally, the practised texts are presented in a creative form in the plenum [7]. The Readers’ Theater integrates repeated reading aloud sessions as the central training technique as well as providing and receiving feedback from teachers and learners. Following a bilingual or multilingual approach, the Multilingual Readers’ Theater (MELT) integrates school and foreign languages as well as migration languages [8]. Thus, MELT responds to social demands on multilingualism as an expectation of competence [9] and to the individual multilingual reality of learners [8].

GameLet integrates a wide variety of reading training methods, some of which will be described in the article. It also extends the MELT approach by applying gamified

learning scenarios and materials, including interactive elements and adding media-based assessment and feedback forms. The aim is to intensify reading fluency training on an individual and a cooperative basis, and to increase the extent of self-learning phases through media support services [3].

3 Gamifying Reading Fluency

In playing the GameLet - learning scenario, the students act as speakers who have been selected to produce an audio play. In doing so, they go through all the tasks needed on their mission to finish the audio play. The Recording Studio is an important part of the GameLet learning scenario. It includes all the essential elements of audio play production: listening to texts, recording, selecting or deleting versions, and then sending the recorded files to receive feedback. Two possibilities exist for recording with regard to the methodology of the Readers' Theater: single roles or synchronous group performance. The progress of the performance is documented in a leaderboard. The leaderboard shows the individual progress as well as the progress of the group. A significant challenge within the Gamelet approach is to increase the intensity of the exercise in a self-directed context. In addition, solutions are being explored to increase the motivation to practice student reading fluency with gamified units that complement the basic functions of the Recording Studio, some of which will be presented in this article.

Addressing GameLet's specific objectives directed toward self-directed and intensified learning and practice, the Recording Studio concept involves a cluster of mini-game design ideas based on repetitive use of "reading" as the primary game verb. The game verb in the context of game design describes the action executed by the player to achieve a goal in the game and this action changes the game state. Anthropy and Clark [10] refer to a game verb as the rules that allow the player to interact with the other rules in the game and create a dialogue between game and player. Recording Studio mini-games give a player only one basic action: "Read". As Jesse Schell mentioned in the *Art of Game Design*, "If you give a player a gun that can only shoot bad guys, you have a very simple game. But if that same gun can also be used to shoot a lock off a door, break a window, hunt for food, pop a car tire, or write messages on the wall, you now start to enter a world of many possibilities" [11]. Following this logic, in Recording Studio games, by increasing the number of things that you can do only by reading, the number of playful actions increases as well.

Reading fluency requires practice across days or weeks to internalise reading concepts and techniques. Instead of sitting down for long hours to practice reading, short game sessions, carried out multiple times a day, similar to the playing of casual mobile games, could be preferable for students to practice their reading. Employing a mobile game player interaction approach could allow students to practice for brief periods spanning across days or weeks or even months, and so internalise the techniques in the long run. With an approach emphasising the playful side of reading as a study subject, the gamification design group of the GameLet project examined the traditional classroom methods for improving reading fluency and focused on the exercises that students and teachers experienced as game-like. The preliminary design

ideas for mini-games involve mediating these experiences with digitally enriched gamification elements. In that way, the design group aimed to achieve the quality of the mediated player experience without sacrificing either educational objectives or ludic attributes.

4 Let the “Freeze-Frame” Speak: Showing and Sharing Text Understanding

Reading a literary text aloud well is only possible if readers understand what they are reading, which means understanding what conflicts characters experience, what kind of relationship they have with other characters or what situations they are in. If students' understanding of the text is poor, they find it more difficult to read fluently and, in particular, to pronounce the text using appropriate emphasis. Consequently, fostering but also assessing students' understanding of the readers' theater scripts take place at the beginning of the learning process. Therefore, the freeze-frame technique might be used to focus on and clarify an essential aspect of a scene [12]. One possible way to use it within the context of the Multilingual Readers' Theater is the following: After groups have been formed, pupils read the scene assigned to their working group; first silently on their own, making sure that they comprehend what is taking place in the scene. Then, any ideas that are important to help understand the scene are discussed and clarified within the group. Now, the pupils first decide together on a situation in their scene that represents in some way something pivotal or unique (a central conflict, something comical or dramatic, etc.). This situation is then depicted by some members of the group as a single 'frozen' image. The other remaining members of the group describe the frozen scene. After the presentation of the freeze-frame in plenum, selected group members might further explain the intention of their freeze-frame if necessary. Also, a discussion to develop a deeper understanding of the presented scene can follow. Thus, the freeze-frame technique helps to work out relationships between literary figures, visualise conflicts or depict important events, thus stimulating students to actively make sense of their scene and to show their interpretations. Furthermore, the body-focused method makes it possible to empathize with a particular situation or constellation of persons, and promotes a change of perspective.

