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REVIEW ARTICLE

ICT Concepts Development in Educational Theory and Practice since the Time of Independence of Ukraine

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A – Study design;
B – Data collection;
C – Statistical analysis;
D – Data interpretation;
E – Manuscript preparation;
F – Literature search;
G – Funds collection

Abstract

Background and Aim of Study: *The article deals with ICT concepts in the educational theory and practice of Ukraine. It is noted that scientists are exploring different aspects such as a concept, a strategy for implementing the concept, real experience, etc. The analysis of ICT concepts in education which were created during the independence period, has highlighted a number of contradictions that accompany this process.*
The aim of the study: to consider ICT concepts which were created in the system of education in Ukraine during the independence period.

Material and Methods: *In the study, the following general scientific methods were used: analysis (historical and pedagogical), synthesis, comparison, generalization.*

Results: *ICT concepts implemented in Ukraine's education, not only attest to the emergence of innovative information and technological realities in the field of science and education, but also are considered to be new realities, and therefore need to be researched by scholars of different branches – philosophers, educators, sociologists, psychologists, etc. – both in terms of methodology and trends of changes in the reference field of educational informatization.*

Conclusions: *ICT concepts in Ukraine's education, created during the independence period, reflect the course of a controversial process of a state formation. Being innovative by design, concepts, laws, strategies, programs, etc. have been based on traditional, or even outdated, principles of state development. A legislative approval of the National Program of Informatization and periodic changes in innovative nature of its content in relation to ICT in education, showed progressive trends of conceptual importance.*

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Introduction

Education as a sociocultural phenomenon of state formation and development focuses on the set of achievements, problems and challenges that always accompany Ukraine during 29 years since the momentous event of gaining independence. Applying a metaphorical technique, we allow ourselves to use a conditional parallel to the interpretation of such words as "a focus" and "to focus", defined in dictionaries as 1) the point at which parallel rays (streams), refracted by lens or reflected by a spherical mirror, gather; 2) to adjust an optical system to get a clear image. In our opinion, the effective education system is the conditional point that focuses on (that is, reflects) the course of social changes, and which not only illustrates the process of state development during the independence period, but also it becomes the mechanism and means of this development itself. The system of education is the basis for a scientific analysis of many components, including the diversity of ICT implementation aspects in education, which collectively define a rare, unusual, exceptional, unique phenomenon and the name of this phenomenon is independent Ukraine.

In particular, the National report on the state and prospects of education in Ukraine (Kremen, 2016) states that twenty-five years of Ukraine's independence have been marked by the formation, implementation and modernization of state education policy. In the period up to 2002, Ukrainian self-sufficient national education system which corresponded new social relations, gained an innovative potential for further development. Since 1991, adopted laws on education, scientific and technical activities have certified national self-identification of education. The establishment of educational legislation began and the National Doctrine of Educational Development was approved (President of Ukraine, 2002).

The next decade was marked by an increasing transformational impact on education because of European integration and globalization. In national education, the gaps between the best European and world practices were evident; it also touched the ICT concept. Since 2014, a new perspective on the quality level and social role of education has been established in Ukraine. The innovative Laws of Ukraine "On Higher Education", "On Scientific and Technical Activities", "On Education", Conceptual Principles of Secondary School Reform "New Ukrainian School" (Ministry of Education and Science of Ukraine, 2016), numerous educational acts have been adopted. All these helped update national education systematically. Finally, the National strategy for the development of education in Ukraine in for the period up to 2021 (President of Ukraine, 2013) identified and consolidated main priorities of education at the state level.

However, as it was proved by the educational practice, in most cases these are only slogans about the implementation of ICT concepts which sound really very well. The basis for this statement is the condition of the use of ICT in the learning process at all levels of education. Unfortunately, in the interpretation of real educational practice, they mostly perform the function of "a handle", that is, the means of fixing information at one or another level of complexity. World experience, which has been offered to Ukrainian educators by foreign partners for over 20 years (educational projects Intel, Microsoft, etc.), shows that the purpose of ICT is to create, develop and implement innovative ideas in all spheres of people's and country's lives. The experience of the conceptual approach to the functioning of Silicon Valley is a confirmation of an exclusive mission of ICT concepts in the world's socio-economic progress.

Therefore, we consider the analysis of ICT concepts, created in the national educational theory and practice, is an urgent problem that requires a scientific research in several areas such as a concept, a strategy for implementing the concept, real experience, and so on.

The aim of the study. To consider ICT concepts which were created in the system of education in Ukraine during the independence period.

Materials and Methods

In the study, the following general scientific methods were used: analysis (historical and pedagogical), synthesis, comparison, generalization.

Historical and pedagogical analysis of various sources were used to see the historical dynamics in the development of the education system and the problems of developing ICT concepts in particular.

