

Creating and Using Mobile Physics and Mathematics Applications in the Learning Process as One of Teaching Methods to Increase the Quality of Student's Knowledge

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ABSTRACT

The purpose of the study is to create and use a simple, but very effective mobile application available for use during the learning process, as well as for student's independent work after university hours. We have used the X code integrated development environment, developed by Apple for iPhone and iPad, in order to create the application. Our mobile application was used as an element of the digital educational resource in physics and mathematics. Natural and technical students have also used it to prepare for the interim assessment, external evaluation and a unified national testing. Using a mobile application allows a student to make up for the worn out or missing laboratory equipment, to use a large database of reference data without long searching, to create, modify and use software packages. The listed capabilities of a mobile application, ultimately, improve the quality of student's knowledge.

Keywords: mobile application, computer technologies, physics and mathematics

INTRODUCTION

Rapidly developing science and technology require a fundamental change in the process of training new specialists. Changes should be made as quickly as possible, and what is the most important, the message should be conveyed in plain English as for teachers and as for students. The main sticking point is that, despite the widespread penetration of new technologies, there is a noticeable lag in technological and, consequently, information integration in the field of education. As before the computer technology has appeared, the vast majority of educational institutions uses printed materials as a source of information and notebooks as a tool for independent work and a board for visual display of information (Kochan, 2012; Le Vitus, 2009). The major problem of such an approach is that the production of learning and teaching printed materials is resource-consuming and often useless, because information may lose its relevance even before printed editions reach educational institutions. Using electronic teaching aids turns out to be the most attractive option in terms of convenience and relevance. The possibilities of timely update and rapid access to extensive electronic resources: databases, the Internet, electronic encyclopedias, as well as the possibility of their rapid replication, should motivate the modern education system development (Schreiber & Eggen, 2014). Access to dynamically changing and complementing (in accordance with science, culture and society) databases connected via the Internet is very important for providing students with relevant learning materials (Neuburg, 2012; White, 2010). Working with electronic media, as well as surfing through the Internet in search for information, will stimulate the development of student's computer and

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Contribution of this paper to the literature

- Our application is written with X code integrated development environment and can be downloaded to the iPhone or iPad for further use in the learning process and everyday life.
- Proposed mobile app makes it possible to transfer physics from the category of strange abstract theories to a completely operational experimental base.
- The submissions will allow increasing the level of bachelor's graduate projects and undergraduate's graduate qualification works based on modern elemental base.

telecommunication skills. This will increase the adaptability of young professionals and their qualification (Mallick, 2013).

Automation is another issue that can greatly affect the modern system of education. Computers can be used for teaching and assessing knowledge, thereby replacing books and notebooks. Modern communication technologies will allow the teacher to deliver lectures and seminars on-line. This will make it possible to greatly simplify the learning process organization (Nurkasymova et al., 2013). However, the quality of existing electronic applications and their effectiveness are very low. Despite the fact that a lot of electronic manuals and textbooks have appeared recently, studies have shown that more than 80% of the training programs do not comply with the existing standards. According to different research centers, these results differ (mainly for the worse). For example, 4.000 software tools, designed by different commercial firms, were assessed in Germany. They concluded that only 2% (80 programs) meet the minimum criteria of psycho-educational standards. The purpose of this article is to demonstrate the possibility of creating mobile applications by creating a physics and mathematics reference manual. Mobile application designed for the Physics and mathematics course is a reference manual for natural and technical students learning the general physics and mathematics course at the university (Johnson, 2009; Williams, 2009).

METHOD

This work is based on the X code integrated development environment (IDE) developed by Apple for writing applications for OS X and iOS operating systems. Accordingly, an application written with this environment can be downloaded to the iPhone or iPad for further use in the learning process and everyday life (Serik & Balgozhina, 2014; Rogers et al., 2013).

DATA, ANALYSIS AND RESULTS

Below is an example of creating an application with the X code. One has to create a new project in order to start processing an application in the X code IDE. To create a new project, open the Apple X code processing environment (Applications directory). The appearance of the X code IDE is shown in **Figure 1**.



Figure 1. The appearance of the X code IDE

After opening the X code processing environment, select Application on the left and Empty Application on the right (**Figure 2**).

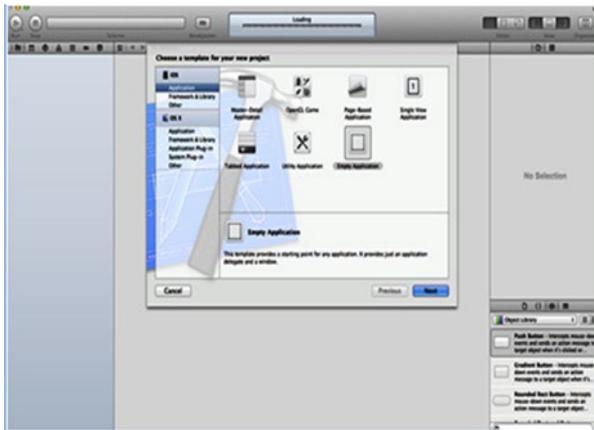


Figure 2. Empty Application platform

To save a new project, enter its name and choose where to save it. In this case, create a new file and select the direction File -> File + New, and the Storyboard window will open. If you select Storyboard, the following work environment will be opened (**Figure 3**).

