DEVELOPMENT OF AN INTELLIGENT ONLINE PLATFORM FOR AUTONOMOUS LEARNING IN SOFTWARE DEVELOPMENT AND DIGITAL DESIGN

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Abstract:

This article explores strategies for structuring self-directed learning in the field of educational technology. The authors discuss innovative approaches and modalities for using information technologies, including Web2.0 and Web3.0, to enhance the educational experience. In addition, the article explores the integration of case-based learning and project-based methodologies within educational frameworks.

Keywords: Self-directed learning, educational technology, Web2.0, Web3.0, case-based learning, project-based learning, electronic educational resources.

Introduction

To enhance the competitiveness of our country's economy on the global stage, the "Digital Uzbekistan-2030" strategy has been adopted and is being progressively implemented. This strategy emphasizes education and skills development in information technology, to equip higher education institutions to train specialists with adequate competencies. This focus arises from the identified shortage of sufficiently skilled IT professionals in the labor market, which is vital for the successful growth of the digital economy. The demand for specialists in this sector is currently high. Therefore, the main objective being pursued is a project aimed at training personnel for the digital economy, with annual increases in target enrollment rates for higher education; in 2023, this figure was raised by 1.8 times.

Problem Statement

Web technologies offer new opportunities for the education sector, facilitating the use of open electronic resources, the independent creation of information online, and the development of interactive communication spaces and online systems. From a pedagogical standpoint, web technology aids in the preparation of educational and creative works and their publication on educational portals. The exploration of independent learning methodologies for programming through online interactive systems continues to be a priority issue.

Current State of Digitization in Programming Training

Digitization has transformed the approach to training specialists in the programming field. The content of professional training for IT undergraduates in our country has been developed with consideration for employer demands and certain international standards. However, this field necessitates continuous adaptation to emerging technologies and innovations.

Training in higher education regarding web technologies adheres to the standards for preparing IT specialists at the undergraduate level. Educational programs specifically designed for web designers and web developers are often inadequate. To remedy this, some companies establish their own training courses and recruit graduates who fulfil their requirements. Web technology implementations or platforms can be developed in three primary ways:

1. Direct Programming: Writing all components of a project from scratch using programming languages, which often necessitates a team or a full-stack developer to oversee. Distinct groups or specialists manage the design, coding, and administration of the site.

2. Using CMS Platforms: Building websites with content management systems (e.g., WordPress, Joomla). According to 2022 data from W3Techs, 43.2% of global websites utilize such systems, with WordPress being the most prevalent, powering approximately 62% of sites created on CMS. The system provides a user-friendly admin panel and a variety of plugins, facilitating seamless integration with different web technologies.

3. Framework-Based Development: Creating systems using frameworks like Angular, React, Vue, Laravel, or Drupal. Frameworks offer structured environments that include reusable libraries and classes, streamlining the development of robust systems. Notable web frameworks include Laravel, Django, Spring Boot, and Symfony.

Key Stages of Website Development. The process of creating a website involves several critical steps:

▪ Analyzing the Technical Specifications: Grasping project requirements, functionality, and interactivity.

▪ Developing the Site Architecture: Crafting the logical structure of the website.

▪ Collecting Content: Assembling text, images, audio, videos, and other materials.

▪ Creating a Website Layout: Utilizing graphic design tools to visualize the site's appearance.

▪ Building the Template with HTML and CSS: Ensuring the layout aligns with the design.

▪ Structuring the Site: Establishing the logical framework.

▪ Filling the Site with Content: Adding and organizing materials.

▪ Registering a Domain and Hosting: Launching the site on a server.

▪ Maintenance and Online Operation: Providing ongoing support to ensure the site operates smoothly.

Training programmers and self-directed learning

For the effective preparation of specialists, higher education institutions need to provide additional courses that can be supplemented by self-study using online systems. Such courses may include

➢ Design course: Covers user interface design and layout creation using tools such as Figma, Adobe XD, Sketch and more.

➢ Frontend Development Course: Learn HTML5, CSS3, JavaScript and frameworks such as React, with knowledge of server-side integrations such as Node.js.

➢ Backend Development Course: Focusing on PHP, MySQL, C# and CMS plugins.

➢ Content Management Course: Skills in word processing, information analysis and working with CMS platforms.

➢ SEO Optimisation Course: Using analytics tools and search engine strategies to improve website visibility.

A structured independent learning environment can be used to study these courses.