Results and Discussion

Scientists of Ukraine consider that it is urgent to study general tendencies of reforming the national education system not only as a single unit, but also in relation to the development and approval of the information society. Specific phenomena and processes related to ICT in education are also studied, challenges and reasons for failure for achieving goals of the use of technology in education are analyzed (Gurzhiy & Lapinsky, 2013). In particular, Bykov, Spirin, and Pinchuk (2017) state that Ukraine has imbalanced indicators or a significant lag behind the developed countries in the development of the information society. The authors refer to the results of international studies (International Telecommunication Union, 2016) and confirm the validity of the conclusion made by the experts who discussed the state of informatization of education during the round table talks: "the introduction of modern technologies is significantly delayed, but an internal and external digital gap is increasing; there is no consolidated national ICT development strategy. It slows down the pace of creation and exchange of information, knowledge, experience and technology" (Committee on Science and Education of the Verkhovna Rada of Ukraine, 2016).

Bykov (2009) emphasizes that general tendencies of informatization of education are the formation tools of information and technological platform of open education. Gurzhiy and Lapinsky (2013) analyze informatization conditions of secondary education establishments, and he also generalizes problems and topical changes.

Morze (2010) as a developer of textbooks, techniques and many other aspects of ICT implementation, offers

strategic techniques for overcoming difficulties encountered by teachers.

ICT in high school is described in research of Melnyk (2016); Kostikova (2018); etc.

The experience of Ukrainian scientists in the implementation of a whole complex of aspects under study is presented in (Ziaziun, 2014). However, there is a lack of specific researches that comprehensively analyze ICT concepts in Ukraine's educational theory and practice.

A generalized definition of "a concept" (conceptio – understanding) is a system of views, one or another understanding of phenomena and processes, a single,

defining concept, which focuses on understanding the ICT concept as a phenomenon. We can assume that there is some inefficiency in the implementation of ICT in education of Ukraine and we have to deal with a lack of proper conceptual approaches, i.e. a coherent system and a single defining concept. In addition, the concept is not identical to theory or strategy, an educational policy or educational practice, but a specified identification is often accompanied by a scientific research, which leads to a traditional confusion for researchers in the content of definitions.

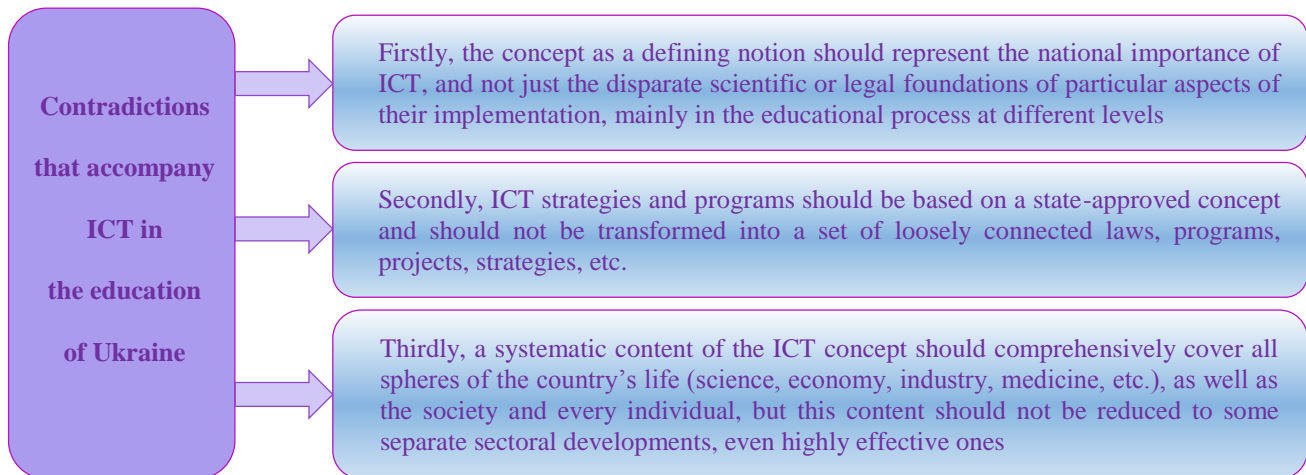In our opinion, it forms a number of contradictions that accompany ICT in the education of Ukraine (Figure 1).

Figure 1. A number of contradictions that accompany ICT in the education of Ukraine.

For example, the Program of informatization of the legislative process in the Verkhovna Rada of Ukraine for 2012-2017 (Verkhovna Rada of Ukraine, 2012) and the Resolution "On Measures for Creation of Electronic Information System "Electronic Government" (Cabinet of Ministers of Ukraine, 2003) should be based on common conceptual principles of the country regarding ICT, but their content does not mention this concept.

