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CRITERIA AND INDICATORS FOR ELECTRONIC ASSESSMENT OF PROFESSIONAL ACTIVITY OF TEACHING STAFF IN GENERAL SECONDARY EDUCATION INSTITUTIONS

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Abstract

The relevance of the study is driven by the inadequacy of traditional teacher assessment methods in addressing the challenges of digital transformation in education. It is substantiated that the existing certification system is subjective, bureaucratic, and fails to reflect the specific nature of teachers' professional activities in the modern digital environment. This necessitates the development of a new, scientifically grounded model of electronic assessment capable of ensuring objective and evidence-based analysis.

Purpose: To develop and scientifically substantiate a system of criteria and indicators for electronic assessment of the professional activity of teaching staff in general secondary education institutions.

Methods: *analysis* – to critically examine official documents and scholarly sources on pedagogical assessment theory and digital transformation in education, forming the conceptual foundation of the study; *synthesis* – to integrate pedagogical, managerial, and technological aspects into the electronic assessment framework; *modeling* – to design a model of criteria and indicators that reflects the interaction of key components and describes the mechanisms of its functioning; *generalization* – to formulate comprehensive conclusions.

Results: A scientifically substantiated model of electronic assessment of teachers' professional activity has been developed, comprising four integral components: normative-target, criteria-indicator, instrumental-technological, and result-analytical. The core of the model is a system of criteria aligned with the labor functions defined in the Professional Standard for Teachers, along with corresponding measurable digital indicators. These indicators enable the collection and analysis of verifiable data ("digital footprints") from educational information systems (LMS, e-portfolios, e-journals, online survey results), transforming the assessment process into an objective and evidence-based procedure.

Conclusions: The implementation of the proposed model facilitates a shift from formal control to objective, multifaceted analysis based on the principles of evidence, transparency, multidimensionality (360-degree approach), and developmental orientation. The primary goal of such assessment is not control, but the provision of high-quality, substantiated feedback to the teacher, which stimulates professional reflection and serves as a foundation for designing an individual trajectory of continuous professional development, thereby turning assessment into an effective tool for managing education quality.

Keywords: *electronic assessment, professional development, teaching staff, criteria and indicators, model, digital transformation, digital footprints.*

Introduction. The relevance of the problem of developing criteria and indicators for the e-assessment of the professional activities of pedagogical workers at general secondary education institutions is driven by the global digital transformation of society, which is radically changing the requirements for the education system and the teacher's professional competence. Under martial law and the COVID-19 pandemic, the Ukrainian educational

system made a forced but powerful leap towards digitalization, which highlighted the urgent need to modernize all managerial processes, including the system for assessing pedagogical workers. As noted by leading scholars, particularly V. Bykov (2019), digitalization is not just the implementation of technologies, but a fundamental restructuring of the educational landscape, requiring new approaches to measuring the effectiveness and quality of pedagogical work. Existing traditional attestation models, which are based predominantly on paper-based documentation and periodic face-to-face observations, are proving to be insufficiently flexible and objective for analyzing a teacher's activities in the modern digital educational environment. They do not make it possible to fully account for such aspects as proficiency with digital tools for teaching, the ability to organize blended and distance learning, skills in ensuring student cybersecurity, and the ability to create innovative digital content. Therefore, there is an acute need for a scientifically grounded system of criteria that would adequately reflect the multifaceted nature of a teacher's professional activity in the new reality, fostering their continuous professional development.

The need to develop new criteria and indicators for e-assessment is also dictated by the obvious obsolescence and insufficient effectiveness of the existing attestation system for pedagogical workers. Traditional approaches are often formal in nature, are excessively bureaucratized, and do not always contribute to the teacher's genuine professional growth, turning into a mechanism of control rather than development. Research in the field of educational management, particularly the work of N. Bilyk et al. (2023), emphasizes that a modern assessment system must be dynamic, formative, and diagnostic, aimed at identifying the educator's professional needs and constructing an individual educational trajectory. Electronic assessment, unlike paper-based assessment, opens unique opportunities for collecting and analyzing large datasets (Big Data) about a teacher's activities, allowing a transition from subjective judgments to objective, evidence-based conclusions. The analysis of the digital footprint, such as activity in an LMS, the quality of developed electronic resources, and the results of online surveys of students and parents, creates a comprehensive picture unattainable by traditional methods. However, without clearly defined, valid, and reliable criteria and indicators, this data remains merely a collection of information, not an effective tool for education quality management.

