Formation of digital competence of specialists in socionomic professions as a pedagogical problem

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Abstract

This study is devoted to the analysis of developments in educational science and practice on the formation of digital competence of specialists of various groups of professions. The study analyzed the relevance of the competency-based approach to the training of specialists in socio-economic professions in the conditions of digitalization of society. The article presents a deductive content analysis of publications over the past 3-4 years in peer-reviewed journals to systematize modern approaches of foreign and domestic scientists to solving the problem of digital competence formation. It was found that the vast majority of scientific intelligence concerns specific issues of digitization of the activities of modern specialists, such as teachers, psychologists, law enforcement officers, etc. The bibliometric analysis of scientific sources based on the keywords "digital competence" and "professional training" allowed us to obtain a comprehensive view of the formation of such personal formation as "digital competence" precisely through the educational process. There are reasons to conclude about the expediency of introducing a competency-based approach to the training of specialists in socio-economic professions, which should be based on the generalization of approaches to representatives of groups of related professions.

Keywords

information society, digital competence, specialists in socionomic professions, pedagogical problem, competence approach

1. Introduction

The information society requires the ability to see and understand the picture of the world, to identify and analyze the various aspects of objects, processes, and phenomena. Against this background, the goal of educational activity should be the training of specialists capable of realizing the transition from an industrial to an information-technological society through innovation in education. Educational systems today are focused on the development of students' intellectual potential, from the point of view of not only mastering the subject, but also processing, adapting and using existing information, generating new ideas. The training of specialists of various groups of professions in the conditions of the information-technological society requires the implementation of a competency-based approach in order to train qualified competent specialists in the relevant field.

The study of problems related to the psychological features of a person's readiness to perform professional activities allowed Super et al. [1], Holland [2], Kuder and Diamond [3] to develop a classification of professions. Recently, in scientific literature [4], [5], [6], [7] we meet the term "socionomic profession", this term has been used in scientific circles relatively recently. This group usually includes people-to-people professions, where working with people is a leading feature of professional activity and has a common focus on social relationships. The teaching profession was recognized as one of

the first among the socionomic ones in the history of mankind (professional activity is aimed at the transfer of human experience, moral norms, cultural and historical traditions), the legal profession is also considered one of the oldest (it performs a regulatory function in social relations based on the existing norms and traditions of society). Professions of the socionomic type are related to education and upbringing (teacher, educator, governor, etc.); provision of social, socio-pedagogical or psychological assistance (social worker, social pedagogue, psychologist); with medical care (doctor, nurse); with the provision of legal assistance (lawyer)" [5].

Currently, the socionomic sphere covers the work of sociologists, teachers, psychologists, lawyers, journalists, social workers, political scientists and other related professional categories [8]. All of them cover different aspects of one of the important spheres of human life – social relations in society, therefore the problem of professional training of specialists for this sphere is of particular importance. Having a single philosophical-methodological and theoretical basis, the professional activity of specialists in the socionomic direction assumes the same, to a certain extent, influence on their professional training in higher education. In particular, the issue of training a competent specialist in conditions of digitalization of society remains relevant. Government documents of various countries of the world, as well as the scientific activity of researchers, their participation in international forums and the publication of articles accessible to the world scientific community, are aimed at solving this issue.

1.1. Related works

The world community developed such well-known documents as the Declaration of Principles Building the Information Society: a global challenge in the new Millennium (hereinafter the Declaration) adopted by the United Nations in 2003 [9], which declared that education, knowledge, information and communication are the basis of development, initiative and well-being of the human personality, and the Declaration of the United Nations Conference on Trade and Development [10], which proclaims the formation of an integrated information society.

The European Digital Competence Framework for Citizens, also known as DigComp [11] offers a tool to improve citizens' digital competence. DigComp was first published in 2013 and has become a reference for many digital competence initiatives at both European and Member State levels. This document introduces DigComp 2.0. It constitutes phase 1 of the update of the framework which focuses on the conceptual reference model, new vocabulary and streamlined descriptors. The current document also gives examples of how DigComp is used at the European, national and regional levels.

"A Tuning Guide to Formulating Degree Program Profiles" of the EU project "CoRe Projects – Competences in Education and Recognition" [12] is one of the new tools of the Bologna process, designed to increase the transparency and comprehensibility of educational programs in the European area of higher education. Methodological recommendations were developed within the framework of the European CoRe-2 project by a group of leading European experts under the leadership of Jenneke Lockhoff and Bas Wegewijs from the Agency for International Cooperation in Higher Education (Netherlands) and Kati Durkin from the National Center for Academic Recognition and Information of Great Britain for practical assistance to developers of educational programs, accreditation agencies, employers and other interested parties. Methodological recommendations contain a brief description of the competency-based approach in higher education, definition of the main categories – "competence" and "learning result", as well as a detailed description of the presentation format of the Program Profile, examples of profiles. The Tuning project recommends a list of general competencies, among which the ability to use information and communication technologies is defined. Methodological recommendations are used in the system of higher education of Ukraine for the development of educational programs, for their description in course catalogs and accreditation materials, as well as for the recognition of foreign diplomas and qualifications. The ideas and projects of the European Union in the field of digitalization of education are embodied in the adopted Digital Education Action Plan (2021-2027) [13], which highlights the European Commission's vision for high-quality, inclusive and accessible digital education in Europe.