The question arises about the effectiveness of those ICT concepts that could be identified as leading in Ukraine's education. Since ICT concepts are dialectically linked to such global concepts as the information society and the informatization of education, they must be provided with deep scientific development, validation, validity, legislative documents, highly qualified specialists, logistical resources, etc.

At the legislative level, since Ukraine's independence, a considerable number of laws, decrees, etc. have been adopted, and they cover this interconnection and determine the diversity of their implementation in education in order to create an information society in the country on the basis of inclusive informatization. Here are only the most significant ones that were defined during the first decade (Table 1).

Even a cursory glance at the legislative field of the first twentieth anniversary of country's independence concerning ICT allows us to argue that the conceptual view of this problem is largely characterized by the Law of Ukraine "On the National Program of Informatization" (Verkhovna Rada of Ukraine, 1998), this law has been systematically updated and

supplemented over the years (2006; 2011; 2013; 2016), which affirms the importance of providing a conceptual approach to solving problems of social and state importance.

The latest version of this law provides the following understanding of informatization: "Informatization is a set of interrelated organizational, legal, political, socio-economic, scientific, technical and production processes which are aimed at creating conditions for meeting information needs of the society and a realization of citizens' rights on the basis of development and the use of information systems, networks, resources and information technologies, created with the help of modern computer and communication technologies (Verkhovna Rada of Ukraine, 2016).

The National Commission is defined as a strategic regulatory authority of the country in the field of information technologies. The Commission carries out state regulations in the field of communication and informatization. The official site of this Commission states that the state regulations should ensure the systematic, comprehensive and coherent development of the country's informatization. The National Programme of Informatization includes: The Concept of the National Programme of Informatization, a set of State Programs for Informatization, sectoral programs and information projects, regional programs and information projects, programs and projects for informatization of local self-government bodies. The National Program of Informatization (Verkhovna Rada of Ukraine, 2016) defines a strategy for solving the

problem of providing information needs and information support for socio-economic, environmental, scientific, technical, defense, national, cultural and other activities of national importance. Main areas of informatization are presented in Figure 2.

Table 1. The list of the most significant legislative documents on creation an information society in the country on the basis of inclusive informatization.

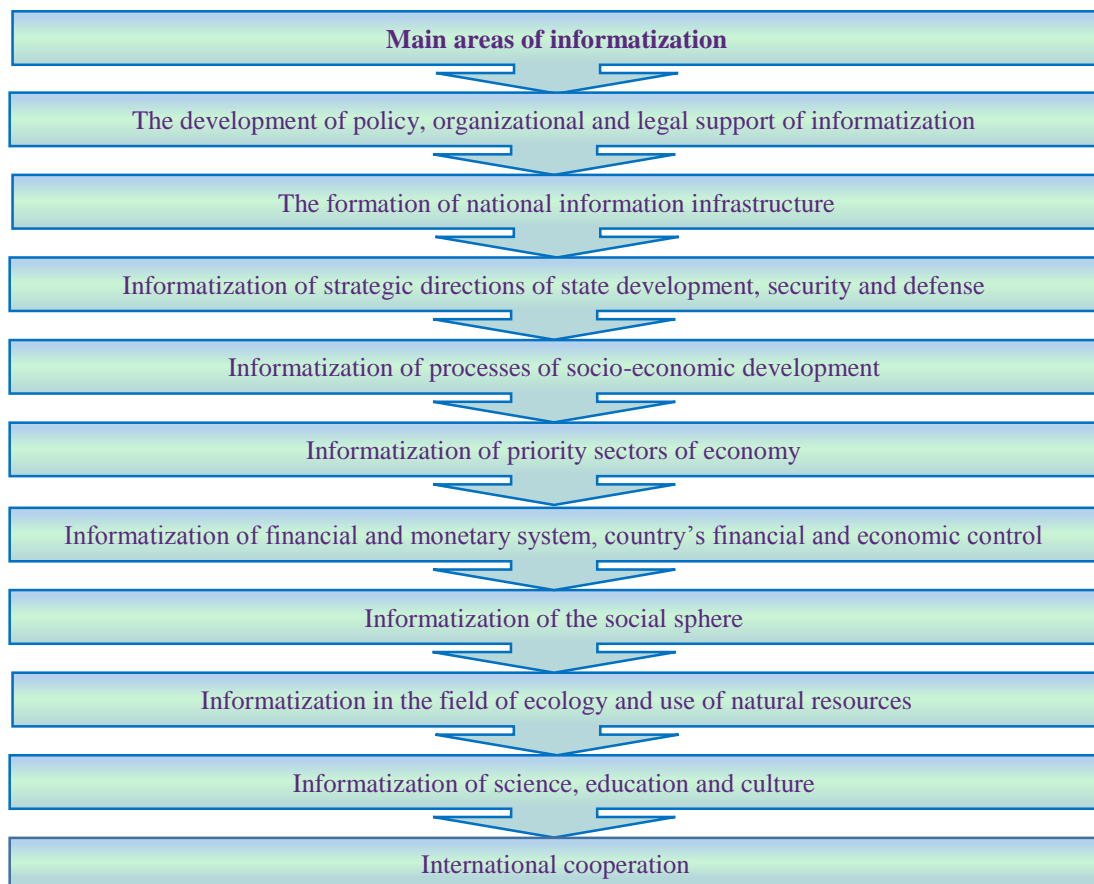| Document type	Document title	Year of implementation
The Law of Ukraine	On the Concept of the National Program for Informatization	1998
	On General Secondary Education	1999
	On Basic Principles of Information Society Development in Ukraine for 2007-2015	2007
The Decree of the President of Ukraine	On Measures to Develop a National Component of the Global Internet Information Network and Provide Wide Access to this Network in Ukraine	2000
	On Additional Measures to Ensure the Development of Education in Ukraine	2001
	On Urgent Measures to Ensure the Functioning and Development of Education in Ukraine	2005
	On Priority Tasks for Introduction of the Latest Information Technologies	2005
	On Measures to Ensure Development of Education in Ukraine as a Priority	2010
The Verkhovna Rada Resolution	On Approval of the Regulation on Information of the Verkhovna Rada Advisory Council	1998
The Resolution of the Cabinet of Ministers of Ukraine	On Approval of the Regulation on the Formation and Implementation of the National Informatization Program	1998
	On Approval of the Program of Informatization of Secondary Comprehensive Schools, Computerization of Rural Schools during 2001-2003	2001
	On Approval of the Comprehensive Program which Provides General, Vocational and Higher Educational Institutions with Modern Technical means of Education for Natural, Mathematical and Technical Disciplines	2004
	On Approval of the State Program "Information and Communication Technologies in Education and Science for 2006-2010"	2005
The State National Program	Education (21st Century Ukraine)	1993
The National Doctrine	The National Doctrine of Educational Development	2002
The State Program	The State Teacher Program	2002
The Development Program	The Development Program of Distance Learning during 2004-2006	2004
The Concept	The Concept of Development of Distance Education in Ukraine	2000
	The Concept of General Secondary Education (12-years school)	2001

