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VIRTUAL PUZZLE AS AN INTERACTIVE MODULE OF A MULTIMEDIA RESOURCE ENSURING ART COMMUNICATION OF PRIMARY SCHOOLCHILDREN IN THE PROCESS OF DISTANCE ART LEARNING

Abstract. *The article highlights the issue of using a virtual puzzle in teaching of art to primary schoolchildren of institutions in general secondary education in the conditions of a distance learning – via asynchronous and synchronous forms. The main attention is focused on the need for art teachers to transform forms and technologies of working with students and to transfer the process of art education to the virtual space due to the challenges of the pandemic and the war in Ukraine in 2022. It is noted that of using the latest multimedia technologies is reasonable as a complex of information technologies with the possibility of combining different types of data (text, sound, graphics, video, etc.) working in dialog mode and creating multimedia tools for various purposes.*

A virtual puzzle is considered as an interactive module available for students to use and to create a new one on various online services or platforms. Online services that have greater potential for this module to use during art education in institutions of general secondary education are Puzzle It!, Jigsawplanet and LearningApps.org. The features of using ready-made puzzles from services and constructing new ones are described according to the subject of art lessons, lesson tasks (summarization of lesson or semester material, formative types of assessment, etc.), preferences or tastes of students, levels of their development.

The author concludes that the virtual puzzle as an educational and game interactive form encourages primary schoolchildren to learn about art through research, accumulate experience in active artistic activity, as well as stimulates students to communicate on art topics and promotes the development of communication skills.

The value of the virtual puzzle for a teacher lies in its opportunity to encode any information, concepts of art in it, use it in individual, pair and group work, and use it in research, quests, competitions and other art activities at online lessons, or do puzzle as a task for asynchronous distance learning form. The virtual puzzle attracts students because of its similarity with a computer game. It allows them to learn new things in art in an interesting, easy and exciting way, to demonstrate their knowledge, to gain experience using it in new educational situations, to learn about art in communication with the teacher and peers that certifies the formation of students' subject competencies and soft skills.

Key words: *virtual puzzle, multimedia resource, interactive module of multimedia resource, artistic communication, distance learning of art, primary schoolchildren, institutions of general secondary education.*

Introduction. Ukrainian education system and art education in particular have faced many challenges caused by the COVID-19 pandemic and the war in Ukraine in 2022. This have led to radical changes related to the implementation of the educational process in institutions of general secondary education. It became necessary to apply a distance learning as well as to reformat the methodological element – how teachers can choose new forms, methods and technologies of

working with schoolchildren.

Teachers of subject characterized by special specificity, in particular, «Art», have felt organizational and methodological difficulties. Achieving the goal of teaching this subject (comprehensive person's artistic and aesthetic development, mastering cultural values in the process of learning art, forming competences for artistic and creative self-expression) is carried out along content lines. "Artistic and creative activity" provides individual and collective-group forms of interaction of participants in various types of artistic activity – ensemble or choral singing, joint playing musical instrument, etc. In addition, the fundamental activity in the lessons is the discussion of works of art, the identification of emotional and value attitudes towards them, the analysis of their content. This contributes to the formation and development of such comprehensive skills as the ability to express one's own opinion, the ability to logically prove a position, to think critically [6, p. 4], which confirms the implementation of the content lines "Perception and interpretation of art", "Communication through art".

As we can see, multifaceted artistic communication becomes a necessary in art education – between students and the work of art (and its author), between students and the teacher, between students in group communication. It which contributes to ensuring the both emotional and valuable component of education (the attitude of students towards works of art), and educational and cognitive component of education (mastery of concepts and artistic means, etc.). This is the value of artistic interaction in the format of "live communication", which is the main problem during distance learning, especially in its asynchronous form.

