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MOTIVATION OF HIGHER EDUCATION STUDENTS IN LEARNING MANAGEMENT SYSTEMS: FROM THEORETICAL FOUNDATIONS TO PEDAGOGICAL PRACTICE

Abstract. The article presents a comprehensive theoretical analysis of the problem of motivation of higher education students in learning management systems (LMS). The psycho-pedagogical essence of learning motivation as a multidimensional dynamic phenomenon is revealed; its structural components in the context of educational digitalization are analyzed; the typology and factors of motivation formation in the digital educational environment are systematized. The structure of learning motivation is conceptualized as an integrated five-component system encompassing motivational-axiological, cognitive, emotional-volitional, behavioral, and reflective dimensions, each acquiring specific characteristics in the online learning context. The typology of motivation is differentiated by source of origin (intrinsic/extrinsic), orientation (achievement/avoidance), temporal perspective (situational/stable), and subject focus (technological, content-based, communicative, and outcome-oriented). Formation factors are systematized across macro-, meso-, and micro-levels. The conceptual understanding of LMS as a complex sociotechnical environment that actively influences motivational processes through architectural decisions, functional capabilities, and pedagogical design is substantiated. The motivational potential of modular course structure, adaptive learning systems, quality multimedia content, immediate and personalized feedback, collaborative tools, and learning analytics dashboards is identified. The specific challenges of the digital educational environment — including technostress, digital divide, social isolation, cognitive overload, and the paradox of choice — are examined as constraints on motivational sustainability. The article draws on classical motivational theories — including Self-Determination Theory (Deci & Ryan), Bandura's self-efficacy concept, and Csikszentmihalyi's flow theory — and adapts them to the realities of digital learning. The findings provide a theoretical foundation for developing evidence-based models of motivation formation and maintenance within LMS contexts.

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МОТИВАЦІЯ СТУДЕНТІВ ВИЩОЇ ОСВІТИ В СИСТЕМАХ УПРАВЛІННЯ НАВЧАННЯМ: ВІД ТЕОРЕТИЧНИХ ОСНОВ ДО ПЕДАГОГІЧНОЇ ПРАКТИКИ

Анотація. У статті здійснено комплексний теоретичний аналіз проблеми мотивації здобувачів вищої освіти у системах управління навчанням (СУН). Розкрито психолого-педагогічну сутність навчальної мотивації як багатовимірного динамічного феномену; проаналізовано її структурні компоненти в умовах цифровізації освіти; систематизовано типологію та чинники формування мотивації у цифровому освітньому середовищі. Структуру навчальної мотивації концептуалізовано як інтегровану п'ятикомпонентну систему, що охоплює мотиваційно-ціннісний, когнітивний, емоційно-вольовий, поведінковий та рефлексивний виміри, кожен з яких набуває специфічних характеристик у контексті онлайн-навчання. Типологію мотивації диференційовано за джерелом виникнення (внутрішня/зовнішня), спрямованістю (досягнення/уникнення), часовою перспективою (ситуативна/стійка) та предметною орієнтацією (технологічна, змістовна, комунікативна, результативна). Чинники формування мотивації систематизовано на макро-, мезо- та мікрорівнях. Обґрунтовано концептуальне розуміння СУН як комплексного соціотехнічного середовища, що активно впливає на мотиваційні процеси через архітектурні рішення, функціональні можливості та педагогічний дизайн. Виявлено мотиваційний потенціал модульної структури курсу, адаптивних систем навчання, якісного мультимедійного контенту, миттєвого та персоналізованого зворотного зв'язку, інструментів співпраці та дашбордів аналітики навчальної діяльності. Досліджено специфічні виклики цифрового освітнього середовища — технострес, цифровий розрив, соціальна ізоляція, когнітивне перевантаження та парадокс вибору — як обмеження стійкості навчальної мотивації. Стаття спирається на класичні мотиваційні теорії — теорію самодетермінації (Дісі та Райан), концепцію самоефективності Бандури, зону найближчого розвитку Виготського та теорію потоку Чиксентміхайї — та адаптує їх до реалій цифрового навчання. Отримані результати формують теоретичне підґрунтя для розробки науково обґрунтованих моделей формування та підтримки навчальної мотивації в контексті СУН.