Figure 2. Main areas of informatization.

Although, the position on informatization of science and education in the list above is almost the last, in our opinion, the content indicates that the process of expected conceptualization of ICT has begun.

Among the documents adopted during the specified period, only two were designated as concepts: 1) the Concept of Development of Distance Education in Ukraine (Ministry of Education and Science of Ukraine, 2000), and 2) the Concept of General Secondary Education (a 12-years school) (Ministry of Education and Science of Ukraine, 2001). Both concepts formally fit the purpose, but rather give a desirable perspective on ICT implementation. For example, the Concept of General Secondary Education (a 12-years school) (Ministry of Education and Science of Ukraine, 2001) only states that students need to own a computer, but obviously this is not enough.

We support Vashkevych's (2016, p. 133) statement about the essence of the conceptualization phenomenon as the basis for the conclusion: "Conceptualization is a theoretical organization of ontological representations. It reflects possible tendencies for changes of a reference field of the research and allows us to produce new hypotheses about the character and nature of interconnections of the information society, evolving in the conditions of globalized society and which is described in special terms – concepts. The conceptual scheme determines a theoretical understanding of study integrity, supports the systematic representation and semantic essence of a research paradigm. Within the structure of scientific theory, the conceptual scheme of research is being transformed as a fundamental theoretical scheme, which should be interpreted as the scientific picture of the world in the context of the historical evolution of the scientific picture of the world". According to this approach, the ICT concept in education as a phenomenon of national importance at a goal-setting level should be recognized as the basis of strategies, programs, projects, etc. at all levels of country's existence, and, of course, in the field of education, based on its priority role, ensuring its own concept.

It is evident that most European countries have developed and implemented their national ICT concepts as a wide range of actions at the national level, ensuring the use of the Internet by all citizens, acquiring ICT competences in the education system of different levels and purpose, as well as specifying ICT strategies in education as a key public sector.

The Eurydice European Education Network has carried out a comparative analysis of Key Data on Learning and Innovation through ICT at School in Europe (EACEA P9 Eurydice, 2011). The activities of schools in more than 30 European countries in 2009-2010 were analyzed: how they teach in general and how they teach ICT in schools, how they use ICT to bring innovation to the educational process, and how they support students. The evolution of ICT infrastructure at schools was also studied in terms of networking, hardware and software development. The use of ICT in the educational process and their implementation in curricula were also under the research. The role of ICT in the formation of the 21st century skills was examined separately. They found that

since 2000 national ICT strategies had been applied in all European countries. In particular ICT strategies in education are aimed at implementation and the use of ICT. Trends in the development of modern education systems in European countries are adjusted to the digital agenda for Europe (Fact Sheets on the European Union, 2020). Digital policy for Europe can be seen as the ICT concept because it defines a state-wide approach to a wide range of components: providing the population with electronic services; creating a fast and secure broadband network; helping Europe's population gain high-level ICT skills, etc. Today, 28 European countries have national ICT strategies in education which are based on the concept. And if Finland and Poland are just starting to form ICT strategies in education, then Sweden has significant national gains along the way.

