Come Code with Codester: A Novel Educational App that Teaches Computer Science

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Despite the recent growth of software-based technologies, educating students in computer science (CS) remains a challenge. In the next decade, there is expected to be 1 million more tech jobs than CS majors. Studies show that individuals who have a K-6 exposure to computing become more adept programmers. Unfortunately, today, less than 10% of elementary school students are exposed to the discipline. Additionally, there is a lack of appropriate CS education programs for this age group since most tools are aimed at older learners. Thus, I developed Codester, a novel CS teaching tool, that teaches elementary school users the fundamentals of computer science. My system is one of the first Android apps for this purpose and is unique since it allows for rapid, self-guided learning and utilizes the accessible, inviting mobile platform of a smartphone or tablet. Students develop code prompts using the special visual programming language of Codester, made up of arrows and symbols to appeal to the young target audience. Through using the app, users learn sequencing, code reuse, iteration, decision-making, efficiency, and problem solving. The multiple user studies of grades 1-8 that I conducted quantify the effectiveness of this app. In only four sessions, users improved in all coding concepts that Codester teaches. For example, 40% more students understood the concept of code reuse after using the app. Eighty percent of students reflected that they preferred the mobile platform over the laptop medium because they are familiar with the mobile technology. Boys and girls alike engaged with Codester. This app empowers young students and advances their CS knowledge, preparing them to tackle future, global technological challenges.

Awards Won:

Fourth Award of $500

European Organization for Nuclear Research-CERN: All expense paid trip to tour CERN