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IMPROVING THE INFORMATION-PEDAGOGICAL COMPETENCE OF TEACHERS IN THE CONTEXT OF THE DIGITAL TRANSFORMATION OF EDUCATION

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Abstract. This thesis examines the theoretical and methodological foundations for improving the information-pedagogical competence of teachers in the context of the digital transformation of education. It explores the content of this competence, including its technological, didactic, communicative, analytical, ethical, and reflective components. The necessity of transitioning from the episodic mastery of digital tools to a systemic model of professional development—comprising diagnostics, modular training, practice-oriented assignments, mentoring, professional communities, and reflection—is substantiated. Special attention is given to the quality of digital educational content, data protection, academic integrity, and the pedagogically appropriate application of modern technologies.

Keywords: digital education, information-pedagogical competence, teacher, digital pedagogy, electronic resources, professional development, information security, reflection

Introduction

The digital transformation of education changes not only the set of technical tools used but also the very logic of designing the educational process. A modern teacher must be able to organize learning in face-to-face, distance, and blended formats, create and adapt electronic materials, apply digital communication and assessment tools, analyze educational data, ensure information security, and maintain academic integrity. Under these conditions, information-pedagogical competence becomes one of the key components of an educator's professional readiness.

However, the availability of digital platforms, interactive services, and multimedia resources does not in itself guarantee an improvement in the quality of education. Technology acquires pedagogical value only when it aligns with the goals, content, age, and individual characteristics of the learners, and allows for the organization of meaningful activities and timely feedback. Consequently, the improvement of competence should be aimed not at the mechanical mastery of software applications, but at the formation of the ability to make informed pedagogical decisions in a digital environment.

The purpose of this thesis is to substantiate the mechanisms for improving the information-pedagogical competence of teachers in the context of the digital transformation of education. To achieve this goal, the structure of this competence, the principles of its development, diagnostic and methodological tools, as well as the organizational conditions necessary for the sustainable implementation of digital pedagogical practices, are examined.

The Essence and Structure of Information-Pedagogical Competence

Information-pedagogical competence is an integrative quality of a teacher's personality, combining knowledge of digital technologies, the skills to apply them in educational activities, the ability to critically evaluate digital content, and the readiness to bear responsibility for the pedagogical and ethical consequences of using technologies. It is not limited to technical literacy, as it involves designing learning activities, organizing interaction, assessing results, and reflecting on one's own practice.

The technological component is associated with the confident use of devices, platforms, cloud services, learning management systems, and content creation tools. At the same time, its development

must be carried out in direct connection with didactic tasks. It is important for a teacher not just to know the functions of a digital tool, but to understand for which educational purposes it is suitable, what limitations it has, and how it affects learner activity.

The didactic component includes the ability to design a digital or blended learning process, choose forms of synchronous and asynchronous interaction, combine individual and group work, and use problem-based tasks, interactive materials, and electronic feedback. High-quality digital design implies a logical course structure, the accessibility of materials, a moderate information load, and clear assessment criteria.

The communicative component is manifested in the organization of pedagogical interaction through email, educational platforms, video conferencing, forums, and collaborative documents. The teacher must observe the norms of digital etiquette, ensure the clarity of messages, regulate the intensity of communication, and maintain a favorable psychological climate. It is particularly important to consider that a distance learning environment can reduce the emotional expressiveness of communication and increase the risk of misunderstanding.

The analytical component is related to the interpretation of data regarding learning activity, assignment results, and the dynamics of mastering the material. Digital systems provide a significant amount of information; however, its pedagogical value depends on the teacher's ability to distinguish significant indicators from secondary ones. Analytics should be used not for formal control, but for the timely support of learners and the adjustment of the educational route.

The ethical and safety components cover the protection of personal data, compliance with copyright, the responsible use of artificial intelligence, the prevention of digital discrimination, and the assurance of academic integrity. The teacher is obliged to critically verify automatically generated content, cite sources, refrain from transmitting confidential information to unreliable services, and foster a similar sense of responsibility in learners.

Diagnosing the Professional Needs of a Teacher

Improving competence should begin with diagnosing the initial level and real professional needs of the teacher. Assessing only technical skills does not provide a reliable picture, as a person may confidently use a platform but experience difficulties in developing a pedagogically appropriate lesson scenario. Therefore, diagnostics must cover the technological, didactic, communicative, analytical, and ethical aspects of the activity.

