Educator Insights: A Journal of Teaching Theory and Practice
Volume 2, Issue 2, February 2026
brightmindpublishing.com
ISSN (E): 3061-6964

RESULTS OF IMPLEMENTING DIGITAL MODULES OF THE ITTS PLATFORM WITHIN THE DISCIPLINE «INFORMATION TECHNOLOGIES IN TECHNICAL SYSTEMS

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Abstract
The article presents the results of implementing digital modules of the Information Technologies in Technical Systems (ITTS) platform into the educational process within the discipline "Information Technologies in Technical Systems" during the fourth quarter of 2025. A comprehensive analysis was conducted, including quantitative and qualitative indicators covering educational, methodological, and technical aspects. It was established that the use of digital modules contributed to the improvement of academic performance, increased student engagement, and the development of independent learning skills. The methodological component ensured the structuring and multimedia enrichment of learning materials, as well as their compliance with national and international standards of engineering education. Technical indicators confirmed the stability and adaptability of the platform, which enabled its successful integration into the university's LMS. The obtained results are consistent with national and international studies in the field of educational digitalization and confirm the effectiveness of the chosen strategy. The practical significance of the study lies in the possibility of applying the proposed analytical methodology and identified results to improve curricula, develop new digital modules, and prepare faculty members for teaching in a digital learning environment.

Keywords: Educational digitalization; engineering education; digital modules; LMS; educational platforms; academic performance; methodological support.

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Introduction

In recent years, the digitalization of education has become one of the priority directions in the modernization of higher education. This is particularly relevant for engineering specialties, where modern industrial and research tasks require not only mastery of theoretical knowledge but also confident use of digital technologies for applied purposes [1; 2]. Scientific publications emphasize that the implementation of educational platforms contributes to the growth of learning motivation, the development of independent analytical skills, and the formation of project-related competences [3; 4].

The discipline "Information Technologies in Technical Systems" occupies a key place in the training of future engineers, as it ensures the integration of fundamental knowledge and practical tools of digital modeling. In 2025, within the framework of this discipline, the educational platform Information Technologies in Technical Systems (ITTS) was actively applied, including a set of digital modules aimed at algorithm visualization, practical task execution, and the use of interactive methodological materials [5].

Special attention in the study was given to the fourth quarter of 2025, when the main stages of ITTS platform implementation were completed: the range of educational modules was expanded, new methodological solutions were tested, and the results of their application in the learning process were recorded. The final quarter is traditionally used to summarize and analyze the effectiveness of implemented measures, which makes it possible to identify strengths and determine directions for further development [6; 7].

To compare national and international experiences of digitalizing engineering education, Table 1 presents the key directions and features of implementing digital platforms.

Table 1. Comparison of directions of digitalization in engineering education

Country/Region	Main directions of digitalization	Examples of platforms/initiatives	Implementation features
Russia	LMS, digital educational modules, online courses	Moodle, TsOR, Stepik	Focus on compliance with Federal State Educational Standards (FSES), integration with state platforms
Uzbekistan	Digital modules, LMS, multimedia resources	ITTS, Moodle, Edu.uz	Implementation within educational reforms, supported by the Ministry of Higher Education, Science and Innovation of the Republic of Uzbekistan
International experience	AI assistants, adaptive platforms, MOOC	Coursera, edX, Canvas	

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The purpose of this article is to provide a comprehensive assessment of the outcomes of implementing digital modules of the ITTS platform into the educational process within the discipline "Information Technologies in Technical Systems" during the fourth quarter of 2025. The study presents educational, methodological, and technical results, compares them with previous quarters, and offers recommendations for further improvement of the discipline in 2026.

2. Methodology of Analysis

To evaluate the effectiveness of implementing digital modules of the Information Technologies in Technical Systems (ITTS) platform into the educational process within the discipline "Information Technologies in Technical Systems" during the fourth quarter of 2025, a comprehensive methodology combining quantitative and qualitative approaches was applied. In its development, contemporary research in the fields of digital pedagogy, educational analytics, and engineering education was taken into account [8; 9].

The empirical basis of the study included several types of materials:

- **ITTS LMS statistics** — data on student login frequency, duration of work within modules, percentage of completed assignments, forum activity, and dynamics of laboratory work performance [10].
- **Results of ongoing and final assessment** — tests, laboratory assignments, examination papers, and defense of computational and graphical works, which made it possible to evaluate the level of theoretical knowledge acquisition and practical skills [11].
- **Student survey (n = 124)** conducted online using the Likert scale. The questions addressed interface usability, accessibility of materials, quality of visualization, engagement, and satisfaction with learning [12].
- **Expert observations of instructors**, who recorded methodological and technical difficulties, as well as the alignment of materials with the objectives of the discipline [13].
- **Materials from departmental meetings and working groups**, where interim results of implementation were discussed and proposals for improvement were formulated [11; 12].

