DOI 10.31392/ONP.2786-6890.9(2)/1.2025.06
UDC 373.3.015.31:124.4]:502

USING AN INNOVATIVE UPDATED LESSON STRUCTURE AS A MEANS OF DEVELOPING CREATIVE THINKING IN "I EXPLORE THE WORLD" LESSONS IN ELEMENTARY SCHOOL

Olena Matviienko
Doctor of Pedagogical Sciences, Professor,
Head of the Department of Primary Education and Innovative Pedagogy,
Dragomanov Ukrainian State University,
9, Pyrohova Str., Kyiv, Ukraine
https://orcid.org/0000-0002-5746-4864
e-mail: o.v.matviyenko@npu.edu.ua

Daria Hubarieva
Candidate of Pedagogical Sciences, Senior Lecturer of the Department of Primary Education and Innovative Pedagogy,
Dragomanov Ukrainian State University,
9, Pyrohova Str., Kyiv, Ukraine
https://orcid.org/0000-0002-4513-8586
e-mail: kameta2014@ukr.net

***Abstract**. This article is dedicated to researching the effectiveness of implementing an innovative updated lesson structure, developed on the basis of pedagogical methods grounded in psychological patterns (according to O. Matviienko, D. Hubarieva), aimed at developing creative thinking and enhancing intrinsic motivation among elementary school students in "I Explore the World" (IETW) lessons. It examines the integration of pedagogical methods with psychological patterns, which allows for the creation of optimal conditions for the development of young learners' creative potential.*

The research aims to analyze contemporary approaches to understanding the phenomena of "creative thinking" and "intrinsic motivation," as well as to investigate examples of successful implementation of the updated lesson structure in elementary school. Particular attention is paid to stimulating the development of divergent thinking based on the intrinsic motivation of younger students.

The study analyzed theoretical and practical aspects of developing creative thinking and intrinsic motivation among elementary school students. It was found that the updated lesson structure, which includes elements of motivation, self-awareness, social understanding, and reflection, promotes the activation of students' creative potential by providing them with an active position in the educational process. Pedagogical methods based on psychological patterns allow for the creation of a safe environment for developing creative thinking and enhancing students' intrinsic motivation.

The research results demonstrated that the use of the updated lesson structure significantly increases students' creative thinking levels, especially in the experimental group where this methodology was applied. It was found that the updated lesson structure facilitates the development of aspects of creative thinking such as fluency, flexibility, originality, and elaboration of ideas. A positive impact on students' intrinsic motivation, expressed through their activity, engagement, and willingness to participate in the learning process, was also noted.

It is anticipated that the research results will be beneficial for enhancing the educational process and pedagogical practices aimed at increasing motivation and academic success among elementary

© Matviienko O., 2025
© Hubarieva D., 2025

school students. They can serve as a foundation for developing new methodological materials and educational programs focused on fostering creative thinking and intrinsic motivation among students.

Keywords: *creative thinking, divergent thinking, cognitive interest, elementary school students, lesson structure, self-reflection, emotional intelligence.*

DOI 10.31392/ONP.2786-6890.9(2)/1.2025.06
УДК 373.3.015.31:124.4]:502

ВИКОРИСТАННЯ ІННОВАЦІЙНОЇ ОНОВЛЕНОЇ СТРУКТУРИ УРОКУ ЯК ЗАСОБУ РОЗВИТКУ ТВОРЧОГО МИСЛЕННЯ НА УРОКАХ «Я ДОСЛІДЖУЮ СВІТ» У ПОЧАТКОВІЙ ШКОЛІ

Матвієнко О. В.
доктор педагогічних наук, професор,
завідувач кафедри початкової освіти
та інноваційної педагогіки,
Український державний університет
імені Михайла Драгоманова,
вул. Пирогова, 9, Київ, Україна
https://orcid.org/0000-0002-5746-4864
e-mail: o.v.matviyenko@npu.edu.ua

Губарєва Д. В.
кандидат педагогічних наук,
старший викладач кафедри початкової
освіти та інноваційної педагогіки,
Український державний університет
імені Михайла Драгоманова,
вул. Пирогова, 9, Київ, Україна
https://orcid.org/0000-0002-4513-8586
e-mail: kameta2014@ukr.net

