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Enhancing the Research Practices and Methodologies for Students' Independent Work Within the Digital and Educational Ecosystem

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Annotation: This article examines the significance of student independent work in higher education, focusing on the research surrounding it and the role of distance learning platforms such as Moodle and HEMIS. It also explores the influence of digital technologies on independent student activities. The study identifies current challenges in the preparation and evaluation of independent work and offers recommendations for improvement, some of which have been incorporated into a new platform.

Key words: independent learning, methodology, Moodle, HEMIS, distance education, teaching methods, classroom hours, modern technologies.

Introduction

The role of modern technologies in enhancing education is steadily increasing. Their integration serves the purpose of modernizing and advancing the educational process, which plays a critical role in improving the quality of training future specialists and bridging education closer to science.

When discussing independent learning in higher education, it is essential to consider the time and resources allocated to it. As the hours dedicated to independent student work increase, so do the demands on the quality of these efforts. Developing specialized guidelines and methodological materials for students is crucial in this process. Information technology plays an important role in organizing independent work within the educational environment, facilitating the effective development of students' research and independent activities. Higher educational institutions must create platforms and guidelines to encourage students to engage in independent work. Utilizing international experiences is also vital, as it contributes significantly to preparing specialists in line with global standards.

Literature Review

Currently, numerous theoretical studies and pedagogical technologies have been developed to advance student independent work. The expansion of information technology has increased collaboration opportunities between students and teachers, enhancing communication and knowledge exchange. Moreover, ensuring students acquire knowledge focused on outcomes remains a priority in scientific-pedagogical processes. As noted by S.V.Panyukova, the development of new information technologies significantly enhances opportunities for day-to-day collaboration and knowledge exchange, both among students and between students and teachers. O.M.Buranok argues that such educational strategies foster "result-oriented" students who are capable of continuous self-development, especially in a rapidly evolving knowledge environment. The work of P.I.Samoylenko and L.Yu.Sergiyenko explores various forms and methods for organizing independent work [2].

Methodology

Improving the methodology for organizing student research and independent work within the information-educational environment is a critical task in modern education. This process requires

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pedagogical approaches aimed at enhancing students' critical thinking abilities and directing them toward scientific research activities.

Students' competencies in Information and Communication Technology (ICT) include the following aspects: the use of information tools, the analysis of software and network resources, and the application of distance learning technologies. These skills are particularly important in the process of transitioning the national education system to digital foundations.

The introduction of digital platforms such as Moodle and HEMIS in Uzbekistan's education system has opened up new opportunities for organizing effective independent student work. Moodle, the world's most popular educational platform, and HEMIS, a system for automating and managing educational processes, both contribute to this effort. Overall, the implementation of digital technologies in the national education system supports the effective organization of students' independent research work and facilitates broader adoption of educational innovations.

Competencies are categorized into core, technological, and professional types. The core competency involves the use of ICT foundations. The technological competency focuses on the analysis of software and network resources. The professional competency involves the development of new tools and applications for various tasks [5].

Currently, several digital educational platforms are in use within the higher education system in Uzbekistan, the most common of which are the Moodle distance learning platform and the HEMIS information system. Moodle, a free Learning Management System (LMS), was developed by Australian Martin Dougiamas, with its first version released in 2002. Today, it is the world's most widely used distance learning system, employed in more than 200 countries [6].

HEMIS, introduced in collaboration with the World Bank in line with Presidential Decree № PD-60 (dated December 24, 2021), serves as a Higher Education Management Information System. It automates data collection and management of higher educational institutions, and a dedicated website, http://hemis.uz, provides all necessary information for using this system [7]. With the introduction of digital technologies into the education system, student interest in academic subjects has increased [8]. These reforms have also led to changes in the distribution of study hours, resulting in a shift towards greater independent work. Previously, independent work accounted for approximately one-tenth of the total study process, with classroom time making up about 70%. Over time, while there have been few significant changes in working with information technology, literature research, and using modern technologies, the introduction of new educational and digital technologies has significantly increased the scope of independent work while nearly halving classroom hours. Other key indicators have remained largely unchanged.

Results

In order to improve the methodology of independent learning, several studies were conducted at the Fergana branch of TUIT on the Moodle and HEMIS systems. Essential features for forming an independent learning process on remote learning platforms were analyzed, and a comparative assessment of the features of the HEMIS and Moodle systems was carried out.

A new independent learning system was proposed as a pilot to submit, receive, and evaluate independent work. This system is designed to be convenient for both teachers and students, and it offers the following features:

- The ability to download files by selecting them;
- The option to either download files directly or review them before downloading;
- Creation of a separate chat system for each subject's assignments;
- The ability to analyze academic performance within student groups.