Ключові слова: навчальна мотивація; цифровізація освіти; системи управління навчанням; вища освіта; педагогічний дизайн; аналітика навчальної діяльності; персоналізація навчання; теорія самодетермінації; самоефективність; внутрішня мотивація; гейміфікація; адаптивне навчання; онлайн-освіта; саморегуляція навчальної діяльності; цифрове освітнє середовище.

Problem statement. The digital transformation of higher education, dramatically accelerated by the COVID-19 pandemic, has fundamentally changed not only the technical aspects of the educational process but also the very nature of students' learning activities. Learning management systems (LMS) have evolved from auxiliary tools into the primary environment of academic interaction, posing new challenges for pedagogical science: the reconceptualization of traditional approaches to forming and sustaining learning motivation.

The problem of motivation has always occupied a central place in educational psychology; however, the specific characteristics of the digital educational environment create a qualitatively new context for its investigation. In traditional instruction, motivation is shaped primarily through direct teacher–student interaction in the physical space of the classroom; in online learning, it is mediated by technological platforms whose architecture and functionality significantly influence motivational processes.

Analysis of the latest research and publications. A theoretical analysis of the literature reveals that research on motivation in the digital educational environment is in a phase of active development. Classical motivational theories— Deci and Ryan's Self-Determination Theory, Weiner's attribution theory, provides a solid foundation for understanding motivational processes but require adaptation to the realities of digital learning. Simultaneously, contemporary research in the fields of educational technology, learning analytics, and pedagogical design offers new conceptual frameworks for understanding motivation in a technologically mediated educational environment [1].

The aim of the article is to provide a theoretical justification of the specificity of motivation among higher education students in LMS through analysis of the structure, typology, and formation factors of motivation in the context of digitalization, as well as to reveal the motivational potential of the architectural and functional components of LMS.

Main part. Learning motivation is traditionally defined as a complex psychological formation that impels students toward activity, gives it a specific orientation, and ensures personal significance. In the context of educational digitalization, however, this definition requires refinement: the digital environment not only creates new conditions for realizing existing motives but also generates qualitatively new motivational phenomena.

An analysis of classical theoretical approaches reveals their heuristic value for understanding motivation in digital learning. Deci and Ryan's (2000) Self-Determination Theory, which postulates three basic psychological needs—autonomy, competence, and relatedness—proves especially productive for analyzing

motivational processes within LMS. The digital environment creates unique opportunities for satisfying the need for autonomy through flexible scheduling and pacing, and through choice of learning trajectories and task formats. At the same time, the absence of direct social contact complicates satisfaction of the need for relatedness, requiring specific pedagogical solutions to create a sense of learning community in virtual space.

A fundamental distinction of motivation in digital learning lies in its objective measurability through the digital traces of learning activity. Whereas traditional motivation research relies primarily on student self-reports via questionnaires and interviews, LMS automatically record numerous behavioral indicators: login frequency, time spent on materials, response speed, discussion activity, and assignment submission timeliness [1]. This opens qualitatively new possibilities for diagnosing motivation and for early detection of its decline.

The dichotomy of intrinsic and extrinsic motivation is particularly salient in the context of digital learning. Intrinsic motivation—linked to interest in the process of cognition itself—can be supported in the digital environment through interactivity, multimedia richness, and opportunities for experimentation in virtual laboratories and simulations. However, excessive use of gamification elements—badges, rankings, leaderboards—can produce an "undermining effect" on intrinsic motivation, whereby activities initially undertaken for their inherent interest come to be perceived as means of obtaining external rewards.

Bandura's concept of self-efficacy—a student's belief in their capacity to successfully perform academic tasks in the online environment—is formed through four sources: mastery experiences (provided by adaptive tasks of optimal difficulty), vicarious experiences (observing peers' successes through public profiles and work galleries), verbal persuasion (encouraging feedback from instructors), and the interpretation of physiological states (minimizing anxiety through transparent requirements and assessment criteria). LMS provide unique opportunities for deliberately influencing all four sources of self-efficacy [2].

The structure of learning motivation of higher education students in the context of digitalization constitutes an integrated multilevel system comprising five interrelated components, each of which acquires specific characteristics in the online learning context.

