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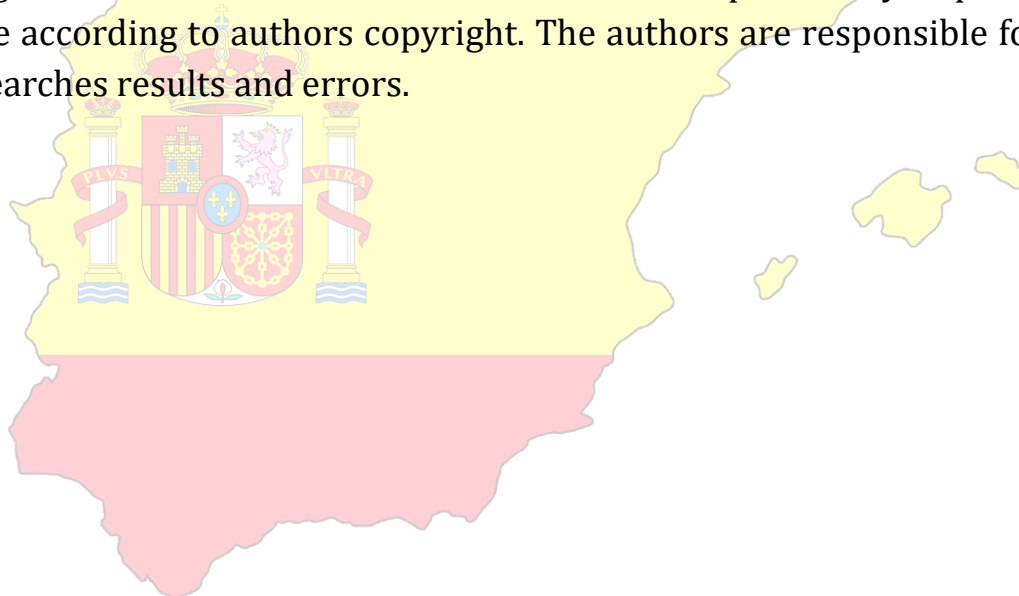


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CREATING AN INTERACTIVE MOBILE APPLICATION FOR TEACHING MATHEMATICS FOR SCHOOL STUDENTS IN THE DART PROGRAMMING LANGUAGE

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Annotation: This article covers the pedagogical and technological foundations of creating an interactive mobile application for teaching mathematics for school students in the Dart programming language. The educational advantages, functional capabilities, user interface and role of the mobile application in improving students' mathematical knowledge are analyzed. It covers the principles of operation and pedagogical significance of the mobile application "Math Learning Easy" for school students. The application was developed based on modern technologies and serves to increase interest in children by transforming the study of mathematics into a game.

Keywords: mobile application, Flutter, Dart, interactive education, mathematics, gamification.

Today, the use of digital technologies in the education system allows students to organize the learning process more interesting, effective and interactive. Especially, mobile applications designed for schoolchildren are creating new forms of education. With the help of mobile applications, a student can learn anywhere and at any time.

Interactive approaches play an important role in teaching mathematics. Because mathematics is a subject that requires logical thinking, analysis and solving problem situations. Therefore, teaching mathematics through mobile applications is one of the relevant directions of modern education. The Dart programming language and the Flutter platform allow you to create mobile applications quickly, conveniently and cross-platform. In this regard, creating an interactive mobile application for teaching mathematics for schoolchildren is of scientific and practical importance.

A mobile application created for schoolchildren performs the following pedagogical tasks: explaining mathematical concepts in a simple and visual way; consolidating knowledge through practical exercises; increasing interest through tests and mini-games; developing independent learning skills; adapting to the individual pace of students' learning.

Interactive applications increase student motivation, increase the number of independent extracurricular activities, and enhance visual learning.

Today, digital technologies are becoming an integral part of the education system. Interactive mobile applications, especially designed for children, play an important role in making the learning process effective and interesting. The "Math

Learning Easy” project was developed for this purpose and is aimed at teaching mathematics to children in an easy and interesting way.

The main goal of the project is to develop the following mathematical skills in students of grades 1–3 and preschoolers: Learning to count; Addition and subtraction; Basics of multiplication.

