

INTEGRATING INFORMATION AND COMMUNICATION TECHNOLOGIES (ICT) IN VISUAL ARTS EDUCATION: ENHANCING TEACHING AND LEARNING

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ABSTRACT

In line with the Curriculum for Visual Culture in Elementary Schools and Visual Arts in Grammar Schools, Croatian grammar schools place the student at the centre of each teaching process. Students are expected to reflect, research, express critical attitudes, solve problems and more. The achievement of curriculum outcomes is assessed across three domains, and Information and Communication Technologies (ICT) can enhance both teaching and learning dynamics. The first part of this paper presents research aimed at determining whether new generations of visual arts teachers are being trained to effectively integrate digital technology into their future classrooms. This study was conducted among students majoring in visual arts teaching at the University of Rijeka. The second part examines how digital technology can be applied to make the teaching and learning of visual arts in high school more effective.

KEYWORDS:

ICT, Rijeka, PRHG, visual arts, curriculum, art history, teacher

INTRODUCTION

According to the *Curriculum for Visual Culture in Elementary Schools and Visual Arts in Grammar Schools* in the Republic of Croatia (2019),¹ the outcomes are assessed across three

¹) *Kurikulum nastavnog predmeta Likovna kultura za osnovne škole i Likovna umjetnost za gimnazije* [Curriculum for Visual Culture in Elementary Schools and Visual Arts in Grammar Schools] (Zagreb: Ministarstvo znanosti i obrazovanja, 2019); accessed August 28, 2023, <https://mzom.gov.hr/UserDocsImages/dokumenti/Publikacije/Predmetni/Kurikulum%20nastavnog%20predmeta%20Likovna%20kultura%20za%20osnovne%20skole%20i%20Likovna%20umjetnost%20>

domains, and the assessment is based on the assumption that the student is at the centre of all activities within the teaching process. Students are expected to engage in critical and analytical thinking, exploration, expressing critical attitudes, problem-solving, etc. Being an accessible and familiar way of expression for new generations of students, Information and Communication Technologies (ICT) help achieve the stipulated outcomes by facilitating the dynamics of the teaching process. In addition, digital tools enable teachers to evaluate the attainment of outcome levels for specific tasks in a faster and more engaging way. During teaching, students are involved in the evaluation process (assessment for and assessment as learning), which can be carried out through various digital tools after individual topics and units have been covered. However, ICT also enables teachers to develop faster and more interesting ways of evaluating the level of achievement of learning outcomes for individual tasks. Nowadays, ICT has become one of the essential tools for enabling better results in acquiring learning outcomes at all educational levels.

In this paper, our aim was to research two different perspectives. First, we aimed to explore the extent to which graduate students are familiar with digital tools and whether they have been introduced to ICT concepts during their studies. Second, we focused on the perspective of a grammar school teacher who extensively uses digital technology in her work with students. As a result, the paper has been divided into two parts. The first section presents the research conducted among students at the Faculty of Humanities and Social Sciences of the University

za%20gimnazije.pdf. The Curriculum was first published as: *Odluka o donošenju kurikuluma za nastavni predmet likovne kulture za osnovne škole i likovne umjetnosti za gimnazije u Republici Hrvatskoj* [The Decision on Adopting the Curriculum for Visual Culture in Elementary Schools and Visual Arts in Grammar Schools in the Republic of Croatia], no. 7 (2019), accessed August 28, 2023, https://narodne-novine.nn.hr/clanci/sluzbeni/2019_01_7_162.html.

of Rijeka, with particular focus on those majoring in art history. The second part elaborates on the potential applications of digital technology in teaching visual arts, especially the ones that enhance the efficiency of learning and teaching at the grammar school Prva riječka hrvatska gimnazija (the First Croatian High School in Rijeka) in Rijeka.

ICT AND ART HISTORY TEACHING MAJOR

Throughout two academic years, 2022/2023 and 2023/2024, a survey was carried out among students majoring in art history teaching at the Faculty of Humanities and Social Sciences of the University of Rijeka. The level of digital technology literacy of art history students was assessed using a questionnaire consisting of six questions. Through this questionnaire,² we aimed to determine the extent to which students are familiar with the term Information and Communication Technologies (ICT). Furthermore, we were interested in whether the use of digital tools and multimedia content had been introduced in classes designed to develop teaching competencies during their studies. All data were collected anonymously and treated with strict confidentiality.