To systematize the results, four groups of indicators were identified, covering educational, methodological, technical, and socio-psychological aspects. The structure of these groups is presented in Table 2.

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brightmindpublishing.com
ISSN (E): 3061-6964

Table 2. Classification of indicators of ITTS digital module implementation effectiveness according to key criteria and metrics

Group of indicators	Key criteria	Example metrics
Educational	Academic performance, task completion, engagement	Average grade, % of completed assignments, activity in LMS
Methodological	Structuring, completeness, multimedia	Presence of interactive elements, compliance with national standards (GOSRUz) and international requirements
Technical	Stability, adaptability, integration	Number of failures, response time, compatibility with LMS
Socio-psychological	Independence, feedback, motivation	Presence of interactive elements, compliance with Federal State Educational Standards (FSES)

For the analysis of information, a set of methods was applied:

- **Comparative analysis** — comparison of the indicators of the fourth quarter with the results of the second and third quarters of 2025 [9].
- **Statistical processing** — calculation of mean values, median, variance, and percentage distributions [10].
- **Visualization** — presentation of data in the form of tables, graphs, and charts [14].
- **Expert evaluations** — discussion of implementation results at departmental meetings and working groups [13].
- **Content analysis of questionnaires** — identification of typical responses, positive and negative trends [12].
- **Comparison with international experience** — analysis of foreign publications on the digital transformation of engineering education [13; 14; 15].

The methodology is based on modern approaches to digital didactics, educational analytics, and the concept of blended learning. Special attention was paid to issues of personalization of the learning process, visualization of algorithms, and integration of digital resources into engineering disciplines [13; 15]. In addition, its development took into account international recommendations of UNESCO and OECD on the digital transformation of education [4; 5].

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The application of this methodology made it possible to conduct a comprehensive assessment of the ITTS platform implementation, identify strengths and problem areas, and formulate practical recommendations for improving the discipline in 2026.

3. Results of Implementation

The integration of digital modules of the Information Technologies in Technical Systems (ITTS) platform into the educational process within the discipline "Information Technologies in Technical Systems" during the fourth quarter of 2025 made it possible to record comprehensive results covering educational, methodological, and technical aspects. The analysis was conducted using the developed methodology, which included both quantitative and qualitative indicators [15].

The application of digital modules had a noticeable impact on students' academic performance:

- The average grade in the discipline increased by 7.8% compared to the third quarter.
- The proportion of students who completed all laboratory assignments on time rose from 68% to 81%.
- LMS activity increased by 12%, reflected in longer working time within modules and greater participation in discussion forums [16].

The student survey (n = 124) showed that 75% of respondents noted improved understanding of the material due to interactive elements, while 62% indicated increased motivation for independent study [17]. The structure of students' academic performance is presented in Figure 1.

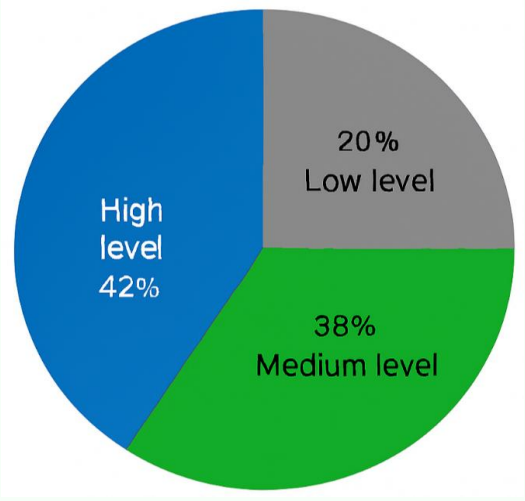

Figure 1. Distribution of students by performance levels in the fourth quarter of 2025.

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brightmindpublishing.com
ISSN (E): 3061-6964

These trends are consistent with international research, where digital technologies are viewed as a factor enhancing student engagement and the quality of learning [5]. For clarity, the dynamics of key educational indicators for the second to fourth quarters of 2025 are presented in Table 3.