In order to accelerate the development of the information society in our country, the Law of Ukraine "On the Basic Principles of the Development of the Information Society in Ukraine for 2007-2015" dated

January 9, 2007 No. 537-V [14] was adopted.

The Decree of the Cabinet of Ministers of Ukraine dated January 17, 2018 No. 67-r approved the "Concept for the Development of the Digital Economy and Society of Ukraine for 2018-2020" (hereinafter the Concept) [15], which states that digitalization is a recognized mechanism of economic growth thanks to the ability of technologies to positively influence the efficiency, effectiveness, cost and quality of economic, public and personal activities.

Since 2018, the Ministry of Education and Science of Ukraine has been actively pursuing the development of digital education in Ukraine. This is confirmed by the Concept of Reforming General Secondary Education, the Digital Agenda of Ukraine – 2020 [16], the State Program "Information and Communication Technologies in Education and Science" [17]. In the National Strategy for the Development of Education in Ukraine for the period until 2021, attention is focused on the fact that one of the priority areas of its development is the introduction of information and communication technologies aimed at "informatization and computerization of general education, vocational and technical and higher educational institutions, ensuring such institutions with modern technical means of teaching in natural, mathematical and technological disciplines, introduction of information and communication technologies in education and science" [18].

It should be noted the role of international scientific forums in the study of the problems of digitalization of society. The 3L-Person 2023 workshop provided a unique forum for researchers and practitioners from diverse backgrounds to explore the multifaceted role of information and communication technologies (ICT) in lifelong learning and professional development [19]. As well as the availability of peer-reviewed scientific journals that allow you to explore the ways of development of digital technologies and their implementation Educational Technology Quarterly [20], investigate current and promising problems of modern pedagogical science *Educational Dimension* [21], present the latest achievements in the study of educational technologies *CTE Workshop Proceedings* [22].

In the above-mentioned and other scientific sources, certain aspects of the problem are discussed, both those related to education in general and dedicated to highlighting the problem at the same level as the training of specialists of a certain profile. Thus, Vakaliuk and Antoniuk [23], Mikhailutsa et al. [24], Voitovych et al. [25], Curca [26] investigate the relevance of the introduction of ICT in the educational process at various levels and levels of education.

Vakaliuk and Antoniuk [23] found that the use of digital technology in various fields of education is one of the most important trends in the educational process worldwide.

Mikhailutsa et al. [24] suggest that interactive teaching methods using visualization can help students acquire knowledge and skills related to information systems and cloud technologies, which are essential for effective implementation of ICT in education.

Voitovych et al. [25] argue that information culture is an essential component of vocational education, and it is necessary to develop it among vocational education specialists to improve the quality of vocational education.

The paper by Curca [26] is the result of a synthesis about the role of digital competence in pre-university and university education in an era where digitization has transformed and reformed society. In the context of the pandemic, the importance of digital competence has become vital for education systems all over the world , which is talked about to this day about technology facilitated teaching.

A number of publications [27, 5, 28, 29, 30, 31, 32, 33] raise the issues of digitalization of education in the discourse of training specialists in socionomic professions.

The authors of the studies emphasize:

- on the problem of developing the conceptual foundations of training specialists for professional activities using digital technologies [27, 31, 32, 33];
- on the urgent need to revise the content and means of forming the digital competence of graduates in order to solve professional tasks and professional self-development [30, 32];
- on the study of features, content and structure of the readiness of future specialists in the socionomic sphere to use digital technologies in their professional activities [5, 28, 29, 33];

- on issues of digitalization of professional and personal life activities of a modern specialist in the socionomic sphere [27, 29].

1.2. Research focus

The above scientific researches relate to certain issues of digitalization of professional and personal life activities of modern specialists who represent certain socionomic professions (teacher, psychologist, law enforcement officer, social worker, etc.).

The processing of these scientific sources confirms the need to systematize approaches to the analysis of the existing experience of the formation of digital competence of specialists who represent separate socionomic professions, and to develop general recommendations specific to the formation of digital competence of any specialist in the socionomic field. Considering the formation of the digital competence of a specialist in the socionomic sphere as a pedagogical problem, we consider it necessary to systematically analyze the modern achievements of scientists.

Therefore, the purpose of this study is to review and systematize: modern approaches to interpreting the concepts of "digital competence", "digital competence of a specialist in the socionomic sphere"; available research on the features, content and structure of the readiness of future specialists in the socionomic field to use digital technologies in professional activities, as well as highlighting the stages of modeling the process of forming this complex personal formation in the process of professional training of students of socionomic specialties.