An important aspect of this relevance is the need for the objectification of the assessment process and the minimization of the human factor, which is one of the key problems of traditional attestation. Electronic assessment, based on clear algorithms and measurable indicators, is capable of ensuring a higher level of transparency, fairness, and impartiality, which positively affects the psychological climate among the teaching staff and teacher motivation. As noted by Shyshkina et al. (Shyshkina et al., 2023), the implementation of information and communication technologies into managerial processes allows for the standardization of procedures and ensures a level playing field for all participants in the educational process. The development of a unified system of criteria for e-assessment will make it possible not only to analyze the activities of an individual teacher but also to conduct comparative analysis at the level of the educational institution, community, or even the entire country, identifying systemic problems and best practices. This, in turn, creates a scientific foundation for making informed managerial decisions in the sphere of educational policy, particularly regarding professional development programs and resource allocation. The creation of such a system is a response to the societal demand for increasing the accountability and effectiveness of the educational system.

The problem of researching criteria and indicators for the e-assessment of the professional activities of pedagogical workers at general secondary education institutions is highlighted by Ukraine's orientation towards European educational standards, where significant attention is paid to the digital competence of educators as a key element of their professional qualification. European framework documents, such as the Digital Competence Framework for Educators (DigCompEdu), establish clear benchmarks regarding the digital skills that a modern teacher must possess. The work of N. Morze and M. Hladun (2022) emphasizes the need to implement the provisions of these documents into the Ukrainian system of professional development and assessment for educators. A scientifically grounded system of indicators will make it possible not only to assess but also to purposefully develop the digital

competence of teachers, which is critically important for preparing competitive graduates capable of living and working in the digital economy. This task takes on special importance in the context of Ukraine's post-war reconstruction, where digital technologies and quality education will become drivers of the country's innovative development. Electronic assessment, unlike discrete attestation once every five years, can function in real-time, providing the teacher with constant feedback on their activities. Tools such as the electronic portfolio (e-portfolio) are becoming not just a repository for certificates, but a dynamic instrument for self-reflection and planning professional growth, as confirmed by research in the field of pedagogical andragogy. Such a system allows the teacher to see their strengths and areas for development, choose relevant professional development courses, and receive recognition for their achievements.

Sources. An analysis of the problem of developing criteria and indicators for the e-assessment of educators' professional activities is impossible without considering the current regulatory and legal framework and the scientific works of Ukrainian scholars. This analysis makes it possible to define the legislative frameworks, conceptual foundations, and existing scientific approaches that collectively outline the current state of the problem and identify existing gaps that need to be addressed.

The fundamental basis for modernizing the assessment system for pedagogical workers is the key educational laws of Ukraine. The Law of Ukraine "On Education" (2017) establishes the principles of educational activity, including the academic freedom of the educator, and defines their obligation regarding continuous professional development. Article 50 of this law, for the first time at the legislative level, enshrined such forms of professional development as attestation and certification. The Law of Ukraine "On Complete General Secondary Education" (2020) details these provisions, emphasizing pedagogical internships, supervision, and the need to create conditions for the professional growth of teachers. These laws create the legal field for the transition from outdated, formalized methods of control to stimulating and supportive assessment systems. Specific assessment mechanisms are regulated by by-laws.

The key document defining the substantive content of the assessment is the Professional Standard for the profession "Teacher of a General Secondary Education Institution" (Ministry of Education and Science of Ukraine, 2024). This standard describes in detail the general and professional competencies that an educator must possess. Of particular importance is the distinction of digital competence, which includes the ability to navigate the information space, use digital technologies in the educational process, and ensure student safety on the Internet. The standard effectively provides a framework for what exactly needs to be assessed. However, it does not answer the question of how to do this, and what specific measurable indicators might attest to the level of development of a particular competence, especially during its analysis via electronic systems (Professional standard “Teacher of general secondary education institution” approved, 2017).

The new Regulation on the Attestation of Pedagogical Workers (2022) is a significant step forward. It is aimed at the debureaucratization of the process, increasing objectivity, and accounting for the educator's activities during the inter-attestation period. Importantly, it provides for the possibility of using information technologies for document management, yet it does not contain clear criteria and indicators for assessing professional activity specifically in the digital environment. In parallel, there is a Regulation on the Certification of Pedagogical Workers (Resolution of the Cabinet of Ministers, 2019), which is a voluntary external assessment procedure. Certification actively uses digital tools, in particular, requiring the creation of an electronic portfolio, which indicates the state's policy towards the digitalization of assessing educators' professional activities. These two documents create a logical and mutually complementary tandem. The professional standard answers the question "WHAT" to assess, outlining the content of the teacher's professional competencies and labor functions. The Regulation on Attestation, in turn, answers the questions "HOW," "WHEN," and "BY WHOM" the assessment is conducted, establishing its procedure, periodicity, and subjects. Any e-assessment system must be fully aligned with these regulatory requirements to be legitimate and effective (Attestation 2024/2025, 2024).

