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CONCEPTUAL APPROACH TO THE DIGITAL TRANSFORMATION OF STUDENT-RELATED OPERATIONAL PROCESSES IN HIGHER EDUCATION SYSTEMS

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ABSTRACT
In the article, this study explores a conceptual framework for the digital transformation of student-related operational processes in higher education. It highlights the benefits of systematic and continuous digital monitoring across entry, core, and supporting processes, enabling institutions to optimize operations, improve information flow, and respond effectively to individual student needs. The proposed three-tier approach at the university, educational program, and course levels facilitates comprehensive oversight of academic and daily student activities, supports data-driven decision-making, and enhances the overall quality of education. The findings demonstrate that a conceptual approach to digital transformation not only streamlines operational processes but also strengthens institutional competitiveness and significantly enhances students' learning experiences.
KEYWORDS: *Digital Transformation, Higher Education, Student Activities, Operational Processes, Three-Tier Monitoring, Data-Driven Management.*

1. INTRODUCTION

Digital transformation has become one of the key strategic directions shaping the functional and institutional development of higher education today. In the context of the Fourth Industrial Revolution (Industry 4.0), the fundamental changes in mechanisms for creating, transferring, and managing knowledge demand flexibility, transparency, and data-driven management from higher education institutions. In this process, the digital transformation of student-related operational processes emerges as a crucial factor ensuring the sustainability and competitiveness of the higher education system.

Current experience shows that, in many higher education institutions, student-related operational processes such as admissions, academic activities, curricula, assessment, financial, and administrative services are managed through separate information systems or traditional management mechanisms. Such a fragmented approach disrupts the continuity of information flows, reduces the quality of managerial decisions, and limits the ability to respond promptly and individually to student needs. Therefore, the digital reorganization of these processes based on a unified conceptual model has become an urgent scientific and practical challenge.

"In this context, the relevance of the research is also explained by the need to implement the strategic objectives established for accelerating digital transformation in the higher education and science sectors of the Republic of Uzbekistan. In particular, Presidential Decree No. PF–6079, dated October 5, 2020, "On the Approval of the 'Digital Uzbekistan – 2030' Strategy," identifies the widespread implementation of digital technologies in education, the digitalization of management and service processes, and the development of digital competencies as priority tasks[1]".

Furthermore, Presidential Decree No. PF-60, dated January 28, 2022, "On the Development Strategy of the New Uzbekistan for 2022–2026," outlines tasks for deepening digital transformation in public administration and social

[1] *Presidential Decree № PF–6079 of the Republic of Uzbekistan dated October 5, 2020, "On the 'Digital Uzbekistan – 2030' Strategy."*

sectors, including the higher education system. The decree emphasizes increasing the share of electronic government services and implementing data-driven management systems[2]".

Within the framework of these strategic documents, the digital transformation of student-related operational processes in higher education institutions, the management of digital data, the integration of modern information systems, and the enhancement of management efficiency through digital platforms have acquired significant scientific and practical relevance.

Accordingly, this study is aimed at analyzing and comparing various approaches to implementing digital transformation in the higher education system, as well as substantiating a conceptual approach that facilitates the advancement of student-related operational processes to a mature level of digitalization. The results of the research contribute to achieving the objectives outlined in the state's strategic documents and to improving digital transformation strategies in Uzbek higher education institutions, taking into account their specific characteristics.

Digital transformation of student-related operational processes is understood in a broader sense than mere technical digitization. It encompasses process optimization, the design of data architectures, the implementation of digital management tools, and the institutional reinforcement of a student-centered approach. Only when these processes are implemented based on a conceptual framework do digital technologies become a source of tangible value within higher education institutions.

From this perspective, the present study focuses on developing the conceptual foundations for the digital transformation of student-related operational processes, systematizing the stages of transformation, and evaluating their impact on management efficiency and the quality of educational services. The findings hold both theoretical and practical significance for developing digital strategies in higher education institutions, integrating operational processes, and improving mechanisms for data-driven management decisions.

