doi: 10.15330/msuc.2024.30.11-15

Оксана КОНДУР,
доктор педагогічних наук, професор, декан педагогічного факультету,
Прикарпатський національний університет імені Василя Стефаника (м. Івано-Франківськ, Україна)

Oksana KONDUR,
Doctor of Pedagogical Sciences, Professor, Dean of the Pedagogical Faculty,
Vasyl Stefanyk Precarpathian National University (Ivano-Frankivsk, Ukraine)
oksana.kondur@pnu.edu.ua
ORCID ID 0000-0001-9342-1127

Оксана ЦЮНЯК,
доктор педагогічних наук, професор кафедри початкової освіти та освітніх інновацій,
Прикарпатський національний університет імені Василя Стефаника (м. Івано-Франківськ, Україна)

Oksana TSIUNIAK,
Doctor of Pedagogical Sciences, Professor of Department of Primary Education and Educational Innovations,
Vasyl Stefanyk Precarpathian National University (Ivano-Frankivsk, Ukraine)
oksana.tsiuniak@pnu.edu.ua
ORCID ID 0000-0002-4573-1865

Світлана ВЕРБЕЩУК,
кандидат педагогічних наук, викладач кафедри початкової освіти та освітніх інновацій,
Прикарпатський національний університет імені Василя Стефаника (м. Івано-Франківськ, Україна)

Svetlana VERBESCHUK,
Candidate of Pedagogic Sciences (Ph.D.), Department of Primary Education and Educational Innovations,
Vasyl Stefanyk Precarpathian National University (Ivano-Frankivsk, Ukraine)
svitlana.verbeshchuk@pnu.edu.ua
ORCID ID 0000-0002-4209-416X

УДК 378.147

ІНТЕГРАЦІЯ ТА ЦИФРОВІЗАЦІЯ ЯК СУЧАСНІ ОСВІТНІ ТРЕНДИ

Анотація. У статті розглянуто актуальність інтеграційного підходу та цифровізації в освіті, зокрема їх значення для початкової школи. Підкреслено, що інтеграція сприяє формуванню міжпредметних зв'язків, розвитку критичного мислення, креативності та цілісного розуміння світу. Використання інтеграційного підходу дозволяє побудувати цілісне розуміння матеріалу, підвищуючи мотивацію дітей до навчання. Висвітлено роль цифровізації у впровадженні інтеграційного підходу, яка надає нові можливості для навчання учнів та вдосконалення освітнього процесу. Цифрові інструменти сприяють створенню адаптивного навчання, що враховує індивідуальні особливості учнів. Описано сучасні цифрові інструменти, які ефективно підтримують міжпредметне навчання. Наведено приклади їх використання для створення інтегрованих уроків і проєктів.

Зроблено акцент на необхідності підготовки майбутніх педагогів до впровадження інтеграційного навчання з використанням цифрових технологій, що включає педагогічну практику та розвиток професійних цифрових компетентностей. Підготовлений учитель здатен впроваджувати ці елементи в навчальний процес, забезпечуючи його відповідність сучасним вимогам. Учитель, який володіє цифровими технологіями та методиками інтеграції, допомагає учням не лише засвоювати знання, а й розвивати критичне мислення, креативність, комунікативні навички та цифрову грамотність.

Ключові слова: інформатизація освіти, інтеграція в освіті, підготовка вчителя, освітній простір, початкова школа, цифрове покоління, цифрові інструменти.

INTEGRATION AND DIGITALIZATION AS MODERN EDUCATIONAL TRENDS

Abstract. The article examines the relevance of the integration approach and digitalization in education, in particular their significance for primary school. It is emphasized that integration contributes to the formation of interdisciplinary connections, the development of critical thinking, creativity and a holistic understanding of the world. The use of an integration approach

allows building a holistic understanding of the material, increasing children's motivation to learn. The role of digitalization in the implementation of an integration approach is highlighted, which provides new opportunities for teaching students and improving the educational process. Digital tools contribute to the creation of adaptive learning that takes into account the individual characteristics of students. Modern digital tools that effectively support interdisciplinary learning are described. Examples of their use for creating integrated lessons and projects are given.