Therefore, the communicative nature of art implies the need for varieties of dialogue in its cognition. However, at the very beginning of applying distance learning (the beginning of 2020) art teachers had trouble in organizing artistic communication and searching technologies, especially in primary school level. The aims were to unite students in the discussion of works of art and renew dialogue, and at the same time, to support interest in the subject, to continue learning at an emotionally stable level. Taking into account the peculiarities of the age of children 6-10 years old, the appropriate technologies were considered those that combine game and educational components of learning based on integrated, activity and competence approaches. With this, teachers turned their attention to multimedia technologies.

O.V. Bazeliuk, O.O. Huminska, L.H. Kondratova, N.V. Novykova, L.M. Masol, considered multimedia technologies and organizational and methodological issues of how to use them in art

educational practice. Scholars defines multimedia technologies as "... a complex of information technologies - hardware and software tools that enable the user to work in dialog mode with various types of information (graphics, text, sound, and video), organized into a single system... Software for creating multimedia and multimedia resources (multimedia products, network resources) are included in software multimedia tools" [8, p. 8]. Several types of data are combined in a multimedia resource: any combination of text, sound, graphics, video and animation, as well as the organization of hyperlinks [8, p. 8]. Today's modern online services or platforms offer a variety of electronic resources with interactive modules. One of them is a virtual puzzle.

Aim and tasks. The purpose of the article is to consider a virtual puzzle as an interactive module of a multimedia resource that provides of artistic communication during distance teaching of art, to highlight the possibilities how to use it in art education of primary schoolchildren in order to organize their dialogical interaction and develop their communication skills.

Research methods. The study was based on: normative documents in the educational art field, which were analysed for reference points in ensuring the educational process in 2022-2023; theoretical provisions of philosophy, artistic psychology and pedagogy regarding the nature of artistic communication, generalization of modern practices of scientists and teachers in art education with the aim of highlighting promising educational practices of working with primary schoolchildren that combine traditional and innovative forms and methods as well as provide new educational opportunities. Therefore, the analysis of normative sources and scientific and methodological literature, the analysis and classification of multimedia resources, the generalization and description of individual online services necessary for research were used.

Research results are clarification of the essence of the concepts (puzzle, virtual puzzle, multimedia resources, interactive module), analysis capabilities of online services for using and constructing virtual puzzles on artistic subjects, studying the possibilities of using a virtual puzzle as a pedagogical tool for ensuring dialogic interaction during art education in distance learning. Let us consider them.

Definition of the concept of "puzzle". Puzzle (from English – jigsaw puzzle) is a puzzle game that looks like a mosaic, and the content of the game involves making a complete image from many small fragments of different shapes. Puzzle is one of the most available games for children of all ages and adults, which is useful for the development of logical thinking, attention, memory and cognitive abilities. Therefore, this game is used for children's development and education, in

particular, in primary school. Modern puzzles are made of different materials (wood, cardboard, plastic, fabrics) and have many varieties. In addition to classic puzzles that are board-printed games, there are "soft" puzzles for children, as well as three-dimensional puzzles for schoolchildren or adults [10].

The analysis of the sources has shown that there are thorough research on the issue of the puzzle. A.D. Williams [14] investigated the history of the American toy and puzzle industry. As a result, the great puzzle exhibitions was held based on her at the Bates College Museum of Art (1988), the National Heritage Museum (Lexington, Massachusetts, 1996), the Cato Museum of Art (Cato, New York, 2000-2001), and the of the main part of the collection is stored in the Strong Museum in Rochester (New York, USA). In addition, the International Association of Games and Puzzles was founded [13].

In today's world, not only the industry of development and sale of puzzles is developing, but also studies that study various facts about them: the data have shown a boom in puzzles during COVID-19 in Britain – the sale of puzzles increased by 38 % [12].

In this research, we focuses on virtual puzzles that are gaining more and more popularity due to the development of gadgets and online services. Puzzles used to be as a means of entertainment in the cultural and leisure activities of a person or a group of people (family, friends), but today they are also used as a didactic tool.

