

MASTER THESIS A digital tool for mathematical calculations with focus on interaction design**STUDENTS** Malin Cronquist, Mergim Rruka**SUPERVISOR** Joakim Eriksson (LTH), Peter Hansen (Studentlitteratur)**EXAMINER** Mattias Wallergård (LTH)

A digital tool for mathematical calculations with focus on interaction design

POPULAR SCIENCE SUMMARY **Malin Cronquist, Mergim Rruka**

Digital educational tools have become a natural part of society and can facilitate the user's learning process. The inclusion of these types of tools can further improve the national educational system. By creating a digital tool for mathematical calculation, students can improve their learning process through digital interaction.

Being able to present how a solution was obtained is a central part of learning mathematics. Providing the whole calculation, and not only the answer, also enables the teacher to give adequate feedback. Most digital mathematical tools, developed for students in elementary school, focus solely on if the answer is correct. Therefore, the aim of this master's thesis was to design a digital tool for mathematical calculations that allows the student to present all steps taken while also supporting other aspects such as live collaboration and automated feedback. This was done together with Studentlitteratur, which is one of the leading publishers of educational materials in Sweden.

A digital tool named Kaku, was developed as a high-fidelity prototype to support students during calculations, see Figure 1. A user study was performed to investigate what students and teachers value in such a tool. Based on the outcome of this study, a custom made keyboard was developed for students to have easy access to mathematical symbols and operators. Hints which contain feedback on calculation errors and provide guidance on how to continue the calculation were also included. Pair and group work was a common part of lessons and support for this was therefore added.

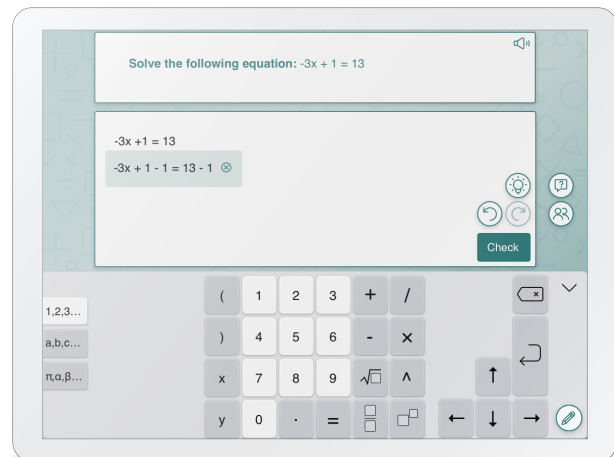


Figure 1. The high-fidelity prototype of Kaku.

The high-fidelity prototype was evaluated by teachers and it was well-received. The teachers expressed that they would use Kaku and they thought it would help their students in their mathematics learning process. A task-based usability test was also performed to investigate the functionality of Kaku. The participants expressed that they thought Kaku was easy to understand and easy to learn how to use.