The emphasis is placed on the need to prepare future teachers for the implementation of integration learning using digital technologies, which includes pedagogical practice and the development of professional digital competencies. A trained teacher is able to introduce these elements into the educational process, ensuring its compliance with modern requirements. A teacher who is proficient in digital technologies and integration techniques helps students not only acquire knowledge, but also develop critical thinking, creativity, communication skills, and digital literacy.

Keywords: informatization of education, integration in education, teacher training, educational space, primary school, digital generation, digital tools.

INTRODUCTION

The problem formulation. The modern educational process requires teachers to be able to build learning on an integrative basis, which involves combining knowledge from different subject areas into a single educational system. This allows children to create a holistic perception of the world, improve their understanding of interdisciplinary connections, and develop critical thinking and creativity. The use of digital tools in the educational process of primary school helps to develop not only mathematical, language, and digital skills of students. With their help, interdisciplinary connections can be easily formed. Therefore, it is important to correctly select and apply modern information technologies to create an integrated learning space. Future teachers need to be taught this. This approach meets the requirements of modern educational reform.

Analysis of recent research and publications. In the context of education reform, one of the key aspects is the integration of digital tools into the educational process. The issue of digitalization of education is devoted to the publications of many scientists, in particular, it was studied by S. Bader, V. Bykov, O. Bilyakovska, L. Bogdanovich, A. Gurzhiy, R. Gurevich, M. Zhaldak, T. Koval, A. Kocharyan, V. Lapinsky, S. Lytvynova, A. Lytvyn, N. Morse, O. Ovcharuk, O. Piskun, L. Romanyshyna, O. Spivakovsky, O. Spirin, M. Shyshkina, M. Shvardak, L. Sushchenko etc.

Modern problems of organizing the educational process on an integrative basis were studied by I. Bekh, N. Bibik, S. Goncharenko, M. Grinova, M. Masol, M. Murashchenko, L. Nikolenko, O. Savchenko, S. Skvortsova, V. Fomenko, etc. It should be noted that pedagogical integration is interpreted differently by researchers, depending on the objects and levels of its application in education.

AIM AND TASKS RESEARCH – analyze the features of using digital tools for the effective implementation of an integration approach in the educational process.

RESEARCH METHODS: method of analysis and synthesis, historical method, method of generalization, systematic.

RESULTS OF THE RESEARCH

The idea of integrated learning is currently extremely relevant, since its successful methodological implementation is expected to achieve the goal of quality education (Yakimchuk, Kolupaeva, 2019). Examples of the use of integrative educational technologies in higher education institutions and their effectiveness are presented in more detail in our work (Mykhailyshyn & Kondur, 2022).

The integration approach is becoming an important component of the pedagogical activity of primary school teachers. It involves combining different academic disciplines in order to achieve better assimilation of knowledge through the creation of interdisciplinary connections. We agree with T. Zasekina that «establishing connections between different scientific fields leads to new ways of thinking and knowledge, combines different abilities, develops critical thinking and forms a deep understanding of the overall picture of the world» (Zasiekina, 2020, p.64). The global task of integration is not so much to combine separately existing educational subjects or parts into a whole, but to extend the principle of expediency to the entire content of education.

Integration increases students' interest, allows them to be taught not in isolation within a specific discipline, but in the context of real situations that form a holistic vision of the world. In the context of primary school, integration involves the joint use of materials from different subjects, which allows students to develop critical thinking and creativity.

In recent years, the informatization of education has been actively taking place (Kondur & Fuchynska, 2021). Digital technologies not only change the way material is presented, but also provide new opportunities for student development, particularly in primary school. Thanks to information technologies, it is possible to improve students' access to various educational materials through educational online platforms and electronic textbooks. In the process of working with digital technologies, students acquire the skills necessary for successful adaptation to the modern information environment and develop digital literacy.

The interactivity of digital tools helps to activate students in the learning process. They can work with materials in the lesson. At the same time, digital content is available to children anywhere and at any time. This stimulates the development of their independent work.

The integration of digital tools into the educational process is especially effective at the primary school stage, when children are still forming the foundations of their cognitive abilities.

Generations X, Y, Z and Alpha perceive the integration approach in education differently, which is due to the technological and socio-cultural characteristics of their development.