The first question asked whether students were familiar with the concept of applying Information and Communication Technology (ICT) in the teaching process, including its use in learning, teaching and assessment. Students had to circle either “yes” or “no,” and if they answered affirmatively, they were asked where they had first encountered the concept of ICT in teaching.

2) I would like to express our gratitude to our colleague, Assistant Professor Nataša Košuta (Department of German Studies), the chair of the methodology committee at the Faculty of Humanities and Social Sciences at the University of Rijeka, for her invaluable assistance in developing the questionnaire used in this study.

They were then required to select from multiple predefined options while also having the opportunity to provide additional input in an open-ended format. The goal was to determine whether the ICT concept had been introduced in core or elective courses within their department, or in courses within the “Teaching Module”. Additionally, students could specify course names or indicate another source under the “Other” option. Next, they were asked whether they were familiar with any tools for creating multimedia content in teaching. If they answered affirmatively, they were asked to specify the tools they knew. Following this, students evaluated the adequacy of ICT-related content at the faculty, and whether it effectively prepared them for their future teaching work or careers. The question provided multiple-choice responses, allowing them to indicate whether they found the content sufficient, lacking, too theoretical, or in need of additional workshops, with an option to provide further input. The final question asked students whether they considered ICT knowledge important for their future teaching careers and required them to explain their reasoning.

The survey included twelve female and two male students majoring in art history teaching in Rijeka. Despite the small sample size, due to the relatively low number of students enrolling in art history teaching majors at the Faculty of Humanities and Social Sciences in Rijeka, the survey results indicate that all of them were acquainted with the term “Information and Communication Technologies (ICT)”. Some students had already encountered the term during their elementary and secondary education, while for most of them, ICT was introduced during their undergraduate and graduate studies. At the outset of the research, the hypothesis was that, since the students were all in their final year of studies, they must have already had tasks related to ICT.

The survey results revealed that, for most students, the term ICT was introduced during their core educational courses, such as general didactics, teaching methodology, and psychology.³ They were also required to utilise ICT tools and resources within the framework of art history teaching courses as well as foreign language majors. Most of them had assignments that involved ICT in their elective courses, primarily art history electives. Students also acknowledge the significance of using ICT, but they consider that they have too much of theoretical knowledge, and a deficiency in applying that theory in practice. All students emphasised that more content should be provided, and additional training should be organised within the study programme. Finally, almost everybody knew about at least one of the most widely used applications, such as *Kahoot*⁴ and *Nearpod*,⁵ while some of them were also familiar with *Wizer.me*,⁶ *Quizizz*⁷ and *Mentimeter*.⁸ Furthermore, they also stated that *MsTeams*, *Skype*, *PowerPoint*, *Zoom* and *Google Forms* are considered part of ICT.

In summary, the outcomes of this study did not align with our expectations. While students are familiar with the concept of ICT, most do not fully utilise its potential during their studies. Many remain unaware of the diverse opportunities that new technologies offer. Their coursework primarily involved PowerPoint presentations, with limited encouragement to explore other forms of ICT. In the contemporary educational

3) It is worth noting that at the Faculty of Humanities and Social Sciences in Rijeka, for students enrolled in the two-year master's programme in art history teaching, a future Visual Arts teacher receives 55 credit points for general teaching subjects out of a total of 120 credit points. This accounts for approximately 45% of the total credit points dedicated to teaching subjects.

4) Kahoot, accessed August 28, 2023, <https://kahoot.com/>.

5) Nearpod, accessed August 28, 2023, <https://nearpod.com/>.

6) Wizer.me, accessed August 28, 2023, <https://app.wizer.me/>.

7) Quizizz, accessed August 28, 2023, <https://quizizz.com/?lng=en>.

8) Mentimeter, accessed August 28, 2023, <https://www.mentimeter.com/>.

context, where ICT proficiency is essential, effectively working with children in the classroom has become increasingly dependent on the integration of technology. Exactly for that reason a teacher should know how to find and maintain the balance between the old and the new “digital” methods of teaching and learning. What should be taken into consideration is the implementation of new technologies into undergraduate and graduate art history programmes, particularly into educational modules, especially today when we are aware that there are endless possibilities for ICT implementation.

