RegioDiff: Digitally fostering reading and regional competencies in Grade 4 students

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Introduction

The project RegioDiff (Paleczek, 2020; RegioDiff, 2021) fosters Grade 4 students’ reading skills and regional knowledge. It offers topics consisting of differentiated texts and exercises about regional particularities (historical, geographical, etc.), either digitally or in print. The differentiation allows working on a topic while students read according to their reading level. The reading levels are labelled using pictures of regional fruits, which is not related to student achievement but provides an orientation and a form of diversity and inclusion (Table 1). Students’ reading abilities are assessed beforehand using the Graz reading comprehension test GraLeV (Paleczek et al., in prep.).

The text is arranged in paragraphs referring to various subtopics. Each text contains marked glossary words (difficult words, e.g., archduke). Each paragraph is followed by exercises that have been proven to support students in their reading comprehension and learning (cooperative learning, reading strategy and comprehension) (Hattie, 2009; RAND Reading Study Group and Snow, 2002; Spörer, Brunstein and Kieschke, 2009).

The Challenges

Making the best out of users’ displays: customization of appearance of the exercises to provide a comfortable reading experience (12” tablet and a 32” computer).

Pop-ups: lower resolution of tablets led to difficult placing and handling (required fine-tuning to avoid information loss, maintain responsiveness, and make sure everything worked smoothly on a touchscreen device)

Crossword Puzzles (Fig. 6): to motivate students but proved to be challenging in development and coding (e.g., umlaut ä, ö, ü; automatic selection of the next empty field after typing a letter; redesigning the pattern vertically and horizontally).

Difference between Android and iOS devices: automatic user interaction did not allow embedded audio to play on iOS; different security overlay in full screen mode on iOS (instructions for the reading task and exercises had to be repositioned). This is clearly an obstacle to widespread classroom use where seamless cross-platform use is a strict requirement.

Weak internet connection: whole class setting requires stable and high bandwidth internet connections; mimimizing data amount to increase performance.

The Infrastructure

Digitally, the material is implemented in a browser-based learning management system (LMS). Students work on tablets with the material. Teachers set up classes in the LMS, and assign the topic and the appropriate reading level to their students. The LMS offers a wide variety of content presentation and interactive formats. By clicking on glossary words (Fig. 1), students launch a pop-up with written, audio, or (where appropriate) pictorial information.

Besides the text, each level contains comprehension exercises (e.g. true/false, ordering or matching words/sentences/pictures; Fig. 2-3) and cooperative tasks (combined with reading strategy elements) which allow the students to work together in pairs across reading levels (e.g., think-pair-share; summing up or predicting content; non-digital format; Fig. 4). Each text ends with a task to find the letters for a word related to a topic-question. Wrongly chosen letters will make balloons burst. When finding the correct word, the remaining balloons rise into the air (Fig. 5).

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Expected learning outcomes

In the main study (18 classrooms working with the material for 10 lessons - half of them print/half digitally), we will gather data on (a) students’ knowledge concerning two chosen topics before and after reading the texts, and (b) students’ reading skills before and after 10 lessons (with a control group). We expect to find that students know significantly more about the topic afterwards and that their reading skills increase. We also expect the cooperative learning elements to positively affect student’s social-emotional skills and the classroom climate.

Plans for future development

More differentiated texts have been created and digitized, considering necessary adaptations. We plan on expanding the material with other topics (e.g., sustainability) and in different languages to implement the material internationally and compare relative effects. Furthermore, we plan on creating a digital toolbox (Editor), that enables teachers to build their own topics simply by using copy and paste to fill in text, glossary-word-pop-ups enriched with audio files or pictures, and select exercises from a given list of (empty) exercise templates. The material can then be used as required in an open-source browser-based LMS.

Such new infrastructure is likely to be crucial in large-scale implementation, especially with respect to the targeting of specific topics of regional significance. Such topics are normally outside the interest of standard textbook publishers. The digital creation of a pool of texts (written by teachers), offering free material for all the teachers in German speaking primary schools, would help reduce the effort required in adaptations and would, therefore, enable schools to create learning spaces that are relevant to their immediate regional environment.

References