The integration of Ukraine into the European community of states, in particular into the European educational space, citizens' demands for competitive education, powerful theoretical and methodological studies in various fields of economic and social knowledge, have led to the updating of previously defined scientific principles and legislative approaches to ICT implementation in the system of education. This also has led to the development of fundamentally new documents that can be recognized as ICT concepts because of the perspective of the goals and the content value.

The benchmark in the integration processes of Ukraine is the analysis of Turkish scientific research. Ozar (2013a) demonstrates the need for planning, implementation and evaluation of educational experience in schools. The author emphasizes on the need to identify the cognitive, affective, dynamic and social features of students. In his opinion, it is important to regularly monitor the development stages of each aspect in the process and communicate the results to all interested parties (Ozar, 2013a, p. 25). Exploring the problem of continuous learning, Ozar (2013b) in another publication claims that education professionals can help another person learn. For this reason, in schools should focus on the phenomenon of learning. "Teachers" teaching at the school according to the principles of traditional education, mainly act by the reflex of controlling the behaviour of "students" (Ozar, 2013b, p. 39).

In 2010, the Cabinet of Ministers of Ukraine approved the Concept of the State Targeted Program on Introducing ICT into the Educational Process of Secondary Educational Establishments "One Hundred Percent" for the period up to 2015 in order to realize equal access to quality education, comprehensive approach to the use of modern technical, methodological, educational information resources, building the information society. The draft of National Strategy for the Development of Education in Ukraine for 2012-2021, approved by the third all-Ukrainian Congress of Teachers, prioritized the introduction of ICT to ensure the improvement of the educational process, the accessibility and effectiveness of education and preparation of the young generation for social life.

The timeliness and importance of these documents have been exacerbated by the demands of educational

practice, and they have begun the process of developing conceptualization of education concerning ICT. We share Zhaldak's (2013) opinion that the problems of informatization of the educational process are complex and, above all, pedagogical. These problems determine the content of a new branch of pedagogical knowledge that goes far beyond the school course of informatics and covers the whole educational process, which becomes more democratic and humanistic because of the skillful ICT application. Thus, the prerequisites for the justification and implementation of open educational systems are created. Consequently, the emergence of such concepts is conditioned by the renewal of public needs and citizens' individual requests for effective education.

In 2016, the Ministry of Education and Science of Ukraine published the first version of "Conceptual Principles of Secondary Education Reform" and invited everyone to discuss it. The document made the ideology of changes in education clear, and it was embedded in the draft of a new basic Law "On Education". The socio-political dialogue over the Conceptual Framework for more than 3 years has led to numerous responses both in the media and on social networks. The introduction to the New Ukrainian School concept states that more than 60 letters with comments and proposals were sent by active citizens and public organizations, individual educators and pedagogical teams of educational institutions as well as by local education councils. As a result of the dialogue, a revised version was created. Of course, all the proposals cannot be taken into account, but we tried to satisfy public requests, add essential points, take into account constructive criticism. Thus, the New Ukrainian School is, in fact, the first document in education that conceptually corresponds to the content and purpose.

In particular, the Concept defines the formula of a new school: the school should be at the forefront of social changes, because "in Ukraine, as well as in the whole world, the so-called generation Y, or "children of the millennium", is gaining its value. For them life means is constant creativity, harmony between making money and learning something new, self-improvement and having fun". The formula of the new school consists of nine key components, including the "cross-cutting use of information and communication technologies in the educational process and management of educational institutions and the education system. The introduction of ICT in the educational sector must move from one-off projects to a systematic process that covers all activities. ICTs will significantly increase a teacher's capabilities, optimize management processes, and as a result form the technological competencies which are important to our students in this century" (Ministry of Education and Science of Ukraine, 2016). Among the 10 key competences of the New Ukrainian School there is a digital competence, which implies confident, yet critical use of information and communication technologies (ICT) for creating, finding, processing, exchanging information at work, in public space and in private communication. Information and media literacy, programming basics, algorithmic thinking, database management, Internet security and cybersecurity skills

are very important nowadays. Understanding the ethics of working with information (copyright, intellectual property, etc.) sometimes can be crucial in modern society.