Generation X (born in 1965–1980) grew up in a world where information was less accessible than today. This generation is inclined to more structured and systematic learning, which did not always include the integration of subjects. They value a deep understanding of each discipline separately, so it may take them time to adapt to an integrative approach, where knowledge from different disciplines is combined into a single topic. At the same time, representatives of this generation, who are educators in the educational process today, are more likely to introduce innovative methods, as they strive to provide modern and practical learning for younger generations.

Generation Y (millennials born between 1981 and 1996) has actively integrated into the digital age and perceives learning through technology and a multidisciplinary approach. They easily accept integration as a way of learning because it fits their style of working with information - fast search, adaptation to change and interdisciplinary thinking. Millennials are flexible in applying knowledge and open to learning at the intersection of several disciplines. This approach contributes to their ability to integrate knowledge in professional life, particularly in areas such as technology and creative industries. (Șchiopu, Nica, Pădurean & Țală, 2023)

Generation Z (born between 1997 and 2012), who grew up in the era of smartphones and social networks, is accustomed to visual and interactive presentation of information. They prefer active learning methods, including an integration approach, where they can see the practical application of the material. This generation values learning that has real-world applications and enjoys integrated projects and interdisciplinary learning, especially through digital tools and virtual platforms. They are prone to independent research, so they like methods where they can find connections between different subjects themselves. (Koulopoulos & Keldsen, 2016).

Generation Alpha (born since 2013) is the first digital generation, as they were born into a world of technology. They have been exposed to remote classrooms, tablets, and ubiquitous streaming services since early childhood. They will be influenced by new uses of artificial intelligence (AI) through both voice assistants and natural language processing tools such as ChatGPT. This generation is learning in an environment where an integrative approach is central to education. Alphas easily adapt to interactive, digital, and flexible learning that encompasses the simultaneous use of different disciplines.

Therefore, an integrative approach promotes a deep understanding of the connections between disciplines for all generations, but is best understood by millennials, Gen Z, and Alphas. At the same time, technological developments allow us to adapt this approach to the needs of each of them: from structured learning for Generation X (lifelong learning) to an interactive and digital environment for Generation Alpha.

Generation Alpha children are accustomed to instant feedback and visual learning tools, so integration through practical exercises, the use of VR and AR technologies, and artificial intelligence (AI) is extremely effective for them.

“It is obvious that the model of education for children of the digital generation should be different from the one that exists now, and school should not turn into a drill, the child should feel the joy of learning» (Kondratenko & Manilova). S. Skvortsova and O. Onoprienko justify that «representatives of the digital generation are mainly visual people who need a clear schematization of educational actions. To take into account this ability of modern children, textbooks, study notebooks, multimedia presentations should implement printing tools - highlighting words that need attention in color; using a system of arrows and bars that help the student establish connections or prompt certain operations and are components of the guiding basis of action» (Skvortsova & Onoprienko, 2020). At the same time, scientists in the publication (Skvortsova, Onoprienko & Britzkan, 2020) warn about the possible risks of deterioration of cognitive processes in modern students through uncontrolled interaction with the virtual environment. Therefore, it is necessary to satisfy the needs of modern children in the use of information technologies, but this virtual reality must be controlled by the teacher. Then it implements educational goals, involves the child in collective activities.

The issues of digital transformation of education, which includes training future teachers in the use of digital tools and technologies for organizing integrated learning, are actively addressed by scientists from the Institute of Digitalization of Education of the National Academy of Pedagogical Sciences of Ukraine. Their recommendations (Scientific and Methodological Support for the Digitalization of Education in Ukraine ...) help future teachers use multimedia resources, digital platforms and interactive tools to create a flexible and convenient educational environment adapted to the individual needs of students. When training future teachers, it is necessary to focus on the fact that digital tools can effectively organize interdisciplinary classes. There are various types of practices for integrating digital tools into learning on an interdisciplinary basis. In particular, using digital tools, students can be offered to create projects that cover several subject areas. For example, in a lesson on the subject "I Explore the World", students virtually model an ecosystem using mathematical calculations, research natural science issues, and apply artistic skills in the form of spatial visualization.

Using digital platforms like Google Classroom and Moodle, teachers can integrate different subjects so that students can work with materials from math, science, art, etc. at the same time.

The digital tool Canva is convenient for creating visual materials that can be part of integrated lessons. Future teachers can use Canva to develop integrated presentations that combine elements of different subjects in one topic.