The scientific discourse regarding criteria and indicators for assessing the professional activities of educators is multifaceted and is developing in several key directions, creating a theoretical foundation for the development of modern, particularly electronic, assessment systems. An analysis of these works makes it possible to trace the evolution of approaches from general concepts of professionalism to specific digital assessment tools. The basis for any assessment system is a clear understanding of the essence of the educator's professionalism and the strategic goals of educational reforms. A fundamental contribution to this field was made by O. Savchenko (2019), whose work became the conceptual basis for the New Ukrainian School. She not only defined but also substantiated in detail the content of the teacher's key competencies, which makes her work a starting point for the operationalization of assessment criteria. The ideas of the competence-based approach were also developed by N. Bibik (2004), who researched the connection between the level of development of a teacher's professional qualities and their ability to form key competencies in learners, which makes it possible to construct indicators of educator effectiveness through the prism of learners' academic achievements.

The context of modernizing the content of education, which directly affects assessment criteria, has been researched in the works of V. Kremen, O. Liashenko, T. Lukina, O. Topuzov, et al. In particular, the research by O. Liashenko and O. Topuzov emphasizes the need for educational outcomes to correspond to modern socio-economic challenges, which requires teachers to have new skills related to project-based activities, STEM education, and the development of critical thinking in students, and these skills must become an object of assessment (Liashenko & Topuzov, 2021). At the same time, O. Liashenko et al. (2017) laid the methodological foundations for education quality assessment, emphasizing that any assessment must be based on a clear philosophy, be systemic, transparent, and use valid indicators that preclude subjectivism. In developing these ideas, T. Lukina (2020) developed the theoretical and methodological foundations of educational monitoring, substantiating a multi-level system of indicators for tracking the quality of educational processes, which can be adapted to analyze the activities of an individual educator. This conceptual block is completed by the human-centric approach, substantiated by V. Kremen (2023), according to which assessment must move away from a punitive-controlling function and transform into an instrument of support and development for the personality of both the student and the teacher.

The traditional attestation system has long been an object of scientific criticism. O. Dobosh (2019) analyzes in detail the shortcomings of this system, researching attestation as a tool for managing professional development and emphasizing the need for its transformation from a controlling procedure to a diagnostic tool that makes it possible to design an individual trajectory of professional growth. In the same context, L. Vashchenko analyzes the professional development of educators under reform conditions, linking the effectiveness of this process to systems of motivation and objective assessment at the level of the educational institution. Her work shows how assessment results can become the basis for forming professional development programs and providing targeted methodological support to teachers (Vashchenko et al., 2020).

The introduction of certification as an alternative, voluntary form of assessment has also been reflected in scientific works. Yu. Brusov (2024) analyzed the first results and challenges of pilot certification, viewing it as a mechanism of external independent assessment that could become a powerful stimulus for professional improvement. They examine in detail the stages of certification, including independent testing and the study of practical experience, which lays the foundation for developing criteria-oriented towards real pedagogical practices.

The key factor driving the need to review assessment criteria is the digitalization of education. Research from the Institute for Digitalisation of Education of the NAES of Ukraine, particularly the work of V. Bykov et al. (2019), comprehensively analyzes global experience and Ukrainian realities of digital transformation, substantiating the need to develop new assessment models adequate for the modern digital educational environment. O. Humennyi (2025) thoroughly analyzes the structure of digital competence, adapting European frameworks, particularly DigCompEdu, to the

Ukrainian context and proposing specific descriptors for measuring its components: from information literacy to digital content creation and cybersecurity. An important contribution to understanding the role of digital tools was made by Yu. Zhuk (2012), who researched information and communication competence and developed criteria for assessing the quality of electronic educational resources. His approach makes it possible to assess not only the teacher's ability to use ready-made programs but also their ability to create their own high-quality digital content.

A separate important direction is the development and analysis of specific digital assessment tools. The electronic portfolio (e-portfolio) technology is the most researched in this aspect, as it allows for a comprehensive presentation of evidence of professional growth. O. Isaieva and R. Aleksieieva (2021) view the e-portfolio as an effective means of authentic assessment, which captures not a static snapshot of knowledge, but the dynamics of competence development. Developing this direction, a team of scholars including M. Pryhodii, A. Hurzhii, O. Radkevych et al. (2022) proposed practice-oriented research, embodied in the methodological recommendations "Technology for Creating a Digital Portfolio for Vocational Education Learners." This work is important as it moves the discussion about e-portfolios from the theoretical to the applied plane, offering a specific, step-by-step technology for its development and implementation. And although these recommendations were developed for vocational education learners, the structural components of the portfolio proposed in them (informational, diagnostic, content, and reflective blocks), the criteria for content, and the technological solutions are universal. They can be extrapolated and adapted for developing an e-portfolio model for a pedagogical worker at a general secondary education institution, serving as a methodological basis for determining the relevant indicators of their professional activity. I. Voloshchuk (2012) analyzes the portfolio as a tool for developing reflection – a key ability of the modern educator for self-analysis and self-improvement. The practical aspects of implementing the e-portfolio in the attestation process are researched by S. Shevchuk (2019), revealing its advantages for demonstrating professional achievements and emphasizing the need for clear criteria for assessing its content. At the same time, M.V. Marienko, M.P. Shyshkina, and O.A. Konoval (2019) study cloud-oriented technologies as the technical basis for creating large-scale, reliable, and secure e-assessment platforms capable of supporting the functioning of such systems at the national level.