2. Methods

As a research method for the systematization of modern approaches, we chose deductive content analysis of publications over the past 3-4 years in peer-reviewed journals, where both foreign and domestic scientists publish their own research, and bibliometric analysis of sources by key words. Three journals were chosen for the study, namely:

Educational Technology Qarterly [https://acnsci.org/journal/index.php/etq] is a Diamond Open Access peer-reviewed journal focused on the ways in which digital technology can enhance education. Educational Technology Quarterly (ETQ) welcomes research papers on the pedagogical uses of digital technology where the focus is broad enough to interest a wider education community. In addition to empirical work, we welcome systematic reviews and meta-analyses that include clear research questions, a framework of analysis, and conclusions that reflect the paper's aims. Educational Technology Quarterly, a peer-reviewed journal exploring ways digital technology can enrich the field of education [34]. Notably, ETQ covers a wide range of topics and aligns with the 3L-Person interest topics: Designing Personal Learning Environments.

Educational Dimension [https://acnsci.org/journal/index.php/ed] a Diamond Open Access peer-reviewed journal focused on the research on education, learning, and training, and applications of theories and philosophies used in the sciences of learning and adjacent sciences. The Educational Dimension occupies contributions in all aspects of learning theories, learning technologies and tools, paradigms and models. The main problematic field of the journal is the current and future issues of modern pedagogical science: psychological and pedagogical, philosophical, and socio-cultural aspects of education, learning and training, modern theories, technologies and teaching aids, the emergence of which is determined by globalization, integration processes, social transformations, humanitarian and scientific and technological development.

CTE Workshop Proceedings [https://acnsci.org/journal/index.php/cte] is a Diamond Open Access peer-reviewed journal published annually by the Academy of Cognitive and Natural Sciences. CTE Workshop Proceedings depict the latest achievements in educational technology research – revealing emerging trends and new ideas before they appear in journals. CTE Workshop Proceedings offer broad coverage of new ideas, methodologies, and projects in fast-moving areas of research on the pedagogical uses of digital technology where the focus is broad enough to be of interest to a wider education community: adaptive learning platforms, blended learning, cloud-based AI education applications,

cloud-based e-learning platforms, tools and services, cloud-based learning environments, competency-based education platforms, design and implementation of immersive learning environments, digital transformation of education, educational data mining, emotion AI, immersive technologies, mobile learning, VR/AR gamification etc.

The table 1, table 2 and table 3 present articles that are grouped by two characteristics: belonging to a certain journal; the study of related problems in the content of the article.

Thus, the analysis of selected sources makes it possible to state that, on the one hand, the scientific community actively raises the issue of researching the problems of digitalization of society in various directions, most of the studies are focused on the educational process and the formation of digital

Table 1
Articles published in *Educational Technology Quarterly*.

Articles	Direction and topic of research
Kovalchuk, V., Maslich, S. and Movchan, L. Digitalization of vocational education under crisis conditions, (2023) [35] Kovtoniuk, M., Kosovets, O., Soia, O. and Tyutyun, L. Virtual learning environments: major trends in the use of modern digital technologies in higher education institutions, (2022) [36] Prokhorov, O., Lisovichenko, V., Mazorchuk, M. and Kuzminska, O. Implementation of digital technology for student involvement based on a 3D quest game for career guidance and assessing students' digital competences, (2022) [37] Vakaliuk, T., Spirin, O. and Kontsedailo, V. Formation of digital competence of CS bachelors in the use of cloud-based learning environments, (2021) [38] Morze, N., Buinytska, O., Varchenko-Trotsenko, L., Vasylenko, S., Nastas, D., Tiutiunnyk, A. and Lytvynova, S. System for digital professional development of university teachers, (2022) [39] Zhorova, I., Kokhanovska, O., Khudenko, O., Osypova, N. and Kuzminska, O. Teachers' training for the use of digital tools of the formative assessment in the implementation of the concept of the New Ukrainian School, (2022) [40] Khyzhniak, I., Vlasenko, K., Viktorenko, I. and Velychko, V. Training of future primary school teacher for use digital educational resources in their professional activities, (2021) [41]	The first group of articles consists of studies that touch on the problems of forming digital competence of participants in the educational process at its various links or the use of digital technologies in education, in particular, the following questions are investigated: A) formation of digital competence of CS bachelors [38]; training of the future primary school teacher to use digital educational resources [41]; digital professional development of university teachers [39]. B) digitalization of vocational education [35]; use of modern digital technologies in universities [36]. C) evaluation of students' digital competencies [37] and training of teachers to use digital formative assessment tools [40].
Shapovalov, Y., Shapovalov, V., Shapovalov, B. and Antonenko, P. Synchronization competencies provided by traditional educational system with real-life required competencies in conditions of digital sociality, (2022) [42] Bondarchuk, O., Balakhtar, V., Gorova, O., Lytvynenko, N., Pinchuk, N., Shmanko, O., Kiv, A. and Oleksiuk, V. Features of responsibility of future specialists of the socionomic professions as an indicator of their digital competence, (2022) [43]	The second group of articles is devoted to specific issues related to the training of specialists in socionomic professions, namely: competences needed in real life in the conditions of digital sociality are investigated [42] as well as indicators of digital competence of future specialists in socionomic professions [43].
Sych, T., Khrykov, Y. and Ptakhina, O. Digital transformation as the main condition for the development of modern higher education, (2021) [44]	The third group includes one article that examines the potential and limitations that arise in the higher education system as a result of the use of electronic technologies; different views of scientists on the digital transformation of higher education are summarized.