Motivational-Axiological Component

This component reflects the student's system of value orientations regarding learning activity and its place in the structure of life priorities. In the context of digital learning, it encompasses awareness of the value of developing digital competencies, recognition of the benefits of flexible scheduling, and appreciation of opportunities for self-development through access to global educational resources. Empirical research demonstrates that students who perceive digital learning not as a forced alternative to traditional instruction but as an opportunity to expand their educational horizons exhibit higher levels of academic achievement and satisfaction with the educational process. This component is closely linked to the student's professional identity and their vision of the role of digital technologies in future professional activity.

Cognitive Component

The cognitive component encompasses cognitive interests, intellectual needs, goal-setting, and learning activity planning. Research demonstrates that in online learning, the cognitive dimension of motivation is more closely linked to metacognitive skills than in traditional educational environments. The student in an LMS must not merely assimilate information but independently structure the learning process, prioritize materials, evaluate the relevance of informational resources, and critically analyze multiple sources. Interactive course elements, multimedia content, and simulations create a cognitively enriched environment that stimulates cognitive activity; however, they simultaneously require a higher level of self-regulation compared to traditional learning.

Emotional-Volitional Component

This component includes emotional attitudes toward learning, self-regulatory capacity, and perseverance in overcoming difficulties. The digital environment is characterized by specific emotional states: from enthusiasm for technological possibilities to frustration with technical problems; from satisfaction with autonomy to feelings of isolation. Contemporary research identifies specific emotions of online learning: technostress, digital anxiety, satisfaction from interactivity, and pride in gamified achievements. Digital learning places special demands on the volitional sphere, requiring high self-discipline, resistance to digital distractions, and the ability to allocate time among various online activities.

Behavioral Component

The behavioral component manifests in the student's concrete actions and activity in the learning process. In digital learning conditions, behavioral indicators of motivation acquire an objectively measurable character through the capabilities of learning analytics. LMS automatically record numerous parameters of learning behavior, allowing instructors to identify low-motivation students at early stages and implement preventive pedagogical interventions. However, interpretation of behavioral data requires caution: for example, extended time in the system may indicate either high engagement or difficulties with understanding material.

Reflective Component

The reflective component includes self-analysis of one's learning activity, evaluation of the effectiveness of chosen strategies, and awareness of one's motivational dynamics. Digital LMS—by providing detailed progress analytics—create new opportunities for developing the reflective dimension of motivation through visualization of achievements, comparison of actual results with target indicators, and the ability to adjust learning strategies on the basis of objective data. Personal dashboards with activity graphs, progress bars, and task completion statistics stimulate metacognitive reflection and develop the capacity for self-monitoring [3].

The classification of types of learning motivation in the context of digital learning is based on multiple criteria and requires a reconceptualization of traditional typologies in light of the specifics of the online environment.

By source of origin, the traditional intrinsic/extrinsic dichotomy requires refinement. Intrinsic motivation in the digital environment can be nurtured by

interactivity, immediate feedback, personalized learning, and opportunities for experimentation and inquiry in a safe virtual space. Extrinsic motivation is reinforced through badges, rankings, and public achievements, which can either support or undermine intrinsic motivation depending on their mode of implementation. The observed tendency toward strengthening extrinsic motivation in online learning is explained by the weakening of social motives due to the absence of direct contact with instructors and peers.

By orientation, a distinction is drawn between positive achievement motivation and negative failure-avoidance motivation. Students with achievement motivation actively utilize additional LMS resources, participate in elective activities, and strive for maximum quality of task completion. By contrast, students with avoidance motivation confine themselves to the minimum required scope of work and demonstrate a passive strategy. Research indicates that the distance-learning format can amplify avoidance motivation by diminishing the social visibility of academic achievements.

By temporal perspective, a distinction between situational and stable motivation is particularly significant. Situational motivation arises in response to specific digital environment stimuli—reminders, deadlines, new materials, gamified tasks—and dissipates quickly upon encountering difficulties. Stable motivation is grounded in a deep awareness of the professional relevance of the material being studied and in developed self-regulatory skills that sustain prolonged learning activity regardless of situational fluctuations.

