

UDC 378.148:371.13

DOI <https://doi.org/10.32840/1992-5786.2020.70-3.33>

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FORMATION OF DIGITAL COMPETENCE OF FUTURE PHYSICAL EDUCATION TEACHERS IN INNOVATIVE ENVIRONMENT

The aim of the article is to analyse the development of digital competence in the applicants of the first (Bachelor's) and second (Master's) levels of higher education in the Institute of Physical Education and Sports, State Institution "Luhansk Taras Shevchenko National University"; to contribute to the formation of digital competence of applicants in the innovative environment of a higher education institution in order to improve the quality of vocational training of future physical education teachers and to expand the experience of MoPED international project: "Modernization of Pedagogical Higher Education by Innovative Teaching Instruments" (No 586098-EPP-1-2017-1-UA-EPPKA2-CBHE-JP) of EU Erasmus + KA2 program: collaborative projects to develop innovations and share good practices; development of higher education potential.

Research methodology is based on the main provisions related to the improvement of vocational training quality in the applicants in innovative environment of a higher education institution based on student-oriented study, research, innovations and trust.

Scientific novelty is an attempt of comprehensive understanding of digital learning by the applicants of higher education majoring in "Secondary education (physical education)" due to creation of and innovative educational environment, interaction of students with each other (group work, teamwork), whereas the students are active, self-sufficient, professionally mobile, competitive entities based on the integration of educational, research, sports and creative activities. Besides, the notions of "digital competence of future physical education teacher" and innovative educational environment have been expanded.

Conclusion. Development of digital competence standards based on the European Digital Competence Framework, creation of an appropriate legal framework and innovative educational environment, active learning community will promote future professional development and digital competence development of future physical education teachers in higher education institutions. It is important to assist students in practical classes, to solve certain issues together, including the research work. It is necessary to create digital environment where students will be able to freely share their ideas and trust each other, to hold debates, trainings, case studies. Thus, it is necessary to change ourselves and to change the environment around us. The applicants of higher education majoring in "Secondary education (physical education)" should understand, be able to use, analyse, filter, evaluate, create, design and distribute digital educational resources.

Key words: digital competence, innovative educational environment, quality of vocational training, future physical education teachers.

Problem statement and its relevance. In order to improve the quality of training of applicants, the concept of "digital competence" has become increasingly common in conditions of fast growing information and innovation space of higher education institutions of Ukraine. Thus, rapid spread of digital technology among young people gives preference to digital competence of the applicants in higher education institutions among other life competencies, including future physical education teachers.

The conference "New Pedagogical Approaches in STEAM Education" dated September 26–27, 2019 and held in Kyiv University named after Boris Grinchenko was valuable for our research. It was organized as part of an international project MoPED: "Modernization of Pedagogical Higher Education by Innovative Teaching Instruments" (No 586098-EPP-1-2017-1-UA-EPPKA2-CBHE-JP) of EU Erasmus + KA2 program: collaborative projects to develop

innovations and share good practices; development of higher education potential.

Analysis of references and recent research. The project "Description of Digital Competency of Teaching Staff" (2019) was developed by O.V. Bazelyuk, I.P. Vorotnikova, N.P. Dementiyevskaya, O.G. Zakhar, N.V. Morze, T.V. Nanayeva and others. O.G. Zakhar (2019) paid attention to the development of digital competence standard of teachers in Nikolayev region [1; 2]; I.P. Vorotnikova (2019) studied conditions for the formation of digital competence of a teacher in postgraduate education [3]; O.D. Vorobets (2019) examined information technology in the context of digital competence formation for future teachers as well as other aspects of digital competence; K. Fross, D. Winnicka-Jasłowska, Sempruch (2018) [4] emphasize that networking activities as well as new forms of work create new functional and spatial relationships and interactions at the university.

Highlighting the insufficiently studied aspects.

In recent years, there has been a problem of setting up and implementing innovative methods in Ukrainian higher education institutions and strategic learning objectives: creation of innovative environment, the atmosphere which can make it possible for lecturers to develop their creativity, active scientific work with students, participation in international projects and grants. But not all lecturers are ready for such changes, especially in the institute of physical education. Instead, foreign scientists A. Maxwell, Z. Jiang, C. Chen (2017) place emphasis on constantly changing learning style, thus, students have to learn the latest digital technologies every day [5]. For this purpose, H. Demarle-Meusel, B. Sabitzer, and J. Sylle (2017) propose to set up digital laboratories at the university where both students and lecturers could study at any time. Therefore, it is necessary to learn from foreign experience [6].

The Aim and Tasks of the Study. The aim of the article is to promote the development of digital competence of applicants in innovative educational environment of higher education institutions in order to improve the quality of vocational training of future physical education teachers and to expand the experience of MoPED international project: “Modernization of Pedagogical Higher Education by Innovative Teaching Instruments” (No 586098-EPP-1-2017-1-UA-EPPKA2-CBHE-JP) of EU Erasmus + KA2 program: collaborative projects to develop innovations and share good practices; development of higher education potential.