The results of scientific research provide the theoretical foundation for developing e-assessment criteria. However, despite significant developments, there remains a need to create a holistic, scientifically grounded model that would integrate all these aspects into a unified system.

The purpose of the article is the development and scientific substantiation of a system of criteria and indicators for the e-assessment of the professional activities of pedagogical workers at general secondary education institutions.

Research methods: analysis – for a critical reflection on official documents and scientific sources on the theory of pedagogical assessment and the digital transformation of education, which made it possible to form the conceptual framework of the study; synthesis – to combine pedagogical, managerial, and technological aspects into e-assessment; modeling – to develop a model of criteria and indicators that reflects the interaction of key components and describes its functioning mechanisms; generalization – to form comprehensive conclusions.

Results and Discussion. Electronic assessment (e-assessment) of an educator's professional activity is a systemic process that involves the use of digital technologies to collect, analyze, interpret, and present data about various aspects of a teacher's work in order to make informed decisions regarding their professional suitability and further development. This concept goes far beyond the simple digitization of paper reports or attestation sheets. It marks a fundamental paradigm shift in assessment, a transition from a static "snapshot" to a dynamic, multidimensional, and contextualized "video feed" of professional practice. Unlike traditional approaches, e-assessment allows for the collection and analysis of a wide range of authentic digital artifacts: video recordings of lessons, teacher-developed interactive learning materials, analytics

from an LMS, samples of student work, results of online surveys, and much more (Malik et al., n.d.).

The development of an effective system for the professional development of pedagogical workers involves the creation of an objective and transparent basis for analyzing their professional activities. A key role in this process is played by the model of criteria and indicators for e-assessment, which provides the theoretical foundations that systematize all assessment elements into a single integrative framework, define the connections between them, and describe their interaction mechanisms. The foundation of such a model is the normative-target component, which defines the goal and objectives of the assessment. It is based on the requirements of the professional standard for teachers of general secondary education institutions (Ministry of Education and Science of Ukraine, 2024), which outlines the key labor functions (teaching learners subjects (integrated courses), partnership-based interaction with participants in the educational process, participation in organizing a safe and healthy educational environment, implementing the educational process, continuous professional development) and professional competencies (language and communication, subject-methodological, information and digital, psychological, emotional-ethical, pedagogical partnership competence, inclusive, health-promoting, project-design, prognostic, organizational, assessment-analytical, ability for lifelong learning (Ministry of Education and Science of Ukraine, 2024). It is the professional standard that serves as the source for forming criteria, and clearly defined goals – whether attestation for control or stimulating professional growth – set the vector for the entire process.

On this foundation, the core of the model is built – the criteria-indicator component, which directly specifies the object of assessment. Criteria, such as digital, methodological, or organizational competence, are generalized areas stipulated by the professional standard. They, in turn, are detailed based on specific and measurable indicators. For example, for the "digital competence" criterion, indicators might include the actual use of electronic educational resources, the creation of one's own digital learning materials, or the effectiveness of communication with participants in the educational process on digital educational platforms.

The instrumental-technological component is responsible for collecting and analyzing data according to these indicators. It covers digital environments, such as the electronic portfolio or learning management systems (LMS), where the educator uploads evidence of their professional activity. Assessment tools include video recordings of lessons, student projects, results of self-assessment and expert conclusions, as well as the analysis of digital footprints of activity, which together form the evidence base.

The final element of the model is the resultant-analytical component, which ensures the interpretation of the collected data. Special mechanisms and analysis algorithms make it possible to correlate the provided evidence with the defined indicators and criteria, thus establishing the educator's level of professional development. The key result of this stage is not just a statement of fact, but the provision of high-quality feedback, namely, well-grounded information about strengths and areas for professional development.

The functioning of the model of criteria and indicators for e-assessment occurs as a sequential and logically connected process. First, the assessment goals are defined, after which the educator collects and uploads evidence of their professional activity to the electronic platform in accordance with the defined indicators. Next, experts or automated systems analyze these materials, correlating them with the criteria. Based on this analysis, a summary report is generated, containing not only conclusions but also personalized recommendations. It is these recommendations that become the basis for forming the teacher's individual professional development trajectory, transforming assessment from a formal procedure into a dynamic management tool.