By subject orientation, it is useful to distinguish: technological motivation (interest in digital tools themselves), content motivation (focus on the disciplinary subject matter), communicative motivation (orientation toward interaction with participants in the educational process), and outcome motivation (focus on achieving specific learning results). An optimal motivational profile presupposes a balanced combination of all these types [3].

Factors of motivation formation in the context of digitalization are systematized at three levels. The macro-level encompasses the global digital transformation of society, which shapes social expectations regarding the digital competency of graduates; the legitimization of online education following the COVID-19 pandemic; and the digital divide in access to technology, which creates demotivating barriers for certain categories of students. The meso-level includes organizational-pedagogical factors: the pedagogical design of online courses, the quality of multimedia content, the structure and logic of content presentation, and assessment systems. Empirical data indicate that excessive complexity of LMS navigation, ambiguity of requirements, or technical failures can radically reduce motivation even in highly motivated students. Of particular importance is social presence in the digital environment: the sense of connection with instructors and peers, and opportunities for communication and collaboration, significantly influence motivation. The quality and timeliness of instructor feedback is regarded as one of the most powerful motivational factors in digital learning. The micro-level is represented by individual student characteristics. Academic self-efficacy—belief in one's ability to successfully complete learning tasks—is one of the strongest

predictors of online learning motivation. Self-regulation of learning activity acquires critical significance due to the high degree of autonomy and the necessity of independent planning. Students with developed self-regulatory skills demonstrate higher motivation, as they are able to effectively organize their own activity, overcome distracting factors, and sustain concentration.

LMS are best conceptualized not merely as technological platforms but as complex sociotechnical environments that actively influence motivational processes. An ecopsychological approach allows LMS to be viewed as spaces that create specific possibilities for action—affordances [4]. Motivational affordances include the visibility of progress (progress bars, completion statistics), social interaction (forums, chats, commenting), autonomy (access to materials at any time, choice of sequence), and recognition of achievements (badges, rankings, public praise). It is crucially important to understand that these affordances do not directly determine motivation but rather create possibilities for its actualization, contingent upon the individual characteristics of the student and the pedagogical design.

The architecture of LMS carries significant motivational potential. The modular structure characteristic of most systems allows students to perceive a course as a sequence of achievable stages, supporting motivation through the creation of intermediate goals and a sense of progress. An intuitive navigation system with a clear hierarchical structure reduces cognitive load associated with technical aspects of operation and allows students to concentrate on the substantive side of learning. Adaptive learning systems, integrated into contemporary LMS, utilize machine learning algorithms to personalize the learning trajectory based on prior results, learning pace, and identified knowledge gaps. From a motivational perspective, adaptive systems sustain motivation by ensuring an optimal level of task difficulty.

Feedback within LMS constitutes one of the most powerful motivational mechanisms. Immediate automated feedback—characteristic of online tests—satisfies the need for competence and enables students to rapidly adjust their learning strategies. However, high-quality feedback requires not only confirmation of response correctness but also explanation of errors and recommendations for further study. Individual instructor feedback on open-ended tasks must be substantive, specific, constructive, and timely. Research has established that combining assessment with constructive commentary is more effective for learning and motivation than either assessment or commentary alone [5]. LMS that integrate assessment rubrics with the possibility of annotating individual criteria create optimal conditions for such combined feedback.

Social interaction in LMS is critically important for sustaining motivation. The Community of Inquiry framework postulates that effective online learning requires a balance among three types of presence: teaching presence (organizing the learning process, facilitating discussion, providing expert support), social presence (interpersonal interaction, creating a trusting atmosphere), and cognitive presence (engagement in critical thinking and knowledge construction). Teaching presence manifests through regular announcements establishing the context for learning activity, instructor participation in forum discussions with synthesis of key ideas, and personalized messages to students. Instructor video presentations at the beginning of

the course and at key points help create the sense of a real person behind the system interface.

Collaborative learning in LMS supports motivation through several mechanisms: social accountability (awareness that the group's success depends on one's contribution), social learning through observation (seeing how others solve problems can increase self-efficacy), and emotional support (knowing that others experience similar difficulties reduces anxiety and isolation). Personalization and adaptivity in LMS support the basic psychological need for autonomy, critical for intrinsic motivation [5]. The ability to choose an essay or project topic from a list of options allows students to orient toward their own interests and professional priorities, thereby increasing intrinsic motivation through a sense of autonomy. Empirical research demonstrates that students who have the possibility of personalization within LMS exhibit higher levels of engagement and course completion.

