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INFLUENCE OF THE COVID-19 PANDEMIC ON THE ART TEACHERS' UTILIZATION OF BLENDED LEARNING (BL) IN CROATIA

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Abstract: Reflecting on models in which digital technology and online learning are combined with live teaching has become necessary in today's education. The research aims to determine whether visual arts teachers have developed digital competencies during the COVID-19 pandemic significantly and what they think about the effectiveness of blended learning. It will determine whether attitudes about distance teaching depend on their digital competence. The research results show that half of the teachers had satisfactory digital competencies because they used blended learning before the COVID-19 pandemic. During the COVID-19 pandemic, digital literacy in using technology has been developed more than multimedia didactic competencies. Those teachers who used blended learning before the COVID-19 pandemic are more inclined to have positive attitudes about the effects of distance teaching. They think that they will apply new teaching skills during face-to-face teaching after the COVID-19 pandemic, that methods and tools for teaching in the digital environment develop students' interest and abilities, and that the independent creation of digital teaching materials has improved their methodical capabilities.

Keywords: blended learning, COVID-19, digital literacy, multimedia didactic competencies, visual arts teachers

INTRODUCTION

During the COVID-19 pandemic, new conditions were made in which teachers were forced to change their methodologies from face-to-face teaching to distance teaching. Such new circumstances have left their mark on all education systems and all levels. They have encouraged reflection on teachers' existing digital competencies, the possibilities of developing them in new circumstances, and their applicability even after returning to face-to-face teaching. Anđelić et al. (2020) showed that at the time of the COVID-19 pandemic, 58.1% of teachers considered that they possessed a satisfactory level of competence for

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the implementation of distance teaching, 32.9% were not sure, and only 5.2% felt that they did not have such competence.

Over the last two years, several studies of the attitudes of teachers, parents, students, and university professors on distance teaching experiences have been published in Croatia (Ćurković et al., 2020; Bulić et al., 2021; Ivanković & Igić, 2021), but no research was applied on visual arts teachers. Due to the subjects' creative and experiential character, it was a challenge to replace direct contact with work of art and creative work with distance teaching and learning.

This paper explores the impact of the COVID-19 pandemic on the adoption and utilization of blended learning (BL) by art teachers in Croatia. The sudden shift from traditional face-to-face teaching to distance learning highlighted the importance of digital competencies and adaptive teaching strategies. Given the unique challenges of teaching visual arts—where direct interaction with artworks and hands-on creative processes are central—this study examines how visual arts teachers integrated digital tools and methods into their practice. The research focuses on the extent to which blended learning was employed before, during, and after the pandemic, as well as its perceived effects on teaching methodologies, student engagement, and learning outcomes.

LITERATURE REVIEW

The literature analysis found that there is no single definition of blended learning. Quite a few authors agree that blended learning combines face-to-face and online learning and teaching (Allan, 2007; Horton, 2006; Roger, 2007; Voos, 2003; Sophonhiranrak et al., 2015). Many authors share the standard view that blended learning combines the potential of internet-assisted learning with classroom techniques (Delialioglu & Yildirim, 2007; Ginns & Ellis, 2009). Some authors have pointed out that blended learning improves traditional face-to-face teaching because learning becomes a meaningful activity (Gülbahar & Madran, 2009; Garrison & Kanuka, 2004), while others have pointed out that it changes students' experiences and improves achievement, expands resources, boosts confidence, deepens knowledge (Davis & Fill, 2007; Chen & Jones, 2007). The Council of the European Union (2021) has recommended using blended learning in formal education and training, implying that a school, teacher, or student applies multiple approaches to the learning process: combine spatial and distance learning environments and combine different digital and non-digital learning tools within educational content.

Growing up in a digital environment has changed how children and young people perceive the world and how they learn. While teachers in such a world

are digital immigrants, students are digital natives (Prensky, 2001). Such generations are also called net generations, digital generations, or homo zappiens, born after the 80s and raised alongside the Internet and digital media from a young age (Veen, 2007; Jenkins, 2006). Dimmock (2019) classified living generations as Silent Generation (born 1928–1945), Baby Boomers (born 1946–1964), Generation X (born 1965–1980), Generation Y or Millennials (born 1981–1995), Generation Z (born 1996–2010), and McCrindle (2020) added generation Alpha that appears after 2010. Generation Alpha is also known as the e-generation or the first generation born in the 21st century.