The most objective result is achieved by combining several methods: self-assessment, the completion of a practical assignment, the analysis of an electronic portfolio, lesson observation, the expert evaluation of a digital resource, and a professional interview. Self-assessment helps identify subjective difficulties, a practical assignment demonstrates real skills, and a portfolio allows for tracing the sustainability of the developed skills in various situations.

It is advisable to present the diagnostic results in the form of an individual competence profile. Such a profile highlights strengths and areas for development, allows for the abandonment of one-size-fits-all programs for all teachers, and helps to form a personalized route. One educator may need to develop digital assessment skills, another might need to create multimedia content, and a third might need to organize collaborative online work or ensure information security.

Diagnostics must have a developmental, rather than a punitive, character. Its task is not to record shortcomings, but to set achievable professional goals. It is important to ensure the confidentiality of the results, offer clear feedback, and link the identified needs with specific forms of methodological assistance.

Practice-Oriented and Modular Training

Effective professional development of a teacher is built on a modular principle. Each module should be linked to a specific pedagogical task: developing an e-learning course, creating an interactive assignment, organizing formative assessment, using open educational resources, preparing

accessible multimedia material, or protecting educational data. This approach increases the meaningfulness of training and facilitates the transfer of new skills into real practice.

The content of the modules should take into account the specifics of the academic discipline. Universal digital skills are necessary for all teachers, but the ways they are applied vary. For a science teacher, virtual laboratories and modeling are relevant; for humanities disciplines—working with digital sources and collaborative text annotation; for language training—audio and video assignments; for physical education—video analysis of movements and monitoring of individual activity.

A key condition is the creation of their own educational product by the teacher. This could be a fragment of an e-learning course, an interactive test, a digital case, a video lecture, a system of assessment criteria, or a blended lesson scenario. The practical result makes it possible to check not only the knowledge of the tool, but also the ability to link it with the goals, content, and characteristics of the learners.

A one-time seminar rarely leads to sustainable changes. A cycle of "learning – application – observation – reflection – refinement" is necessary. After mastering a new approach, the teacher tests it in a lesson, collects feedback, analyzes difficulties, and improves the created product. Such a cycle turns professional development into a continuous process, rather than the formal completion of courses.

Mentoring and Professional Communities

Mentoring is an important mechanism for supporting a teacher in the process of digital development. A mentor helps to choose an appropriate tool, align it with an educational task, foresee potential risks, and analyze the results of its application. Effective mentoring is built on collaboration, trust, and a joint search for solutions, rather than on administrative control.

Professional communities allow teachers to exchange ready-made materials, discuss methodological difficulties, conduct peer reviews, and collaboratively create digital resources. At the same time, file sharing should not be an end in itself. The main importance lies in analyzing the pedagogical value of the material, its accessibility, reliability, alignment with learning outcomes, and the possibility of adapting it to different groups of learners.

A useful format is the peer observation of lessons. A colleague can evaluate not the technical flashiness, but the structure of educational activities, the degree of learner engagement, the quality of feedback, and the appropriateness of the chosen technology. After the observation, a professional discussion is held, during which specific recommendations for improving practice are formulated.

Collaborative activity reduces the fear of new technologies and creates a culture of safe experimentation. A mistake is viewed not as a professional failure, but as a source of data for improvement. Such a culture is particularly important in the context of the rapid updating of digital services and the emergence of new pedagogical challenges.

Reflection and Electronic Portfolio

Reflection ensures conscious professional development. After applying a digital tool, the teacher needs to answer the following questions: was the learning goal achieved, were the learners active, what difficulties arose, what was the quality of the feedback, were safety requirements met, and what should be changed next time? Without such an evaluation, a technology can be used repeatedly without becoming more effective.

An electronic portfolio serves as a means of recording professional growth. It can include lesson plans, digital resources, examples of assignments, learner results, colleague reviews, and reflective comments. The portfolio demonstrates development over time and allows competence to be assessed based on real products, rather than just on testing results.

Reflection can be individual and collective. An individual diary helps the teacher analyze their own decisions, while group analysis makes it possible to see alternative approaches and avoid repeating typical mistakes. It is important that reflection concludes with a specific action plan: refine

the instructions, reduce the volume of material, change the format of the assignment, strengthen support, or choose a different digital tool.

Organizational Conditions of Digital Transformation

The professional competence of a teacher cannot develop sustainably without institutional support. An educational organization must provide stable network access, reliable devices, licensed or secure services, technical assistance, methodological support, and time for the development of digital materials. Shifting all responsibility onto the teacher leads to overload and the fragmented use of technologies.

