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Andriy PASHKOV,

orcid.org/0009-0002-2530-7589

*Postgraduate student at the Department of Informatics and Methods of Teaching Informatics
Volodymyr Hnatiuk Ternopil National Pedagogical University
(Ternopil, Ukraine) pashkov@ukr.net*

PEDAGOGICAL CONDITIONS FOR THE FORMATION OF PROFESSIONAL COMPETENCE OF FUTURE COMPUTER TECHNOLOGY SPECIALISTS IN THE PROCESS OF STUDYING PROFESSIONALLY ORIENTED DISCIPLINES

The article analyses the peculiarities of creating pedagogical conditions for the formation of professional competence of future computer technology specialists as vocational teachers in the process of studying professionally oriented disciplines. The aim of the study is to theoretically substantiate and experimentally verify the pedagogical conditions that contribute to the effective formation of professional competence of future computer technology specialists in the process of studying professionally oriented disciplines. The research hypothesis is based on the assumption that the formation of professional competence of future computer technology specialists as a holistic phenomenon will be effective if, on the basis of the identified methodology, a set of pedagogical conditions is determined and implemented that determine the results of professional training of students in the field of study 015. 39 'Vocational education. Digital technologies' in higher education institutions.

The pedagogical conditions necessary for the effective formation of the professional competence of future computer technology specialists in the process of studying professionally oriented disciplines have been identified: development of educational content for profile training disciplines using innovative technologies; practice-oriented improvement of the content of specialised training disciplines using the educational potential of innovative technologies; mastering the professional and technical foundations of the information (digital) industry in conjunction with the didactic and methodological foundations of their teaching; ensuring the project-based nature of the independent work of future computer technology specialists. The implementation of the defined pedagogical conditions involves the integration of the following elements: information technologies (computers, high-speed Internet, specialised software; digital content and multimedia materials; new forms and methods of teaching (interactive tasks, projects, case studies).

Key words: computer technology specialists, professional competence, vocational education teachers, professionally oriented disciplines, pedagogical conditions.

Андрій ПАШКОВ,

orcid.org/0009-0002-2530-7589

*аспірант кафедри інформатики та методики її навчання
Тернопільського національного педагогічного університету імені Володимира Гнатюка
(Тернопіль, Україна) pashkov@ukr.net*

ПЕДАГОГІЧНІ УМОВИ ФОРМУВАННЯ ФАХОВОЇ КОМПЕТЕНТНОСТІ МАЙБУТНІХ ФАХІВЦІВ КОМП'ЮТЕРНИХ ТЕХНОЛОГІЙ В ПРОЦЕСІ ВИВЧЕННЯ ПРОФЕСІЙНО ЗОРІЄНТОВАНИХ ДИСЦИПЛІН

У статті зніснено аналіз особливостей створення педагогічних умов для формування фахової компетентності майбутніх фахівців комп'ютерних технологій як педагогів професійного навчання в процесі вивчення професійно зорієнтованих дисциплін. Мета дослідження полягає в теоретичному обґрунтуванні та експериментальній перевірці педагогічних умов, що сприяють ефективному формуванню фахової компетентності майбутніх фахівців комп'ютерних технологій в процесі вивчення професійно зорієнтованих дисциплін. Гіпотеза дослідження базується на припущенні, що формування фахової компетентності майбутніх фахівців комп'ютерних технологій як цілісного феномену стане ефективним, якщо на основі виявленої методології буде визначено та реалізовано комплекс педагогічних умов, які детермінують результати професійної підготовки студентів напряму підготовки 015.39 «Професійна освіта. Цифрові технології» у закладах вищої освіти.

Визначено педагогічні умови, необхідні для ефективного формування фахової компетентності майбутніх фахівців комп'ютерних технологій в процесі вивчення професійно зорієнтованих дисциплін: розробки освітнього контенту дисциплін профільної підготовки із застосуванням інноваційних технологій; практико зорієнтоване вдосконалення змісту дисциплін профільної підготовки з використанням освітнього потенціалу інноваційних технологій; освоєння професійно-технічних основ інформаційної (цифрової) галузі в єдності з дидактико-методичними основами їхнього викладання; забезпечення проєктного характеру самостійної роботи майбутніх

фахівців комп'ютерних технологій. Реалізація визначених педагогічних умов передбачає інтеграцію таких елементів: інформаційні технології (комп'ютери, високошвидкісний інтернет, спеціалізоване програмне забезпечення; цифровий контент та мультимедійні матеріали; нові форми та методи навчання (інтерактивні завдання, проекти, кейси).