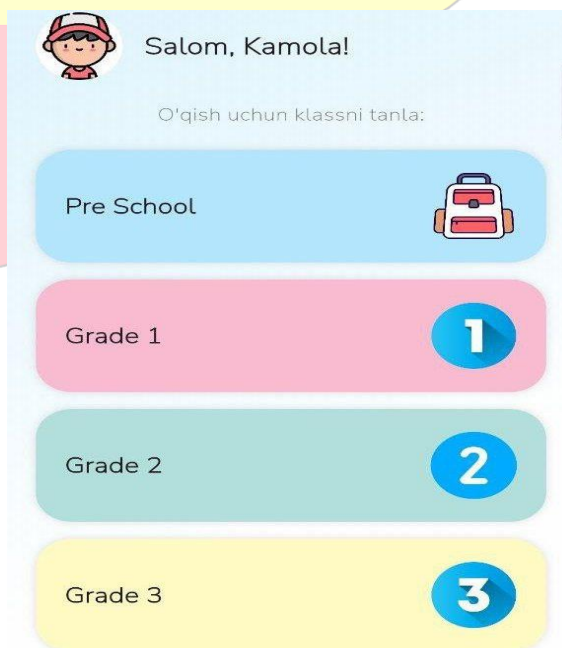
The application allows users to consolidate their knowledge in a playful way, which increases their motivation to learn.



The application was developed using the following modern technologies:

- Dart programming language - the main logic of the application is written;
- Flutter framework - allows you to create cross-platform applications;
- SharedPreferences - for local storage of user data;
- Confetti library - for visual display of successful results.

These technologies ensure fast, convenient and efficient operation of the application.



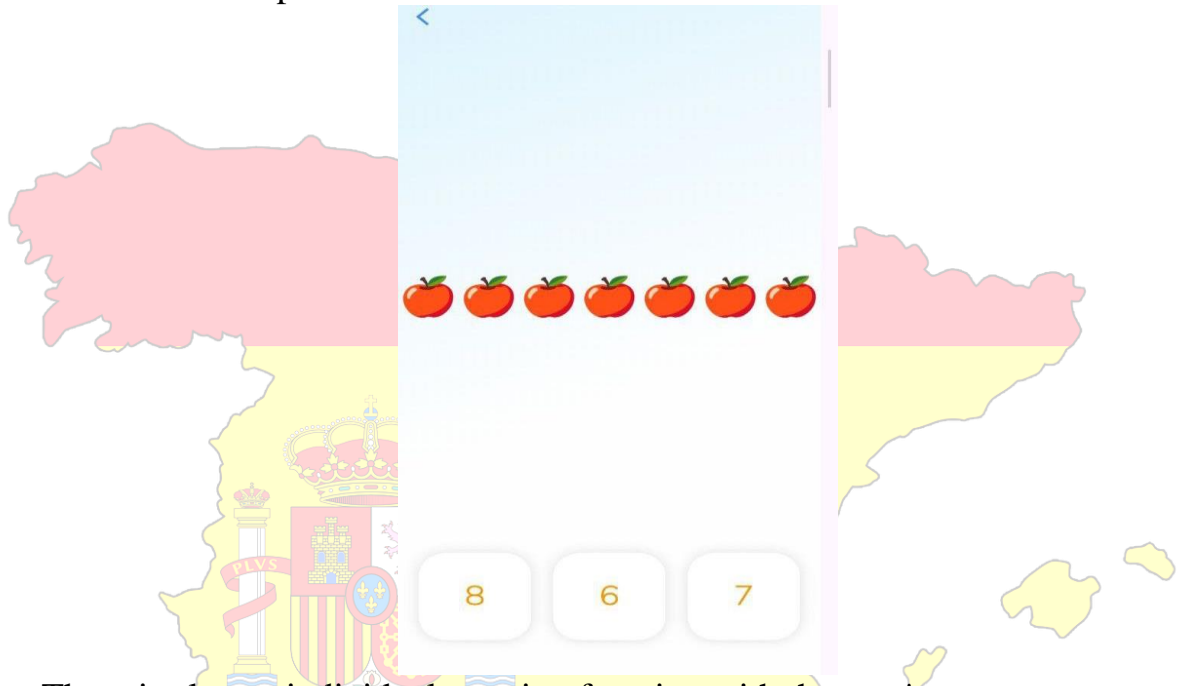
The application consists of three main modules:



This module serves to register the user. It is where the child's name and gender are entered. This data is stored on the device and is not requested again at subsequent logins. The interface is also adapted depending on the user's gender.

On the main page, the user selects the section that corresponds to his level of knowledge:

- Pre School - learning to count
- Grade 1 - simple addition operations
- Grade 2 - addition and subtraction
- Grade 3 – multiplication



There is also an individual greeting function with the user's name.