If this drama technique is transferred to a gamified and media-supported learning environment, advantages but also challenges emerge. The visualisation of the freeze-frame requires a digital version and must contend with the problem that there is no body-focused group work anymore. One solution is to implement the concept explored in the project STREEN [13] that aims the stimulation of students' reading comprehension by allowing them to collaboratively or individually author 2D illustrations (see Fig. 1). STREEN offers drag and drop mechanisms to compose an illustration by manipulating 2D graphical representations of the characters and other elements of the narrative.

The selection of objects should allow enough creative options to arrange the freeze frame, for example, the figures shown and their typical postures, or the presented objects. Further, this digital version allows the integration of recorded audio files to the collage. Essential functions of the Recording Studio, such as recording, listening and sending audio recordings, are added here and connected to the selected figures and



Fig. 1. Students creating illustrations in project STREEN [13].

objects in the freeze-frame. The finalised version of the freeze-frame can then take part in a competition with the help of peer feedback or feedback from the teacher. The freeze frame with the most votes gets the most points. Further, the digital freeze frame can be used to start a plenary discussion (Fig. 2).

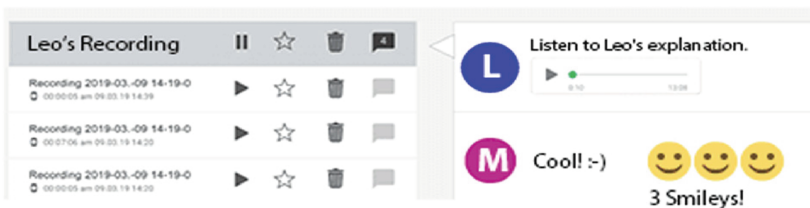


Fig. 2. Digital freeze frame.

5 Addressing Prosodic Reading as a Design Objective: “Emoji Tales” and “Maestro”

Prosody is a compilation of spoken language features that include stress or emphasis, pitch variations, intonation, reading rate, and pausing [5]. Fluent readers use prosodic or melodic features of spoken language – stress, pitch variations, intonation, rate, phrasing, and pausing – in their voices [14]. Thus, when readers embed these features in oral expression, they are giving evidence of actively interpreting or constructing meaning from the passage [14].

Regulating intonation - e.g. higher voices to express strong emotions like anger, joy or lower voices to express nonchalance or indifference - allows the reader to achieve optimal comprehension and express the emotion of the content more accurately [15]. Two mini-game concepts within GameLet, *Emoji Tales* and *Maestro*, focus on improving expressive reading skills through proper intonation and speed.

The first game, *Emoji Tales*, allows the player to read and record a text according to the adverbs suggested by the random emoji icons assigned by the game system. *Emoji Tales* employs the popular social media pictographs “emojis” as an attraction point. Emojis are ideograms used in electronic messages and web pages, and users heavily use them to colour and humanise text-based social media messages [16]. Depending on the random emojis, the student reads the text, e.g. “sadly”, “happily”, “angrily”, “surprised”, “nervously”. In addition to the turn-based mimicking of different emotions, another fun factor of the game comes from the contrast of the text’s content and the assigned emotion by the emoji. For example, the student might read a passage based on a love serenade angrily or a violent scene kindly and mildly.