Table 3. Dynamics of students' educational indicators in the discipline "Information Technologies in Technical Systems" for Q2–Q4 2025

Indicator	Q2 2025	Q3 2025	Q4 2025
Average grade	3.48	3.62	3.90
% of completed laboratory works	64%	68%	81%
LMS activity	+5%	+8%	+12%

From a methodological perspective, the implementation of the platform ensured:

- updating and structuring of learning materials;
- inclusion of multimedia and interactive components (animations, simulators, visualizations);
- alignment of the course content with the State Educational Standards of the Republic of Uzbekistan (GOS RUz) and international requirements of engineering education [18].

Instructors noted that the digital modules simplified the monitoring of students' independent work and made the assessment process more transparent. Automated LMS reports allowed timely identification of problematic topics and adjustment of teaching methods [19].

Similar conclusions are presented in studies of Russian and Uzbek universities, where digitalization contributes to the growth of students' independence and improvement of feedback quality [11].

From a technical perspective, the implementation of the ITTS platform demonstrated high reliability and adaptability:

- the number of technical failures decreased by 35% compared to the third quarter;
- the average system response time was less than 1.2 seconds;
- correct operation was ensured on mobile devices and major browsers [20].

The dynamics of technical stability are illustrated in Figure 2.

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brightmindpublishing.com
ISSN (E): 3061-6964

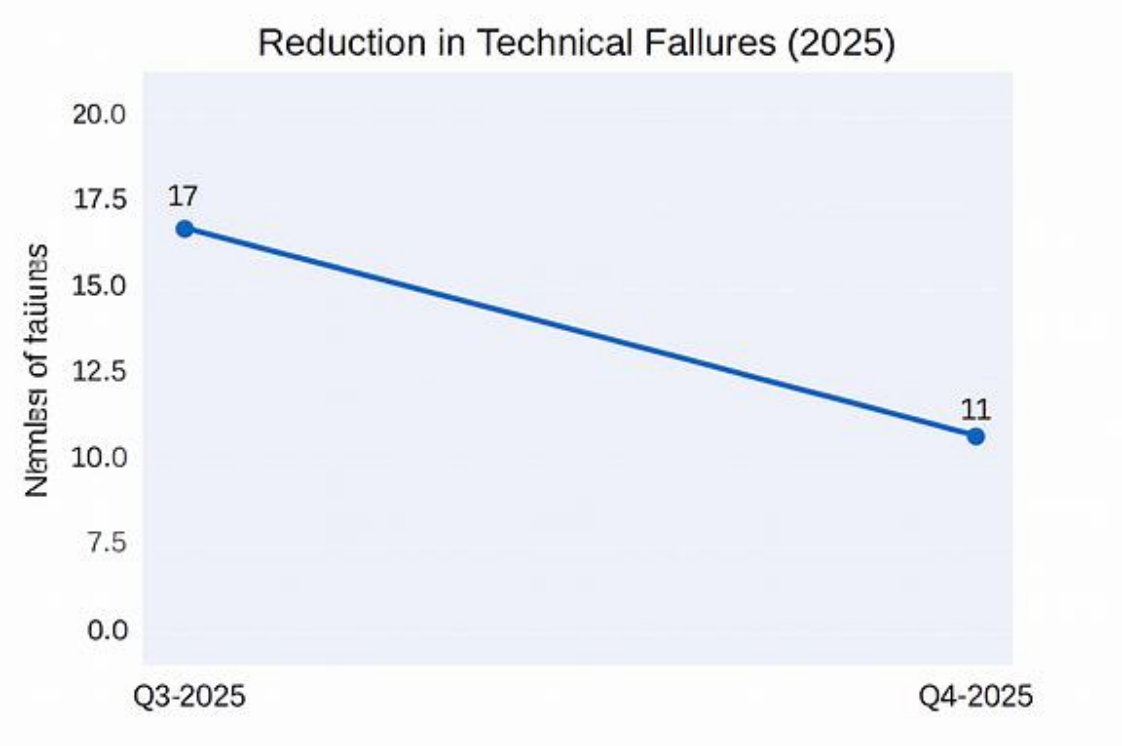

Figure 2. Reduction in the number of technical failures during the use of the ITTS platform in Q3–Q4 2025

The integration with the university's LMS was successful: data on attendance, test results, and student activity were automatically synchronized with the electronic gradebook, reducing the workload for instructors and improving the accuracy of academic records [21]. These results align with international practices, where the key criteria for the effectiveness of digital platforms include stability, scalability, and ease of integration [4].