Анотація. *Стаття присвячена дослідженню ефективності застосування інноваційної оновленої структури уроку, розробленої на основі педагогічних методів, що базуються на психологічних закономірностях (за О. Матвієнко, Д. Губарєвої), з метою розвитку творчого мислення та підвищення внутрішньої мотивації учнів початкової школи на уроках «Я досліджую світ» (ЯДС). Вона розглядає поєднання педагогічних методів з психологічними закономірностями, що дозволяє створити оптимальні умови для розвитку творчого потенціалу молодших школярів.*

Дослідження має на меті аналіз сучасних підходів до розуміння феноменів «творчого мислення» та «внутрішньої мотивації», а також дослідження прикладів успішної реалізації оновленої структури уроку в початковій школі. Особлива увага приділяється стимулюванню розвитку дивергентного мислення на основі внутрішньої мотивації молодших школярів.

В ході дослідження було проаналізовано теоретичні та практичні аспекти розвитку творчого мислення та внутрішньої мотивації учнів початкової школи. Було виявлено, що оновлена структура уроку, яка включає елементи мотивації, самосвідомості, соціального розуміння та рефлексії, сприяє активізації творчого потенціалу учнів надаючи їм активну позицію в освітньому процесі. Педагогічні методи, що базуються на психологічних закономірностях, дозволяють створити безпечне середовище для розвитку творчого мислення та підвищення внутрішньої мотивації учнів.

© Matviienko O., 2025
© Hubarieva D., 2025

Результати дослідження продемонстрували, що використання оновленої структури уроку значно підвищує рівень творчого мислення учнів, особливо в експериментальній групі, де застосовувалася ця методика. Було виявлено, що оновлена структура уроку сприяє розвитку таких аспектів творчого мислення, як плинність, гнучкість, оригінальність та розробка ідей. Також було відзначено позитивний вплив на внутрішню мотивацію учнів, що виражається в їхній активності, зацікавленості та бажанні брати участь у навчальному процесі.

Очікується, що результати дослідження будуть корисними для вдосконалення навчального процесу та педагогічних практик з метою підвищення мотивації та успішності учнів початкової школи. Вони можуть слугувати основою для розробки нових методичних матеріалів та навчальних програм, спрямованих на розвиток творчого мислення та внутрішньої мотивації учнів.

Ключові слова: *творче мислення, дивергентне мислення, пізнавальний інтерес, молодші школярі, структура уроку, саморефлексія, емоційний інтелект.*

Introduction and Current State of the Researched Problem. The contemporary digital generation demonstrates changes in thinking processes. A significant number of researchers indicate that digital skills and competencies are indeed developed to a higher degree in the new generation compared to their predecessors. However, researchers also point to the "moral panic" that arises among representatives of Generation Z and Alpha [2; 3]. This is the generation that grows up with artificial intelligence and has answers to many questions. However, researchers of the impact of artificial intelligence, such as Velibor Božić [1], point to the dangers that this tool poses. One of the important directions is the change in the manifestation of creative thinking. Representatives of the modern generation already have numerous variations and ready-made solutions, but the motivation to create something new or innovative decreases, as it is easier to reproduce or request information from artificial intelligence. That is, the modern generation demonstrates an easy path to solving problem tasks.

We conducted a survey among secondary school students about the use of AI and the creation of creative products. The survey results showed that students solve a large number of complex tasks with the help of AI (76%); find solutions when creating a project with the help of AI (54%); and turn to AI or bloggers with ready-made algorithms when mastering a new skill (74%). Only 12% of students showed that they are ready to work independently on the assigned task without using digital media. The survey results are striking and demonstrate a gap in the use of creative thinking in life circumstances. This determines the relevance of the chosen research.

Scientists around the world are studying the main aspects of "creative thinking," including both domestic researchers: D. Bogoyavlenskaya, A. Brushlinsky, T. Bogdanova, V. Davydov, M. Ilyakhov, V. Molyako, N. Muranova, S. Rubinstein, O. Sergeeva, E. Telegina, O. Tikhomirov, I. Yakimchuk, and others, as well as global researchers: Teresa M. Amabile, Gergana Vladova, Johnathan Cromwell, and many others.