Table 2
Articles published in *Educational Dimension*.

Articles	Direction and topic of research
Moiseienko, M. Didactic model of formation pedagogical universities students' digital competence, (2020) [45]	The vast majority of the materials of the peer-reviewed journal presented in the table are devoted to the formation of digital competence of students of various specialties, in particular: students of a pedagogical university [45] , [50]; students of economic specialties [51]; future social workers [49]; officers of the Armed Forces of Ukraine [47].
Ovcharuk, O. and Ivaniuk, I. A self-assessment tool of the level of digital competence of Ukrainian teachers in the context of lifelong learning: the results of an online survey, (2021) [46]	
Pinchuk, O. and Prokopenko, A. Actual areas of development of digital competence of officers of the Armed Forces of Ukraine, (2021) [47]	We also single out studies devoted to the formation and self-development of digital competence in the system of continuous learning [48] and in the context of lifelong learning [46].
Berezhna, T., Zaiets, S., Shybirina, S. Formation and self-development of the students' digital competencies within the lifelong learning system [48]	
Fedorenko, O., Havrysh, O. and Velychko, V. Features of using Moodle tools in the training of future social workers, (2022) [49]	
Riezina, O., Puzikova, A. and Kotyak, V. The experience of thesis writing in terms of the methodological students' digital competence development, (2022) [50]	
Berezhna, T., Zaiets, S. and Shybirina, S. Formation of digital competencies among students of economic specialties, (2022) [51]	

competence of its participants, there are studies that reveal the specifics of certain areas of activity (social, economic, legal, military, etc.) in conditions of digitalization. However, among the sources selected for analysis, there are no studies in which a system of forming digital competence of specialists in several related fields of activity would be developed. In particular, we are talking about specialists in socionomic professions. And therefore, in order to get a comprehensive idea of the current state of knowledge and the limits of research on the problem, we turn to bibliometric analysis.

3. Results

A bibliometric analysis can provide a comprehensive picture to determine the problem field. The analysis was carried out using VOSviewer in order to obtain clustering of data based on keywords and citations. The search was carried out in the Scopus database using the keywords "digital competence" and "professional training", as a result, a collection of 181 documents was obtained (figure 1).

As a result of the analysis, a network of connections of keywords was presented on figure 2.

As seen in figure 2, key words (35 words in total) from studies on the formation of digital competence in the process of professional training are grouped into two clusters (20 and 15 words, respectively). Consider these groups (figure 3): the first group consists of keywords dominated by terms related to psychological and pedagogical issues in the education of different age groups; the second group represents terms related to the digitalization of the educational process.

Also, the visualization of the keyword network shows that there are two cores in the second cluster (figure 4), one of which is dominated by the term "digital competence", through which there is a connection with such cluster terms as: education, human, human experiment, article , male, female, which make up the second core of this cluster. Connections between the first and second clusters are established precisely through these keywords (figure 5).

If we focus on the key word "education", we observe that precisely because of this term, there is a

Table 3
Articles published in *CTE Workshop Proceedings*.