The interactive application Kahoot! can be used to create integration quizzes that will consist of tasks from several subjects. It is good to combine math with elements of science or language. This way, students develop an idea of integration in the learning process.

Using VR/AR tools, students can immerse themselves in an interactive environment where they can study educational objects from different perspectives. Such virtual simulations create conditions for experiments and research in which students can see examples of interdisciplinary thinking and learning.

Effective is the development of cases that require the integration of knowledge from different fields. For example, the analysis of a problematic environmental situation using mathematical knowledge. In this way, Case Study develops critical thinking in students, forms skills in analyzing and solving complex problems.

Cross-curricular quests, organized using digital tools, help students integrate knowledge from different subjects in an interesting way. For example, in a mathematics lesson, you can create a task, the solution of which will give students a clue for the next stage of studying material from language or literature.

In the context of the New Ukrainian School, the educational environment should be creative, ensure the use of different forms of work, promote the development of a sustainable cognitive interest in students, form needs for knowledge and motivate them to learn (Savchenko, 2018). The use of digital technologies and tools, such as computers, gadgets, interactive whiteboards and visualization tools, is a necessary step in the development of education, which will increase the efficiency and interactivity of the learning process. Using digital technologies in the educational process, the teacher can achieve a new educational result that will meet the requirements of a modern digital society. In particular, students will be able to study not only traditional educational fields, but also acquire skills in working with artificial intelligence, big data, programming, etc. (Goncharova, 2024).

An important form of training a future teacher to use digital tools and implement integration processes in teaching is pedagogical practice. We agree with the opinion of O. Piskun that «during pedagogical practice, future teachers have the best opportunities to master the techniques of working with an interactive whiteboard/panel, as well as to improve their digital skills in creating the necessary educational content and, most importantly, to test it in action, to assess the advantages and disadvantages in organizing interactive interaction of applicants» (Pyskun, 2024. p.67)

Future teachers should be fluent in modern digital interactive tools in order to effectively use them in their further professional activities. Therefore, significant attention should be paid to the formation of these competencies during student training.

CONCLUSIONS AND PROSPECTS OF FURTHER RESEARCH

The integration of digital tools into the primary school learning process is an important stage in the development of modern education. The use of digital technologies not only enriches the learning process, but also opens up new opportunities for the development of interdisciplinary connections. Modern digital tools contribute to the development of students' critical thinking, help them better assimilate the material and develop practical skills necessary for life in the digital world. Therefore, it is important that educational institutions actively implement these tools to form students who are ready for the challenges of modern society.

Preparing primary school teachers to use digital tools in an integrated approach is a necessary condition for ensuring the effectiveness of the educational process. This contributes to the formation of basic 21st century competencies in students, improves the quality of education, and stimulates the development of a modern school.

REFERENCES

Honcharova I.P., (2024). Tsyfrovi tekhnolohii v osviti yak zasib pokrashchennia dostupnosti ta efektyvnosti navchannia.[Digital technologies in education as a means of improving the accessibility and effectiveness of learning] URL: https://lib.iitta.gov.ua/734946/1/Гончарова_тези.pdf [in Ukrainian]

Kondratenko L, Manylova L. Shkilni problemy ditei informatsiinoi ery [School problems of children of the information age] ULR: https://core.ac.uk/download/pdf/141487958.pdf [in Ukrainian]

Kondur O., Fuchynska N. (2021) Information society and informatization of education. Mountain school of Ukrainian Carpaty. № 24. 11-15.

Koulopoulos, T., & Keldsen, D. (2016). Gen Z Effect (1st ed.). Taylor and Francis. Retrieved from https://www.perlego.com/book/1573131/gen-z-effect-the-six-forces-shaping-the-future-of-business-pdf (Original work published 2016)

Mykhailyshyn H., Kondur O., Sorokolita O., Dyakiv I., Kryzhanivska A. (2022) Integrated Technologies in the Educational Process of Professional Training AD ALTA: Journal of Interdisciplinary Research. 2022. Vol. 12, Issue 2, Special Issue XXIX. 160- 165.