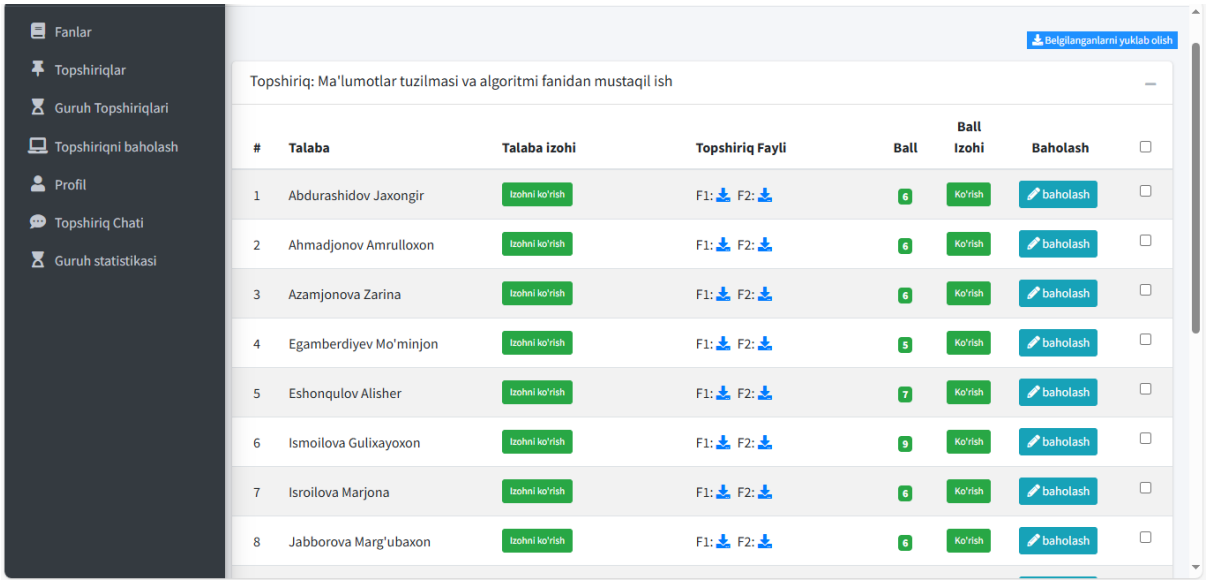

Figure 1. The ability to download files by selection.