Articles	Direction and topic of research
Balyk, N., Shmyger, G., Vasylenko, Y. and Oleksiuk, V. Exploring modern trends in developing a digital educational environment for university: A case study of Ternopil Volodymyr Hnatiuk National Pedagogical University, (2023) [52] Simakhova, A., Artyukhov, A. and Shmarlouskaya, H. Problematic issues of digitalization of education in Eastern Europe, (2022) [53]	It is worth highlighting the articles devoted to the study of modern trends in the development of the digital educational environment: for example in article [53] problematic issues of digitalization of education in Eastern Europe are revealed, and the authors of article [52] investigate the digital educational environment of the university: on the example of Ternopil National Pedagogical University named after Volodymyr Hnatyuk.
Martyniuk, O., Martyniuk, O. and Muzyka, I. Formation of informational and digital competence of secondary school students in laboratory work in physics, (2021) [54] Kovalchuk, V., Maslich, S., Movchan, L., Soroka, V., Lytvynova S. and Kuzminska,!O.. Digital transformation of vocational schools: problem analysis, (2022) [55] Moiseienko, M., Moiseienko, N., Kohut, I. and Kiv, A. Digital competence of pedagogical university student: definition, structure and didactical conditions of formation, (2020) [56] Hlushak, O., Semenyaka, S., Proshkin, V., Sapozhnykov, S. and Lytvyn, O. The usage of digital technologies in the university training of future bachelors (having been based on the data of mathematical subjects), (2020) [57] Strutynska, O., Torbin, G., Umryk, M. and Vernydub, R. Digitalization of the educational process for the training of the pre-service teachers, (2021) [58] Ovcharuk, O., Gurzhii, A., Ivaniuk, I., Kartashova, L., Hrytsenchuk, O., Vakaliuk, T. and Shyshkina, M., 2022. The use of digital tools by secondary school teachers for the implementation of distance learning in the context of digital transformation in Ukraine, (2022) [59]	The second group of articles, more numerous and presents a study of the problem of formation of information and digital competence of students of various levels of education, in particular: students of general educational institutions [54]; digital transformation of vocational training [55]; use of digital technologies in university training [56], [57]; digitalization of the process of training of pedagogical personnel [58]; the use of digital tools by secondary school teachers in practical activities [59].
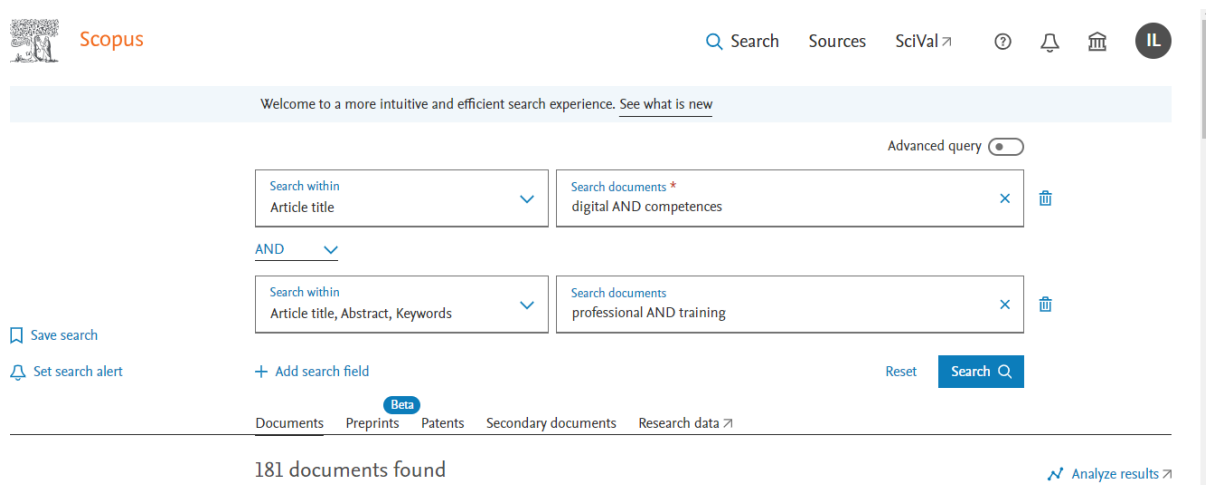
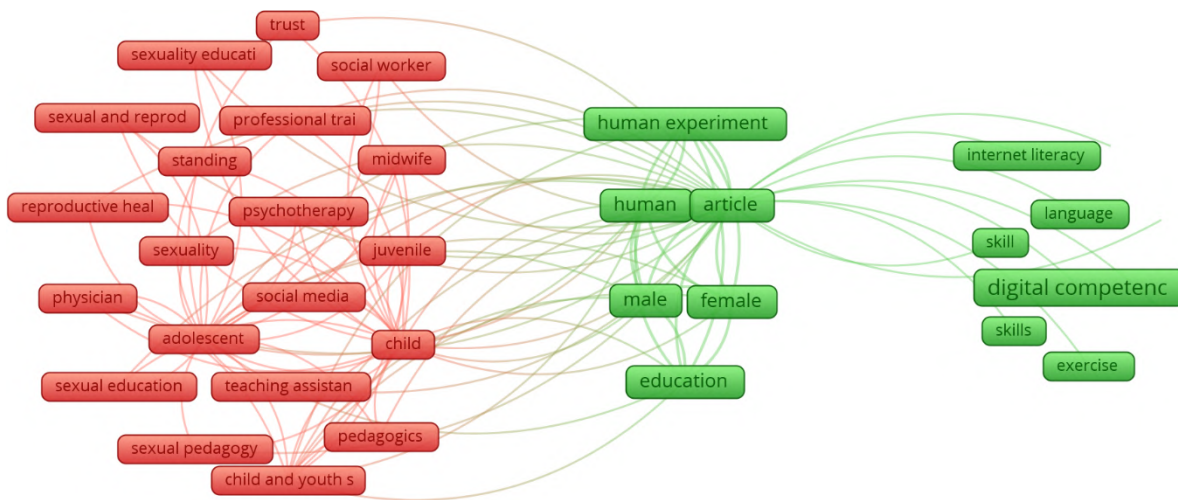**Figure 1:** Search parameters in the Scopus database.