In particular, psychologist Teresa M. Amabile, in her research, described that she invited several recognized art experts to evaluate the works of 29 professional artists. The experts were unaware that each artist was asked to present 10 commissioned works and 10 non-commissioned works. In the vast majority of cases, experts rated the non-commissioned works as more creative than the commissioned ones. The research results led Amabile to formulate the "principle of intrinsic motivation of creativity": "People will be most creative when they are motivated primarily by interest, enjoyment, and challenges of the work itself, not by external pressures" [4]. We can draw an analogy in

the educational process: the main task of teachers is to create an opportunity to generate intrinsic motivation for using creative thinking in the educational process and avoid extrinsic motivation (grades, rewards, etc.). The above necessitates changing approaches in education to develop and improve the creative thinking of the digital generation and enhance intrinsic motivation.

The aim of this research is to demonstrate the effectiveness of combining pedagogical methods based on psychological patterns through an updated lesson structure (according to O. Matviienko, D. Hubarieva) to influence the development of creative thinking with intrinsic motivation among elementary school students in "I Explore the World" (IETW) lessons.

Research objectives:

1. Analysis of contemporary approaches to understanding "creative thinking" and the impact of "intrinsic motivation".
2. To explore examples of successful implementation of the updated lesson structure in elementary school with an emphasis on stimulating the development of creative thinking based on the intrinsic motivation of elementary school students.
3. To demonstrate the effectiveness of the updated lesson structure's impact on the development of creative thinking based on the intrinsic motivation of elementary school students.
4. Based on the results obtained, to formulate conclusions about the effectiveness of the updated lesson structure and develop recommendations for teachers and educational institutions to develop creative thinking based on the intrinsic motivation of elementary school students.

Expected outcomes: The research will reveal how the updated lesson structure can contribute to the development of creative thinking based on the intrinsic motivation of elementary school students. The results can be useful for improving the educational process and pedagogical practices to enhance student motivation and success.

Research methods. *Theoretical Methods.* Analysis of scientific sources: an analysis of scientific sources on the problem under study was conducted. This included analysis and synthesis, as well as comparison and contrast of scientific facts. The purpose was to distinguish the criteria and levels of divergent thinking in elementary school students, as well as the criteria and indicators of intrinsic motivation. *Empirical Methods.* Observation and student surveys: diagnostic tools such as the Torrance Tests of Creative Thinking (TTCT), adapted for the age group of elementary school students, the Alternative Uses Test (AUT), and the Intrinsic Motivation Inventory (IMI) were used. These methods allowed for the measurement of criteria and indicators of creative thinking. *Mathematical and Statistical Methods.* For data analysis, a graphical method of data distribution analysis and the generalization of statistical indicators were used.

Presentation of the Main Research Material. Modern society is saturated with an information space that is no longer limited by terabytes. The manifestation and creation of something unique is becoming increasingly difficult and, at the same time, easier. The philosophy of creativity is acquiring a permanent state. After all, the scientific interpretation of "creativity" is constantly being improved. Mihaly Csikszentmihalyi, in his scientific publication, states, "The study of creativity is a systematic process. The interpretation of the concept of 'creativity' is a complex process. Researchers do not have a clear consensus on how to define creative abilities. It is commonly asserted that creativity is the ability to solve problems or create new things in a different way. The two main components of creativity are: originality: the idea must be new, not simply

repeating what has been created before; functionality: the idea must actually work and be useful" [5].

Accordingly, relying on the previous statement and returning to the interpretations of contemporary researchers, such as David H. Cropley, who asserts that "Creativity is like an iceberg: the new idea or the new solution that emerges is only 10% of the effort. The other 90% is the complex interplay of thinking skills and strategies, personal and motivational properties that activate those [1] skills and strategies, and social and organizational factors of the environment that influence the creative process" [7]. The main direction of thinking skills and strategies is the type of thinking. Adam Jorlen, in his research, analyzed and systematized 5 main styles of creative thinking: divergent, systemic, inspiring, aesthetic, and lateral [6]. However, scientists around the world have concluded that the main type of creativity is divergent thinking, which allows observing and finding various variations of the same action. Divergent thinking involves mental flexibility, unlike its opposite – convergent thinking. Convergent thinking is a style of thinking that allows finding unique solutions to a clearly defined problem, which requires more persistence and focus. That is, it is used after the creation of an idea, which allows concentrating on creating a new product.