2. LITERATURE REVIEW

An analysis of the literature on digital transformation (DT) and project management demonstrates that in recent years a number of significant scientific approaches have emerged in this field. In particular, Yakovleva and Tolochko (2021) focused their research on integrating digital transformation processes with strategic management. They emphasize that flexible decision-making and a data-driven approach are crucial for the successful implementation of digital changes.

Similarly, Savvinov, Ivanov, and Strekalovskiy (2021) conducted an in-depth study on assessing the digital maturity of higher education institutions. They proposed methodological approaches to evaluate the readiness of educational organizations for digital changes. Their research identifies digital infrastructure, educational programs, faculty digital competencies, and the degree of student engagement with new services as key evaluation criteria.

Frantansov, Balanovskaya, and Gorbunova (2022) interpret digital maturity as the foundation for the strategic development and digital transformation of higher education institutions. They highlight the importance of developing and implementing digital strategies, ensuring organizational resilience, and improving the quality and efficiency of education through modern technologies.

Furthermore, Suykova (2021) examines the project office as a crucial institutional mechanism for implementing project-oriented management in professional and higher education organizations. Her study explores the effectiveness of project management in the context of digital transformation, including process organization, resource management, adaptation to changes, and overall efficiency improvement. This approach is essential for the systematic and consistent implementation of digital transformation in higher education institutions.

3. RESEARCH METHODOLOGY

The methodology applied in this study enables a comprehensive analysis of the interrelationship between mechanisms involved in the digital transformation of student-related operational processes in higher education institutions. The research extensively employs methods such as synthesis, generalization, analysis, and comparison, which allow for a systematic assessment of the efficiency of digital management processes.

[2] *Presidential Decree №. PF–60 of the Republic of Uzbekistan dated January 28, 2022, "On the Development Strategy of the New Uzbekistan for 2022–2026".*

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4. ANALYSIS AND RESULT

In the higher education system, student-related operational processes (admission, enrollment, academic planning, assessment, academic monitoring, documentation, and graduation processes) under traditional management conditions are characterized by fragmentation, a high bureaucratic burden, and strong dependence on the human factor. This situation leads to data duplication, delays in decision-making, and inconsistency in the quality of services provided.

To analyze these problems, a process based approach was selected as the main methodological foundation. According to this approach, the student is not viewed as a "consumer" within the higher education system, but rather as a key value creating subject, and all operational processes are integrated into a single digital value chain.

The analysis shows that the main student-related operational processes require digital transformation at the following stages:

- **Input processes** (admission, contract management, payment, ID creation);
- **Core processes** (class scheduling, learning management systems (LMS), assessment, grading, and monitoring of academic arrears);
- **Supporting processes** (library services, dormitory management, scholarships, and advisory services).