Figure 2: Visualization of the keyword network.

Figure 3: Keyword distribution by clusters.

close connection of all the key words of the first cluster with all the key words of the second cluster (figure 6). Therefore, such an analysis makes it possible to state that it is through education that the digital competence of a specialist in any professional field is formed. And therefore there are reasons to predict that the formation of digital competence of future specialists of socionomic professions is based on generally recognized principles, but may have its own characteristics for certain professional groups of this cycle.

Regarding the analysis of the period when the selected terms were spread, it should be noted here that the years 2019–2023 were chosen for the analysis, but as we can see in figure 7, the spread of the terms took place in 2023. And this testifies to the relevance of the study of the problem of the formation of digital competence of a specialist in professional training.

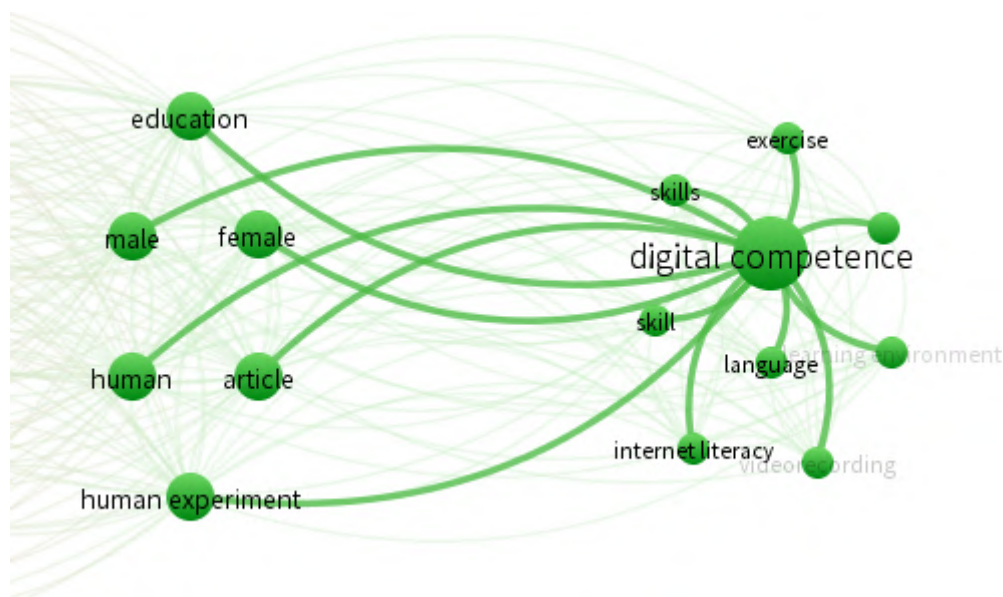Visualization of the density of elements is shown in figure 8.

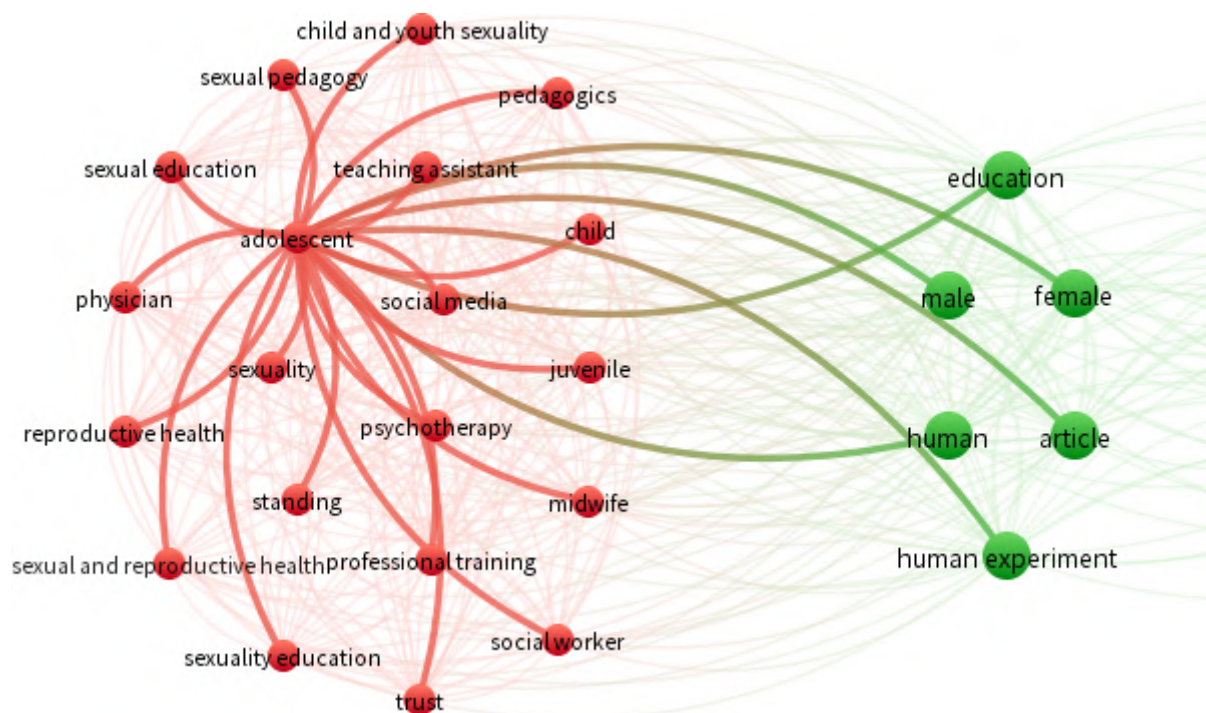**Figure 4:** Connections between keywords in the second cluster.