This concept has become the basis for the emergence of the Concept of providing secondary education recipients with E-textbooks and other electronic educational resources "The National Educational Electronic Platform" (Ministry of Education and Science of Ukraine, 2017), approved by the working group on the development of the Concept of the National Educational Electronic Platform at the meeting in December 15, 2017, chaired by the Minister of Education. The introduction of the document states that the Concept was prepared as a result of a public policy dialogue. More than 20 expert interviews, extensive desk studies on the best foreign experience, three working group meetings, an extended meeting on the role of e-textbooks, more than 10 workshops and Skype conferences were organized. In order to implement the Concept, memorandums of understanding public, international and donor organizations will be signed. By the end of 2020, the legal acts which are necessary to start the process will be elaborated. The documents will be developed as a result of a dialogue between experts, stakeholders, government agencies, public and international organizations. Thus, as a concept, the National Educational Electronic Platform (Ministry of Education and Science of Ukraine, 2018) defines a set of documents, measures, resources to achieve the expected results in providing secondary education recipients with E-textbooks and other electronic educational resources.

Scientists Sosnin and Kononets (2017); Voronkova (2015) consider new information and technological realities of communication in the scientific and educational activities to be the key features of innovative development of society defines the Internet as a new supranational reality, Kyrychenko (2017) points to the conceptualization of the ideology dimensions of the information society in the humanitarian and scientific discourse of the 21st century. Predicting the further development of conceptual models in educational policy, most participants of the International Conference "Education Reform in Ukraine: Information and Analytical Support" (State Scientific Institution "Institute of Educational Analytics", 2017) noted that aspects related to ICT needed 1) the methodology of researches to be updated, 2) to identify relevant issues, 3) to have practical orientation, etc. For example, Savchenko (2017) points to the need for scientific substantiation of public administration principles (in accordance with the theory and practice of public educational policy) and a conceptual definition of a public management paradigm.

Conclusions

To conclude the article, it should be noted that ICT concepts in Ukraine's education, created during the independence period, reflect the course of a controversial process of a state formation. Being innovative by design, concepts, laws, strategies, programs, etc. have been based on traditional, or even

outdated, principles of state development. A legislative approval of the National Program of Informatization and periodic changes in innovative nature of its content in relation to ICT in education, showed progressive trends of conceptual importance.

The markers of positive changes that accompany the development of the information society in Ukraine and modernization of the education system are the Conceptual Principles of Secondary School Reform "New Ukrainian School" and other electronic educational resources "National Educational Electronic Platform". Acceptance of these concepts by society and the state as common values optimizes the further development of ICT in education.

Therefore, the near-term outlook of our scientific exploration are linked to the identification of new trends of conceptual importance in educational practices, focused on the effective use of ICTs and the study of their impact on overcoming contradictions in the educational space of Ukraine.

Funding source

References

Bykov, V. Yu. (2008). *Modeli orhanizatsiinykh system vidkrytoi osvity* [Models of open education organizational system]. Kyiv: Attica. [in Ukrainian]

Bykov, V. Yu., Spirin, O. M., & Pinchuk, O. P. (2017). Problemy ta zavdannia suchasnoho etapu informatyzatsii osvity [Problems and tasks of the current stage of informatization of education]. In V. H. Kremen (Ed.), *Naukove zabezpechennia rozvytku osvity v Ukraini: aktualni problemy teorii i praktyky – Scientific support of education development in Ukraine: current issues of theory and practice* (pp. 191–198). Kyiv: Vydavnychyi dim "Sam". [in Ukrainian]

Cabinet of Ministers of Ukraine. (2003, February 24). *Postanova "Pro zakhody shchodo stvorennia elektronnoi informatsiinoi systemy "Elektronnyi Uriad"* [Resolution "On Measures for Creation of Electronic Information System "Electronic Government"]. Retrieved April 15, 2020, from government portal: https://www.kmu.gov.ua/npas/150472 [in Ukrainian]

Committee on Science and Education of the Verkhovna Rada of Ukraine (2016, May 24). *Rekomendatsii kruhloho stolu "Osvitnia polityka v umovakh informatsiinoho suspilstva"* [Recommendations of the round table "Educational policy in the information society"]. *The Association of Information Technology Enterprises of Ukraine.* Retrieved from http://old.apitu.org.ua [in Ukrainian]

EACEA P9 Eurydice. (2011). *Key data on learning and innovation through ICT at school in Europe 2011.* Brussels: Eurydice. doi:10.2797/61068 Retrieved from https://op.europa.eu/en/publication-detail/-

/publication/8f864668-0211-4a40-bc14-65bf1a97b6a8

Fact Sheets on the European Union. (2020). *Digital Agenda for Europe.* Retrieved from https://www.europarl.europa.eu/factsheets/en/sheet/64/digital-agenda-for-europe.nd