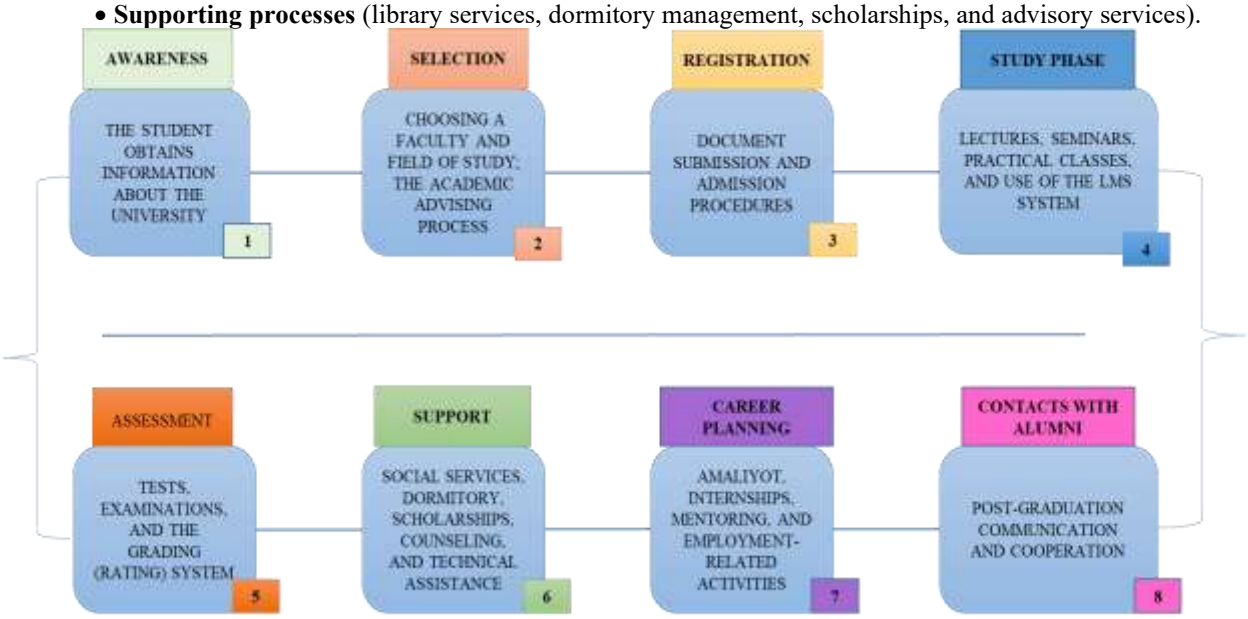


Figure 1. Stages of student university interaction in the Higher education system[3]

Figure 1 illustrates that in the higher education system, student–university interaction is manifested as a continuous, consistent, and institutionalized process. This process begins with the student's initial awareness of the higher education institution and continues through the conscious selection of a field of study, document submission, and formal admission procedures. At these stages, transparency of information, the effectiveness of academic advising and guidance services, as well as the implementation of digital management mechanisms are considered key factors in enhancing the quality of education. This, in turn, facilitates the student's rapid adaptation to the educational environment and ensures managerial efficiency within the higher education system.

The subsequent stages of the educational process study, assessment, support, and career planning serve to comprehensively develop students' knowledge, practical skills, and professional competencies. Effective use of LMS platforms, transparent and fair assessment systems, social support mechanisms, as well as the integration of mentoring and employment-oriented activities significantly increase graduates' competitiveness in the labor market. Continuous and systematic engagement with alumni is regarded as one of the most important factors ensuring sustainable institutional development of universities and the long-term effectiveness of educational outcomes.