Presenting main material. According to analysis of the scientific literature, digital environment in the system of digital competence of citizens is a context or “place” which is secured by technologies and digital devices; it is often transmitted over the Internet or other digital means, such as mobile networks. The term “digital environment” is used in DigComp system as background for digital actions without specifying a specific technology or a specific tool [7, p. 11]. It should be emphasized that digital competence framework was widely used for the first time in 2013. Whereas, in 2016–2017 there was a conceptual renewal of citizens’ (EU) digital competence framework DigComp. The comparison of changes and example with ESCO can be seen in table 1.

The project “Describing the digital competence of a teacher” [8, p. 8]. indicates reflection of digital competence development for individual and collective reflection, critical evaluation of the development of their own digital competence. Digital services are used for the following actions:

- assessment of digital competence level;
- identification of gaps in the individual’s digital competence in order to build their own development program;
- seeking help from others to improve individual’s digital competence;
- search of training materials and their usage for continuous vocational development.

Digital competence as a general competence includes the following:

- information and media competence as a culture of working with information; ability as a result of educational activity to create and present information products using Internet tools, Internet resources and information technologies;
- technological competence as a confident knowledge of ICT tools and information technologies during Internet usage;
- communicative competence as the ability to build interpersonal contacts, professional dialogues and to resolve conflict situations;
- consumer competence as the ability to solve everyday issues with the use of current information technologies, digital and Internet resources.

In our study, we will consider “**digital competence of a future physical education teacher**” as confident and responsible use and engagement of higher education applicants with digital technologies in the educational, research, sports activities for continuous vocational self-development. This includes information literacy, communication, creative collaboration, digital content creation (including wellness programs and cases), security and problem solving, as well as the use of digital technology in professional activities, everyday life and communication.

We should emphasize that qualitative preparation of future physical education teachers for the implementation of various innovations, modern achievements of science and best practices is related to the innovative feature. The most important purpose

Table 1

Comparison of competencies based on version 1.0 (digital competence framework), DigComp 2.0 and ESCO example

	Areas of competence – Version 1.0	Areas of competence – Version 2.0 (DigComp)	ESCO cross-sector ICT skills
Interrelated areas and aspects, which partially interlap, and cross links	1. Information	Information and ability to work with data.	Digital data processing
	2. Communication	Communication and cooperation	Digital communication
	3. Content creation	Creation of digital content	Creation of content with ICT software
Competencies that cover all areas	4. Security	Security	ICT security
	Troubleshooting	Troubleshooting	Troubleshooting with ICT tools and hardware

of vocational development of applicants majoring in “Secondary education (physical education)” is to rebuild their thinking, develop analytical and research skills which enables deep penetration into the processes and phenomena. It is important for each student to understand the essence of innovative processes in their professional activities and to learn how to use these opportunities. In this regard, it is necessary to solve the problems associated with the development of personal and professional growth of future specialists during lectures and practical classes, willingness to innovate and creatively implement them in innovative educational environment [9, p. 228].

We consider the innovative educational environment of a higher education institution as a set of created special conditions for productive creative vocational activity, which ensure the formation of digital competence, vocational focus on knowledge, skills, readiness for creative interaction on the basis of student-centered learning, where students are active, self-contained, vocationally mobile, competitive entities based on the integration of educational, scientific, sport and creative activities, generation and implementation of innovations.

Luhansk Taras Shevchenko National University has a local network “Educational Portal” which has unlimited access for the university applicants. The users of the network have the opportunity to access methodological support of academic subjects, use the electronic library, obtain information which looks like databases (database of staff, students, etc). The study was conducted during 2019–2020 in educational and scientific Institute of Physical Education and Sports, State Institution “Luhansk Taras Shevchenko National University”. The questionnaire (20 questions) was conducted among 90 students of 1–4 years of study (full-time) majoring in Secondary education (physical education) and 30 lecturers of the educational and scientific Institute of Physical Education and Sports.

The results of the study show that when comparing the ICT competencies of young teachers to teachers with 20–25 years of experience, young educators generally show a high level of digital literacy, which is 94.6%, and experienced, mature teachers have 72.8% of digital literacy, they show average activity in the use of digital technologies in teaching. This is because younger educators are more likely to share information with colleagues through digital communication, are more likely to improve their skills through online learning, and are more focused on identifying the individual characteristics and needs of educators through digital data analysis.