Figure 5: Connections between the first and second clusters.

4. Discussion

The relevance of the idea of forming the digital competence of specialists in the "person-to-person" type of profession was confirmed by the existing state documents relating to the processes of digitization in society and in education in particular [13, 15, 16, 17], as well as research [27, 5, 28, 29, 30, 31, 32, 33] in which the authors reveal specific issues of digitalization of the professional and personal life of modern specialists who represent certain socionomic professions.

The analysis of the study [34] confirmed our opinion about the need to systematize approaches to the analysis of existing experience in the formation of digital competence of specialists, in particular,
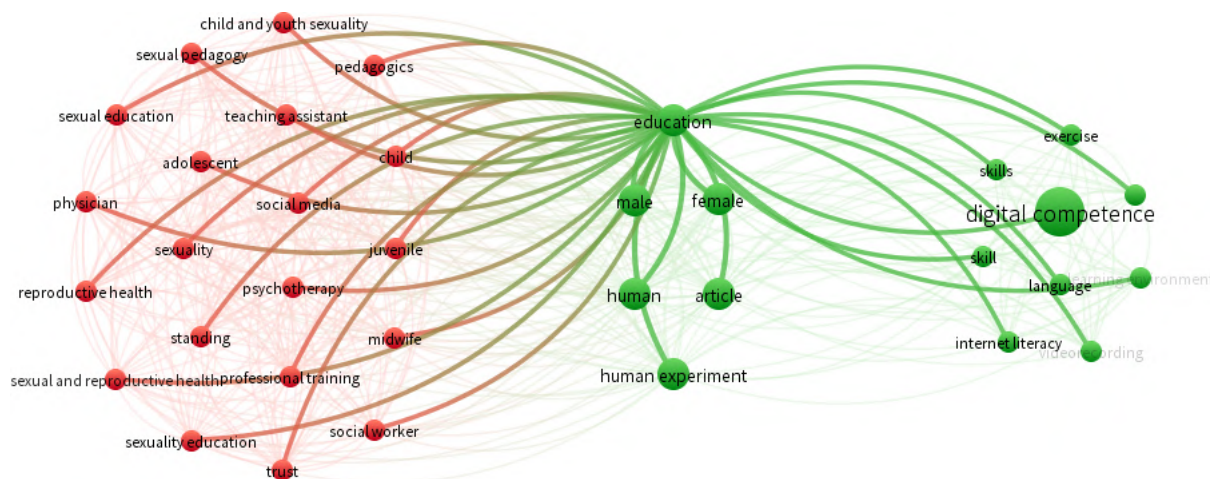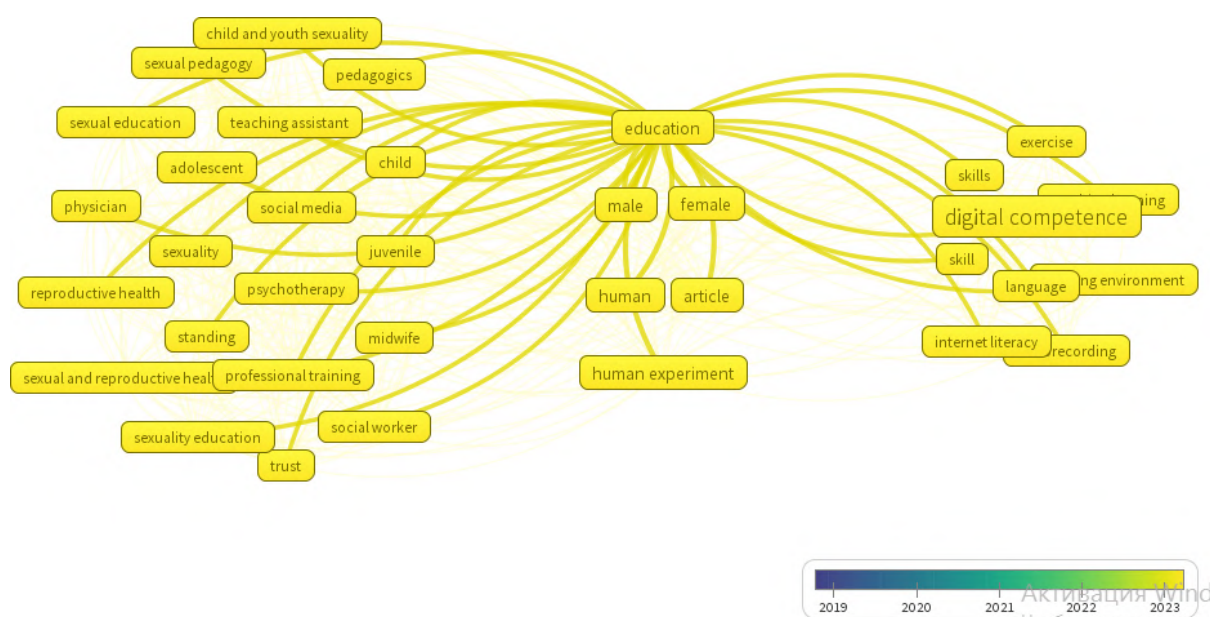
Figure 6: Connections between clusters.