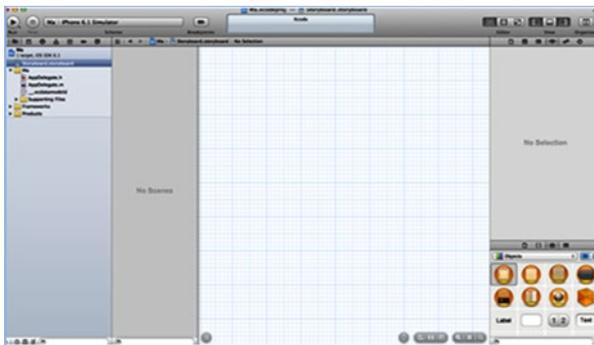


Figure 3. Storyboard work environment

In the library (lower right side of the work environment), drag the required Tab Bar Controller object to the work environment (**Figure 4**).

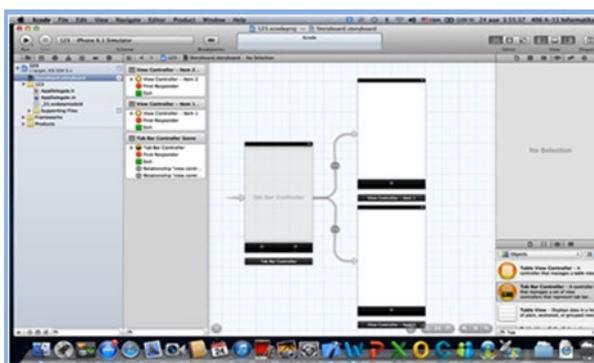


Figure 4. Tab Bar Controller object

Mobile applications will automatically switch from one page to another, if we use the direction Editor -> Enabled in -> Navigation Controller. Drag the Table View Controller from the object list to the work environment to make the app look like a table. Select any Accessory link by clicking the Attributes Inspector button on the top right of the window. Drag the Text View and Image objects to the View Controller in order to view the necessary texts and images (Balgozhina, 2015). Next, we need to connect the objects by pressing the Ctrl key and dragging the connected objects into the window (**Figure 5**).



Figure 5. View Controller object

Mobile app created in this way can be used as a physics and mathematics reference and study guide. App's appearance is shown in Figures 6 and 7.



Figure 6. Physics and mathematics reference and study guide appearance Figure

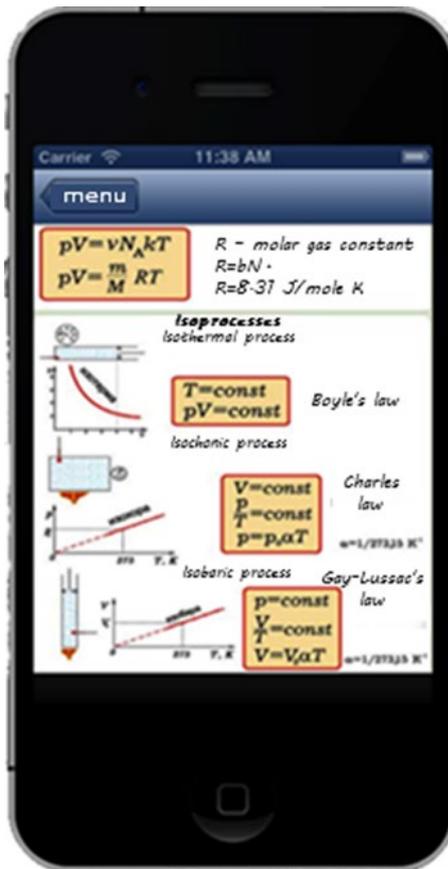


Figure 7. Molecular physics and mathematics information appearance

DISCUSSION

Each operating system is known to be very different in comparison with other systems. We can fully realize this by creating any app in the X code IDE designed for Mac OS X. X code IDE enables you to create different apps: both reference tools and games. Each user can create any mobile app if necessary and according to the X code IDE conditions. Physics and mathematics application is an electronic general physics reference book. An intuitive interface and ease of use should attract student's attention to such a product (Chyndaliev & Musina, 2012).

Mobile app makes it possible to transfer physics from the category of strange abstract theories to a completely operational experimental base. The student subconsciously begins to perceive information as "his own" by using personal smartphone. This leads to better learning. Various psychological studies also confirm the possibility of forming a modular-reflective style of thinking in students using electronic educational resources while teaching (Serik et al., 2014).

CONCLUSION

Organizing innovative physics and mathematics teaching laboratories and modern laboratory facilities will allow increasing the level and relevance of bachelor's graduate projects and undergraduate's graduate qualification works based on modern elemental base. This approach to the learning process organization at the university increases the competitiveness of graduates in Kazakh labor market, as well as the demand for skillful people in the high-tech plants.

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