Thus, the implementation of ITTS digital modules in Q4 2025 ensured: • growth in educational indicators (academic performance, engagement, student autonomy); • methodological improvement of the discipline (structured content, multimedia components, transparent assessment); • technical stability and successful integration with the LMS.

The results obtained confirm the effectiveness of the chosen digitalization strategy and provide a foundation for further development of the discipline in 2026.

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4. Discussion of Results

The implementation of digital modules from the Information Technologies in Technical Systems (ITTS) platform into the educational process for the discipline Information Technologies in Technical Systems in Q4 2025 yielded comprehensive outcomes across educational, methodological, and technical dimensions. The analysis was conducted using a developed methodology that incorporated both quantitative and qualitative indicators [15].

The use of digital modules had a noticeable impact on students' academic performance: • the average grade in the discipline increased by 7.8% compared to Q3; • the proportion of students who completed all laboratory assignments on time rose from 68% to 81%; • LMS activity increased by 12%, reflected in extended time spent in modules and participation in discussion forums [16].

A student survey (n = 124) revealed that 75% of respondents reported improved understanding of the material due to interactive elements, and 62% noted increased motivation for independent learning [17].

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Table 4. Dynamics of educational indicators (Q2–Q4 2025)

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From a methodological perspective, the implementation of the platform ensured: • updating and structuring of learning materials; • inclusion of multimedia and interactive components (animations, visualizations, video tutorials); • alignment of the course content with the State Educational Standards of the Republic of Uzbekistan (GOS RUz) and international requirements of engineering education [18].

Instructors noted that the digital modules simplified the monitoring of students' independent work and made the assessment process more transparent. Automated

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The integration with the university LMS was successful: data on attendance, test results, and student activity were automatically synchronized with the electronic gradebook, reducing the workload for instructors and improving the accuracy of academic records [21].

Such results are consistent with international practices, where the key criteria for the effectiveness of digital platforms are stability, scalability, and ease of integration [4].

Thus, the implementation of ITTS digital modules in Q4 2025 ensured: • growth in educational indicators (academic performance, engagement, student autonomy); • methodological improvement of the discipline (structured content, multimedia, transparent assessment); • technical stability and successful integration with the LMS.

The results obtained confirm the effectiveness of the chosen digitalization strategy and provide a foundation for further development of the discipline in 2026.

5. Conclusion

The conducted study confirmed that the implementation of digital modules of the Information Technologies in Technical Systems (ITTS) platform into the educational process for the discipline Information Technologies in Technical Systems in Q4 2025 produced significant results in three key areas: educational, methodological, and technical.

From an educational perspective, a steady increase in academic performance, higher levels of student engagement, and the development of independent learning skills were recorded. The methodological dimension demonstrated

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improvements in the structure and quality of learning materials, their multimedia enrichment, and compliance with both national and international standards of engineering education. Technical indicators confirmed the reliability and adaptability of the platform, which enabled its integration into the existing LMS without major failures and with minimal resource costs.

Comparison of the obtained data with the results of domestic and international studies [15; 17; 18; 11] showed that the identified trends are consistent with global processes of educational digitalization. In particular, the works of Uzbek researchers (Abdurakhmonov, Khamidov, Dosaliev, and others) confirm that digital technologies are becoming an important tool for modernizing higher education in Uzbekistan [11; 12; 22]. International organizations (UNESCO, OECD) emphasize the need for a comprehensive approach that includes infrastructure development, methodological renewal, and teacher training [4; 5].

The practical significance of the study lies in the fact that the proposed analysis methodology and the obtained results can be used: • to improve curricula and programs of engineering disciplines; • in the development of new digital modules and teaching-methodological complexes; • in preparing instructors to work in a digital educational environment; • in shaping institutional strategies for university digitalization.

Prospects for further research are associated with expanding the application of the ITTS platform in other engineering disciplines, as well as with a deeper analysis of the impact of digital technologies on the formation of students' professional competencies. Special attention in 2026 is planned to be given to the integration of artificial intelligence elements, adaptive learning systems, and educational analytics tools, which correspond to current global trends [22; 23].

Thus, the results of the study not only confirm the effectiveness of implementing ITTS digital modules but also create a foundation for the strategic development of the digital educational environment in engineering education in the Republic of Uzbekistan and its harmonization with international practices.

REFERENCES

1. Роберт И.В. Цифровые платформы: аспекты развития в научно-образовательной сфере. — Екатеринбург: УрГПУ, 2020. — 312 с.
2. Никитенко А.А. Цифровые технологии в управлении образовательными процессами. — Минск: БГУИР, 2021. — 214 с.