ICT IN GRAMMAR SCHOOL

The *Guidelines for Assessing the Attainability of Educational Outcomes*, a publication of the Ministry of Science, Education and Youth of the Republic of Croatia, define summative assessment, whose purpose is to evaluate the achievement of outcomes after a certain (shorter or longer) period of learning and teaching. The document also establishes a connection between the curriculum, teaching and learning methods, and two types of assessment: assessment for learning, which takes place during teaching and learning, and assessment as learning, which involves students in the assessment process.⁹

The implementation of assessment for learning is facilitated by digital tools enabling teachers to create various quizzes, walks, exhibitions, and more. This prompts us to expand the

9) *Smjernice za vrednovanje procesa i ostvarenosti odgojno-obrazovnih ishoda u osnovnoškolskome i srednjoškolskome odgoju i obrazovanju* [Guidelines for the Evaluation of the Process and Achievement of Educational Outcomes in Primary and Secondary Education] (Zagreb: Ministry of Science and Education, 2019), accessed September 10, 2022, <https://mzo.gov.hr/UserDocsImages/dokumenti/PristupInformacijama/eSavjetovanja-2019/Smjernice%20za%20vrednovanje%20proces%20i%20ostvarenosti%20odgojno-obrazovnih%20ishoda%20-%20eSavjetovanje%204-12-2019.pdf>.

concept of the didactic triangle, which involves the continuous interaction among the three teaching elements (students, content, and teachers), into a didactic square by incorporating digital technology as the fourth element. This expansion is logical, as today's students are an integral part of the internet generation.¹⁰ However, as Zoran Kojčić states: "Every use of technology in the classroom must have a predetermined purpose that justifies its use,"¹¹ such as the above-mentioned assessment of curriculum-prescribed learning outcomes. Kojčić also points out: "Therefore, what is important is that the purpose of using any mobile technology in the classroom is to facilitate learning something new or reviewing familiar concepts in a new and engaging way for students."¹² Without critical reflection on the implementation of ICT in the teaching process and its connection to achievable learning outcomes, technology risks becoming merely an end in itself.¹³

Among many, we will highlight several applications that we use in learning and teaching in our grammar school in Rijeka and which have proven to be valuable tools helping students achieve better results. *Kahoot* is one of the most well-known and widely used tools for creating multiple-choice questions. This tool allows access to quizzes via mobile devices, making it easy to use in the teaching process as a means of assessing student participation in the learning process. When projecting a quiz, the question is visible, and it is possible to include visual examples, to set a time limit for responses (adjustable in the quiz settings), and to provide four answers.

10) Petra Pejić Papak and Hana Grubišić Krmpotić, "Poučavanje primjenom suvremene tehnologije u obrazovanju" [Teaching Using Modern Technology in Education], *Život i škola*, no. 3 (2016): 153–162.

11) Zoran Kojčić, "Upotreba mobilnih tehnologija u nastavi" [The Use of Mobile Technologies in Education], *Metodički ogledi*, no. 2 (2012): 101–109. All translations of the quotations are by the authors.

12) Ibid.

13) Pejić Papak and Grubišić Krmpotić, "Poučavanje primjenom," 153–154.

A good tool for formative assessment is *Learning Apps*,¹⁴ whose greatest advantage is that it does not require student registration. Instead, students access the tool via a link or a QR code. This tool allows the creation of various types of content, from the well-known *Who Wants to Be a Millionaire* quiz to crosswords, word guessing and pair matching games. The application even enables embedding video content with the option to add different types of questions and quizzes within the video itself, thus encouraging active viewing of the attached video material. An additional positive aspect of the tool is the availability of ready-made content in various categories, with the “Arts” category being of particular interest to art teachers, who can access and use these materials in their teaching.

Nearpod is known for enabling the creation of interactive learning content, which teachers can enrich by uploading their presentations and adding various types of additional content, such as video content with questions, matching pairs, drawing, and the *Time to Climb* quiz.¹⁵ This quiz is particularly engaging for younger generations, as it allows students to choose avatars that guide them through various adventures and to earn points by answering questions. In addition to implementing interactive content into presentations, these materials, created in *Nearpod*, can be used as separate activities that teachers can use for formative assessment of student progress in the learning process. All content is accessible to students through a provided code.

In line with the *Curriculum for Visual Culture in Elementary Schools and Visual Arts in Grammar Schools* in the Republic of Croatia, the learning outcome in the domain *Creativity*

14) Learning Apps, accessed August 28, 2023, <https://learningapps.org/>.