Management needs to evaluate the quality of educational solutions, not the number of platforms used. The simultaneous implementation of multiple services creates confusion, increases the workload, and complicates data protection. It is more productive to select a limited set of compatible tools, develop uniform rules for their use, and create a system of methodological support.

The digital policy of the organization must include requirements for the protection of personal data, the storage of educational materials, the publication of photos and videos, the use of external cloud services, and generative artificial intelligence. Teachers need clear instructions, and learners need understandable rules for responsible behavior in a digital environment.

An important factor is the recognition of the time spent on creating digital content and professional training. If such work is not accounted for in the workload and incentive system, digital transformation is perceived as an additional burden. Institutional recognition, methodological support, and the exchange of successful practices increase the motivation of teachers.

Current Risks and Directions for Improvement

The rapid development of digital technologies creates not only new opportunities but also a number of professional risks. One of them is technological formalism, where a teacher strives to use a digital service simply for the sake of using it. As a result, the learners' attention shifts to the interface, and the educational task fades into the background. Preventing this risk requires obligatory pedagogical justification for each tool: what activity it organizes, what difficulty it helps to overcome, and what result it allows to achieve.

Another risk is associated with information overload. An excessive number of links, notifications, video materials, and interactive elements can hinder the understanding of the content and reduce learning motivation. Therefore, the teacher must master the principles of cognitive accessibility: structuring the material into small semantic blocks, highlighting the main points, limiting the number of parallel information channels, and ensuring clear navigation.

The problem of the digital divide requires special attention. Learners may differ in the quality of their network access, device specifications, their level of digital literacy, and their need for special conditions. Pedagogical competence includes the ability to foresee alternative assignment formats, provide materials accessible from mobile devices, and use subtitles, text transcripts, and flexible deadlines where justified by the educational situation.

The proliferation of generative artificial intelligence enhances the importance of the teacher's critical thinking. Automatically generated text, images, or test items should not be accepted without verification. It is necessary to evaluate the factual accuracy, potential distortions, alignment with educational goals, language, and the age-appropriateness of the material. At the same time, it is necessary to establish transparent rules for the use of artificial intelligence among learners: acknowledging the tool's assistance, verifying sources, independently explaining the result, and complying with the requirements of academic integrity.

A promising direction for improving competence is the transition from mastering individual services to developing universal pedagogical strategies. Interfaces and platforms change quickly, whereas the principles of setting learning goals, organizing activity, providing feedback, protecting

data, and reflecting maintain their significance. This approach makes the teacher less dependent on a specific program and increases their ability to adapt to new conditions.

The Proposed Methodological Model

The methodological model for improving information-pedagogical competence can include five interconnected stages. The first stage is comprehensive diagnostics and the formation of an individual profile. The second is setting specific professional goals and selecting modules. The third is practice-oriented training with the creation of one's own digital product. The fourth is implementation in the real educational process with the support of a mentor or colleagues. The fifth is reflection, expert evaluation, portfolio updating, and repeated diagnostics.

Evaluating the effectiveness of the model should be based on changes in real pedagogical practice. The criteria can include the quality of the digital design of the lesson, the alignment of the technology with the educational goal, the accessibility of materials, the degree of learner engagement, the quality of feedback, the validity of using learning analytics, compliance with ethical norms, and the teacher's ability to independently improve their practice.

The proposed model is cyclical in nature. After completing one stage of development, the teacher formulates a new goal, since the digital environment and pedagogical tasks are constantly changing. It is precisely the ability for continuous self-learning and the critical adaptation of technologies that is the hallmark of mature information-pedagogical competence.

Conclusion

Improving the information-pedagogical competence of teachers is a necessary condition for the high-quality digital transformation of education. This competence combines technological knowledge, pedagogical design, digital communication, assessment, working with data, ethical responsibility, and reflection.

The most sustainable results are achieved through a combination of diagnostics, personalized modules, the practical creation of digital products, mentoring, professional interaction, trial implementation, and reflection. An important role is played by the institutional environment, which provides infrastructure, security, methodological assistance, and recognition of the teacher's digital work.

Thus, digital transformation should be viewed not as a technical upgrade of an educational organization, but as the systemic development of pedagogical culture. The teacher becomes not a passive user of technologies, but a responsible designer of the educational environment, capable of critically selecting tools and directing them towards achieving meaningful learning outcomes.

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