Naukovo-metodychne zabezpechennia tsyfrovizatsii osvity Ukrainy: stan, problemy, perspektyvy. [Naukovo-analitychna dopovid Scientific and methodological support for the digitalization of education in Ukraine: status, problems, prospects. Scientific and analytical report] V.Iu. Bykov, O.I. Liashenko,S.H. Lytvynova, V.I. Luhovyi, Yu.I. Malovanyi, O.P. Pinchuk, O.M. Topuzov /za zah. red. V.H. Kremenia. Kyiv: ITsO NAPN Ukrainy, 2022. 96. [in Ukrainian]

Pyskun O. (2024) Pidhotovka maibutnikh pedahohiv do zastosuvannia tsyfrovykh zasobiv dlia orhanizatsii interaktyvnoi vzaiemodii uchasnykiv osvitnoho protsesu. [Preparing future teachers to use digital tools to organize interactive interaction between participants in the educational process] Visnyk Natsionalnoho universytetu "Chernihivskyi kolehium" imeni T. G. Shevchenka. Tom. 182. №26. 64-68. [in Ukrainian]

Tsyunyak,O.P. (2021). Vykorystannya tsyfrovykh tekhnolohiy u profesiyniy pidhotovtsi maybutnikh pedahohiv u zakladakh osvity [Use of digital technologies in professional training of future teachers in educational institutions]. Pedahohika formuvannya tvorchoyi osobystosti u vyshchiy i zahal'noosvitniy shkolakh –Pedagogy of creative personality formation in higher and secondary schools. 75 (3). 128–133. [in Ukrainian].

Savchenko O. A. (2018) Pochatkova osvita v konteksti idei Novoi ukrainskoi shkoly i uchniv. [Primary education in the context of the ideas of the New Ukrainian School and students] Dyrektor shkoly, litseiu, himnazii. T. 19. № 2. 4–10. URL: https://director-ua.info/index.php/dslg/article/view/51 [in Ukrainian]

Șchiopu A., Nica A-M., Pădurean A., Ţală M-L. (2023) Generation Z vs. generation Y: different from or similar? a comparison of centennials and millennials regarding the use of social media for travel purposes. Cactus Tourism Journal Vol. 5, No. 1. New Series, 20-35.

Skvortsova S., Onopriienko O. (2020). Nova ukrainska shkola: metodyka navchannia matematyky u 3-4 klasakh zakladiv zahalnoi serednoi osvity na zasadakh intehratyvnoho i kompetentnisnoho pidkhodiv.[New Ukrainian School: Methodology for Teaching Mathematics in Grades 3-4 of Secondary Education Institutions Based on Integrative and Competency-Based Approaches] URL: https://nuschool.eu/lessons/mathematics/3-4klas/2.html [in Ukrainian]

Shvardak,M.V. (2023). Tsyfrovi interaktyvni tekhnolohiyi v osvitn'omu protsesi pochatkovoyi shkoly [Digital interactive technologies in the educational process of primary school]. Naukovyy zhurnal Khortyts'koyi natsional'noyi akademiyi. Seriya «Pedahohika. Sotsial'na robota»–Scientific journal of the Khortytsk National Academy. Series «Pedagogy. Social work».Zaporizhzhia, Ukraine. 1. 39–49. [in Ukrainian]

Skvortsova S., Onopriienko O.. Britskan T. (2020) Osoblyvosti navchannia matematyky v pochatkovii shkoli ditei tsyfrovoho pokolinnia. [Peculiarities of teaching mathematics in primary school to children of the digital generation] Problemy suchasnoho pidruchnyka : zb. nauk. prats / [red. kol. ; holov. red. – O. M. Topuzov]. Kyiv: Pedahohichna dumka, V. 25. 160-181. [in Ukrainian]

Zasiekina T. (2020) Intehratyvnyi pidkhid u shkilnii pryrodnychii osviti. [Integrative approach in school science education] Ukrainskyi pedahohichnyi zhurnal. № 4. 61-68. URL: http://nbuv.gov.ua/UJRN/ukrpj_2020_4_7 [in Ukrainian]

Yakymchuk A.Ia., Kolupaieva T.Ie. (2019) Nova ukrainska shkola: intehratsiinyi pidkhid u pochatkovii zahalnii osviti. [New Ukrainian school: an integration approach in primary general education] Nauka, osvita, suspilstvo ochyma molodykh. 165-167. [in Ukrainian]

Received *12.04.2024*
Accepted *02.05.2024*