The teacher can view the files uploaded by students and download selected files. By placing a checkmark in the box next to the student's name, the teacher can select multiple files, which will then be downloaded as a single file_name.zip archive. When the "Grade" button in the upper right corner is clicked, the students are evaluated. The program code implementing this feature is written in PHP using the Yii2 framework, as shown below.

```
<script>
document.addEventListener('DOMContentLoaded', function() {
var checkAll = document.querySelectorAll('input[type="checkbox"][id^="check-all"]');
var oneCheckboxes = document.querySelectorAll('input[type="checkbox"][id^="one"]');
var values = [];
checkAll.forEach(function(allCheckbox, index) {
allCheckbox.addEventListener('change', function() {
var oneCheckboxes = document.querySelectorAll('input[type="checkbox"][id^="one' + index + '"]');
oneCheckboxes.forEach(function(oneCheckbox) {
oneCheckbox.checked = allCheckbox.checked; });
values[index] = allCheckbox.checked ? Array.from(oneCheckboxes, checkbox => checkbox.value) : [];
console.log(values);
updateDownloadLink();
});
});
oneCheckboxes.forEach(function(oneCheckbox) {
oneCheckbox.addEventListener('change', function() {
var allChecked = Array.from(oneCheckboxes).every(checkbox => checkbox.checked);
checkAll.forEach(function(allCheckbox) {
allCheckbox.checked = allChecked;
```

```
});
});
});
});
</script>
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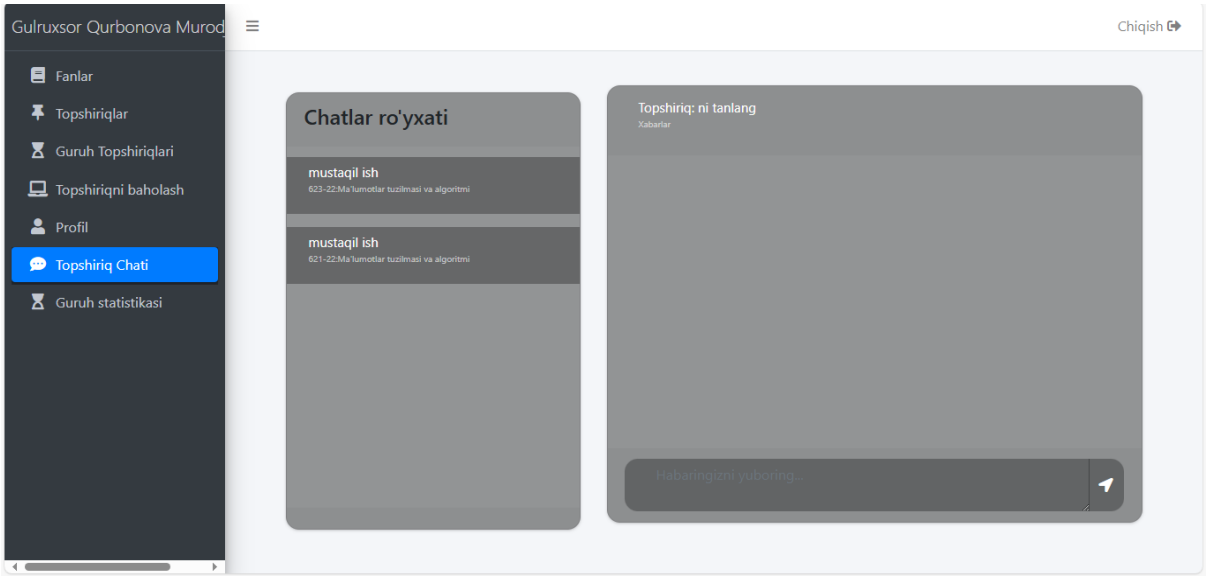

Figure 2. Dedicated chat system for each course assignment.

A separate chat system is provided for each course assignment, allowing the group of students assigned to the course and the instructor to exchange ideas and discuss the assignment in real-time.

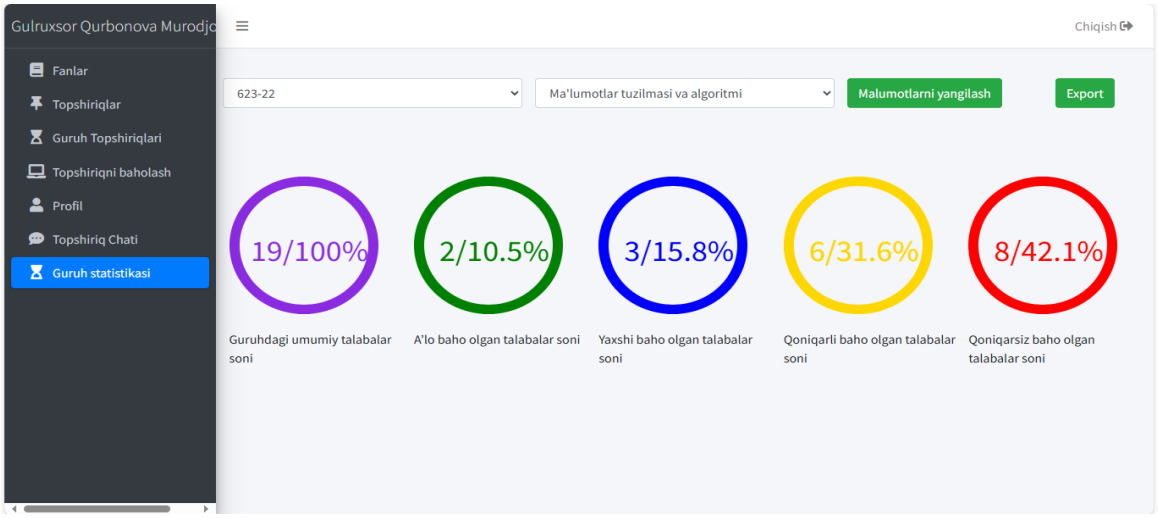

Figure 3. Group statistics and exporting grades to Excel.

This feature shows the total number of students in the group and the breakdown of grades: excellent, good, satisfactory, and unsatisfactory. By selecting a group and course, clicking the update button will display the grades for the specific assignment. Additionally, there is an option to export the grades to an Excel file, which can be done by clicking the export button.

Conclusion

During the analysis of the Moodle and HEMIS systems, theoretical and practical issues were identified. The assignment files uploaded by students were reviewed, and it was determined that necessary guidelines need to be developed to address problems, particularly for formatting and preparing independent work. Through practical analysis, several challenges were identified, and as a

solution, a new independent learning system was proposed for testing. The features of this system, along with partial code, are presented in this article.

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