At the European level, digital competence has also been singled out as one of the eight critical competencies of knowledge-based citizens (ISPL, 2006; Vrkić Dimić, 2013). Information and computer literacy skills are also singled out as valuable skills of modern society regardless of socioeconomic status (Catts & Lau, 2008; Vrkić Dimić, 2013). It distinguishes between two digital competencies that a teacher must possess to integrate computer technology into teaching effectively: basic computer literacy (teaching competence for the use of ICT) and multimedia didactic competencies (developed methods of work and strategies with ICT in teaching) (Vrkić Dimić, 2013). This second competence, which ensures the practical application of ICT in learning processes, is crucial for raising learning levels and knowledge construction.

RESEARCH METHODOLOGY

Research Objectives

The research objectives are to determine the frequency of BL by teachers of visual arts education before the COVID-19 pandemic and whether the percentage increased significantly during distance learning. Is there a statistically significant correlation between how classes were held before the pandemic and social demographic variables? Then, what are teachers' attitudes about the impact of distance teaching on their professional development and student competencies?

Population Sample

The population comprises 119 teachers who teach art subjects in Osijek-Baranja and Vukovar-Srijem County. Fifty-six teachers responded to the survey, accounting for 47% of the total population.

Analysis of the sample showed that 64.3% of teachers who participated in the survey were female, while 35.7% were male. According to the academic

education, 82.1% of Master of Arts Education, and 17.9% of academic artists with pedagogical-psychological-methodical-didactical (PPMD) exam. In Vukovar-Srijem County, 28.6%, and in Osijek-Baranja County, 73.2% of teachers completed the survey.

According to the seniority, the sample is almost equally distributed because the study shows that: 26.8% of teachers with a working experience of 0 to 5 years, 30.4% from 5 to 10 years, 26.8% from 10 to 20 years, and 16.1% with 20 or more years of service. Most teachers are aged 30–35 years (26.8%) and 35–40 years (21.4%), while the number decreases by the edges, so there are 17.9% at the age 23–30, 14.3% at the age 40–45, 7.1% at the age 45–50 and 12.5% at the age 50 or more.

Measuring Instruments

A questionnaire was created for this research as a measuring instrument for teachers' attitudes toward blended learning during the COVID-19 pandemic.[1] It consists of three constructs that examine different teachers' data. The first construct includes socio-demographic variables of nominal and ordinal type. It consists of 7 particles that collect data on gender, education, workplace, county, years of service, age, and teacher's title.

The second construct consists of 11 particles of the nominal type and has the possibility of multiple choice. This construct assessed teachers' digital competence before and during the COVID-19 pandemic. The first particle refers to blended learning experiences before the COVID-19 pandemic. The following two particles are dependent variables that depend on the previous answer and clarify the last choice. Questions of other particles relate to ways of teaching before and during the COVID-19 pandemic. They provide information on how they organized teaching, testing, and learning and with what kind of materials.

The third construct consists of 6 particles, according to the Likert scale of 5 degrees (I completely disagree, disagree, neither agree nor disagree, agree, fully agree). It examines teachers' opinions and experiences on acquiring new skills during the pandemic, applying new skills after the pandemic, developing students' interests in the digital environment, improving methodical abilities by creating digital teaching materials, and the experiences of distance learning effect. The third construct proved to be a reliable measuring instrument with normal data distribution.

[1]https://drive.google.com/drive/u/0/folders/1odRZZCl06z4LMyeXa_0yCCyYcR4F7W-1
https://docs.google.com/forms/d/e/1FAIpQLSday6AaNwaEIyFhkIhVxvsTBSUvg9vZTnTlcxH-00jkSHH4oIg/viewform?usp=sf_link

Testing with the G*Power test with a probability of 80% that the statistical power of the test is correct showed that a sufficient number of individuals tested is 52. The internal consistency of the measuring construct based on the Cronbach Alpha coefficient is a = 0.913, meaning the particles are excellently consistent. Tests of all six particles show deviation from skewness and kurtosis. Still, the values are within the prescribed normal limits, so we can conclude that normal data distribution is present (*Table 1*).