Educator Insights: A Journal of Teaching Theory and Practice
Volume 2, Issue 2, February 2026
brightmindpublishing.com
ISSN (E): 3061-6964

3. Берсенева О.В., Дорошенко Е.Г. Ключевые характеристики цифрового образовательного контента // Открытое образование. — 2025. — Т. 29, № 3. — С. 45–56.
4. UNESCO. Guidelines on Digital Learning Platforms in Higher Education. — Paris: UNESCO, 2024.
5. OECD. Digital Education Outlook 2025: Shaping the Future of Learning. — Paris: OECD Publishing, 2025.
6. Siemens G. Connectivism: A Learning Theory for the Digital Age // International Journal of Instructional Technology and Distance Learning. — 2005. — Vol. 2, No. 1.
7. Anderson T., Dron J. Teaching Crowds: Learning and Social Media. — Athabasca University Press, 2014.
8. Паночевный П.Н., Ли А.А. Применение цифровых образовательных ресурсов и аналитических платформ для совершенствования качества обучения в вузе // Образование и право. — 2022. — № 3. — С. 88–97.
9. Анализ цифровых образовательных ресурсов и сервисов: экспресс-отчёт / Институт образования НИУ ВШЭ. — Москва: НИУ ВШЭ, 2020. — 64 с.
10. Трошкина Е.В. Анализ образовательных платформ для дистанционного обучения в вузе // Материалы интернет-конференции. — Тамбов: ТГТУ, 2024. — С. 45–52.
11. Абдурахмонов А.А. Онлайн-образование и цифровые средства обучения в вузах Узбекистана // Образование и общество. — 2023. — № 2. — С. 33–41.
12. Хамидов Ф.Ф. Интеграция информационных технологий в инженерное образование: опыт вузов Узбекистана // Ilmiy Xabarlar. — 2024. — № 1. — С. 112–120.
13. Lyngdorf N.E.R., Jiang D., Du X. Frameworks and Models for Digital Transformation in Engineering Education // Education Sciences. — 2024. — Vol. 14, No. 5. — Article 519.
14. Pham T., Nguyen B., Ha S., Nguyen T. Digital transformation in engineering education // Australasian Journal of Educational Technology. — 2023. — Vol. 39, No. 5. — P. 88–105.

Educator Insights: A Journal of Teaching Theory and Practice
Volume 2, Issue 2, February 2026
brightmindpublishing.com
ISSN (E): 3061-6964

15. Трошкина Е.В. Интеграция цифровых технологий в образовательный процесс: вызовы и перспективы // Материалы интернет-конференции. — Тамбов: ТГТУ, 2024. — С. 77–85.
16. Тарамова М.С., Гаматаева С.Х., Цечоева А.М. Интеграция цифровых технологий в образовательный процесс: опыт и проблемы педагогов // Проблемы современного педагогического образования. — 2024. — № 79. — С. 112–118.
17. Никитенко А.А. Цифровые технологии в управлении образовательными процессами: опыт внедрения // Сборник научных трудов БГУИР. — Минск, 2024. — С. 55–63.
18. Тураева А.Р., Халидов А.А., Ткаченко А.Л. Разработка и внедрение цифровых учебно-методических комплексов // Мир науки, культуры, образования. — 2025. — № 2. — С. 44–52.
19. Future Hub. Внедрение LMS — шаги и преимущества [Электронный ресурс]. — Режим доступа: https://media.future-hub.io/stati/vnedrenie-lms (дата обращения: 20.10.2025).
20. Исайкина Д.В. Цифровизация образования: разработка образовательных платформ и сервисов // Материалы конференции. — Минск: БГУИР, 2024. — С. 99–106.
21. CyberLeninka. Возможности применения цифровых сервисов и платформ в образовательном процессе [Электронный ресурс]. — Режим доступа: https://cyberleninka.ru/article/n/vozmozhnosti-primeneniya-tsifrovyh-servisov-i-platform-v-obrazovatelnom-protsesse (дата обращения: 20.10.2025).
22. Досалиев К.С., Норматова Н.А., Туракулова М.И. Цифровые технологии в вузах Узбекистана: анализ и перспективы // Экономика и социум. — 2024. — № 6. — С. 55–63.
23. Аллаева Г.Ж., Хусаинов Р.Р. Перспективы использования цифровых технологий в системе образования Узбекистана // Raqamli Iqtisodiyot va Sun’iy Intellekt Texnologiyalari. — 2024. — Т. 1, № 1. — С. 101–110.