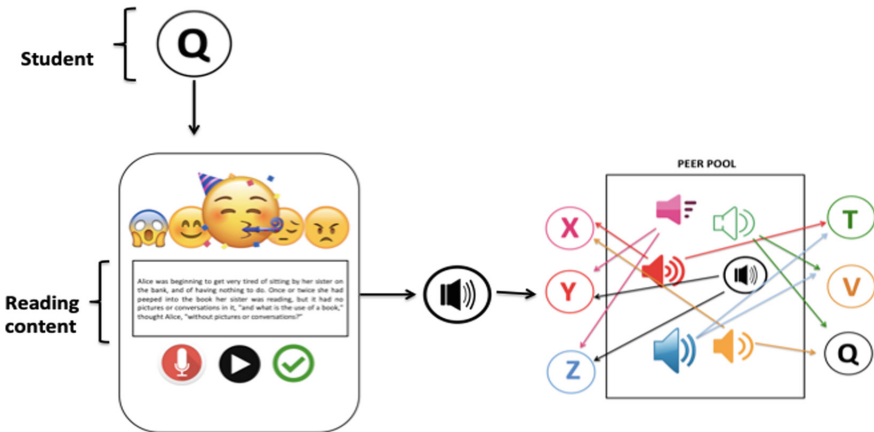


Fig. 3. The feedback cycle of the mini-game *Emoji Tales*.

The main challenge of the game is to read the passage with proper intonation, pace and emotion as the emojis change throughout the game session. When the students have completed the reading/recording mission, the mini-game allows them to listen to the

recording. If they are happy with the result, they can submit the recording to the peer pool (see Fig. 3). The peer pool describes the virtual space where the students' audio clips are collected to be peer-reviewed by other students based on the strengths and weaknesses of the reading performance. How to provide feedback that is content- and style-appropriate is discussed and practised before using criteria-based feedback forms.

Submitted audio clips to the peer pool are assigned by the system to the peer students proportionately to be evaluated. With the help of the criteria-based feedback form, each student gives feedback from one star to five stars to the randomly assigned recordings of their peers. Based on the evaluations, the ones with the higher scores go up on the leaderboard. The leaderboard provides a means to reward the best readers and increase the game's replayability by allowing student players to compete. Moreover, students could also play the game in free-time mode to practice their reading. Also, teachers could choose the reading materials in the game based on their syllabi.

The second mini-game addressing the expressive reading as a design objective is the pacing game *Maestro*. In this mini-game, a student reads the text aloud and the arrows on the screen act as a conductor. "Arrow up" on the screen instructs the student to read aloud, while "arrow down" means reading aloud softly. Similarly, "arrow left" instructs the student to read fast, while the "arrow right" means to read slowly. Multiple arrows together on the screen conduct a choral reading of the selected text. The choral reading could be used for in-class collaborative live game sessions. Similar to the process of *Emoji Tales*, the students read and record their performances as an audio clip. If they are pleased with the result, they submit the clip to the peer pool to be evaluated. Each student gives feedback from one star to five stars to the randomly assigned recordings of their peers. Based on the evaluations, the ones with the higher scores go up on the leaderboards. Again, similar to the feedback cycle of *Emoji Tales*, students could also play *Maestro* in free-time mode to practice their reading and teachers have control over the selection of reading materials in the game by posting to the system.

6 Choral Reading as Collaborative Gameplay: Oratorio Dicer

Choral reading refers to the interpretive reading of the text by a group of voices. Students might read the lines, stanzas, paragraphs on their own, in pairs, or unison. Educators list numerous benefits of utilising choral reading for reading fluency. These benefits vary from improved diction to self-confidence, from increased fluency to expanded vocabulary and enjoyment of reading. Choral reading also makes the students in the classroom active participants and facilitates better comprehension of the text being read [17].

Addressing the choral reading as a design objective, the mini-game *Oratorio Dicer* aims to create a gamified "reading together" experience for the students in groups, and allows students to develop effective and fluent read-aloud skills. In the game, the system assigns a number to every student logged in to the game app. The system also randomly assigns numbers to the parts of the uploaded text (sentences, words, stanzas or paragraphs). The game system randomly throws the numbers of the text parts and the student with the matching number starts to read aloud the part by pushing the record

button while reading, similar to pushing the record button when creating Instagram or Snapchat stories. The system highlights her/his part in the text. While the student finishes reading the assigned part, s/he removes her/his finger from the recording button, and the student/s whose number(s) come up next continues with the reading. This game is designed to be played as part of classroom activities and requires students to follow and listen to the prior readers carefully, while maintaining their concentration on the reading material. To be successful in the game, students have to move along smoothly by reading aloud and following along with the reading of the previous reader from one sentence, line, stanza or paragraph to the next. Each reading performance must be articulated expressively and with the proper emphasis. If the pursuing reader loses track of what is being read, the system assigns another number and the assigned student keeps reading from where the prior reader left off. If losing track while reading more than three times, the student fails the game. If s/he keeps up until the end of the selected text by reading her/his parts, s/he gets points (Fig. 4).