Table 1. Distribution normality of the third construct

	Mean ($\bar{x}$)	Median	Mode	SD	Sk	Ku
My experience with distance learning has been primarily positive.	2.98	3	3	1.213	-0.155	-0.741
During distance learning, I gained new teaching skills in the digital environment.	3.7	4	5	1.361	-0.858	-0.433
I will also apply new knowledge and skills during post-pandemic class learning.	3.73	4	4	1.328	-0.982	-0.117
Methods and tools for teaching in the digital environment develop students' interests and abilities.	3.46	4	4	1.293	-0.573	-0.584
Self-development of digital teaching materials has improved my methodical abilities.	3.46	4	4	1.307	-0.629	-0.667
Preparing distance classes requires more time than preparing frontal classes.	3.48	4	4	1.321	-0.573	-0.699

Data processing methods

Descriptive statistics were applied to socio-demographic variables to obtain answers to the first research question**.** The second research question used a nonparametric methodology of independent variables (phi,p, Risk). In this way, it was determined whether age, gender, seniority, education, and teaching status were associated with blended learning before the COVID-19 pandemic.

The Independent Sample T Test was applied to show whether there is a statistically significant difference between the way classes were conducted before the COVID-19 pandemic and attitudes about the effect of distance teaching. Dependent variables are measured by a Likert interval scale, while the independent variable is of nominal dichotomous type. It determines whether teachers before the COVID-19 pandemic used blended learning or exclusively class teaching.

Research questions

- RQ1: What was the frequency of blended learning before and during the COVID-19 pandemic?
- RQ2: Is there a statistically significant correlation between blended learning before the COVID-19 pandemic and socio-demographic variables?
- RQ3: Is there a statistically significant difference in teachers' attitudes about the impact of distance teaching and blended learning before the COVID-19 pandemic?

Results

The response analysis for the variable "*Which forms of teaching did you use before the COVID-19 pandemic?"* shows that BL had been used by 53.6% of teachers before the pandemic. In comparison, only face-to-face teaching was used by 46.4% of teachers. Teachers who did not use BL before the COVID-19 pandemic cite various reasons. 34.6% believe that face-to-face teaching is the most appropriate for the social development of students, and 7.7% believe that using digital teaching materials harms students' cognitive development. 26.7% of the teachers who used BL even before the COVID-19 pandemic used mobile learning, 43.3% used flipped classrooms, and 33.3% used mixed reality and web materials 56.7%. Answers to the question "*Which ways of teaching did you use during the COVID-19 pandemic?"* showed that most used are web materials (64.3%) and mixed reality (57.1%), and slightly less M-learning (32.1%) and flipped classrooms (33.9%.). The results (*Table 2*) show that during the COVID-19 pandemic, only the use of materials on the Internet (33.9%) and mixed reality (39.8%) grew significantly. Mobile learning and flipped classrooms have been used between 10 – 20% more.

Table 2. Ways of teaching before and during the COVID-19 pandemic

	Mobile learning		**Flipped classroom**		**Mixed realities**		**Web materials**	
	n	%	n	%	n	%	n	%
Before COVID-19 pandemic	8	14.3%	13	23.2%	10	17.9%	17	30.4%
During COVID-19 pandemic	18	32.1%	19	33.9%	32	57.1%	36	64.3%
Difference	10	17.8%	6	10.7%	22	39.8%	19	33.9%

When asked "*How did they hold classes during the pandemic?"*, 75.0% of teachers used distance teaching via virtual classrooms, 58.9% via video calls, and 26.8% hybrid and face-to-face teaching. Half of the teachers (50.0%) combined

remote video calls and virtual classrooms for teaching, while only virtual classrooms were used by 30.4% and video calls by 19.6%. Most often, 32.1% of them conducted trials by combining video calls and virtual classrooms, followed by 37.5% with tests and assignments in virtual classrooms, and most rarely, 12.5% via video calls.

The results of the variable "*What kind of material did you use during distance learning?*" showed that 45.6% of teachers used video lessons recorded by the Ministry of Science and Education, 38.6% recorded their video lessons, 64.9% used their material made in digital tools, 38.6% foreign digital material downloaded from the Internet, and 36.8 % digital material from the selected publisher. Teachers most often used virtual galleries and museums (52.6%), while even 31.6% of teachers did not use them at all. 29.8% of teachers created virtual galleries for teaching purposes, and only 10.5% taught students to make them.

