

DEVELOPING A LIVE SESSION FEATURE FOR GEOGEBRA FOR TEACHING AND LEARNING MATHEMATICS

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The aim of this poster is to present suggestions how a new live session feature for GeoGebra could look like, which can be used either to share GeoGebra resources with the students or to collect the responses in a convenient way and clear format on a dashboard and to use them to start or guide a classroom discussion. The suggestions are based on the review of already existing online tools, a literature review and semi-structured interviews with experts.

Keywords: Connected classroom technologies, online tools, student response system, live session

INTRODUCTION AND BACKGROUND

On the GeoGebra platform there are more than one million resources freely available for math and science (GeoGebra, 2019a). Teachers can search for an existing classroom resource or create one on their own. The teachers share the materials with their students and the students start to work on it. Now there are three different activity elements available, where the students are advised to create or enter something: applet, open question and multiple-choice question. Within the applet the teachers can choose between different perspectives such as geometry, algebra, spreadsheets, graphing, statistics and calculus or search for an already existing, public GeoGebra applet that is available on the GeoGebra platform. Now the teachers have the possibility to share the material in the GeoGebra group, share the link or insert in on other platforms (GeoGebra, 2019b).

By using the GeoGebra activities in the classroom just by sharing them with the link and not by using any special online classroom collaboration environment, it is hardly possible to access a useful insight to the students' understanding of the task. The teachers have no chance to see and monitor all students' constructions or responses at a glance nor to use those results to start or guide a classroom discussion. Giving formative feedback to every single student during the lesson is a challenge for teachers and the students may miss valuable support and on-going feedback.

DEVELOPING NEW IDEAS

To help teachers to improve their teaching by using GeoGebra activities as well as to help students to improve their learning we want to develop a new system that supports mathematics teaching better than existing systems. To gather ideas how this new system could look like, we collected information from different sources. Firstly, we made a review of several online tools that can be applied in mathematics education and focused on the classroom collaboration features. For this review we have chosen the online tools Classkick (www.classkick.com), Desmos (www.desmos.com), Nearpod (www.nearpod.com) and UniDoodle (www.unidoodle.com) which can be used in a classroom setting by teachers to provide activities and to collect students' responses in real time.

Additionally to this review, we made also a literature review and gathered information about student response systems (SRS), classroom response systems (CRS) and connected classroom technology (CCT), which appear in the literature under different names, but have in common that they facilitate the communication between teachers and students as well as display the student responses in real time (Fies & Marshall, 2006; Irving, 2006; McLoone, Kelly, Brennan, & NiShe, 2017). Besides we were

not only interested in how the tools work and in their advantages for teachers and students. But also in how the teachers can use the power of those tools for teacher noticing, especially technology-mediated teacher noticing (Walkoe, Wilkerson, & Elby, 2017) in mathematics education as well as for orchestration in e-learning environments (Weinberger & Papadopoulos, 2016).

Moreover, we also conducted several semi-structured interviews with experts, who are using different online tools in their mathematics teaching complementary to GeoGebra activities. The results of the reviews and the interviews are used to develop the suggestions for a live session feature in GeoGebra.

POSTER / FINDINGS

On the poster we will present suggestions how this new system could look like. Primarily, it should be easy for the teachers to share GeoGebra resources with students. Moreover, teachers have a dashboard which visualizes students' progress of their activities and the responses in a clear format. The teachers should be able to switch between an overview of the whole class and the progress of individual students seamlessly. Each of the three available activity elements appears in a different visualization on the dashboard, where the teachers have a summary of the whole group as well as single answers at one glance. The power of the new live session feature should be that teachers have the possibility to see in real time and at a glance all work done in GeoGebra by their students.

However, the focus is not only on the collection and the display of students' responses. Besides, the teacher can organise and use the collected results for further classroom activities such as starting or guiding a classroom discussion of the varying responses or analysing errors that students may have made. Additionally, the results can be saved by students to record their learning progress.

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