Learning analytics opens qualitatively new possibilities for diagnosing motivation through tracking behavioral indicators. In the context of motivation, analytics allows early signs of motivational decline to be identified by tracking decreased login frequency, increased intervals between sessions, non-completion of tasks within prescribed deadlines, surface-level engagement with content, and absence of participation in discussions. Predictive models, based on machine learning, analyze historical data on learning behavior and results from prior student cohorts to identify risk factors for academic underperformance. Students whose behavioral patterns match a risk profile can receive proactive support from instructors before problems become critical [5]. The visualization of analytics data for students through personal dashboards provides opportunities for self-monitoring and reflection. Activity graphs compared with group averages, and task completion progress, can stimulate motivation by raising awareness of the need to intensify effort. However, an excessive number of metrics can overload students and generate anxiety, particularly if their scores are below the norm.

Despite their significant motivational potential, LMS have a number of limitations and can create specific challenges for student motivation. Technological barriers include system malfunctions, interface complexity, device compatibility issues, and slow loading times—all of which create frustration and impede learning. Technostress encompasses feelings of anxiety, fatigue, and irritation from working with technology. The digital divide between students with different levels of access to technology and digital literacy can lead to inequality in motivational opportunities. Students who encounter technical difficulties accessing or navigating LMS expend cognitive resources overcoming technical barriers rather than focusing on the substantive side of learning.

Feelings of isolation and social distance in online courses can undermine motivation for students with a high need for personal interaction. Despite the availability of communication tools, virtual interaction may be perceived as less authentic and satisfying compared to face-to-face communication. Building trusting relationships and emotional bonds among online course participants requires

purposeful pedagogical strategies and more time compared to a traditional classroom setting.

Information overload can arise from an excessive number of messages, announcements, and resources that disperse students' attention and complicate the identification of genuinely important information. The paradox of choice—whereby an excessively large number of options produces not a sense of freedom but cognitive load and decision-making stress—can reduce student motivation in courses with excessive variation of tasks and resources [6]. Effective personalization requires a balance between structure and flexibility: instructors must provide sufficient options to create a sense of choice without overwhelming students with excessive variability.

Conclusions. The theoretical analysis conducted in this article demonstrates that motivation of higher education students in LMS is a complex multifactorial phenomenon, formed in the interaction of structural components of motivation, individual psychological characteristics of students, architectural and functional features of the digital environment, quality of course pedagogical design, and effectiveness of pedagogical support.

The structure of learning motivation in the digital educational environment constitutes an integrated system of five components—motivational-axiological, cognitive, emotional-volitional, behavioral, and reflective—each acquiring specific characteristics in the context of digitalization. The typology of motivation is differentiated by source of origin, orientation, temporal perspective, and subject focus. Factors of motivation formation are systematized at three levels: macro-level (sociocultural and economic conditions), meso-level (organizational-pedagogical characteristics), and micro-level (individual student characteristics).

The digital environment creates both new opportunities for motivation—autonomy, personalization, interactivity, immediate feedback—and specific challenges: technological barriers, cognitive overload, risk of social isolation. LMS are conceptualized as a complex sociotechnical environment with significant motivational potential, realized through architectural decisions, functional components, and pedagogical design. The motivational role of modular structure, intuitive navigation, adaptive systems, quality content, effective feedback, social interaction, personalization, and learning analytics has been identified.

Effective utilization of the motivational potential of LMS requires not merely the technical implementation of a platform but thoughtful pedagogical course design grounded in scientific motivational theories, attentive to the individual characteristics of students, and ensuring a balance between technological innovations and the fundamental principles of effective pedagogy. Understanding the mechanisms of motivation in the context of digitalization creates a theoretical foundation for the development of evidence-based models of motivation formation and maintenance—models that require empirical verification.

Prospects for further research are linked to the development and testing of specific pedagogical strategies for supporting motivation in LMS, the investigation of the effectiveness of various motivational interventions, the examination of the long-term effects of digital learning on the formation of stable learning motivation, and the study of academic self-efficacy among higher education students.

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