15) Nearpod – Time to climb, accessed August 28, 2023, <https://nearpod.com/time-to-climb>.

and productivity achieved over four years of grammar school education should encompass students' exploration of a selected topic and presentation of their research results in a chosen medium.¹⁶ This outcome can also be accomplished using digital media, with students creating multimedia content such as an exhibition. We recommend utilizing *Emaze*,¹⁷ a platform that not only allows you to showcase works in a digital format but also enables the addition of captions. Anyone with the appropriate link can access the virtual exhibition and “walk” through the displayed exhibits. The outcome stipulated in the Curriculum can be accomplished by creating digital books with content adaptable to the chosen project.

The *Book Creator*¹⁸ tool is intuitive to use, allowing content to be shared via a code that both the teacher and students can access and share within the class group. As far as the content is concerned, a digital book can include texts, visual examples, voice recordings, and various types of multimedia content. Recreations of various spaces and visual presentations of architecture can be created using popular platforms, such as *Minecraft* and *The Sims*. These familiar and fun tools offer students an opportunity to express themselves and provide additional motivation for students to complete project tasks, as they are platforms students already enjoy using in their free time. By using the abovementioned games in teaching, we are already entering the realm of gamification, defined by Klara Lovrečki and Ivan Moharić as “the use of elements of game design in a non-gaming context, i.e., outside the context in which games are typically played.”¹⁹ They also emphasize that

16) *Kurikulum* (outcomes marked as SŠ LU A.1.1., SŠ LU A.2.1., SŠ LU A.4.3. and SŠ LU A.4.1.), 73, 79, 85, 91.

17) Emaze, accessed August 28, 2023, <https://www.emaze.com/>.

18) The Book Creator, accessed August 28, 2023, <https://bookcreator.com/>.

19) Klara Lovrečki and Ivan Moharić, “Igrifikacija (elementi videoigara) u nastavi: pogled iz pedagoško-didaktičke perspektive” [Gamification in Education:

gamification in education leads to active experimentation and discovery, encouraging players to see failure as a key part of the learning process. Lovrečki and Moharić claim that using games in education and grouping players into teams, requiring students to collaborate to achieve a goal, fosters collaborative learning, which has various socially beneficial effects, including improved peer relationships and more positive attitudes towards the subject. Furthermore, the previously mentioned formative assessment, which focuses on the learning process itself and does not result in numerical grades, is compared to the foundational principles of gamification where feedback is also provided throughout learning and does not result in harsh consequences, such as poor grades. The article highlights that gamification places the player at the centre of the process, and the transfer and use of this method in teaching directs the teaching process towards the student, who becomes an active participant and constructor of his or her own knowledge.²⁰

What is especially inclusive in the visual arts teaching process are various forms of field trips that do not require students to be passive observers, but instead engage them actively in the exploration process, requiring them to think, investigate, express critical views, and solve problems. The *Actionbound*²¹ application can be easily installed on students' mobile devices; this multimedia tool assigns precise coordinates on a map that students must find in the field. During field trips, among other things, you can ask students to find a work of art or take a selfie with it to confirm that they have visited the site indicated by the app. You can set various questions with examples, create puzzles, ask students to record videos on the site by specifying

Pedagogical and Didactic Perspective], *Časopis za odgojne i obrazovne znanosti Foo2rama*, no. 5 (2021): 71–85.

20) Ibid.

21) Actionbound, accessed August 28, 2023, <https://en.actionbound.com/>.

the required content or allowing them to choose the content themselves. This approach is suitable for achieving outcomes in the domain *Experience and critical stance*, which requires students to analyse and critically assess the artwork based on the direct contact with it.²² Content prepared for field trips can be found in the *Artour* application,²³ which features ready-made walks through Rijeka in search of tomb sculpture, providing relevant information about the artworks featured in the tour.

An application that combines spatial movement with Augmented Reality (AR) is *Metaverse*. After accessing the app, students scan a QR code that gives them access to the “experience” created by the teacher. On the screen of their mobile device, a three-dimensional avatar appears, guiding them through space by asking them various intriguing questions or requiring them to vote on a given thesis. Content is created by accessing the *Metaverse Studio* page and the “Create experience” option. Each piece of content can be further customized, and users access it via a QR code.

