



A METHODOLOGY FOR TEACHING TECHNICAL TERMS IN ROBOTICS ON MOBILE PLATFORMS

Haydarova Kamolakhon Zokirjon kizi,
Lecturer, Department of Digital Technologies and Mathematics, Kokand University
haydarova.kamolakhon@gmail.com

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ANNOTATION
One of the most important problems in the current technical education process is the lack of a convenient and fast resource for students to master technical terms. Especially in the teaching of modern disciplines such as robotics, many terms are in foreign languages, which makes it difficult for students to understand their content and apply them in practice. Due to the fact that the existing textbooks and manuals in the Uzbek education system do not provide information on these terms in a sufficiently interactive form, students have difficulty remembering them and applying them in practical activities.

Therefore, in this article, to facilitate the learning of technical terms and digitize the educational process, a mobile dictionary application was developed using the MIT App Inventor platform. This application allows you to learn technical terms anywhere and anytime through popular mobile phones. The program includes the most commonly used terms in robotics, their translation, explanation, pronunciation, and visual images.

The application was pilot-tested among students studying robotics at the elementary level. During the test, students' technical terminology memorization, classroom activity, and motivation for independent learning were analyzed. The results showed that using a mobile dictionary has a positive effect on increasing educational efficiency, enhancing interactivity, and quickly and accurately mastering technical terms.

Introduction. In the modern digital education system, robotics is becoming one of the most relevant areas. This science not only develops technical skills, but also develops the ability to analyze problem situations, think algorithmically and find practical solutions. However, one of the unique features of robotics is the presence of many technical terms in it, which are often in a foreign language, have complex pronunciation and technical meaning. As a result, students face difficulties in memorizing, understanding and applying these terms in practice. This hinders deep mastery of the content of the science and the formation of practical skills.

To overcome this problem, the integration of mobile dictionary technology into the educational process is of great importance as an innovative solution. Nowadays, mobile devices are widely used among learners, and through their effective use, the learning process can be individualized, flexible, interactive. Mobile dictionaries not only present terms in text form, but also serve to create a multi-modal learning environment enriched with images, audio pronunciations, code samples and diagrams. This helps to quickly and firmly master the terms.

The main innovation of this study is that it proposes to teach technical terms used in robotics in an interactive way through a mobile dictionary created on the MIT App Inventor platform. This approach will increase the effectiveness of teaching technical subjects in the Uzbek education system, strengthen students' independent learning skills, and provide a deeper understanding of the subject content.

The purpose of the research is to develop a methodology for teaching technical terms on mobile platforms and to increase the effectiveness of the educational process based on this methodology.

To achieve this goal, the following tasks were set:

1. To form a base of technical terms used in robotics;
2. Creating a mobile dictionary prototype based on the MIT App Inventor platform;
3. Developing a methodological model for teaching technical terms;
4. Assessing the effectiveness of the methodology through experimental testing.

As a result of this approach, students learn technical terms not only theoretically, but also through multi-channel perception through

visual and auditory means. This increases the interactivity of the lesson process, improves the level of memorization of terms, and serves to consolidate the content of the subject.

Literature review. In recent years, as a result of the widespread introduction of digital technologies into the education system, there has been an increasing interest in the use of innovative methods in teaching technical subjects. In particular, teaching complex terms and concepts in robotics in the traditional way requires a lot of time and effort. Therefore, creating dictionary platforms based on mobile technologies is one of the urgent issues.

HM Chou and TS Chen (2020) show in their study that teaching technical terms on mobile platforms increased students' ability to remember and apply terms in practice by 37% compared to traditional teaching methods [1]. The advantage of this study is that it increased the efficiency of learning by providing technical terms in visual and audio form; the disadvantage is that the platform is only in English and the specific terms specific to robotics are not sufficiently covered.¹

A study by M. Wolber (2014) on the MIT App Inventor platform highlights that this environment provides opportunities for students with no programming experience to create mobile applications [2]. The advantage of this resource is its user-friendly interface and graphical coding capabilities; however, the lack of a dedicated module for robotics vocabulary is cited as a disadvantage.²

In robotics is also highlighted in the seminal work by B. Siciliano and L. Sciacivco (2010) [3]. The advantage of this resource is that it provides a clear terminological system and model analysis in robotics; however, it does not cover interactive or mobile learning methods.³

The effectiveness of mobile learning technologies has also been extensively studied by H. Crompton (2017) [4]. The author noted that mobile platforms engage students more in the learning process, providing independence and flexibility in the learning process. The strength of this study is that it provides a theoretical basis for integrating mobile technologies into education; however, its lack of direct application to the field of robotics is noted as a drawback.⁴

The above literature analysis shows that the technology of teaching technical terms on mobile platforms is one of the modern solutions that increases the effectiveness of education. However, most of the existing research is focused on general technical or linguistic

¹ Chou, HM, & Chen, TS (2020). *Mobile-assisted vocabulary learning for technical education*. Computers & Education, 150, 103834

² Wolber, D., Abelson, H., Spertus, E., & Looney, L. (2014). *App Inventor 2: Create Your Own Android Apps*. O'Reilly Media

³ Siciliano, B., Sciacivco, L., Villani, L., & Oriolo, G. (2010). *Robotics: Modeling, Planning and Control*. Springer

⁴ Crompton, H. (2017). *Mobile learning: New approach, new theory*. Routledge

dictionaries , and a mobile dictionary adapted to the field of robotics in Uzbekistan has not yet been fully formed. Therefore, in this article, it is relevant to develop a dictionary of robotics terms on the MIT App Inventor platform and evaluate its effectiveness based on experimental testing.