The effective functioning of the model is based on adherence to a number of key principles: evidence-based, according to which all conclusions and decisions made in the assessment process are based not on general impressions or subjective judgments, but on specific, verified digital information and data collected from various sources. The teacher has the opportunity to confirm the results of their self-assessment with evidence that validates

their professional rating (Educator Self-Assessment and Professional Growth Key Method Self-Assessment of Professional Practice, n.d.); transparency, according to which all criteria, indicators, procedures, and assessment tools are clearly defined, open, and understandable to all participants in the educational process – teachers, administration, and members of attestation committees. This promotes trust in the system and eliminates the feeling of "unpredictability" or bias (Improving Teacher Evaluations with PowerSchool Perform. (2019, September 11); multifacetedness (360-degree approach), which prevents the assessment of professional activity from being one-sided. The system involves collecting and analyzing data from various sources, which makes it possible to obtain a comprehensive and balanced view of the teacher's work. This includes: educator self-assessment, expert assessment (observations by administration, mentor colleagues), as well as feedback from students and their parents (SurveyPlanet, 2025); development-orientation, according to which the main goal of the system is to identify the strengths of the teacher's professional development. The assessment results form the basis for developing an individual professional development plan and selecting appropriate forms of professional development. The system stimulates reflection and the desire for self-improvement (Teacher Evaluations, 2023); technological feasibility and flexibility, meaning the system is based on modern, accessible, and user-friendly digital platforms. At the same time, it is flexible enough to be adapted to the specifics of a particular general secondary education institution, as well as to integrate new technological solutions based on artificial intelligence (Mikk Granström & Piret Oppi, 2025). Adherence to these principles will make it possible to transform the assessment process from a formal bureaucratic procedure into a powerful tool for education quality management and an effective mechanism for supporting the professional development of pedagogical workers.

In the context of the digital transformation of education, traditional methods of assessing teachers' professional activities, which largely rely on episodic observations and the analysis of paper documentation, are losing their effectiveness and objectivity. There is an urgent need to develop and implement a scientifically grounded e-assessment model based on the analysis of digital evidence and information systematically generated in the modern educational environment. Such a model makes it possible to move from subjective judgments to judgments based on reliable information and data, where conclusions about the educator's level of professional competence are formed based on verified data from information systems. The basis of the model consists of a system of criteria that correspond to the key labor functions of the teacher. For each criterion, specific digital indicators are defined, which capture the results of the teacher's professional activity in the electronic environment and can be confirmed by specific data from information systems (Table 1).

Table 1

Criteria, Indicators, and Digital Indicators for Assessing a Teacher's Professional Activity

Labor Function (Standard, 2024)	**Assessment Criterion**	**Indicator**	**Digital Indicator**	**Data Source**	**Metric Type**
Teaching learners subjects (integrated courses)	Application of modern educational approaches and technologies	Diversity of educational technologies and resources	• Number of types of digital resources used (video, tests, simulations, interactive exercises). • Frequency of using tools for collaboration (online whiteboards, shared documents).	LMS (lesson materials library)	Quantitative

		Implementation of individual educational trajectories	• Presence of differentiated homework assignments (yes/no, frequency). • Use of adaptive tests (yes/no, frequency).	LMS (task and testing modules)	Quantitative, qualitative
Partnership-based interaction with participants in the educational process	Effectiveness of communication	Quality and promptness of interaction with students	• Average response time to student inquiries in chat/forum. • Ratio of constructive/developmental feedback to summative (based on NLP analysis or expert assessment).	LMS (internal messenger, comments on tasks)	Quantitative, qualitative
		Systemic interaction with parents/guardians	• Regularity of informational newsletters for parents. • Frequency of information updates on the class page/blog.	Communication module with parents, e-daybook	Quantitative
Participation in organizing a safe and healthy educational environment	Creation of an inclusive and safe environment	Ensuring the accessibility of learning materials	• Presence of materials corresponding to universal design principles (e.g., video with subtitles) (in % of the total quantity).	LMS (materials library)	Quantitative
Implementation of the educational process	Effectiveness of planning and design	Systemic nature and quality of calendar-thematic planning (CTP)	• Timeliness of CTP completion (in % of the set deadline). • Completeness of CTP (in % of lessons with defined topics and types of work). • Presence of attached educational resources (in % of lessons).	E-journal (CTP module)	Quantitative, calculated
	Systemic nature and quality of assessment	Application of formative and summative assessment	• Ratio of the number of formative to summative assessments. •Diversity of assessment forms recorded in the e-journal (test, project, oral response, etc.).	E-journal	Quantitative, calculated
		Providing detailed feedback	• Percentage of grades accompanied by a text/audio comment. • Content analysis of comments (focus on advice for improvement).	E-journal, e-daybook (comments on grades)	Quantitative, qualitative
	Analysis and correction of the educational process	Use of assessment data for correction	• Frequency of teacher viewing analytical reports on performance. • Presence of notes in the CTP regarding correction	Analytical module of the platform, e-journal	Quantitative, qualitative

			based on assessment results.		
Continuous professional development	Systemic nature of professional development	Formal and non-formal education	• Number of professional development course hours during the inter-attestation period. • Presence of certificates confirming proficiency in new methodologies.	Teacher's digital portfolio	Quantitative
	Innovative and methodological activity	Dissemination of one's own pedagogical experience	• Number of original educational resources created and shared with colleagues. • Participation in professional communities, webinars, conferences (confirmed by uploaded documents).	LMS (resource library), digital portfolio	Quantitative, qualitative

Compiled by the author based on a synthesis of the sources used.