Creativity depends on general aspects such as creative potential, cognitive abilities, personality traits, motivation, and attitude towards creativity and the environment itself. Creative potential refers to creative ideas or human behavior that reflect the use, evaluation, and ability to work with ideas in a natural environment. The ability to divergent thinking is a reliable indicator of creativity, but the main foundation is intrinsic motivation for creativity.

Elementary school students require special attention. After all, according to neuroscientific research, the main stage of brain block development (left inferior frontal gyrus (IFG), left dorsolateral prefrontal cortex (DLPFC), and the overall right hemisphere with the posterior parietal cortex (PPC), which are responsible for the development of creativity, falls on this period.

Tamnes, Ostby, Walhovd used tomography in their research to assess and analyze the functionality of the frontal cortex of the brain in children aged 8-19, to determine the most active periods of maturation. Scientists concluded that active saturation with cognitive flexibility (development of divergent thinking) and the ability to quickly inhibit thought processes (development of convergent thinking) at the age of 7-12 leads to an increase in myelination and synapses in adolescence, which allows for the formation of rapid variations of solutions, i.e., the development of both directions of thinking [9].

Another study by Meng Sun, Minhong Wang, Rupert Wegerif demonstrated that training in divergent thinking at the age of 7-10 showed a promising impact on improving creativity in higher education and organizational contexts. Scientists indicate that the cognitive process underlying divergent thinking is complex and not easy to grasp; therefore, it is important to promote divergent thinking by making its development a clear direction of learning for students.

Along with the thinking style, intrinsic motivation for the manifestation of creativity is ambivalent. After all, the "evergreen" judgment remains: "Creativity as comprehension and creativity as action in creating something new." Returning to the use of AI, a two-sided view arises, namely: on the one hand, the use of AI is creativity, but at the same time, it is anisotropy, which manifests itself in the absence of creating something new. If we go even deeper into reflection, it turns out that the use of AI in solving a problem or task involves divergent thinking, i. e., replication is applied, there is no personal

new dimension, finding a new option, which is supported by subjective opinion, skills, or knowledge. The above indicates the main motive for the development of a creative personality, or a person who seeks many other options, or the development of a personality that creates its own vision and reproduces its feelings through a creative product.

One of the tools that emphasizes the development of creative thinking through the prism of internal feelings and the impact on motivation is the updated lesson structure by Matviienko O., Hubarieva D., which includes a certain sequence of stages.

1. Reporting the topic, purpose, and objectives of the lesson, motivating students to study the topic;
2. Reproducing and understanding personal feelings when familiarizing oneself with the lesson topic (self-awareness);
3. Perceiving and comprehending, generalizing and systematizing new knowledge by students in relation to other people (social understanding);
4. Independent summarizing of the lesson by students with elements of self-reflection (reflection) [8].

Methodology. To confirm the hypothesis regarding the effectiveness of using the updated lesson structure according to Matviienko O. and Hubarieva D., a study was conducted. Participants were 105 third-grade students from four parallel classes. This study was approved by the Faculty of Pedagogy of the Mykhailo Drahomanov Ukrainian State University. Before the study, parents signed a consent form. The four classes were randomly assigned to experimental and control conditions. Class A (EG) (n = 51, 32 boys and 19 girls) was assigned to experimental conditions, taught using the updated lesson structure, while Class B (CG) (n = 54, 31 boys and 23 girls) was assigned to control conditions. The study was based on the hypothesis that using the updated lesson structure creates an opportunity to increase intrinsic motivation to manifest creative thinking.

Research methods. Theoretical methods were used: analysis of scientific sources on the defined problem, which included analysis and synthesis, comparison and contrast of scientific facts; empirical methods: observation and student surveys using the Torrance Tests of Creative Thinking (TTCT) adapted to the age group of elementary school students, the Alternative Uses Test (AUT), and the Intrinsic Motivation Inventory (IMI); mathematical and statistical data: graphical method of data distribution analysis, generalization of statistical indicators.

At the first stage of the study, the categorical apparatus of the given problem was analyzed. This allowed distinguishing the criteria and levels of divergent thinking of elementary school students. The following criteria and indicators were delimited:

Fluency: the ability to generate a large number of ideas or solutions in solving a specific problem in a short time.