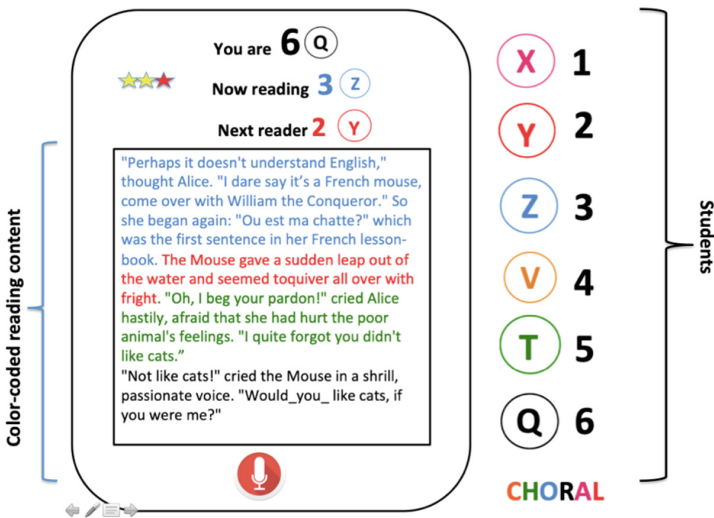


Fig. 4. Oratorio Dicer interface elements.

7 Gamifying Speed-Reading and Accuracy: “Speedy Reader” and “Singing in the Read”

Even though reading speed without comprehending text content is pointless, slow reading is a more severe “weakness independent of the purpose of reading” and a serious problem for learners [18]. Speed has a considerable impact on students’ reading fluency. To increase their reading speed, the students need to be able to recognize and decode words with ease [19]. Improving reading speed requires timed practice. The mini-games *Speedy Reader* and *Singing in the Read* aim to stimulate not only curiosity and interest on the gamification features but also practice itself.

The first mini-game idea promoting reading speed through gamification is *Speedy Reader*. It allows students to compete to see who can read a text fastest, without any mistakes, while also comprehending the content. The students read and record the selected text as fast as they can without mistakes, and respond to the short multiple-choice test questions testing their comprehension of the text content. These multiple-choice questions are prepared and uploaded by the teacher. The students submit their audio clip to the peer pool and the game system automatically calculates their submitted test results. Based on the correct answers, the system calculates the percentage of the student's comprehension of the text. Once learners have played the game for the first time, the teacher should reflect with them on how reading speed, number of errors and text comprehension are related, as high reading speed can lead to more errors and less understanding. In addition to the test score, peer students evaluate each other's reading performances and submit their assessment based on a scale of one to five stars. The game system combines the evaluation of the test results with the peer evaluations and establishes the resulting position in the leaderboard of the game.

The second game addressing speed-reading is *Singing in the Read*. In this game, the students sing the reading text assigned by the game system to a well-known melody while trying to fit the words to the music. The game requires the readers to quickly read and grasp the words, and fit them into the melody accordingly. After having practised a few times, the player students record the reading passage with the melody, listen to the recording, and if they are satisfied with the result, submit the recording as an audio clip to the peer pool. The peer students, similar in the cycles of the previous games, review the audio recordings by allotting stars from 1 to 5. The leaderboard is ordered based on the peer-reviews.

8 Conclusion

Developing an educational game that balances both learning objectives and ludic qualities demands an understanding of both domains. The initial motivation for the ideation of the Recording Studio games involves easy access to a playful mode providing equal participation for all students. Improving reading fluency requires individual and collaborative practice, spanning time and locations (e.g. home, classroom, after school). The mini-games presented here can be used both as part of the GameLet concept as well as independently of it. The rapid idea generation for the Recording Studio, which is a sub-concept in the large-scale GameLet project, is based on the use of "reading" as the primary and only game verb to keep the focus of the game on reading practice. In other words, the winning conditions of the games are determined through the players' use of their reading skills.

The ideation process of Recording Studio games defines an initial phase of the iterative game design process. Following the preliminary process, the games will be playtested by expert groups in terms of gameplay and teaching/learning objectives. For future work, a scheduled design-thinking workshop to refine the gameplay features and improve the quality and gameplay functionality of game design is being planned. The iterative process itself will be used within a design-based research framework as successive versions of the games are implemented.

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