Metric type: quantitative – reflected in numbers, percentages, frequency, ratios. (e.g., number of types of digital resources, average response time, percentage of lessons with resources); qualitative – a descriptive characteristic that assesses quality, content, relevance (e.g., content analysis of comments, presence of differentiated tasks); calculated – obtained by calculation based on quantitative data. (e.g., ratio of formative to summative assessments, completeness of calendar-thematic planning (in %).

The criterion – teaching learners subjects (integrated courses) – assesses the teacher's ability to effectively design and implement the educational process using modern digital tools. The analysis not only of the final result but also of the learning process itself, which leaves numerous "digital footprints," becomes key. Unlike paper-based notes, electronic calendar-thematic and lesson plans, stored in cloud repositories or LMS, allow for the assessment of planning quality. Analysis of such plans makes it possible to see how deeply the teacher integrates digital educational resources (hereinafter – DER) into the lesson structure, whether they plan differentiated and individual work, and whether they use innovative pedagogical technologies. The effectiveness of using DER and online platforms is another important indicator. Modern educational platforms and LMS generate large volumes of data that can be used for assessment. The analytical modules of these systems provide objective statistics on how often the teacher and students use certain resources, how much time they spend on tasks, and which types of content (video, simulations, interactive exercises) are most in demand. This data allows for assessing whether the use of technology is pedagogically justified and whether it contributes to increasing learner engagement. One of the greatest advantages of the digital environment is the ability to apply learning analytics to track learner progress. As researchers note, learning analytics is the measurement, collection, analysis, and reporting of data about learners and their learning outcomes for the purpose of understanding and optimizing the educational process (Siemens & Gasevic, 2012). Data from electronic gradebooks, supplemented by the results of regular online tests and diagnostic works, allow the teacher (and thus, the assessment system) to see the dynamics of each student's learning achievements, identify difficulties in a timely manner, and adjust the educational trajectory. This transforms assessment from summative to formative. Furthermore, the LMS provides unique opportunities for organizing differentiated learning: the teacher can create tasks of varying difficulty levels, form individual learning routes for students with different educational needs, which is easily verified based on the analysis of the subject's structure and electronic content.

Partnership-based interaction with participants in the educational process is a criterion for effective communication, which leaves a clear, documented trace in the digital environment. The effectiveness of digital communication with parents and students can be assessed not only by formal signs (number of messages) but also by content-related ones (promptness of feedback, quality of information). Analysis of communication in electronic daybooks, on school electronic platforms, or in messengers, supplemented by the results of anonymous online surveys of parents and students, provides an objective picture of the level of satisfaction with the interaction. An important indicator of this criterion is the teacher's ability to organize online interaction and collaboration among students, which is a key skill of the 21st century. The use of forums for discussions, organization of group projects using shared online documents (e.g., Google Docs, Miro, etc.), and the use of breakout rooms during video conferences – all these are verified evidence of the development of students' collaboration skills. The edit history of shared documents and activity logs in the LMS make it possible to assess the contribution of each student and the teacher's facilitative role. The teacher's professionalism is also manifested in their readiness for digital collegial collaboration. Active participation in virtual professional communities, joint development of educational materials with colleagues in cloud services, and exchange of experience in professional networks are indicators of openness to innovation and the ability to work in a team. These aspects are easily confirmed by hyperlinks to joint projects, analysis of activity in working groups, or on educational forums.

The criterion – organization of a safe and healthy educational environment – is inextricably linked to the digital space. For example, the teacher's activity in forming students' digital citizenship skills is critically important. An indicator of this work is systematic educational activity: posting high-quality, verified materials on cybersecurity, media literacy, digital ethics, and mental health on the course pages in the LMS or on the school website. The presence of such resources and their discussion with students is proof of the teacher's preventive work. In addition to education, the teacher is responsible for creating safe online spaces for learning. This involves the clear formulation and dissemination of digital ethics rules during online classes and chat communication, as well as effective moderation of discussions to prevent cyberbullying. Chat and forum logs (in compliance with ethical norms and confidentiality) can serve as proof of both the establishment of rules and the teacher's adequate response to their violation. To diagnose the general state of affairs, an effective tool is the online monitoring of the psychological climate based on regular anonymous student surveys, which allow for honest feedback regarding the sense of safety and comfort in the educational environment created by the teacher.