Gurzhiy, A. M., & Lapinsky, V. V. (2013). Elektronni osvitni resursy yak osnova suchasnoho navchalnoho seredovyshcha zahalnoosvitnikh navchalnykh zakladiv [Electronic educational resources as a basis for the modern learning environment secondary schools]. *Informatsiini tekhnolohii v osviti – Information Technologies in Education, 15,* 30–38. doi:10.14308/ite000388 [in Ukrainian]

International Telecommunication Union. (2016). Measuring the information society report. *ITU.* Retrieved from https://www.itu.int

Kostikova, I. I. (2018). Information and communication technologies in students' language learning. *International Journal of Education and Science, 1*(1-2), 7–14. doi:10.26697/ijes.2018.1-2.01

Kremen, V. H. (Ed.). (2016). *Natsionalna dopovid pro stan i perspektyvy rozvytku osvity v Ukraini* [National report on the state and prospects of education in Ukraine]. Kyiv: Pedahohichna dumka. [in Ukrainian]

Kyrychenko, M. O. (2017). Kontseptualizatsiia kohnityvno-komunikatyvnykh vymiriv ideolohii informatsiinoho suspilstva u humanitarno–naukovomu dyskursi XXI stolittia: metodolohiia doslidzhennia [The conceptualization of cognitive and communicative ideology dimensions of the information society in the humanitarian and scientific discourse of the 21st century: Research methodology]. *Hileia: naukovyi visnyk – Gilea: scientific bulletin, 116,* 137–141. [in Ukrainian]

Melnyk, Yu. B. (2016). *Pedahohika vyshchoi shkoly: v skhemakh i tablytsiakh* [Pedagogy of high school: In diagrams and tables]. Kharkiv: KhOHOKZ. doi:10.26697/9789669726063.2016 [in Ukrainian]

Ministry of Education and Science of Ukraine. (2017, December 15). *Kontseptsiia zabezpechennia zdobuvachiv serednoi osvity E-pidruchnykamy ta inshymy elektronnymy osvitnimy resursamy* [Concept of Providing Secondary Education Recipients with E-textbooks and Other Electronic Educational Resources "The National Educational Electronic Platform"]. Retrieved April 29, 2020, from Ministry of Education and Science of Ukraine website: https://mon.gov.ua/storage/app/media/gromadske-obgovorennya/2018/02/15/BROSHURE_CONCEPT_E-BOOK.pdf [in Ukrainian]

Ministry of Education and Science of Ukraine. (2016, October 27). *Kontseptualni zasady reformuvannia serednoi shkoly "Nova ukrainska shkola"* [Conceptual Principles of Secondary School Reform "New Ukrainian School"].

Retrieved April 28, 2020, from Ministry of Education and Science of Ukraine website: https://mon.gov.ua/storage/app/media/zagalna%20serednya/nova-ukrainska-shkola-compressed.pdf [in Ukrainian]

Ministry of Education and Science of Ukraine. (2018, May 22). *Polozhennia "Pro Natsionalnu osvitniu elektronnu platformu"* [Regulation "On the National Educational Electronic Platform"]. Retrieved May 7, 2020, from Verkhovna Rada of Ukraine website: https://zakon.rada.gov.ua/laws/show/z0702-18/ed20180522#Text [in Ukrainian]

Ministry of Education and Science of Ukraine. (2000, December 20). *Postanova "Pro Kontseptsiiu rozvytku dystantsiinoi osvity v Ukraini"* [Resolution "On the Concept of Development of Distance Education in Ukraine"]. Retrieved April 29, 2020, from educational portal of Ukraine: http://www.osvita.org.ua/distance/pravo/00.html [in Ukrainian]

Ministry of Education and Science of Ukraine. (2001, November 22). *Postanova "Pro Kontseptsiiu zahalnoi serednoi osvity (12-richna shkola)"* [Resolution "On the Concept of General Secondary Education (12-year school)"]. Retrieved April 22, 2020, from educational portal of Ukraine: http://osvita.ua/legislation/Ser_osv/2712/ [in Ukrainian]

Morze, N. V. (2010). Yak navchaty vchyteliv, shchob kompiuterni tekhnolohii perestaly buty dyvom u navchanni? [How to teach teachers to stop computer technology from being a miracle in the classroom?] *Kompiuter u shkoli ta simi – Computer at school and family*, *6,* 10–14. [in Ukrainian]

Ozar, M. (2013a). Okullarda destek birimlerinin önemi ve görevleri: Türkiye'de mevcut durum [Importance and role of support in schools: The current situation in Turkey]. *Turkish Journal of Education,* *2*(2), 25–43. doi:10.19128/turje.181058 [in Turkish]

Ozar, M. (2013b). Öğrenme öğrenende gerçekleşir: Yeni nesil eğitim uzmanı [Learning takes place in the learner: A new generation of educational experts]. *Turkish Journal of Education, 2*(1), 39–48. doi:10.19128/turje.181053 [in Turkish]

