### Review Article

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

**Authors:**
- Chasnikova O. V.¹ BDEF
- Dubrovina I. V.² DEG
- Zinchenko O. M.³ EFG

**Affiliations:**
1. Institute of Pedagogics of the National Academy of Sciences of Ukraine, Ukraine
2. National Pedagogical Dragomanov University, Ukraine
3. National Defense University of Ukraine named after Ivan Cherniakhovskyi, Ukraine

**Received:** 16.05.2020; **Accepted:** 11.06.2020; **Published:** 30.06.2020

---

**Authors’ Contribution:**
- A – Study design;
- B – Data collection;
- C – Statistical analysis;
- D – Data interpretation;
- E – Manuscript preparation;
- F – Literature search;
- G – Funds collection

---

**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 have been based on traditional, or even outdated, principles of state development.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.

**Keywords:** ICT concepts in education of Ukraine, conceptualization, the New Ukrainian School, National educational electronic platform, pedagogy

**Copyright:** © 2020 Chasnikova O. V., Dubrovina I. V., Zinchenko O. M. Published by Archives of International Journal of Science Annals

**DOI and UDC:**
DOI 10.26697/ijsa.2020.1.3; UDC 371.2-047.82:37.091.2-021.462(477)

---

**Conflict of interests:**
The author declares that there is no conflict of interests

**Peer review:**
Double-blind review

**Source of support:**
This research did not receive any outside funding or support

**Information about the authors:**
- Chasnikova Olena Volodymyrivna (Corresponding Author) – https://orcid.org/0000-0002-8535-6668; maxlen123@gmail.com; Doctor of Philosophy in Pedagogy, Senior Research Fellow, Institute of Pedagogics of the National Academy of Sciences of Ukraine; Kyiv, Ukraine.
- Dubrovina Iryna Volodymyrivna – https://orcid.org/0000-0002-6676-4789; Doctor of Philosophy in Pedagogy, Associate Professor of Pedagogical Creativity Department, National Pedagogical Dragomanov University; Kyiv, Ukraine.
- Zinchenko Olha Mykolayivna – https://orcid.org/0000-0002-0733-3372; Researcher, the Center of Simulation Modeling, National Defense University of Ukraine named after Ivan Cherniakhovskyi; Kyiv, Ukraine.
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 to 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
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 educational theory and practice.

1. 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.

2. The question arises about the effectiveness of those ICT concepts that could be identified as leading in Ukraine’s educational theory and practice.

3. 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 educational theory and practice.

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

<table>
<thead>
<tr>
<th>Document type</th>
<th>Document title</th>
<th>Year of implementation</th>
</tr>
</thead>
<tbody>
<tr>
<td>The Law of Ukraine</td>
<td>On the Concept of the National Program for Informatization</td>
<td>1998</td>
</tr>
<tr>
<td></td>
<td>On General Secondary Education</td>
<td>1999</td>
</tr>
<tr>
<td>The Decree of the President of Ukraine</td>
<td>On Measures to Develop a National Component of the Global Internet Information Network and Provide Wide Access to this Network in Ukraine</td>
<td>2000</td>
</tr>
<tr>
<td></td>
<td>On Additional Measures to Ensure the Development of Education in Ukraine</td>
<td>2001</td>
</tr>
<tr>
<td></td>
<td>On Urgent Measures to Ensure the Functioning and Development of Education in Ukraine</td>
<td>2005</td>
</tr>
<tr>
<td></td>
<td>On Priority Tasks for Introduction of the Latest Information Technologies</td>
<td>2005</td>
</tr>
<tr>
<td></td>
<td>On Measures to Ensure Development of Education in Ukraine as a Priority</td>
<td>2010</td>
</tr>
<tr>
<td>The Verkhovna Rada Resolution</td>
<td>On Approval of the Regulation on Information of the Verkhovna Rada Advisory Council</td>
<td>1998</td>
</tr>
<tr>
<td>The Resolution of the Cabinet of Ministers of Ukraine</td>
<td>On Approval of the Regulation on the Formation and Implementation of the National Informatization Program</td>
<td>1998</td>
</tr>
<tr>
<td></td>
<td>On Approval of the Program of Informatization of Secondary Comprehensive Schools, Computerization of Rural Schools during 2001-2003</td>
<td>2001</td>
</tr>
<tr>
<td></td>
<td>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</td>
<td>2004</td>
</tr>
<tr>
<td></td>
<td>On Approval of the State Program “Information and Communication Technologies in Education and Science for 2006-2010”</td>
<td>2005</td>
</tr>
<tr>
<td>The State National Program</td>
<td>Education (21st Century Ukraine)</td>
<td>1993</td>
</tr>
<tr>
<td>The National Doctrine</td>
<td>The National Doctrine of Educational Development</td>
<td>2002</td>
</tr>
<tr>
<td>The Program</td>
<td>The State Teacher Program</td>
<td>2002</td>
</tr>
<tr>
<td>The Development Program</td>
<td>The Development Program of Distance Learning during 2004-2006</td>
<td>2004</td>
</tr>
<tr>
<td>The Concept</td>
<td>The Concept of Development of Distance Education in Ukraine</td>
<td>2000</td>
</tr>
<tr>
<td></td>
<td>The Concept of General Secondary Education (12-years school)</td>
<td>2001</td>
</tr>
</tbody>
</table>

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**

This research did not receive any outside funding or support.

**References**


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


**Cite this article as:**

The electronic version of this article is complete and can be found online at: http://ijsa.culturehealth.org/en/arhiv

This is an Open Access article distributed under the terms of the Creative Commons Attribution License, which permits unrestricted use, distribution, and reproduction in any medium, provided the original work is properly cited (http://creativecommons.org/licenses/by/4.0/deed.en).