Spatial movement can also be introduced into the classroom. Using their mobile devices and the *Civilization AR* app,²⁴ students can project three-dimensional artefacts within their classrooms. They can then analyse these artefacts by walking around them and reading texts about them available in the app. For example, assigning students to analyse the formal elements of Rodin’s sculpture *The Kiss*, which they can explore from all angles in their classroom, is more engaging than having them look at a two-dimensional reproduction of the work of art.

22) *Kurikulum* (outcomes marked as SŠ LU B.1.4., SŠ LU B.2.4., SŠ LU B.3.4., and SŠ LU B.4.4.), 76, 82, 88, 96.

23) *Artour*, accessed August 28, 2023, <https://play.google.com/store/apps/details?id=com.app.Artour&hl=en>.

24) *Civilization AR*, accessed August 28, 2023, <https://civilisations-ar.en.aptoide.com/app>.

The following tools are suitable for assessment as well as for learning, which means they can be used as self-assessment tools. *Padlet*²⁵ and *Linoit*²⁶ have a “wall” where students can “pin” their thoughts on a specific topic and their solutions to various problems, they can share their critical thinking, express their awareness of and reflect on their own learning process and achievements. These are all methods of assessment as learning and assessment for learning, both of which are part of the Curriculum for the Visual Arts subject.²⁷ The ability to add texts, images, and links to the “wall” enables research tasks, performing analysis and developing critical thinking. These activities help students develop a deeper understanding of historical and artistic contexts. *Google Forms*, a tool that rapidly gathers data, offering teachers valuable insights into students’ engagement and comprehension of the material, is another example of a resource that facilitates the evaluation of the previously mentioned assessment for learning and assessment as learning.

Finally, there is ready-made multimedia content that teachers can use to enhance the teaching process digitally, by integrating them with the interactive tools mentioned earlier. There are also well-known websites that offer video content, and texts about different periods and artists, while some of them, such as *Khan Academy*,²⁸ even offer ready-made quizzes. Platforms such as *Smarthistory*²⁹ offer similar resources and content applicable in the teaching process. On the other hand, *Google Arts & Culture*,³⁰ *Teaching with Europeana*,³¹ *Europeana*

25) Padlet, accessed August 28, 2023, <https://padlet.com/>.

26) Linoit, accessed August 28, 2023, <https://en.linoit.com/>.

27) *Kurikulum*, 106.

28) Khan Academy, accessed August 28, 2023, <https://www.khanacademy.org/>.

29) Smarthistory, accessed August 28, 2023, <https://smarthistory.org/>.

30) Google Arts & Culture, accessed August 28, 2023, <https://artsandculture.google.com/>.

31) Teaching with Europeana, accessed August 28, 2023, <https://teachwitheuropeana.eun.org/>.

Schoolnet Academy,³² and *Art Class Curator*,³³ provide ready-made teaching scenarios. While all content on *Europeana* is available free of charge, *Art Class Curator* offers access to a limited number of teaching units for free. *TED Talks*³⁴ is perhaps the best source when looking for interesting video content aimed at prompting discussions on various art examples, and by placing videos in tools such as *Nearpod* or *Learning Apps*, you create interactive content urging students to actively watch and learn simultaneously.

CONCLUSION

Teaching and learning in the 21st century are impossible without the use of ICT (Information and Communication Technology). The results of a survey conducted among a rather small group of art history graduate students indicate that these students are familiar with the concept of ICT. However, despite their familiarity with various applications, only a few of those applications are utilized. Most of the teaching and learning activities involving technology at the university participating in the research centre around PowerPoint presentations, with little emphasis on encouraging or instructing students to make significant use of other available applications. On the other hand, in the context of a specific grammar school, it is evident that students are familiar with and actively use a broader array of applications and learning platforms. This undoubtedly contributes to a more effective acquisition of the knowledge necessary to achieve the designated learning outcomes. Hence, we can deduce that a significant modification in the graduate curriculum is required.

32) Europeana Schoolnet Academy, accessed August 28, 2023, <https://www.europeanschoolnetacademy.eu/>.

33) Art Class Curator, accessed August 28, 2023, <https://artclasscurator.com/>.

34) TED Talks, accessed August 28, 2023, <https://www.ted.com/talks>.

This change should enable students aspiring to become visual arts teachers to develop their ICT competencies during their studies. This, in turn, will empower them to help their future students achieve the intended learning outcomes more easily, ultimately enhancing the teaching as well as the learning experience in their classrooms.

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