The essence of the concept of "virtual puzzle". A virtual puzzle is considered as a component of a multimedia resource: "... a type of electronic resource in which several types of data are combined (any combination of text, sound, graphics, video and animation, as well as the organization of hyperlinks)" [8, p. 8]. Based on the specifics of art education, N. Novykova highlights the types of multimedia resources that are appropriate for music education of schoolchildren. Among them are interactive games (educational games) [8, p. 8].

It is important to classify the virtual puzzle as an educational and game multimedia resource. The student interacts during his studies or in independent artistic activity with this interactive module. However, as noted by the developers of such online resources, the module as a puzzle and others cannot be considered as a fully completed educational unit because the teacher must integrate it into the educational process. We will cover this process below and consider the possibilities of using a virtual puzzle in distance learning. We give some examples that teachers can use at the level of reproduction or at the creative level with their own ideas.

Puzzle as a type of educational task for primary schoolchildren used by the authors of "Art" textbooks in primary school. For instance, in the textbook for the 4th grade, the authors L. Masol, O. Haidmaka, O. Kolotylo present separate educational tasks in the form of a puzzle game: "Remember the varieties of Ukrainian folk songs, combine the parts of the puzzles, complete the syllables" [5, p. 2], "Combine the puzzles – only the names of types of decorative and applied art. What types of art are represented in the illustrations? Point with arrows" [5, p. 6], "Connect the puzzle with lines. Find out what is similar among different Slavic peoples" [5, p. 12], etc. Students use a pencil in doing these tasks, connecting puzzle pieces and completing the tasks. It is important that such tasks not only allow students to repeat the educational material, but also to interact in the process of their processing. The reason is schoolchildren can do these tasks in pairs, in a group, discuss the result and along the way actualize the content of concepts, associations in relation to them, remember examples of artistic works, etc. There are also the tasks of this type in electronic versions of textbooks, which can supplement with fragments of musical works for listening or viewing (with the help of QR-codes).

Puzzle is an interactive module of a multimedia resource. Doing puzzles is a dynamic process. This process can be easily organised in virtual reality for modern student using it as a tool to help master the art. There is a question about the availability of such educational material, because it becomes necessary in the conditions of distance learning. It is essential to use appropriate Internet services that allow teachers to both download ready-made colleagues' materials and use services to create their own educational and game content. Teacher should register to start work with these apps.

Resources for creating puzzles are different and have different capabilities. The program ***ProProfs*** offers teachers to create their own game in the format of various puzzles (sliding, scramble, puzzle game). ***JigZone*** provides ready-made puzzles - teachers only need to choose a theme. For the purpose of teaching art, educators can use the puzzles in theme "Travel" and its sub-theme – "Castles", "Cities", "Bridges", "Constructions" (which will develop students' understanding of architecture, styles), as well as the sub-theme "People" with an emphasis on representatives of different races and peoples of the world [2].

Puzzle It! help teachers to create puzzle games from the images. Link to join the game this game can be sent to students on social networks. It give students the opportunity to deep their knowledge about the topic of the lesson or semester, as well as to give them interest in a new topic

by providing a puzzle as a clue to it. The service also offers to collect puzzles offered by other registered members of the service; to stimulate players, a time limit in doing puzzle for rating of players. The service has a blog for communication with the participants: about the rules and announcements of new games, updates, including the possibility of joint puzzle assembly by several users using different gadgets. Therefore, *Puzzle It!* give schoolchildren the opportunity to solve puzzles created by the teacher, as well as to create an individual or collective project – an art-based puzzle – together with parents (thorough recommendations for this are provided by the service provider) [4].

Jigsaw Planet is a free online service with the potential for creating puzzles or play with ready-made ones in order to share them on social networks, as well as embed them in teacher's own website. It has some advantages such as:

● a large online source of various puzzles of varying degrees of complexity;

● different levels according to the number of puzzles and the need to rotate image fragments;

● the ability to create teacher's own puzzles from any image;

● availability of plugins that helps to embed the created puzzle on the page of teacher's own website or blog;

● the ability to send a puzzle to social networks;

● creating your own profile where you can save teacher's own puzzles and games [2].