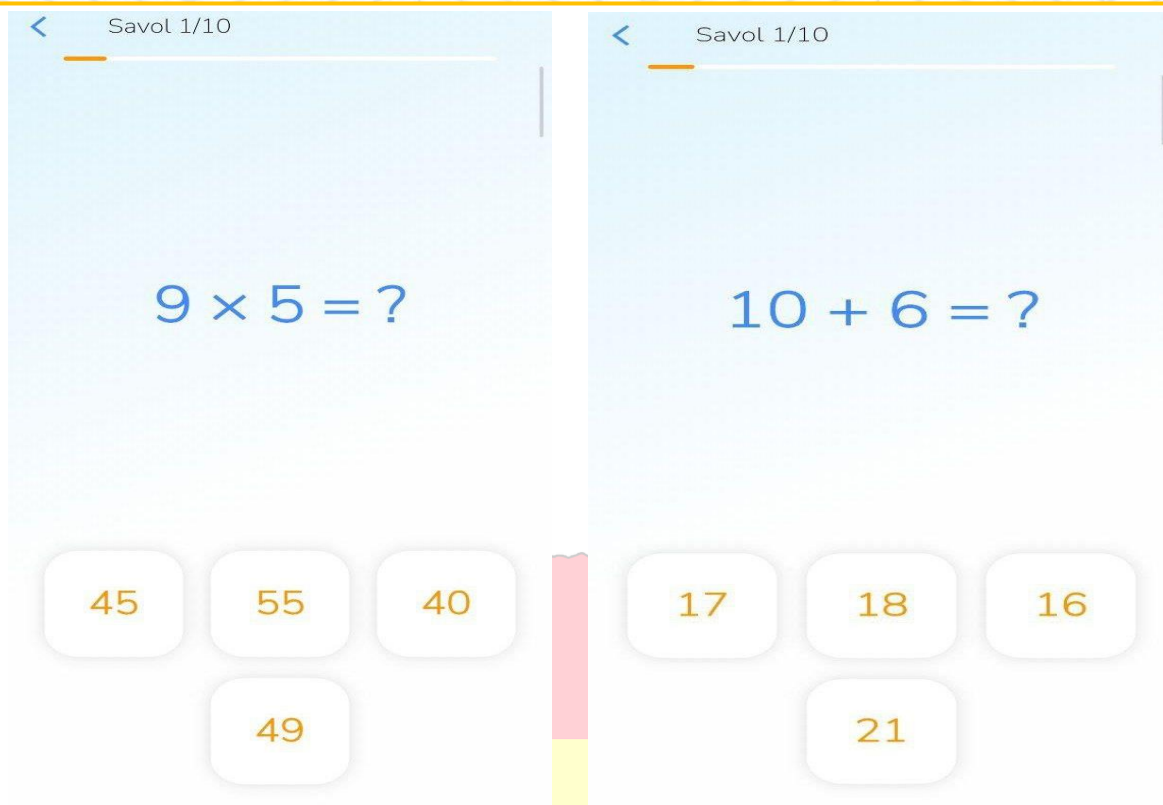
This module is the main functional part of the application. Here:

- Questions are randomly generated;
- The appropriate difficulty is set for each level;
- At the pre-school stage, questions are presented visually (through pictures).

As a result, children learn without getting bored.

The application has the following interactive features:

- Automatic question generation - new examples each time;
- Progress bar - tracking completed questions;
- Error warning - a message appears for an incorrect answer;
- Incentive system - visual effects for a correct answer;
- Final result (Victory window) - appears after 10 questions.



This project provides the following advantages by using the gamification method in education:

- 1) children's interest in learning increases;
- 2) independent thinking develops;
- 3) the lesson process becomes interesting;
- 4) effective use of technology is formed.

The project is also a model project for programmers with a small but excellent architecture based on Flutter and Dart.

This application has a positive impact on the quality of education in the following areas: increases students' interest in mathematics; creates opportunities for independent learning; accelerates the consolidation of knowledge; serves as an additional electronic tool for the teacher; allows parents to monitor their child's learning.

As a result, the interactive mobile application is an effective didactic tool for learning mathematics. The “Math Learning Easy” mobile application was created using modern technologies and is an effective tool for consolidating children's mathematical knowledge. The interactivity of the application, visual elements and a game-like approach make it a useful tool in the educational process. In the future, this project can be further developed and new levels, voice assistants and statistical analysis functions can be added.

In conclusion, creating an interactive mobile application for teaching mathematics for schoolchildren in the Dart programming language is one of the important directions of modern educational technologies. Such applications



increase students' interest in learning, develop independent learning and help them effectively master mathematics.

The Dart and Flutter platforms serve as a convenient, fast and effective technological basis for creating such applications. Therefore, the development and implementation of such digital products in the education system is of urgent importance.

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