As for the criterion – implementation of the educational process – it focuses on the managerial and reflective aspects of the professional activity of a teacher at a general secondary education institution. Accurate and timely maintenance of electronic documentation, particularly the electronic gradebook, is not just an administrative requirement, but an indicator of their professional responsibility and discipline. The correctness of data in information systems is the foundation for any further analytics and managerial decision-making.

The use of tools for formative assessment of students' learning outcomes is of particular importance. As researchers note, the main purpose of such assessment is not to assign a grade, but to obtain information for adjusting instruction (Black & Wiliam, 2009). The electronic environment provides a multitude of tools for this (Kahoot!, Google Forms, Mentimeter). However, the indicator is not the mere fact of their use, but the analysis of the data obtained: how the results of short surveys influence the teacher's subsequent actions, how they adapt the lesson in response to identified gaps in students' knowledge. The pinnacle of a teacher's professionalism is their ability for systematic digital reflection and self-analysis. The practice of maintaining an e-portfolio, where the teacher not just collects information about the results of their professional activity (certificates, developments), but also analyzes them, is a powerful tool for professional growth (Schön, 1983). In the e-portfolio, the teacher can post analytical notes on lessons conducted, links to their video recordings, analyze successes and failures, and set goals for further improvement. This makes the process of

professional reflection visible, structured, and available for analysis.

The criterion – continuous professional development – is key in the era of lifelong learning. The teacher's professional development e-portfolio becomes the central tool for recording and verifying this process. Unlike a paper folder, a digital portfolio allows for providing direct links to profiles on educational platforms (e.g., Coursera, Prometheus), and digital versions of certificates and credentials, which are easily verified. This ensures the transparency and reliability of information about professional development. An important indicator of this criterion is the teacher's readiness to disseminate their own experience online. Maintaining a professional blog, posting publications and methodological developments on educational portals, and speaking at online conferences and webinars testify not only to a high level of professional training but also to leadership qualities and the teacher's contribution to the development of the professional community. These activities are easily verified via hyperlinks and leave a lasting digital footprint. Finally, an indicator of a conscious approach to one's own professional growth is the formation of an individual educational trajectory. The existence of an individual professional development plan in electronic format, with clearly defined goals, resources, and expected outcomes, as well as a regular report on its implementation supported by digital evidence, demonstrates strategic thinking and the teacher's responsibility for their career development. The proposed e-assessment model is based on the analysis of digital evidence and creates conditions for an objective, comprehensive, and transparent analysis of the professional activities of teachers at general secondary education institutions. Its goal is not total control, but the provision of high-quality feedback to stimulate the continuous professional improvement of teachers in the digital society.

The implementation of the e-assessment model is impossible without the selection of adequate digital tools and platforms that allow for the collection, systematization, and analysis of evidence of the teacher's professional activity. The choice of specific tools depends on the assessment goals, available resources, and the level of digital literacy of the participants. They can be conditionally divided into several groups:

first, platforms for creating e-portfolios, which are a central element of the system where the teacher can present their achievements. For its creation, the following can be used: website builders: Google Sites, Tilda, Wix. They allow for the creation of a personalized webpage with a flexible structure, integration of multimedia materials, and links to cloud services; blogging platforms: Blogger, WordPress for maintaining professional blogs that reflect the dynamics of the teacher's reflection and professional inquiry; specialized portfolio platforms: Mahara, Pathbrite. Although they are less common in Ukraine, they offer ready-made templates specifically oriented towards educational goals. Research by Ukrainian scientists confirms that the use of e-portfolios promotes the development of a teacher's reflective skills and makes the attestation procedure more transparent (Lytvynova & Burov, 2020);

second, LMS and online platforms. Systems such as Moodle, Google Classroom, Microsoft Teams, as well as the All-Ukrainian School Online, are not only an environment for organizing learning but also a powerful source of data for the e-assessment of the professional activity of a teacher at a general secondary education institution. Built-in analytics tools allow for tracking student activity, the dynamics of their success, the types of tasks the teacher uses, and the quality of the feedback provided. This makes it possible to indirectly assess their subject-methodological, organizational, and assessment-analytical competencies (Hladun, 2020);

third, tools for collecting feedback (360-degree assessment). To implement this e-assessment model, tools for conducting anonymous online surveys are necessary. The most accessible are Google Forms, Microsoft Forms, SurveyMonkey, and Mentimeter. They allow for the quick creation of questionnaires for students, parents, and colleagues, automatic processing of results, and their visualization in the form of diagrams, which ensures confidentiality and reduces the labor-intensiveness of data collection;

fourth, cloud services for storage and collaboration, in particular, services like Google Drive, OneDrive, and Dropbox are indispensable for

storing digital documents (lesson plans, presentations, videos) and organizing joint work on them, which can be proof of the teacher's capacity for pedagogical partnership;

fifth, platforms for professional development. The teacher's accounts on platforms for mass open online courses (Prometheus, EdEra, Coursera), educational portals ("Na Urok", "Vseosvita"), and participation in webinars are direct evidence of their capacity for lifelong learning. Information about completed courses and received certificates is easily integrated into the e-portfolio. The selection and integration of these tools into the e-assessment system for the professional activity of pedagogical staff is a complex managerial task that requires the development of clear regulations, methodological support for teachers, and the provision of the necessary digital infrastructure in the general secondary education institution.