LearningApps.org is a Web 2.0 service has good opportunities for organizing educational and game artistic activities. There are ready-made online games of various levels of difficulty in the online library, which teachers can edit according to their students' preferences or level. In addition, the multilingual educational and game platform offers a wide variety of interactive modules with programs for creating several types of tasks ("Crossword", "Quiz", etc.). The interactive module "Puzzle" allows teachers to develop their own puzzles and use them to revise and generalize material of particular lesson or semester topics, specific types of student activities, or correct them in certain concepts. For example, the following task: "Make a puzzle by selecting composers and their musical works" (in order to check how well students have learned the material about composers and their works) and many others. The game form of the task, the dynamism of the process turns the task into a computer game, which modern children like.

We believe that such tasks commonly cause students to be active and their desire to discuss

both the content of the tasks and their own actions and feelings – how quickly they coped with the tasks, what was interesting when they do them, what emotions they felt or what difficulties they have, etc. The interaction between students, which is based on the artistic content as a stimulus, conforms the implementation of the content line "Communication through Art". As noted in the Methodological recommendations on the organization of the educational process and teaching of educational subjects in institutions of general secondary education in the 2022/2023 academic year (Art education branch) [6]: "... activity at art classes is also a discussion of works of art, identification of emotional and valuable attitude towards them, analysis of their content, etc. In the process of this type of activity, such cross-cutting skills as the ability to express one's own opinion, the ability to prove logically one's own opinion, think critically, etc. are effectively formed and developed" [6, p. 4]. These skills are the results of the artistic interaction of students and the actual training of art students.

LearningApps.org promotes the interaction between teachers and students, because the service allows them to establish feedback: the teacher clearly monitors the dynamics of student learning – who completed the task and when, how much time was spent, and what mistakes were made.

Therefore, teachers can prefer any of these online services taking into account their own preferences. We note that puzzles can be used for different purposes. Moreover, we focus attention on their *capabilities in ensuring communication between the subjects of the educational process on art topics.*

a) A puzzle as a type of activity involves a *certain type of research with search elements* aimed at the final result, which becomes a complete image, although not necessarily a drawing or a picture (it may contain a phrase, an answer to a riddle and other certain knowledge). In addition, a puzzle can be part of another form of work or method in the lesson, for example, a quest.

As we can see, the puzzle as a tool responds to requests for new means and ways of learning art, departing from traditional ones and based on experiment, research, and heuristics. Consequently, using them in education encourages children to research activities including discussion and creative expression, which is a desirable model of learning for modern children who perceive them positively.

A teacher, who has the opportunity to choose educational technologies freely, types of artistic activity of students, artistic works and forms of work, can take into account the requests and

preferences of students and their level and construct educational content in interesting form [1, p. 4]. The main thing is students' interest, their self-expression and achievement of the expected learning outcomes.

b) Implementing an integrated approach. "...a necessary condition for implementing tasks of art education is to follow an integrative approach through the coordination of the content of the program and the results of learning from various types of art" [6, p. 4]. The services provide opportunities for teachers to construct a variety of content that uses material from different types of art, for example, in the format of a puzzle. Therefore, students will practice to set intra-industry connections, develop associative thinking.

c) Possibilities for group and pair work when putting together puzzles can be created by inviting students to work as a team. The task can be presented in the format of a competition – and then the system will count not only the correctness of the answers, but also the speed of execution. Students can independently evaluate their work – and this is another positive point of their interaction.

d) Using puzzles in evaluation of the results of art education. Researchers who tested this pedagogical tool in practice confirm that [7]. The catalogue of puzzles can be used to test students' knowledge at the stage of ongoing formative assessment, and this is one of its advantages.