In order to improve this situation, first of all, it is necessary to develop the following ICT competences in teachers:

- digital communication with students and colleagues;

- creation and exchange of materials with fellow teachers in cloud systems;
- using a computer to create new study materials;
- creative use of digital technologies to solve professional problems;
- the use of digital technologies in the educational process and the tracking of online activity of education applicants;
- assessment of information reliability;
- the use of digital tools for knowledge assessment and progress tracking of students in education and research.

Most higher education graduates majoring in “Secondary education (physical education)” – 62.4%, understand the importance of development of digital competence and are actively engaged in self-study (52.4%) with the use of IT tools, whereas only 16.8% of them do scientific work.

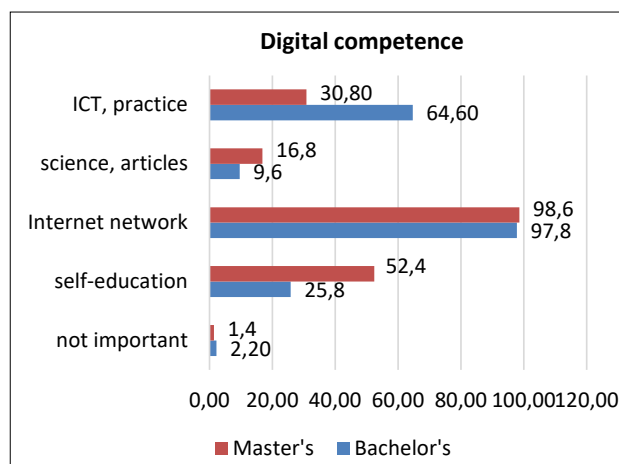


Fig. 1. Answers of the applicants of the first (Bachelor's) and second (Master's) levels of higher education to the question: “How do you develop digital competence?”

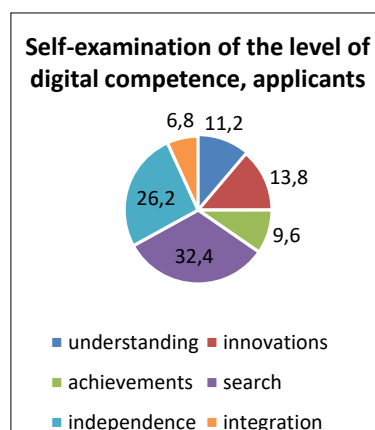


Fig. 2. Self-examination of the level of digital competence by higher education applicants

A survey of future physical education teachers has shown that higher education students highly value their opportunity for ICT collaboration and professional development (Fig.1) and need understanding (11.2%),

innovations (13.8%), achievements (9.6%), search (32.4%), independence (26.2%), integration (6.8%); learning new IT tools to build their own e-resources: work with music editors, electronic songs, creation of site forms, interactive games and tasks for inclusion, smart presentations, videos, etc.

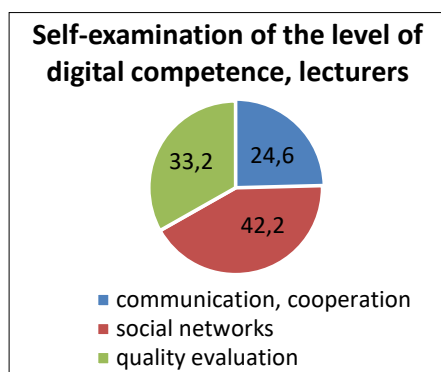


Fig. 3 Self-examination of the level of digital competence by lecturers, %

Thus, lecturers gave 24.6% to work with students (communication, cooperation); 42,2% use IKT for professional development (social networks). Other activities (use of ICT to evaluate applicants: testing their knowledge and skills) were chosen by 33.2% of respondents.

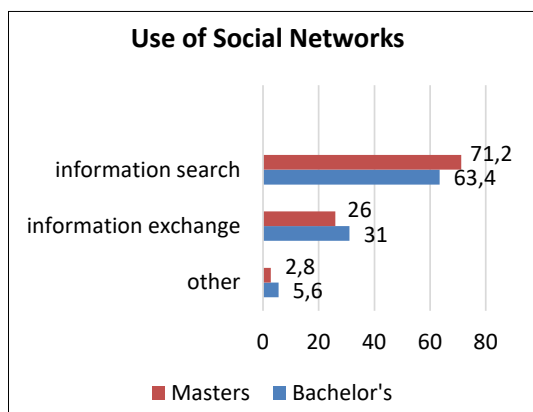


Fig. 4 The use of social networks for educational purpose by the applicants of first (Bachelor's) and second (Master's) levels of higher education

Thus, first level (Bachelor's) students of higher education have identified the use of social networks for the following educational purposes: for information search – 31.0%; for information exchange – 63.4%; other – 5.6%. As for the second level (Master's) of higher education students, they use social networks for the following educational purposes: for information search – 26.0%; for information exchange – 71.2%; other – 2.8%.