Results and examples of good practice

In higher education, the structure for creating an electronic learning environment varies widely, with several specialized tools being used to support the organization of distance learning and to address the technological challenges in this area. For students specializing in computer science, programming is an essential skill that requires considerable time and effort to master. The nature of programming requires not only knowledge of syntax, but also an understanding of algorithm implementation and problem-solving skills. Students need a strong foundation in mathematics, logic, English and algorithmic thinking.
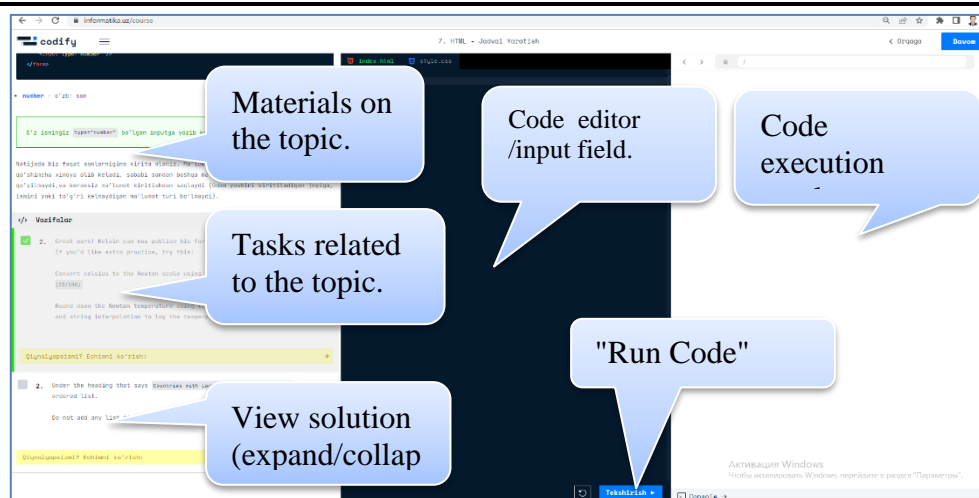
Web Programming Learning Platforms

These platforms can be categorised as online courses, video tutorials and code verification systems. Notable resources for programming include Massive Open Online Courses (MOOCs), mobile applications and educational videos. Leading platforms based on user ratings include Codecademy, Code-basics, Coursera, HTML Academy, Stepik, Codewars, ITVDN, JavaRush and Hexlet. Some of these platforms are paid, but there are also free options such as edx.org, freecodecamp.org, w3schools.com and sololearn.com. These platforms offer a self-testing feature that provides users with theory first, followed by exercises and code evaluation tools.

National platform: Informatika.uz

We propose a system that works similarly to the above platforms but in the Uzbek language. Informatika.uz provides theoretical content, a coding interface, and a console emulator that shows the results of code execution. This platform allows learning HTML, CSS, JavaScript and React JS and follows a structured approach:

- Theoretical Block: Includes explanations of key concepts.
- Exercise Block: Provides exercises to apply these concepts.
- Instruction Block: Offers guidance on solving problems.
- Coding Console: Used for writing code based on the exercises.
- Execution Emulator: Displays the result of the written code.

The Informatika.uz platform for learning programming.

Interface of Informatika.uz

The platform's workspace contains all the necessary resources for learning programming, presenting tasks with relevant guides, scripts and an output console. This learning path supports the progressive acquisition of knowledge and stands out as an accessible system tailored for a wide audience, especially Uzbek speakers.
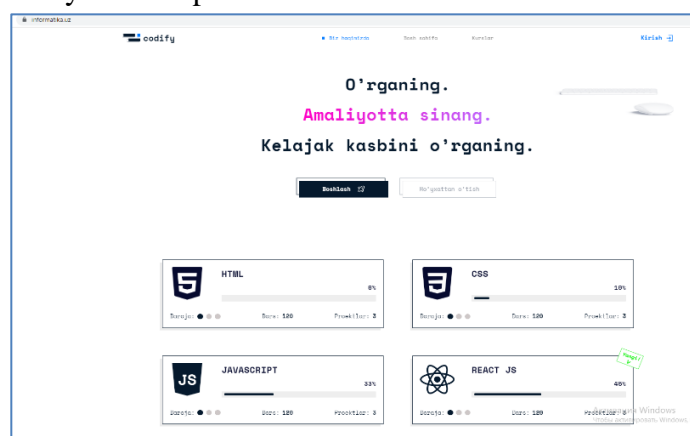
System for learning programming Informatika.uz

Conclusions and Recommendations

To sum up, the implementation of electronic learning in higher education and the gradual development of independent learning systems have been ongoing processes. Analysis conducted at the end of the first semester revealed that the use of independent learning methods improved student performance by 7-10% and increased interest in choosing IT specializations by 10-12%. This indicates that these methods not only enhance educational outcomes but also help develop students' practical skills in modern technologies.

Online learning systems in programming education support the development of algorithmic thinking, problem-solving skills, and proficiency in various programming environments.

Platforms that provide structured, practical exercises are essential for fostering independent learning and equipping students with the knowledge required for the job market. Therefore, incorporating such systems into higher education curricula can significantly enhance the quality of learning and better prepare students for careers in the IT field.

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