e) Study art through extracurricular activities with the help of the game "Puzzle". Knowledge of art has no boundaries both spatial and temporal. If the teacher designs the lessons and educational content in an interesting and productive way, the result of learning art will be desire to learn it outside the classroom or personal account on an online platform. Educational and cultural institutions that offer interesting leisure content on their sites understand this. For instance, the National Museum of the History of Ukraine has created virtual puzzles that are available for a wide audience of adults and children to play and learn about the museum's artefacts [9]. In this way, the researchers of the museum encourage learning about the artefacts that are important in the formation of our state ("Coat of Arms of Ukraine", "Apostle") and its cultural development ("Papai", "Safe chest"). The developers took into account the different level and age characteristics of the players: if children have trouble, there are a number of clues for them that will facilitate the process. The game will encourage children to take interactive tours in the museum, the content of which combines information from history, art, culture and other fields of knowledge as well as includes active forms of knowledge [9]. Furthermore, it will encourage students to different forms

of communication with art: manufactures create puzzles with world-famous works of artists of different eras, which can do by the whole family or with friends. Such puzzles can also be found in galleries and museums, which provide their visitors with the opportunity to purchase such puzzles as a souvenir of visiting the museum or as a gift (e.g. the collaboration of the National Gallery of Great Britain with the well-known company Wentworth Puzzle) [11].

Discussion. The problem of artistic communication is the subject of study by scholars who carried out their research at the intersection of several branches of scientific knowledge – philosophy, psychology, art history and literature (M.M. Bakhtin, V.S. Bibler, L.S. Vygotsky, H.G. Gadamer, O.F. Losev, O.O. Potebnia, etc.). They discussed the terminological concepts of this problem (art image, artistic activity, artistic creativity, dialogue as a form of human understanding of works of art, etc.). Moreover, it enriched the scientific field theoretical provisions regarding the processes of creation of an artistic image by an artist, interpretation of an artistic work by a performer, and knowledge of art by a listener or viewer. O.A. Komarovska [3] carried out a thorough study of the genesis of the theoretical idea of an artistic image. The generalization of the postulates of researchers allows us to distinguish between different forms of dialogue in the process of learning about art – the artist and the future viewer or listener (who should act as an active interlocutor in the process of perceiving the work, establish a dialogue with oneself) and a dialogue with other participants in the perception of the work of art [3, p. 51]. We analysed theoretical approaches of scientists of the 20th-21st centuries in the context of research of the artistic image and the development of the idea of dialogue and creating the dialogic nature of the artistic image. As a result, we agree with the scholars' conclusions regarding the dialogicity and polylogic nature of the process of learning about works of art as important for the personal development. During the multivariate interpretation of artistic images, the group of participants in the discussion of the work of art has the greatest opportunities for this. This ensures the development of the general opinion and the each participant's opinion in the discussion, and at the same time, in the plane of dialogicity, the ability to communicate at different levels is formed.

We along with the experts' opinion of on the issue of multimedia technologies (O.V. Bazeliuk, O.O. Guminska, L.H. Kondratova, N.V. Novykova, L.M. Masol, etc.) regarding the possibilities of multimedia technologies in organizing completely new unprecedented interactions with art and the people who perceive it. The variety of information in these technologies (in a graphic-textual-video-sound combination) stimulates their users to engage in active multi-format

dialogue – both with these resources and among themselves.

Conclusions. In connection with the challenges of the pandemic and war in Ukraine in 2022, teaching of art have moved to the virtual space that affected its organization, methods and forms of work with students. Accordingly, with the help of various online services and platforms, art teachers have constructed content and didactic materials for lessons to engage students in the art learning process and encourage them to interact actively.

A virtual puzzle as an educational and game form can act as a tool that encourages learning about art through research, accumulation of experience in active artistic activity, as well as stimulates students to communicate on art topics and promotes development of communication skills. Many online services have the ability to provide and construct various puzzles. The greater potential using puzzles in art education in institutions of general secondary education have Puzzle It!, Jigsawplanet and LearningApps.org. These services present interactive modules for creating puzzles – with different images, content and level of complexity, which allows educators to implement differentiated and individualized approaches to learning.