Conclusions. Based on the analysis conducted, it can be stated that the implementation of e-assessment of a teacher's professional activity is a natural stage in the digital transformation of general secondary education, enabling a transition from episodic and subjective control methods to objective, evidence-based, and multifaceted analysis. The developed e-assessment, based on the professional standard of a teacher at a general secondary education institution, creates a holistic integrative framework that combines normative-target, criteria-indicator, instrumental-technological, and resultant-analytical components.

The key core of the e-assessment model is the system of criteria corresponding to the main labor functions of the teacher, and their corresponding indicators and digital indicators. These indicators capture the real results of the teacher's activity in the electronic environment, based on the analysis of "digital footprints" and verified data from information systems. This approach ensures objectivity, as conclusions are based on authentic digital documents, such as analytics from LMS, e-portfolios, online survey data, and the history of digital interaction.

The effectiveness of the proposed e-assessment model is determined by adherence to fundamental principles: evidence-based, transparency, multifacetedness (360-degree approach), technological feasibility, and, most importantly, orientation towards development. The main goal of e-assessment is not control, but providing the teacher with high-quality, well-grounded feedback that stimulates their professional reflection and becomes the basis for designing an individual trajectory of professional development.

The practical implementation of the model necessitates the integration of various digital tools, including platforms for e-portfolios, learning management systems, services for collecting feedback, and cloud storage. Successful implementation of such a model transforms assessment from a formal bureaucratic procedure into an effective managerial mechanism aimed at improving the quality of general secondary education by supporting the continuous professional improvement of pedagogical staff.

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КРИТЕРІЇ ТА ПОКАЗНИКИ ЕЛЕКТРОННОГО ОЦІНЮВАННЯ ПРОФЕСІЙНОЇ ДІЯЛЬНОСТІ ПЕДАГОГІЧНИХ ПРАЦІВНИКІВ ЗАКЛАДІВ ЗАГАЛЬНОЇ СЕРЕДНЬОЇ ОСВІТИ

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Реферат:

Актуальність дослідження зумовлена невідповідністю традиційних методів оцінювання педагогів викликам цифрової трансформації освіти. Обґрунтовано, що існуюча система атестації є суб'єктивною, бюрократизованою та не враховує специфіку професійної діяльності вчителя в сучасному цифровому середовищі. Це вимагає розроблення нової, науково обґрунтованої моделі електронного оцінювання, здатної забезпечити об'єктивний та доказовий аналіз.

*Мета***:** розроблення та наукове обґрунтування системи критеріїв та показників для електронного оцінювання професійної діяльності педагогічних працівників закладів загальної середньої освіти.

Методи: аналіз – для критичного осмислення офіційних документів та наукових джерел з теорії педагогічного оцінювання та цифрової трансформації освіти, що дало змогу сформувати концептуальну основу дослідження; синтез – для поєднання педагогічних, управлінських та технологічних аспектів в електронне оцінювання; моделювання – для розроблення моделі критеріїв та показників, що відображає взаємодію ключових складників та описує механізми її функціонування; узагальнення – для формування комплексних висновків.

Результати: розроблено та науково обґрунтовано електронне оцінювання професійної діяльності вчителя, що має цілісну чотирикомпонентну структуру: нормативно-цільовий, критеріально-показниковий, інструментально-технологічний та результативно-аналітичний складники; ядром моделі визначено систему критеріїв, що відповідають трудовим функціям Професійного стандарту вчителя, та відповідних їм вимірюваних цифрових показників; покащано, що ці показники дозволяють фіксувати та аналізувати верифіковані дані («цифрові сліди») з інформаційних освітніх систем (LMS, електронні портфоліо, е-журнали, результати онлайн-опитувань), що перетворює процес оцінювання на об'єктивний і доказовий.

Висновки: впровадження запропонованої моделі забезпечує перехід від формального контролю до об'єктивного, багатогранного аналізу, що базується на принципах доказовості, прозорості, багатогранності (360-градусний підхід) та орієнтації на розвиток; головною метою такого оцінювання є не контроль, а надання вчителю якісного, обґрунтованого зворотного зв'язку, що стимулює його професійну рефлексію та стає основою для проєктування індивідуальної траєкторії безперервного професійного вдосконалення, перетворюючи оцінювання на дієвий інструмент управління якістю освіти.

Ключові слова: *електронне оцінювання, професійний розвиток, педагогічні працівники, критерії та показники, модель, цифрова трансформація, цифрові сліди.*

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