Flexibility: the ability to adapt to new conditions and easily switch from one idea to another.

Originality: the ability to create unique, new ideas that differ from standard or conventional approaches.

Elaboration: the ability to work with an idea in a detailed and specific manner.

Imagination: the ability to imagine atypical, often fantastic solutions, allowing one to see possibilities where limitations seem to exist.

In accordance with the analysis of diagnostic methods (Torrance Tests of Creative Thinking (TTCT) adapted to the age group of elementary school students, Alternative Uses Test (AUT)), levels were identified: high, sufficient, low.

And the criteria and indicators of intrinsic motivation were considered:

Autonomy. The individual feels that they control their activities and make decisions independently. This sense of personal choice and freedom in actions is an important aspect of intrinsic motivation.

Competence. The feeling that a person can perform tasks successfully, achieving set goals. This is confidence in one's abilities and capabilities, as well as the desire to improve and develop one's skills.

Engagement. The activity brings pleasure and interest in itself. A person enjoys the process of performing the task, not just its result. This is a sense of flow, when a person is so engaged in the activity that they lose track of time.

Value. The importance or significance of the activity for the individual. Intrinsic motivation arises when the activity corresponds to the individual's personal values and beliefs. People who feel that their work has meaning and significance are more motivated to perform their duties.

Satisfaction from the result. The enjoyment a person receives from achieving their goals and successfully completing tasks. This is a sense of pride in the work done, which reinforces the desire to continue working in the same direction.

This allowed integrating and creating criteria with indicators for the development of creative thinking in elementary school students, which are presented in Table 1.

Table 1.

Criteria and indicators of creative thinking of elementary school students, taking into account intrinsic motivation

Criteria	Indicators
Cognitive criterion	The cognitive criterion encompasses the student's ability to generate a large number of diverse ideas, quickly switch between categories of thoughts, find original and unusual solutions, and elaborate and expand their ideas in detail. This criterion reflects intellectual flexibility and thinking productivity.
Emotional criterion	The emotional criterion focuses on the student's internal motivations and attitude towards the creative process. It includes curiosity, i.e., the desire to ask questions and explore new opportunities, openness to new experiences, which manifests in the willingness to accept unusual ideas and take risks, as well as imagination, which allows creating fantastic images and scenarios. This criterion reflects emotional engagement and interest in creativity.
Activity criterion	The activity criterion assesses the practical aspects of creative thinking, such as the ability to creatively express oneself through various activities, the ability to find alternative ways to solve problems, and to collaborate with others to generate new ideas. This criterion reflects the student's ability to apply their creative abilities in practice and interact with others to achieve common goals.

The results of the initial diagnosis demonstrated that in the Control Group (CG), only 6% of students showed a high level, while in the Experimental Group (EG), it was 4.8%; more than half of the respondents showed a low level. This is explained by the fact that reproductive thinking dominates in the educational activities of elementary school students, reflecting the initial stage of conscious application of cognitive functions. At this stage, students focus on mastering already known knowledge and skills, reproducing algorithms and rules, rather than independently searching for new solutions. This is also explained by the age-related developmental features, when children actively

accumulate information and form basic cognitive structures. Reproductive thinking allows them to effectively assimilate educational material, develop memory, attention, and other important cognitive functions. However, it is important to understand that reproductive thinking is only the initial stage of cognitive development. Over time, as the child develops, it is necessary to gradually transition to more complex forms of thinking, such as productive and creative. This involves creating conditions for the development of divergent thinking, stimulating imagination, encouraging the search for non-standard solutions, and forming the ability for independent analysis and synthesis of information.

In the experimental part, we created a series of lessons from the "I Explore the World" (IETW) course, built on the updated lesson structure according to Matviienko O. and Hubarieva D. The updated lesson structure in the "I Explore the World" (IETW) course has significant potential for developing creative thinking in elementary school students, as it focuses on actively engaging students in the learning process, stimulates their imagination, and promotes the development of critical thinking.

