

School Mathematics App for Study Beginners

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Abstract. We present our app for school mathematics based on the concept of intelligent E-Tutor training and improving math performance^{1,2}. The app is a further development for the studies beginning phase. The first version of our app was published at Windows Phone Store. It consists of five mathematical tasks belonging to different fields of school math.

After testing the first prototype with 30 students during mathematics preliminary course at our university, we set an average specific time for each task in the app concerning to the students feedback. We changed the handwritten formulae in LaTeX formulae and added an English language package. A help function is available for every task. The learning progress for the user is shown as a statistical diagram at the end of the tests and can be displayed before restarting the app. In addition to the Windows Phone the app will be available for Android Smartphones.

1. Functional Description

The application is based on a statistical calculation algorithm, which detects the right and wrong solved tasks. The application consists of several tests and pools with different tasks in differentiated levels of difficulty. Depending on how the prospective student solves the tasks he gets other tasks of the same type but different difficulty or move to the next test. This serves to the individual weaknesses of the students respond and compensates for this. Figure 1 represents the flow chart of the application.

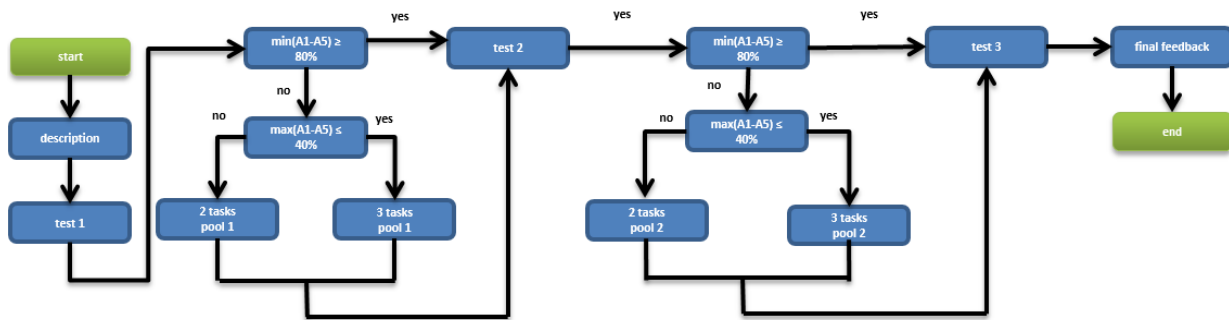


Figure 1: Application flow chart

¹ Intelligent E-Tutor for Training and Improving Math Performance and its Mobile Application, TLK07 OEB 2013.

² Supported by BMBF (Federal Ministry of Education and Research) the project for improving of the quality of education and blended learning was started in March 2012 at our University.

2. Tasks in the Application

In the current version of the application, which is designed for Windows Phone, there are five tests with five tasks of the sub-areas of analysis, geometry and algebra. The test texts are implemented with the optimized math expressions typesetting program LaTeX, see figure 2. All the different tests are to solve handwritten in a given time. The remaining time is displayed continuously to the user. Before starting a task the user can select help button to open tutorials with specific theoretical explanations for the task. The tutorials are statements on external websites as well as audiovisual media, such as videos.

After the user has solved the task by hand, he stops the time. In the next screen he check the correctness of his solution in percent and selects his feeling on a scale from very bad to very good while solving the task. All this information for all tasks will be saved continuously in the program.

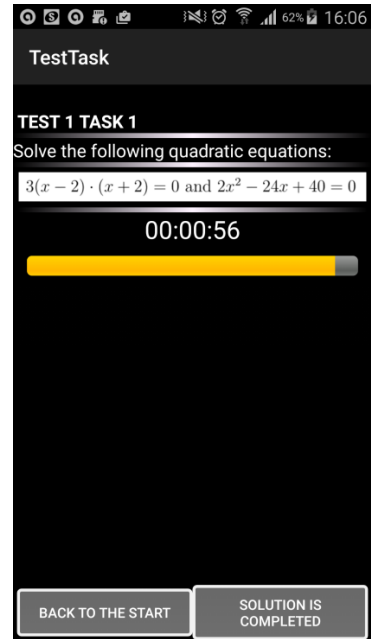


Figure 2: Exercise example

3. Test Evaluation and Statistics

For each test, the results are shown as a graphical evaluation chart, a feedback text how well or badly every test was completed is shown too, see figure 3. The test results of the application are only stored locally on the mobile device. A forwarding of data will actually not take place because of concerns that include data protection. The application has been tested extensively for possible errors. A first test run with about 30 freshmen of the preliminary course in 2014 was evaluated positively by the participants.

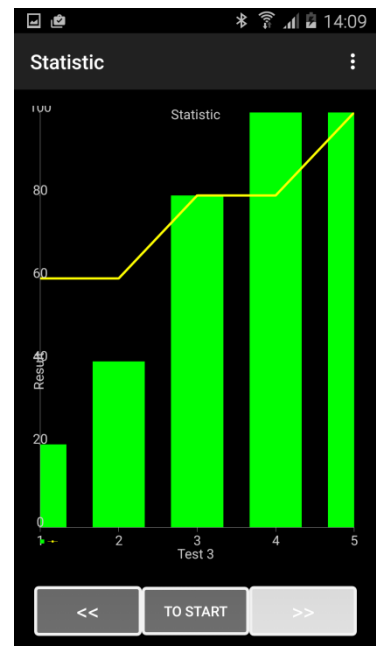


Figure 3: Test evaluation