To demonstrate a statistically significant correlation between BL before the COVID-19 pandemic and socio-demographic variables, correlation analysis by nonparametric tests was conducted because abnormal data distribution was established. For individual variables, the results are as follows (*Table 3*):

Table 3. Correlations between socio-demographic variables and BL before the COVID-19 pandemic

	Phi	p	R
Gender and BL	0.128	0.338	1.711
Education and BL	0.314	0.019	6.222
Curricula and BL	-0.05	0.709	0.782
Teaching status and BL	-0.040	0.763	0.075
Seniority and BL	0.134	0.315	1.727
Age and BL	0.089	0.505	1.458

There is no statistically significant correlation between the use of BL before the COVID-19 pandemic and gender, curriculum, teaching status, seniority, and age. According to the data, we can only see a statistically significant correlation between teacher's education and BL before the COVID-19 pandemic (Phi>0.30 and p>0.05). So, it was found that 61% of MAs had been more inclined to use BL than teachers of other professions (2%) before the COVID-19 pandemic.

The Independent Sample T Test was used to determine the statistically significant difference in the effect of distance teaching attitudes between those teachers who used BL before the COVID-19 pandemic and those who did not (*Table 4*).

Table 4. The relationship between the use of BL before the COVID-19 pandemic and teachers' attitudes on the impact of distance teaching

		t	df	p
H1	My experience with distance learning has been mostly positive.	2.688	54	< 0.05
$_{H}2$	During distance learning, I gained new teaching skills in the digital environment	1.006	54	> 0.05
H_3	I will also apply new knowledge and skills during face-to-face classes after the COVID-19 pandemic	2.086	54	< 0.05
H_4	Methods and tools for teaching in the digital environment develop students' interests and abilities	2.391	54	< 0.05
H_5	The development of digital teaching materials has improved my methodical abilities	2.602	54	< 0.05
$_{H}6$	Preparing distance teaching requires more time than preparing face-to-face teaching	1.764	54	> 0.05

Based on the T-test results, at a significance level of 5%, there is no significant statistical difference in teacher attitudes between those who used BL before the COVID-19 pandemic and those who did not. Although the vast majority of teachers (66.1%) still agree with the statement that during distance learning, they acquired new teaching skills in the digital environment, the difference is not statistically significant because $p > 0.05$ and obtained results are a product of chance. Also, there is no significant statistical difference in teachers' attitudes about the complexity of distance teaching and face-to-face classes between those who used BL before the COVID-19 pandemic and those who did not ($p > 0.05$). However, 55.4% of teachers believe that distance teaching is more demanding to prepare than frontal.

H_1, H_3, H_4, and H_5 can be accepted because $p < 0.05$ and there is a statistically significant difference in the attitudes of teachers about the stated claims between teachers who used BL before the COVID-19 pandemic and those who did not. Teachers who used BL before the COVID-19 pandemic are more inclined to think that experiences with distance teaching are overwhelmingly positive.

There is also a statistically significant difference in teachers' attitudes about applying new knowledge and skills even after the COVID-19 pandemic between teachers who used BL before and those who did not. Most teachers (69.6%) still see a valuable contribution to distance teaching because they will apply new knowledge and skills in the future, while 17.9% disagree. We conclude that the differences in frequencies are not accidental ($p < 0.05$) and that teachers who used BL before the COVID-19 pandemic are more inclined to

think that the new knowledge and skills acquired during distance learning will also apply during face-to-face classes after the COVID-19 pandemic.

There is a statistically significant difference in teachers' attitudes toward the impact of teaching methods and tools in the digital environment between teachers who used BL before the COVID-19 pandemic and those who did not. From the frequencies, we see that most teachers (53.6%) believe that teaching methods and tools in the digital environment develop the interest and abilities of students. The conclusion is that teachers who used BL before the COVID-19 pandemic are more inclined to think that teaching methods and tools in the digital environment will develop students' interests and abilities ($p< 0.05$).