1. Announcing the topic, purpose, and objectives of the lesson, motivating students to study the topic.

At this stage, it is important not just to announce the topic, but to create a problem situation, ask questions that spark interest and a desire to explore. For example, instead of "Today we are studying animals," you can ask: "Why do you think some animals live in the desert and others in the jungle?". This encourages students to search for answers, formulate hypotheses, and develop creative thinking. Instead of a dry announcement of the topic, the teacher creates a problem situation that requires multiple answers. For example, "If you could change something in our city, what would it be?". This stimulates fluency and flexibility of thinking.

2. Reproducing and understanding personal feelings when familiarizing oneself with the lesson topic (self-awareness).

This stage promotes the development of emotional intelligence and self-reflection. Students learn to recognize their feelings and emotions related to the lesson topic, which is important for developing empathy and social understanding. For example, after watching a video about ocean pollution, you can ask students to share their feelings and thoughts or experiences from their personal lives. Students not only express feelings, but also explore their causes, seeking alternative interpretations. For example, "Why did you feel sad when you saw the polluted lake? Can we look at this situation from another perspective?". This develops originality and flexibility of thinking.

3. Perceiving and comprehending, generalizing and systematizing new knowledge by students in relation to other people (social understanding).

This stage promotes the development of social understanding and the ability to collaborate. Students learn to analyze information, draw conclusions, and apply them in the context of interacting with other people. For example, when studying the topic of "Friendship," you can organize a discussion about what qualities are important for friendship, or what qualities in others they have encountered that have harmed good friendship. Students not only discuss facts, but also imagine themselves in the place of other people, seeking non-standard ways to resolve conflicts. For example, "How would you reconcile two friends who quarreled over a pear?". This stimulates imagination and idea development.

4. Independent summarizing of the lesson by students with elements of self-reflection (reflection).

This stage promotes the development of independence and critical thinking. Students learn to analyze their work, draw conclusions, and plan further steps. For example, at the end of the lesson, you can ask students to answer the questions: "What new things did I learn?", "What was most interesting to me?", "What would I like to learn more about?" or how I will apply today's information in everyday life. Students not only summarize, but also create creative projects that reflect their discoveries. For example, "Create a comic strip that tells about your most interesting moment in the lesson." This develops idea elaboration and creative self-expression.

After conducting a cycle of lessons, a re-diagnosis was made, which showed results that in the experimental group (EG), there was a significant increase in the number of students with a high level of creative thinking. In particular, after applying the updated lesson structure, the number of students with a high level of creative thinking in the EG increased by 40%, while in the control group (CG), this increase was only 7%.

The analysis of the average level of creative thinking also showed a positive trend in the EG, but less pronounced. The number of students with an average level of creative thinking in the EG increased by 15%, while in the CG – by 10%. As for students with a low level of creative thinking, in the EG, there was a decrease in their number by 18%, while in the CG, this indicator remained practically unchanged. This indicates that the updated lesson structure effectively influences the development of creative thinking in students, especially in increasing the level of high indicators.

Conclusions and perspectives of further researches. The results obtained confirm the hypothesis that the use of an updated lesson structure, with an emphasis on motivation, self-awareness, social understanding, and reflection, promotes the activation of the creative potential of elementary school students. This underscores the importance of introducing innovative teaching methods that stimulate the development of not only cognitive but also creative abilities of students, which is a key factor in their successful learning and further development.

СПИСОК ВИКОРИСТАНИХ ДЖЕРЕЛ:

1. Amabile, T. M. (1996). *The Motivation for Creativity in Organizations*. Harvard Business School Background Note, 396-240.

2. Božić, V. (2023). *The Dangers of Artificial Intelligence*. URL: https://doi.org/10.13140/RG.2.2.22058.80326

3. Cromwell, J., Haase, J., & Vladova, G. (2023). The creative thinking profile : Predicting intrinsic motivation based on preferences for different creative thinking styles. *Personality and Individual Differences*, 208, 112205. URL: https://doi.org/10.1016/j.paid.2023.112205

4. Csikszentmihalyi, M. (1996). Creativity : Flow and the psychology of discovery and invention. New York : HarperCollins. (pp. 107-126 plus Notes).