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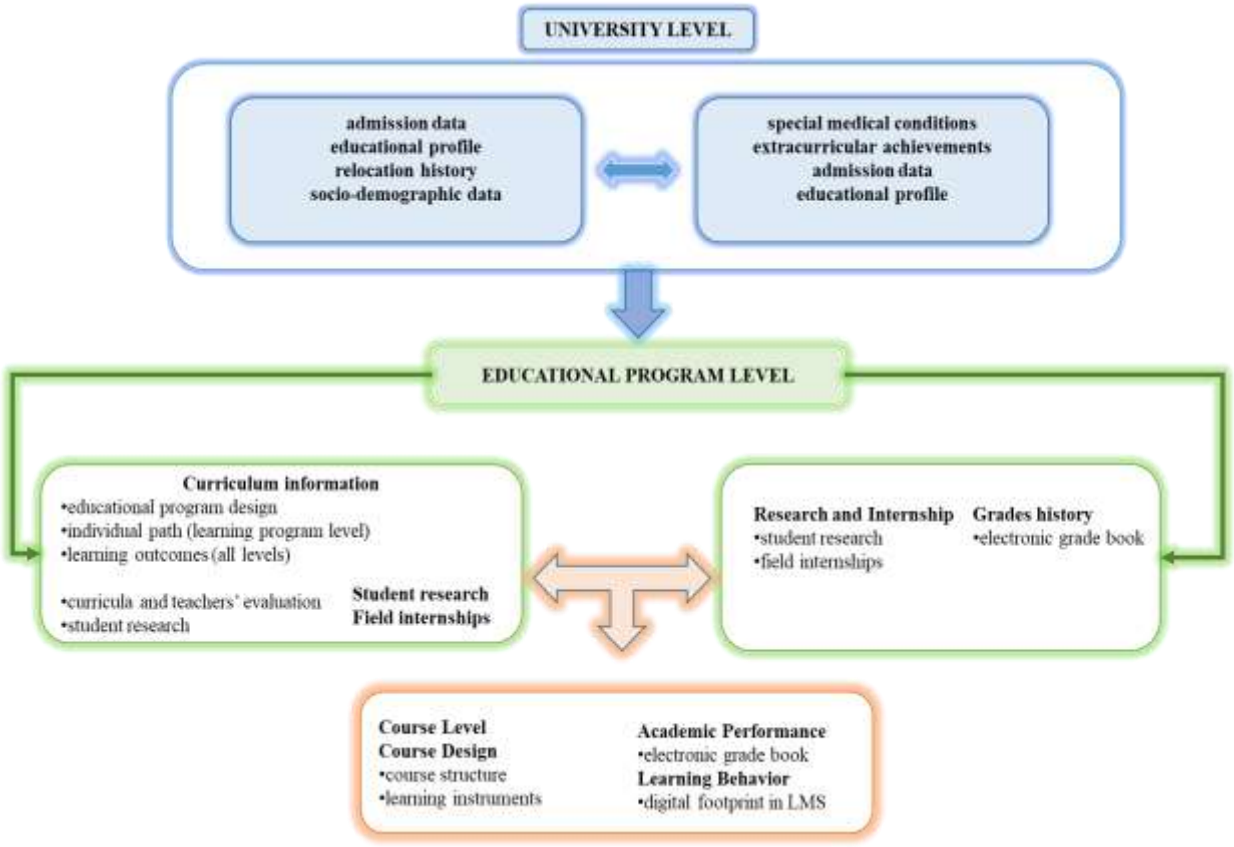


Figure 2. Multilevel monitoring system of student activity: university, program, and course dimensions[4]

Thus, the three-tier hierarchy of the education system is clearly represented by the university, the educational program, and the course level. At the university level, comprehensive information about students is collected, including the admission process, socio-demographic indicators, health status, and additional achievements. This information is crucial for shaping the student's personal profile and determining the entry stage into the educational process.

At the educational program level, the curriculum, individual learning paths, research activities, and assessment systems play a central role. This stage allows for systematic monitoring of the student's academic development, research engagement, and practical training experience.

At the course level, the student's daily learning activities are monitored through instructional design, electronic assessments, and digital traces. In this way, the three-tier hierarchical structure serves to comprehensively track student activity and enhance the quality of education.

5. CONCLUSION

Based on the above analysis, we summarize the conclusions and the achieved results:
This study demonstrates that the digital transformation of student-related operational processes in higher education is of critical importance for enhancing institutional efficiency, improving management quality, and increasing the overall quality of educational services. The research findings provide the possibility of systematic and continuous digital monitoring of student activities across entry, core, and supporting processes, which facilitates process optimization, improves information flow, and enables prompt responses to students' individual needs.

Furthermore, the three tier approach encompassing the university, educational program, and course levels allows for comprehensive monitoring of students' academic and daily activities, supports data-driven decision-making within the educational process, and enhances management efficiency. This approach strengthens student-centered

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strategies within higher education institutions, ensures transparent and consistent organization of learning processes, and maximizes the potential of digital technologies to generate real value.

Thus, digital transformation implemented based on a conceptual approach not only automates and optimizes processes but also enhances the competitiveness of higher education institutions, significantly improves the quality of educational services, and enriches the overall learning experience for students.

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