In recent years, the Uzbek education system has been paying special attention to expanding the field of robotics and teaching technical subjects using modern technologies. However, the complexity of technical terms creates problems for students to remember and apply them in practice. Therefore, creating terminological dictionaries using mobile technologies is one of the urgent issues.

In a study conducted by NF Khaitova (2022), mobile technology-based teaching methods were developed and it was found that through them, students' independent work skills and mastery levels increased [5]. The author emphasizes that the use of mobile applications in education makes the process interactive and turns the student into an active participant. However, the work did not raise the issue of the development of a specialized platform in the field of robotics or the development of a technical terminology dictionary⁵.

UE Nurimov (2023), analyzing the issues of widespread introduction of robotics into the higher education system, emphasizes the need for modern technological solutions in mastering technical terms [Nurimov, 2023]. The author notes the effectiveness of demonstration materials, visual models, and digital tools, but does not provide specific methodological solutions regarding mobile dictionaries or interactive term bases⁶.

This literature review shows that although existing studies have studied mobile technologies and robotics in separate directions, the methodology for systematically teaching technical terms through mobile platforms has not yet been sufficiently developed . Therefore, in this article, the issue of creating a dictionary based on MIT App Inventor and evaluating its effectiveness on a trial basis is considered an innovation.

Methodology

In teaching technical terms related to the field of robotics was developed. The MIT App Inventor platform was chosen as the main technical tool. This platform is a visual programming environment that simplifies the creation of applications for mobile devices running the Android operating system , allowing the user to create applications with complex functionality using the block coding method. At the initial

stage of the study, the most commonly used technical terms in robotics and those that are difficult for students were analyzed and their basic database was formed. For each term, an explanation, pronunciation, illustrative image, diagram or code sample was included⁷.

A mobile dictionary application containing these terms was developed using the MIT App Inventor environment. The application interface was designed in a simple and understandable way , with user convenience as a priority. The application structure included a main menu, a list of terms , explanations, visual materials, and the ability to listen to audio pronunciation. Each section was programmed using blocks, so that when the user clicks on the name of the term, the relevant information appears on the screen.

In the practical phase, the application was tested with the participation of students studying in the field of elementary robotics. The experiment was organized in two stages: in the first stage, the terms were explained to the students in a traditional way, and in the second stage, they were given the opportunity to independently study these terms using a mobile dictionary. During the experiment, the students' level of memorization of technical terms, speed of understanding, and activity in the lesson were observed and analyzed⁸.

The results showed that students who were taught using the mobile dictionary had higher retention rates of terms than those who were taught using the traditional method. In addition, it was observed that the mobile application aroused interest in independent learning among students and increased motivation in the subject . This approach allows for a more interactive and effective teaching of robotics by integrating modern technologies into the educational process .

This methodology serves to fill the gap in teaching technical terms in the Uzbek education system. Because the current education system has almost no special interactive dictionaries or mobile platforms designed to teach terms . The dictionary, created based on MIT App Inventor, simplifies this process, accelerates the process of students acquiring knowledge in the technical field, enhances demonstrability, and helps to form practical competencies.

The application, created in the MIT App Inventor environment, uses Arduino and related devices, such as an ultrasonic sensor, a servo motor, and a piezo buzzer. The application is a small guide designed to provide users with information about these components or to control them . The user interface is created using buttons and images, which increases interactivity. This application is used for educational purposes or to learn how to work with Arduino .