Ключові слова: *фахівців комп'ютерних технологій, фахова компетентність, педагоги професійного навчання, професійно зорієнтовані дисципліни, педагогічні умови.*

General statement of the problem. It is obvious and indisputable that the development of the education system, the transition to a bachelor's and master's degree system, and the development of new educational programmes have heightened interest in the formation of professional competence among future specialists, including computer technology specialists as vocational teachers, within the framework of professional training in higher education institutions and in the context of teaching practice as its component. Moving forward in education is only possible through continuous improvement and development, which is linked to current trends in the development of professional and pedagogical education, including its cyclical and multi-level nature, personalisation and individualisation, intensification and computerisation (Shcherbak, 2017: 52). Consequently, there are growing demands for the professional training of future computer technology specialists as vocational teachers capable of ensuring the quality of education in the information society.

Professional and pedagogical activity can no longer be reduced to a set of traditional functions; modern vocational education teachers are forced to integrate into new practices, take contexts into account, analyse, compare, select ways of solving professional tasks and apply them in their own professional and pedagogical activities, which are becoming increasingly complex. This requires the search for effective pedagogical conditions for the formation of professional competence of future computer technology specialists in the process of studying professionally oriented disciplines.

Analysis of recent research and publications. Modern practical training of future computer technology specialists as vocational teachers should take into account the specific conditions of practice, provide students with opportunities to show initiative, design educational activities under the guidance of higher education teachers, practicing vocational teachers of vocational (vocational and technical) education institutions in cooperation with colleagues.

Based on an analysis of studies reflecting the problems of organising the training of future vocational education teachers, it has been established that scientists are considering the problems of vocational and pedagogical education in modern conditions (O. Shcherbak (2017)), the theoretical foundations

of professional pedagogical training of future engineering teachers (O. Kovalenko, N. Bryukhanova, O. Melnychenko (2007) and others), the peculiarities of psychological and pedagogical training of vocational education teachers (Y. Gvozdecka (2023), R. Gorbatyuk (2017), O. Kryvylova (2018) and others), innovative approaches to the implementation of the content of training future vocational education teachers (N. Dubova (2023), L. Kozak (2016) et al.), the specifics of practical training of future vocational education teachers in higher pedagogical education institutions (Y. Gryshchenko, M. Vovk, L. Lukyanova, S. Solomakha (2023) et al.) and the role of practice as a component of practical training (I. Androshchuk (2021), M. Vorovka, A. Protsenko (2020) et al.). However, despite a number of studies, the potential of professionally oriented disciplines in the training of future computer technology specialists as vocational teachers and the determination of the specifics of their implementation in the practical component of professional training in higher education institutions remain insufficiently studied.

The purpose of the article is to provide a theoretical justification for the pedagogical conditions for the formation of professional competence of future computer technology specialists in the process of studying professionally oriented disciplines.

Presentation of the main material. The process of developing professional competence in future specialists in computer technologies (SCTs) is regulated and managed through the implementation of specific pedagogical conditions. Scholars offer various interpretations of the concept of “pedagogical conditions,” yet they generally agree that these should be regarded as a set of measures necessary for creating a favorable educational environment that ensures the quality of the learning process through the appropriate selection of content, teaching methods, forms, and organizational strategies (Babkin, 2021; Derevyanko, 2013; Lobatskyi, 2024; Shaikina, 2012, et al.). As an integral component of the educational system, pedagogical conditions require continuous analysis, evaluation, and improvement based on current scientific research and effective pedagogical practices. They must be adaptable to the individual needs and specific characteristics of student groups, considering their sociocultural context and the professional orientation of their training.

In the context of this study, pedagogical conditions for the development of professional competence in future SCTs during the study of professionally oriented disciplines are defined as a set of purposefully designed influences aimed at creating a favorable educational environment – one that is both necessary and sufficient for the successful development of professional competence in SCTs. This is determined with respect to the structure and content of the studied phenomenon and includes a system of interconnected technologies, methods, formats, and learning tools.