The value of the virtual puzzle for teachers lies in its opportunity to encode any information, concepts of art in it, use it in individual, pair and group work, use it in research, quests, competitions and other art activities at online lessons, or do puzzle as a task for asynchronous distance learning form. The virtual puzzle attracts students because of its similarity with a computer game. It allows them to learn new things in art in an interesting, easy and exciting way, to demonstrate their knowledge, to gain experience using it in new educational situations, to learn about art in communication with the teacher and peers that certifies the formation of students' subject competencies and soft skills.

Future studies should investigate a potential of other interactive modules of online services for teaching art in primary, secondary and high school taking into account students' age characteristics, requirements for educational results, as well as the capabilities of these services.

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ВІРТУАЛЬНИЙ ПАЗЛ ЯК ІНТЕРАКТИВНИЙ МОДУЛЬ МУЛЬТИМЕДІА-РЕСУРСУ ЗАБЕЗПЕЧЕННЯ МИСТЕЦЬКОЇ КОМУНІКАЦІЇ МОЛОДШИХ ШКОЛЯРІВ У ПРОЦЕСІ НАВЧАННЯ МИСТЕЦТВА ДИСТАНЦІЙНО

Анотація. *У статті висвітлюється питання використання віртуального пазлу у навчанні мистецтва молодших школярів закладів загальної середньої освіти в умовах дистанційного режиму – в асинхронній та синхронній його формах. Акцентується увага на необхідності переформатування вчителями мистецтва форм і технологій роботи з учнями – у зв'язку з викликами пандемії і війни в Україні 2022 року та переміщення процесу навчання мистецтва у віртуальний простір. Зазначається про доцільність використання новітніх мультимедійних технологій як комплексу інформаційних технологій з можливостями комбінування різних типів даних (текст, звук, графіка, відео та ін.), роботи в діалоговому режимі та створення мультимедійних засобів різноманітного призначення.*

Розглядається віртуальний пазл як інтерактивний модуль, доступний для використання учнями та для створення нового на різних онлайн-сервісах чи платформах. З поміж багатьох, виокремлюються онлайн-сервіси, що володіють більшим потенціалом щодо цього модулю з метою використання під час навчання мистецтва у закладах загальної середньої освіти – Puzzle It!, Jigsawplanet та LearningApps.org. Описуються особливості використання готових пазлів з бібліотеки сервісів та конструювання нових – відповідно до тематики уроків мистецтва, завдань уроку (узагальнення матеріалу уроку чи семестру, проміжного чи формувального видів оцінювання та ін.), уподобань чи смаків учнів, рівнів їх розвитку.

Зроблено висновки щодо віртуального пазлу як навчально-ігрової інтерактивної форми, що спонукає молодших школярів до пізнання мистецтва дослідницьким шляхом, накопичення

досвіду активної мистецької діяльності, а також стимулює учнів до комунікації на теми мистецтва, і сприяє розвитку комунікативних навичок.

Цінність віртуального пазлу для вчителя полягає у можливості зашифрувати в ньому будь-які відомості, поняття мистецтва, використати його у індивідуальній, парній і груповій роботі, розгорнути з його допомогою дослідження, квести, змагання та інші мистецькі активності на online-уроці, або ж залишити завдання-пазл для виконання в асинхронному дистанційному режимі. Привабливість віртуального пазлу для учнів полягає у його наближенні до комп'ютерної гри, що дозволяє цікаво, легко й захопливо дізнаватися нове у мистецтві, проявляти свої знання й набувати досвіду їх використання у нових навчальних ситуаціях, пізнавати мистецтво у спілкуванні з вчителем і однолітками, що засвідчує про сформованість предметних компетентностей учнів та компетентностей soft skills.

Ключові слова: *віртуальний пазл, мультимедіа-ресурс, інтерактивний модуль мультимедіа-ресурсу, мистецька комунікація, навчання мистецтва дистанційно, молодші школярі, заклади загальної середньої освіти.*