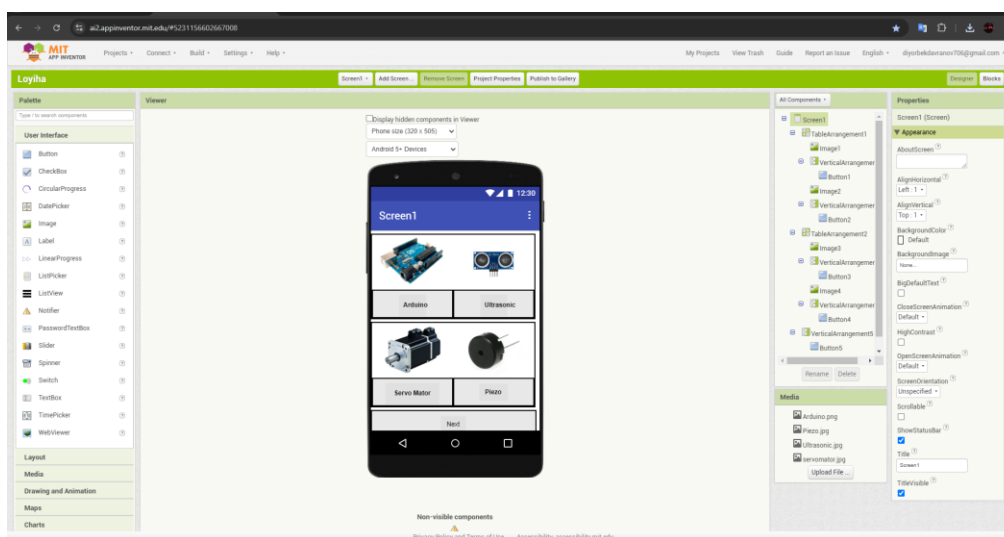


Figure 1. The process of creating an application at MIT.App.Inverter

⁵ Khaitova, NF (2022). Developing students' independent work skills based on mobile technologies . (Scientific article). Scientific Journal of the Higher Education System of the Republic of Uzbekistan

⁶ Nurimov, UE (2023). Methodological foundations for the widespread introduction of robotics into the higher education system. Scientific Journal of Higher and Secondary Specialized Education of the Republic of Uzbekistan

⁷ Melikozieva O., Haydarova K. METHODOLOGY FOR DEVELOPING COMMUNICATION SKILLS THROUGH SOCIAL STORIES WITH YOUNG CHILDREN

WITH AUTISM //Journal of Applied Science and Social Science. – 2025. – T. 1. – №. 4. – C. 184-190

⁸ Kamolaxon H., Abbasjon T., Nurmatov S. DEVELOPMENT OF A DEVICE PROJECT THAT DETERMINES THE AMOUNT OF ELEMENTS THAT ENSURE SOIL FERTILITY (POTASSIUM, CALCIUM, NITROGEN) /QO 'QON UNIVERSITETI XABARNOMASI. – 2025. – T. 14. – C. 242-247

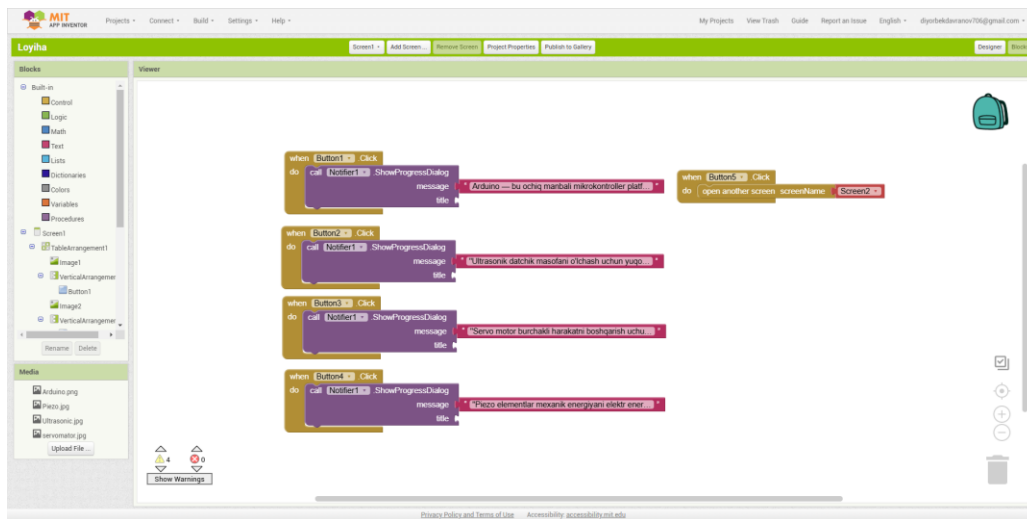


Figure 2. The process of coding a program



Figure 3. Application interface

Result. The study assessed the effectiveness of teaching technical terms via a mobile platform. It was observed that students had difficulty memorizing terms during traditional teaching. The group that used a mobile dictionary had higher scores on understanding terms, remembering pronunciation, and applying them to practical activities. According to the results of the analysis, the methodology based on mobile technologies helped students improve their knowledge by 30–40%, increase their interest in the learning process, and develop independent learning skills.

has a simple interface, which allows students to study independently outside of class. This has led to effective mastery of technical terminology in a short period of time. In general, the approach based on a mobile platform is distinguished by its advantages over traditional methods in terms of visuality, interactivity and ease of use.

Conclusion. Research has shown that using mobile dictionary technology to teach technical terms significantly increases students' mastery compared to traditional methods. Providing terms not only in

text form, but also with images, audio pronunciations, diagrams, and code samples helped to understand their content more deeply and memorize complex concepts faster. This was an important factor in developing students' independent learning skills, increasing technical literacy, and increasing motivation for science.

The experiment compared the results of the group that studied using a mobile dictionary application with those of the group that studied using traditional teaching methods. The group that used mobile technology achieved higher test scores and a higher level of ability to apply terms in practical tasks. This, in turn, indicates that the widespread introduction of digital technologies into the technical education process can further deepen terminological knowledge.

Thus, mobile dictionary technology can be recommended as an effective tool for teaching terminology in technical fields, in particular, robotics. It allows improving the quality of education, delivering modern technical knowledge quickly and conveniently, and preparing students for active work in a digital environment.

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