President of Ukraine. (2013, June 25). *Ukaz "Pro Natsionalnu stratehiiu rozvytku osvity v Ukraini na period do 2021 roku"* [Decree "On the National Strategy for the Development of Education in Ukraine until 2021"]. Retrieved May 3, 2020, from Verkhovna Rada of Ukraine website: http://zakon4.rada.gov.ua/laws/show/344/2013 [in Ukrainian]

President of Ukraine. (2002, April 17). *Ukaz "Pro Natsionalnu doktrynu rozvytku osvity"* [Decree "On the National Doctrine of Educational Development"]. Retrieved May 7, 2020, from Verkhovna Rada of Ukraine website:

https://zakon.rada.gov.ua/laws/show/347/2002#Text [in Ukrainian]

Savchenko, I. H. (2017, November). *Kontseptualna model derzhavnoi osvitnoi polityky v umovakh funktsionuvannia instytutu publichnoho upravlinn*ia [A conceptual model of public education policy under functioning of the Institute of Public Administration]. Paper presented at the International Conference on Education Reform in Ukraine: Information and Analytical Support, Kyiv, Ukraine. Abstract retrieved from http://iea.gov.ua/wp-content/uploads/2018/02/Conf.pdf [in Ukrainian]

Sosnin, O. V., & Kononets, M. O. (2017). Novi informatsiino-tekhnolohichni realii komunikatsii v naukovo-osvitnii diialnosti yak zaporuka innovatsiinoho rozvytku suspilstva [New information and technological realities of communication in scientific and educational activities as a pledge of innovative development of a society]. In V. H. Voronkova (Ed.), *Infrormatsiine suspilstvo v sviti ta Ukraini: problemy stanovlennia ta zakonomirnosti rozvytku – Information society in the world and Ukraine: problems of formation and patterns of development* (pp. 120–141). Zaporizhzhia: ZDIA. [in Ukrainian]

State Scientific Institution "Institute of Educational Analytics" (2017). *Education reform in Ukraine: Information and analytical support*. Retrieved from SSI "Institute of Educational Analytics" website: http://iea.gov.ua/wp-content/uploads/2018/02/Conf.pdf [in Ukrainian]

Vashkevych, V. M. (2016). Istorychna evoliutsiia naukovoi kartyny svitu [The historical evolution of scientific world]. *Hileia: naukovyi visnyk – Gilea: scientific bulletin, 109,* 133–139. [in Ukrainian]

Verkhovna Rada of Ukraine. (2012, July 5). *Postanova "Pro zatverdzhennia Prohramy informatyzatsii zakonotvorchoho protsesu u Verkhovnii Radi Ukrainy na 2012-2017 roky"* [Resolution "On Approval of the Program of Informatization of the Legislative Process in the Verkhovna Rada of Ukraine for 2012-2017"]. Retrieved April 14, 2020, from Verkhovna Rada of Ukraine website: https://zakon.rada.gov.ua/laws/show/5096-17#Text [in Ukrainian]

Verkhovna Rada of Ukraine. (1998, February 4). *Zakon Ukrainy "Pro Natsionalnu prohramu informatyzatsii"* [Law of Ukraine "On the National Program of Informatization"]. Retrieved April 7, 2020, from Verkhovna Rada of Ukraine website: https://zakon.rada.gov.ua/laws/show/74/98-%D0%B2%D1%80 [in Ukrainian]

Verkhovna Rada of Ukraine. (2016, August 1). *Zakon Ukrainy "Pro Natsionalnu prohramu informatyzatsii"* [Law of Ukraine "On the National Program of Informatization"]. Retrieved April 7, 2020, from Verkhovna Rada

of Ukraine website: https://zakon.rada.gov.ua/laws/show/74/98-%D0%B2%D1%80/ed20160801#Text [in Ukrainian]

Voronkova, V. G. (2015). Internet yak hlobalna tendentsiia rozvytku informatsiinoho suspilstva [Internet as a global trend development the information society]. *Hileia: naukovyi visnyk – Gilea: scientific bulletin*, *93*, 174–179. [in Ukrainian]

Zhaldak, M. I. (2013). Problemy informatyzatsii navchalnoho protsesu v serednikh i vyshchykh navchalnykh zakladakh [Problems of informatization of educational process at secondary and higher educational institutions]. *Kompiuter u shkoli ta simi – Computer at School and Family*, *3*, 8–15. [in Ukrainian]

Ziaziun, I. A. (Ed.). (2014). *Suchasni informatsiini tekhnolohii ta innovatsiini metodyky navchannia u pidhotovtsi fakhivtsiv: metodolohiia, teoriia, dosvid, problem* [Modern information technologies and innovative teaching methods for training specialists: methodology, theory, experience, problems]. Kyiv-Vinnytsia: TOV firma "Planer". [in Ukrainian]