Scientific and pedagogical literature presents a wide range of pedagogical conditions that have proven effective in the professional training of future SCTs. For instance, Lobatskyi (Lobatskyi, 2024: 165) emphasizes the need for active individualization of learning, which includes providing personalized consultations, differentiating tasks, and developing curricula and methodologies tailored to different learning styles. In contrast, Tryfonova (2019a) highlights the importance of organizing interdisciplinary educational processes that foster the integration of knowledge across various fields and promote flexible thinking. Potapchuk (2024a) identifies the development and use of digital learning materials, online courses, webinars, and distance learning tools as effective conditions, enabling students to assimilate material effectively, engage in practical tasks, and broaden their competencies. Babkin (Babkin, 2021: 110) regards pedagogical interaction between students and instructors as a key condition, where group work and discussions encourage knowledge exchange, problem-solving, and the development of communication and teamwork skills.

Meanwhile, Gedzyk and Sazhienko consider the stimulation of student initiative in learning new technologies, analyzing and evaluating information, asking questions, and solving problems to be essential (Meanwhile et al, 2021: 15). These activities support the development of soft skills, self-organization, analytical and critical thinking – critical competencies for future professional success.

Thus, contemporary educational science and practice suggest various pedagogical conditions that effectively support the professional preparation of students pursuing the specialty 015 "Professional Education (by Specializations)," including future SCTs. Notable among these are interactive teaching methods, individualization and differentiation of learning, interdisciplinary approaches, and collaboration. However, most of the reviewed studies do not specifically address which pedagogical conditions facilitate the development of professional competence in SCTs during the study of professionally oriented disciplines. These disciplines

possess the potential not only to enhance technical knowledge and skills but also to foster personal qualities such as communication, self-organization, creativity, and adaptability – key traits for a successful career in information technology education.

Given the complexity of developing professional competence in future SCTs, which involves the meaningful integration of various components, it is essential to carry out this process gradually and in stages. This must be done with due consideration of the specific nature of training SCTs as teachers of vocational subjects (TVSs) and the peculiarities of this field. Based on the unique cognitive and professional characteristics of SCTs as TVSs, and drawing on research in this area (Horbatyuk, 2011; Malyshevskyi, 2021; Rutylo, 2013; Fedoreiko, 2013; among others), particularly in relation to the application of innovative technologies (Alekseeva, 2019; Herasymenko, 2016; Dukhanina, 2011; Ovsyannikov, 2019; Palamarchuk, 2016), the following general requirements for pedagogical conditions can be outlined:

- Encourage students' active exploratory behavior;
- Provide opportunities for problem-based and project-based learning;
- Ensure integration of knowledge and skills from various domains;
- Foster the development of communication skills, teamwork, collaboration, and social responsibility;
- Offer practical opportunities for applying knowledge and skills;
- Support the widespread use of innovative technologies in the educational process – not only as learning tools but also as instruments for conducting research;
- Promote systematic and purposeful reflection, analysis, and discussion of work results, identify achievements and challenges, and plan strategies for self-development and improvement.

Hence, the pedagogical conditions for developing professional competence in future SCTs during the study of professionally oriented disciplines must facilitate the creation of an interactive learning environment where innovative digital technologies promote active and independent learning, stimulate the development of professional skills and creative potential, and support practical engagement. Therefore, the process of competence development will be more effective under the following conditions:

1. Development of educational content for core professional disciplines using innovative technologies to gradually increase task complexity and sustain student interest in professionally oriented studies;
2. Practice-oriented enhancement of the content of core professional disciplines by leveraging the educa-

tional potential of innovative technologies to stimulate student engagement in an ever-expanding range of vocational-pedagogical tasks;

3. Integration of technical knowledge in the digital/information domain with didactic and methodological principles for its teaching;

4. Ensuring the project-based nature of independent work for SCTs, enabling students to acquire new modes of professional activity, establish novel formats of professional interaction, and create and apply innovative digital products.

Conclusions. In today's fast-paced global environment, rapid changes are occurring across all sectors of socio-economic activity, including higher education, which is undergoing a phase of digital transformation. The pedagogical conditions discussed in this article, which support the effective development of professional competence in future specialists in computer technologies during their study of professionally ori-

ented disciplines, are based on the principles of high learner autonomy and collaborative engagement. These principles align with students' fundamental educational needs: to interact with other institutional and individual actors in order to verify tasks, methods, and outcomes, engage in mutual exchange and evaluation, while maintaining autonomy in determining their personal educational trajectories based on individually meaningful goal-setting.

At the same time, the successful implementation of the proposed pedagogical conditions largely depends on their adaptation to local circumstances and situational constraints typical of specific higher education institutions. This adaptation should be based on pedagogical design strategies, which opens up broad opportunities for introducing innovative forms and methods of organizing the educational process, taking into account the diverse internal and external factors influencing the development of professional competence.

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