A statistically significant difference was established in the attitudes of teachers who used BL before the COVID-19 pandemic and those who did not. The data shows that 24.2% of teachers disagree that the independent creation of digital teaching materials will improve their methodical abilities, and 17.9% do not have a built-in opinion about it. In comparison, 58.9% of teachers believe this is true to a lesser or greater extent. The difference in frequencies is not accidental ($p< 0.05$) and teachers who used BL before the COVID-19 pandemic are more inclined to think that independent production of digital teaching materials will improve their methodical abilities than those who are not.

DISCUSSION

It is assumed that teachers who had positive experiences with distance learning even before the COVID-19 pandemic experimented with digital technology and E-learning and used specific models, sources, and forms of BL. Although the paradigm of traditional frontal teaching has remained because 34.6% of those who used only face-to-face classes before the COVID-19 pandemic as a reason state that teaching face-to-face is the most appropriate and highest quality for the social development of students.

It is evident that during distance classes, the use of materials on the web and the use of virtual reality increased significantly, which was expected because it became necessary to use digital sources. The conclusion is that the digital competence of teachers to use computer technology in teaching has significantly increased, but they are less qualified in the methodical application of constructivist teaching in cooperation with digital technology.

Although there are differences in frequencies in the use of BL before the COVID-19 pandemic between Generation X (19%) and Generation Y (37%), no statistically significant correlation has been established. Only a statistically significant correlation between teachers' education was shown, so it turns out that Master of Art Education (61%) was more inclined to use BL before the

COVID-19 pandemic than those who graduated from an art academy or some other related faculty (2%). The reason could be better methodical training.

Teachers who used BL before the COVID-19 pandemic are more inclined to think that their experiences with distance teaching are primarily positive (t 2.688; df 54; $p < 0.05$). Openness to digital teaching has also facilitated their further development of competencies, so from the results, we can see that teachers who used BL before the COVID-19 pandemic are more inclined to think that they will apply new knowledge and skills during frontal classes after the pandemic (t 2.086; df 54; $p < 0.05$). They are primarily aware of the positive impacts of digital technology on learning, which we see from the results of the t-test because teachers who used BL before the COVID-19 pandemic are more inclined to think that methods and tools for teaching in the digital environment develop students' interest and abilities (t 2.391; df 54; $p < 0.05$).

The teachers who used BL before the COVID-19 pandemic were mainly developing their digital competencies in the methodical field and they think that the independent creation of digital teaching materials improved their methodical abilities (t 2.602; df 54; $p < 0.05$). 66.1% of teachers believe they have developed skills, but no statistically significant difference exists between those who used BL before the COVID-19 pandemic and those who did not (t 1.006; df 54; $p > 0.05$). There is also no statistically significant difference in attitudes about the complexity of distance teaching and face-to-face teaching (t 1.764; df 54; $p > 0.05$) between those teachers who used BL before the pandemic and those who did not. Although 55.4% of teachers believe that the preparation for distance teaching is more demanding than face-to-face, such classes are resistant due to higher teacher engagement, more preparation, and more learning (Matijević et al., 2017).

CONCLUSION

This study provides valuable insights into visual arts teachers' digital competencies and teaching methodologies during the COVID-19 pandemic. The digital competence of visual arts teachers was visible even before the COVID-19 pandemic because such teachers included computer technology and multimedia methodology in teaching, believing that they were developing students' interests and abilities. During the COVID-19 pandemic, they set their digital skills even further, making digital teaching materials on their own and instructing students to use them in solving tasks, considering that this is how they improve their methodical abilities.

However, it has several limitations. The sample was limited to visual arts teachers in Croatia, which may affect the generalizability of the findings to

other regions or disciplines. The reliance on self-reported data introduces the possibility of response bias, as participants may overestimate or underestimate their competencies and experiences. The study focused on BL and digital competencies without delving deeply into other potentially significant factors, such as institutional support or access to technology.

The findings have important implications for educational practice. The results highlight the necessity of ongoing professional development to enhance basic digital literacy and advanced multimedia didactic competencies. Additionally, the positive experiences of teachers who used BL before the pandemic underscore the potential of this approach to enrich face-to-face teaching. Schools and policymakers should consider integrating BL into standard curricula, emphasizing its benefits for fostering creativity and engagement in education.

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