While preparing for the practical classes, students have the following preferences: 15.6%

prefer YouTube videos; 38,4% prefer to make a presentation using visual aids like PowerPoint; and 46.0% of the applicants make oral presentations.

Therefore, it is important to assist students in practical classes, to solve certain issues together, including the research work. It is necessary to create digital environment where students will be able to freely share their ideas and trust each other, to hold debates, trainings, case studies. Thus, it is necessary to change ourselves and to change the environment around us!

According to the analysis of scientific sources and world best practices, digital transformation is the process of change induced by digital technologies. It is necessary to be prepared for certain changes, innovations, as well as to be proactive, creative and flexible. The quality of training must be connected with the search, efficiency, autonomy, integration of the educational and research work of the applicants.

It is important to note that the improvement of vocational training quality and training efficiency will take place in the conditions of educational-innovative, digital environment of the institution of higher education with a harmonious combination of traditional methods and results of a creative search, application of non-standard, ICT technologies, modern methods, means, techniques, flexible learning pathways, original ideas and forms of educational process based on student-centered learning, search, innovation, trust, and systematic monitoring of educational service quality.

Conclusions. Thus, development of digital competence standards based on the European Digital Competence Framework, creation of an appropriate legal framework and emotional teaching environment, active learning community will promote future professional development and digital competence development of future physical education teachers in higher education institutions.

It should be noted that digital competence of a future physical education teacher should secure the development of a wide range of its components: from media literacy to the processing and critical evaluation of information, security and collaboration on the Internet to knowledge of various digital technologies, the ability to use open resources and technologies in digital learning, distance learning and blended learning (for professional development, formation of skills for the use of digital technologies and services in educational and life situations for the solution of different problems and tasks); the ability to apply innovative technologies to evaluate the results of their educational and research activities. Therefore, the applicants of higher education majoring in "Secondary education (physical education)" should be able to use, filter, evaluate, create, design and distribute digital educational resources.

Methodology for the development of digital competence of future physical education teachers in various educational forms (full and part-time, mixed) needs further research.

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Отравенко О. В. Формування цифрової компетентності майбутніх учителів фізичної культури в умовах інноваційного освітнього середовища

Мета та завдання статті – проаналізувати досвід розвитку цифрової компетентності здобувачів першого (бакалаврського) та другого (магістерського) рівнів вищої освіти в інституті фізичного виховання і спорту ДЗ «Луганський національний університет імені Тараса Шевченка»; сприяти формуванню цифрової компетентності здобувачів в умовах інноваційного освітнього середовища закладу вищої освіти для підвищення якості професійної підготовки майбутніх учителів фізичної культури та поширення досвіду міжнародного проекту MoPED: «Модернізація педагогічної вищої освіти з використанням інноваційних інструментів викладання» (№ 586098-EPP-1-2017-1-UA-EPPKA2-SVNE-JP) програми ЄС Еразмус + KA2 проекти співпраці задля розвитку інновацій та обміну успішними практиками – Розвиток потенціалу вищої освіти.

Методологія дослідження спирається на головні положення, що стосуються підвищення якості професійної підготовки здобувачів в умовах цифрового середовища закладу вищої освіти на основі студентоцентрованого навчання, пошуку, інновацій, довіри.

Наукова новизна полягає у спробі цілісного осмислення цифрового навчання здобувачами вищої освіти спеціальності «Середня освіта (фізична культура)» завдяки створенню інноваційного освітнього середовища, творчій взаємодії студентів між собою (групова робота, робота в команді), де студенти є активними, самодостатніми, професійно-мобільними, конкурентоспроможними суб'єктами на основі інтеграції освітньої, науково-дослідницької та спортивно-креативної діяльності. Доповнено поняття «цифрова компетентність майбутнього вчителя фізичної культури» та «інноваційне освітнє середовище».

Висновки. Розробка стандартів цифрових компетентностей на основі європейських рамок цифрових компетентностей, створення відповідної нормативно-правової бази та інноваційного освітнього середовища, активної навчальної спільноти сприятимуть професійному розвитку та розвитку цифрової компетентності майбутніх фахівців у закладах вищої освіти. Важливо на практичних заняттях надавати студентам допомогу, разом вирішувати певні труднощі, особливо у науково-дослідній роботі. Необхідно створювати цифрове середовище, де студенти зможуть вільно ділитися своїми ідеями, довіряти один одному, проводити дебати, тренінги, кейс-технології. Отже, необхідно змінюватись самим та змінювати середовище навколо нас. Здобувачі вищої освіти за спеціальністю «Середня освіта» (фізична культура) повинні розуміти, вміти використовувати, аналізувати, фільтрувати, оцінювати, створювати, проектувати та поширювати цифрові освітні ресурси.

Ключові слова: цифрова компетентність, інноваційне освітнє середовище, якість професійної підготовки, майбутні учителі фізичної культури.