Figure 7: Term distribution period.

specialists in socionomic professions.

When starting the bibliometric analysis of sources to determine the problem field, we got acquainted with the work [60], which allowed us to decide on the strategy of finding sources for analysis.

5. Conclusions

The relevance of the problem of the formation of digital competence of specialists in the process of professional training is due to the fact that in the conditions of the information and technological society, the implementation of the competence approach requires the training of specialists of various groups of professions. Highlighting a group of socionomic professions, we note that the problem of training competent specialists in this field is urgent, since they all cover various aspects of social relations in society, which in turn acquire new qualities under the conditions of digitalization.

Based on the analysis of the existing regulatory documents regarding the digitization of society, as well as taking into account the results of scientific research, we state the need to systematize approaches to the analysis of the existing experience of forming the digital competence of specialists in the socionomic
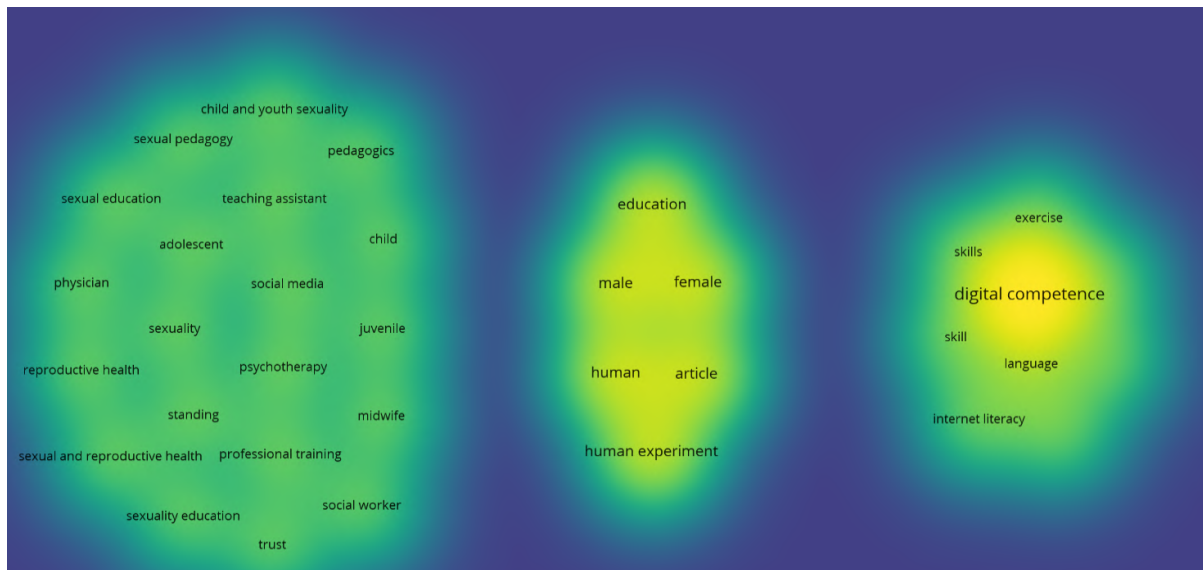
Figure 8: Visualization of element density.

field.

The conducted deductive content analysis of scientific research presented in peer-reviewed journals confirmed that the available scientific intelligence concerns certain issues of digitalization of professional training of teachers, psychologists, law enforcement officers, social workers, etc. However, it should be noted that there are no studies in which a system of forming the digital competence of specialists of several related professions is developed.

A bibliometric analysis using the keywords "digital competence" and "professional training" made it possible to single out 181 documents in which the clustering of keywords took place according to such groups as psychological and pedagogical issues of education of different age groups and digitalization of the educational process, the keyword through which the balance occurs "Education" determined the connection of clusters.

The obtained results make it possible to determine some directions of further research, including the study of the conditions of the organization of the educational process aimed at forming the digital competence of representatives of groups of related professions.

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