DASTURLASH KURSI O‘QUV MODULI ASOSIDA TALABALARNING AXBOROT KOMPETENSIYASINI TAKOMILLASHTIRISH

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Annotatsiya: *Mazkur maqola dasturlash kurslari o‘quv modullari asosida talabalar axborot kompetensiyasini takomillashtirish masalasini ko‘rib chiqadi. O‘zbekistonda ta’lim tizimida zamonaviy axborot texnologiyalari va dasturlashni o‘rganish bo‘yicha amalga oshirilayotgan islohotlarning ahamiyati yoritiladi. Dasturlash modullari orqali talabalarni ma’lumotni izlash, tahlil qilish va innovatsion yondashuv asosida foydalanishga o‘rgatish bo‘yicha takliflar keltirilgan. Tadqiqotning nazariy va amaliy natijalari dasturiy ta’limni rivojlantirishda foydalanish uchun tavsiya etiladi.*

Аннотация: *В данной статье рассматривается вопрос совершенствования информационной компетенции студентов на основе учебных модулей по программированию. Освещается значение проводимых реформ в образовательной системе Узбекистана по изучению современных информационных технологий и программирования. Приводятся предложения по обучению студентов поиску, анализу и использованию информации на основе инновационного подхода через модули программирования. Теоретические и практические результаты исследования рекомендуются для использования в развитии программного образования.*

Abstrast: *This article addresses the issue of enhancing students' information competence based on programming course modules. The significance of ongoing reforms in Uzbekistan's education system regarding the study of modern information technologies and programming is highlighted. Suggestions are provided for teaching students how to search, analyze, and utilize information innovatively through programming modules. The theoretical and practical results of the research are recommended for use in the development of programming education.*

Introduction

In today's digital era, information and communication technologies (ICT) play a crucial role in all aspects of life, requiring the development of new skills. Particularly in teaching programming courses, it is essential to enhance students' information competency

so that they are prepared to effectively utilize modern technologies. This contributes to the formation of a digital economy and the processes of innovative development. Through programming courses, students not only acquire technical knowledge and skills but also develop competencies such as analyzing information, designing programs, and solving digital problems. Furthermore, interactive and practical approaches through educational modules increase the effectiveness of learning. Modern programming educational modules include the following:

• Visual Programming Environmen for Algorithmic Thinking Development: Using Scratch, students learn to construct complex algorithms using simple blocks. This programming language provides a wide range of opportunities for students.

• Data Analysis and Program Development: Students learn data analysis and the creation of software solutions. With interfaces similar to Scratch, the module offers a straightforward and engaging approach to teaching programming.

• HTML, CSS, and JavaScript: Students learn to create simple web pages, fostering their creative skills.

• Learning Through Game Environments: Students learn programming through gamification methods. This educational module engages students in programming with game elements.

Currently, in Uzbekistan, the widespread integration of digital technologies into the educational process and the development of information competency are among the main priorities of state policy. In President Shavkat Mirziyoyev's decree on measures to develop the "digital economy," it was emphasized that all necessary conditions should be created for this field.

The primary goal of this study is to develop innovative methods aimed at enhancing students' information competency through programming course modules and to evaluate their effectiveness.

MATERIALS AND METHODS

The study involved 90 students from programming courses at three higher education institutions in Uzbekistan. The participants were randomly divided into two groups: an experimental group (45 students) and a control group (45 students).

• Experimental Group: Lessons were conducted using mobile technologies and modern educational modules.

• Control Group: Traditional teaching methods were used.

Materials Used:

• Scratch and Blockly Applications: For developing algorithmic thinking and mastering programming basics.

• Python Programming Environment: To study and apply fundamental programming principles.

• Quizizz and Kahoot Platforms: For interactive tests and self-assessment.

• Jupyter Notebook: To effectively organize practical Python exercises.

Research Methods:

1. Experimental Method Interactive and practical sessions based on the programming course module were conducted for the experimental group. The control group followed traditional lectures and practical sessions.

Students' knowledge levels were assessed at three stages: initial, intermediate, and final tests.

2. Gamification Approach: To make the learning materials engaging and understandable, gamification techniques were applied. Algorithmic tasks were developed in the form of games using Scratch, and students' knowledge levels were assessed.

3. Quantitative Analysis: Results from the experimental and control groups were statistically analyzed. Data were processed using MS Excel and SPSS software and presented in graphs and tables.

4. Qualitative Analysis: Surveys and interviews were conducted to gather students' opinions and evaluate the knowledge they acquired during lessons. Students' feedback on the educational module was analyzed.

DATA COLLECTION TOOLS

• Initial Test: Conducted to determine students' programming and information competency levels.

• Intermediate Assessment: Assessed progress in mastering educational materials during the course.

• Final Test: Used to compare changes in the experimental and control groups.

Evaluation Criteria:

• Students' programming knowledge levels (results in percentages).

• Progress in developing algorithmic thinking.

• Competencies in analyzing and utilizing information resources.

RESULTS AND DISCUSSION

During the study, the effectiveness of innovative methodological approaches integrated into the educational process through programming course modules was evaluated. The findings provided the following conclusions:

• Improved Information Competency: Students in the experimental group demonstrated 25% higher results in analyzing and utilizing information resources compared to the control group.

• Practical Skill Development: Over 90% of the experimental group successfully completed algorithmic tasks, compared to 60% in the control group.

• Increased Engagement: Sessions incorporating mobile applications and gamification elements increased students' interest in lessons. For instance, tests conducted via Kahoot saw active student participation with high performance.

• Enhanced Creativity: Using Scratch, students developed creative solutions for algorithmic tasks.

• Self-Assessment Skills: Through platforms like Quizizz, students could independently evaluate their knowledge, fostering responsibility and self-reliance.

Conclusion

This study, aimed at improving students’ information competency through programming course modules, demonstrated the effectiveness of integrating mobile technologies into the educational process. Key conclusions include:

1. Development of Information Competency: Students showed significant improvement in analyzing and utilizing information resources. Tools like Scratch and Python enhanced their algorithmic thinking and programming skills.
2. Enhanced Engagement and Motivation: Gamification elements increased students’ interest in lessons. Platforms like Quizizz and Kahoot enabled active participation.
3. Promotion of Creativity: Applications like Scratch and Blockly allowed students to creatively approach algorithmic tasks, enhancing their innovative thinking.
4. Comparison of Results: The experimental group’s learning outcomes were 25% higher than those of the control group, confirming the effectiveness of interactive educational modules.
5. Addressing Technological Limitations: Challenges such as insufficient internet resources and technological infrastructure were identified. Future efforts should focus on improving technological support and allocating additional resources.

Future Prospects: This approach can be applied to other subjects. Further research is required to develop similar interactive methods in programming modules for upper-grade and professional education courses to foster digital literacy. Overall, enhancing students’ information competency through programming course modules not only makes the learning process effective but also prepares them to work with modern technologies.

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