Comparing pupils and teacher's reflections on iRead tablet-based literacy games in a German elementary school

Nancy Knorr[1] and Kay Berkling[2]

Abstract. iRead is an EU Project involving literacy games in Spanish, German, Greek, and English for L1 and L2 acquisition. Content is selected dynamically from a large database using linguistic rules based on the player profile. The teacher can view pupils' progress based on automated game sequences or assign games manually. This project strives to understand how teaching with new technology is incorporated into the classroom. The authors interviewed both teachers and children about their points of view and compared their answers at the end of the project. Results indicate that pupils had a much deeper understanding of their learning than was apparent from the teachers' point of view.

Keywords: serious games, literacy games, elementary educational games, self-evaluation, pupils' perspectives, technology appropriation.

1. Introduction

According to an EU study (European Commission, 2019) on Information and Communication Technology (ICT) use in schools, there is a large gap between the use of technology in German elementary schools compared to other school forms within Germany. 9% of German elementary schools are connected to the internet compared to 35% EU-wide. Germany has a lower share of strong policy and strong support[3] when compared to the EU average (European Commission, 2019). Previous work in educational games covers only partial aspects of our project,

1. Karlsruhe University of Education, Karlsruhe, Germany; nancy.knorr@gmx.de; https://orcid.org/0000-0002-3279-5341
2. Cooperative State University, Karlsruhe, Germany; berkling@dhbw-karlsruhe.de; https://orcid.org/0000-0003-1186-5678
3. Defined by the EU as a school's external and internal support for digitalisation

such as adaptivity (Jung et al., 2016), definitions (Breuer & Bente, 2010), second language acquisition (Järvinen, 2020), or teacher training (Gebele & Kaleta, 2019).

As part of the iRead EU Horizon Project[4], adaptive learning games (Navigo) for first and second language literacy games are deployed in German elementary schools. Content, such as grapheme-phoneme correspondence or syntax questions are presented through various game mechanics. Providing games based on the skill level of each pupil is efficient for personalized use in classrooms (Viertel, Ehrenspeck-Kolasa, & Spies, 2017). Navigo leads the player with adaptive content and is not in sync with classroom lessons. Its integration into classroom activities may therefore not be straightforward. Therefore, we are interested in looking at the use of adaptive literacy games in the German elementary classroom.

In our past work, we have shown that the games provide an effective learning experience (Berkling & Franken, 2019; Berkling & Kermes, 2020). This study looks at pupils' and teachers' beliefs and attitudes about the games. Comparing results from both studies, we uncovered discrepancies between academic improvement on the one hand and pupils' and teachers' beliefs about learning on the other.

2. Method and data collection

Researchers joined groups of five pupils for ten-week sessions playing one to two games in each session. We were interested in teachers' and pupils' beliefs about their learning. Teachers were interviewed before, during, and after the intervention, using the same questions as the pupils, who were interviewed after two weeks. For data protection reasons, pupils' answers were noted down by the interviewer while teacher responses were recorded, transcribed, and quantified manually.

To study pupils' acceptance of the technology, we combined observations with interview results. The observations were based on about 140 children from two schools in Grades 1, 2, and 3. Interesting patterns of behavior during the observations were noted and quantified manually.

Forty-five children in first grade and 20 in second grade were interviewed.

- Do you believe you can learn something from this game? (yes, no, I don't know)

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4. https://iread-project.eu

- What would you like to learn? (open)

- Do you think you are improving in the game? (open)

A total of eight teachers across several schools were interviewed ranging from Grade 1-4.

- Do you believe the pupils can learn something from the game? (yes/no)

- What have the pupils learned so far? (open)

- Do you believe the pupils are improving? (If yes, in which skill?) (open)

3.   Results

3.1.   Results from pupil responses and observations

Pupils supported each other in handling the devices, including explaining how to improve during gameplay. Touching input fields and typing login information were difficult for all pupils, especially for first graders. Regarding interaction, we observed the following:

- about 2%[5] of pupils did not wish to play the game;

- very few first graders (around 10%) read out loud while playing;

- around 5% of pupils asked the teacher's opinion before submitting an answer to avoid potential mistakes;

- generally, first graders demonstrated a lack of digital literacy;

- customizing the avatar contributed to the motivation of playing; and

- social interaction between pupils during play was important.

Based on the interviews, we obtained the following overall results:

5. % is based on the count of children in a particular category under observation.

- 92% of pupils wished to continue outside of classroom time;

- 70% of pupils thought that they are learning something;

- 90% of pupils believed that they were improving within the game; and

- when asked what they are learning, top items included reading, grapheme (ie), words, speed, spelling, and other topics relating to language skills.

3.2. Results from teachers' interviews

Initial observations reflect the difficulty of integration efforts due to the technology, resulting engagement, social aspects, and the belief about learning academic content through games. From the teacher point of view, there was a diverse set of attitudes toward the games and how the games could be integrated into the classroom. Initial skepticism toward the games was pervasive. However, in the final interview all eight educators said they believe the pupils had learned something. Regarding teachers' beliefs about what a pupil can learn from the games, the most frequent mentions were: reading, grapheme (ie), lecture material practice, concentration, and orthography for specific phenomena. Additionally, teachers mentioned: digital literacy skills; sense of achievement; and enjoyment for language. Teachers believed that pupils with stronger vocabularies were better able to benefit from the games compared to pupils with weaker vocabularies. One teacher recognized the importance of the games in teaching language patterns.

Regarding, 'the impression that the pupils are getting better', teachers said pupils could learn from the games, but most educators were unsure whether the observed improvements were really due to games. All agreed it was impossible to solely attribute improvements in the post-tests to games rather than classroom teaching. A minority of teachers found that some individuals profited from the games in their spelling. One teacher discussed the games directly with the pupils and remarked how the pupil was able to express their comprehension of the trained skills. In general, fourth grade teachers were more positive about learning achievements than lower grade teachers.

4. Discussion and conclusions

Pupils are aware and can articulate their learning improvements even in first grade, namely reading, spelling, vocabulary, word patterns, and speed at recognizing

these. In contrast, educators diverge in their opinion based on grade. In early grades, they would attribute the learning more toward their own teaching, and provide the games as a motivator and fun way to deal with language, while in upper grades they are more likely to recognize learning progress through the game. Given other publications we can say that there are clear improvements that can be seen in the game analytics that match the academic improvement in pupils' writing skills. In the future, we plan to conduct interviews with the pupils at a later date to have a more accurate assessment and integrate educators into the interview process as a first step toward improving their understanding of the usefulness of the games, not only as a motivator but as a real skill booster.

5.   Acknowledgments

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