5. Cropley, D. H. (2015). Chapter 3 – Phases : Creativity and the Design Process. In D. H. Cropley (Ed.). *Creativity in Engineering,* 35-61. Academic Press. URL: https://doi.org/10.1016/B978-0-12-800225-4.00003-3

6. Hockly, N. (2011). The digital generation. *ELT Journal*, 65, 322-325. URL: https://doi.org/10.1093/elt/ccr041

7. Sun, M., Wang, M., & Wegerif, R. (2020). Effects of divergent thinking training on students' scientific creativity : The impact of individual creative potential and domain knowledge. *Thinking Skills and Creativity*, 37, 100682. URL: https://doi.org/10.1016/j.tsc.2020.100682

8. Taipale, S. (2015). Synchronicity matters : defining the characteristics of digital generations. *Information, Communication & Society*, 19 (1), 80-94. URL: https://doi.org/10.1080/1369118X.2015.1093528

9. Tamnes, C. K., Ostby, Y., Walhovd, K. B., Fjell, A. M., & Westlye, L. T. (2010). Neuroanatomical correlates of executive functions in children and adolescents : A magnetic resonance imaging (MRI) study of cortical thickness. *Neuropsychologia*, *48 (9)*, 2496-2508. URL: https://doi.org/10.1016/j.neuropsychologia.2010.04.024

10. Матвієнко, О., Олефіренко, Т., & Губарєва, Д. (2024). Формування пізнавального інтересу у молодших школярів за оновленою структурою уроку. *Освітньо-науковий простір :* науковий журнал / Український державний університет імені Михайла Драгоманова [гол. ред. д-р пед. наук, проф. Матвієнко О. В.]. Київ : Видавництво Ліра-К, Вип. *6 (1 – 2024)*. *С.* 86-96.

REFERENCES:

1. Amabile, T. M. (1996). *The Motivation for Creativity in Organizations*. Harvard Business School Background Note, *396-240* [English].

2. Božić, V. (2023). *The Dangers of Artificial Intelligence*. Retrieved from: DOI: 10.13140/RG.2.2.22058.80326 [in English]

3. Cromwell, J., Haase, J., & Vladova, G. (2023). The creative thinking profile : Predicting intrinsic motivation based on preferences for different creative thinking styles. *Personality and Individual Differences*, *208*, 112205. Retrieved from: https://doi.org/10.1016/j.paid.2023.112205 [in English]

4. Csikszentmihalyi, M. (1996). Creativity : Flow and the psychology of discovery and invention. New York : HarperCollins. (pp. 107-126 plus Notes) [in English].

5. Cropley, D. H. (2015). Chapter 3 – Phases : Creativity and the Design Process. In D. H. Cropley (Ed.). *Creativity in Engineering, 35-61*. Academic Press. Retrieved from: https://doi.org/10.1016/B978-0-12-800225-4.00003-3 [English].

6. Hockly, N. (2011). The digital generation. *ELT Journal*, *65*, *322-325*. Retrieved from: https://doi.org/10.1093/elt/ccr041 [in English]

7. Sun, M., Wang, M., & Wegerif, R. (2020). Effects of divergent thinking training on students' scientific creativity : The impact of individual creative potential and domain knowledge. *Thinking Skills and Creativity*, *37*, 100682. Retrieved from: https://doi.org/10.1016/j.tsc.2020.100682 [in English]

8. Taipale, S. (2015). Synchronicity matters : defining the characteristics of digital generations. *Information, Communication & Society*, *19 (1), 80-94*. Retrieved from: https://doi.org/10.1080/1369118X.2015.1093528 [in English]

9. Tamnes, C. K., Ostby, Y., Walhovd, K. B., Fjell, A. M., & Westlye, L. T. (2010). Neuroanatomical correlates of executive functions in children and adolescents : A magnetic resonance imaging (MRI) study of cortical thickness. *Neuropsychologia*, *48 (9),* 2496-2508. Retrieved from: https://doi.org/10.1016/j.neuropsychologia.2010.04.024 [in English].

10. Matviienko, O., Olefirenko, T., & Hubarieva, D. (2024). Formuvannia piznavalnoho interesu u molodshykh shkoliariv za onovlenoiu strukturoiu uroku. *Osvitno-naukovyi prostir :* naukovyi zhurnal / Ukrainskyi derzhavnyi universytet imeni Mykhaila Drahomanova [prof. Matviienko O. V. (Ed.)]. Kyiv : Vydavnytstvo Lira-K, *6 (1 – 2024), 86-96* [in Ukrainian].