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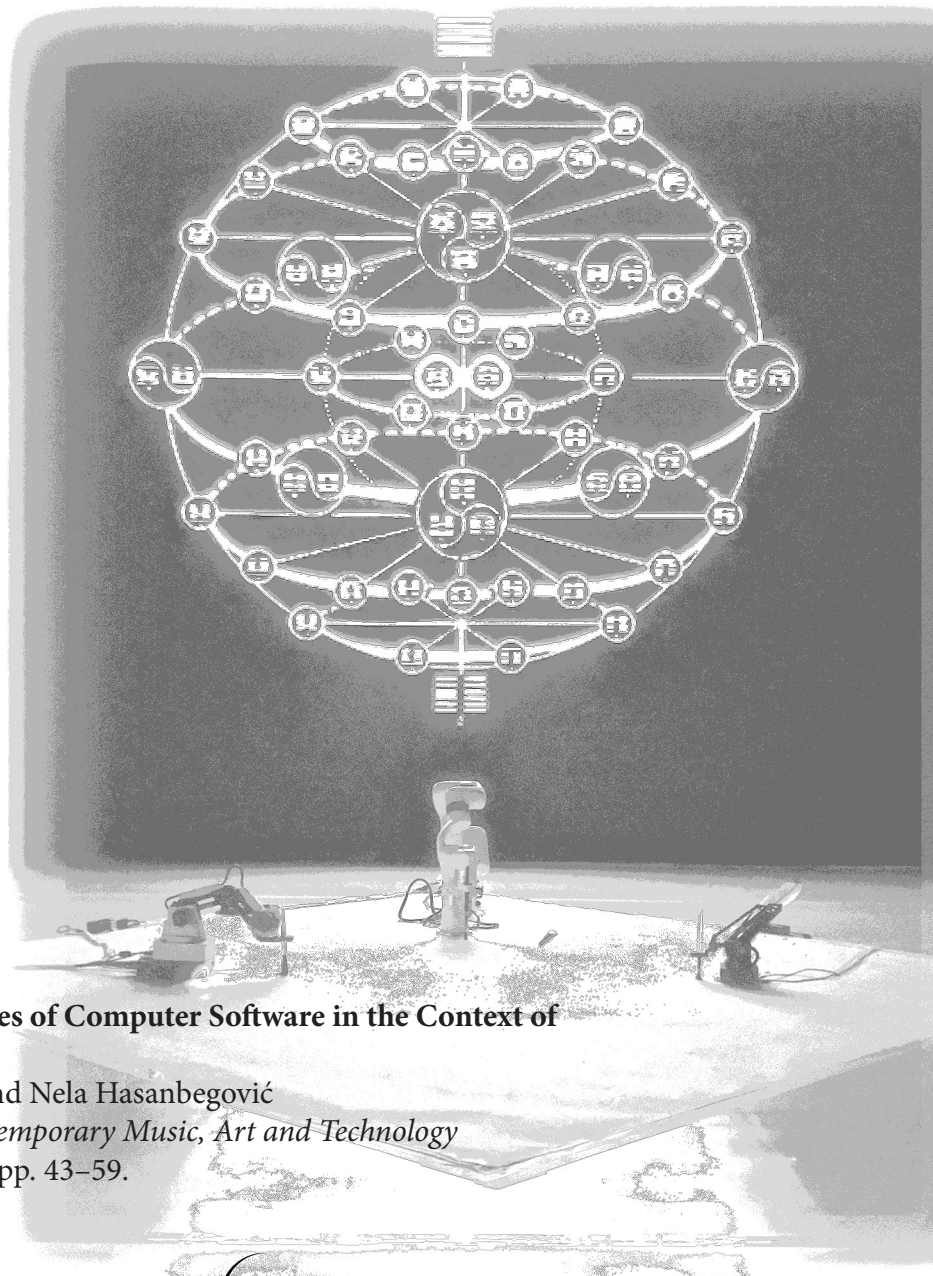

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Sandra Bjelan-Guska and Nela Hasanbegović

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Sandra Bjelan-Guska*
Faculty of Philosophy, University of Sarajevo
Sarajevo, Bosnia and Herzegovina

Nela Hasanbegović**
Academy of Fine Arts, University of Sarajevo
Sarajevo, Bosnia and Herzegovina

APPLICATION POSSIBILITIES OF COMPUTER SOFTWARE IN THE CONTEXT OF THE ART TEACHING

Abstract: The development of technology has significant implications for human creativity. The nature of creative processes is being redefined, and technology is playing an increasingly important role in creative activities, becoming a tool or an extension of the creator's hand helping to integrate a new idea. Implications are also evident in the teaching of fine arts, enhancing the possibilities of stimulating students' creativity using computer software. This assisted creation system is empowering for the student, as it enables him / her to acquire new abilities and a wide range of creative skills, as well as facilitating the formation of personal semantics. In order to determine the possibility of using computer software in the teaching of fine arts, research has been conducted among subject teachers. The aim is to determine the extent to which teachers of fine arts are familiar with software suitable for visual design, to establish whether they use it in their educational work, and to examine the methodical specifics of the realization such teaching. The results of the research are significant for the processes of designing initial university education programs, as well as in programs for lifelong professional teacher training, both for the purpose of educating teachers about the possibilities of using computer software and their impact on enhancing students' creativity. The results can be a real boost for teachers who want to complement and strengthen their educational practice.

Keywords: creativity, design, computer software, divergent thinking, visual arts

* Author's contact information: sandra.bjelan@pedagogijaffsa.com, sandra.bjelan@ff.unsa.ba
** Author's contact information: nelahasanbegovic@gmail.com, n.hasanbegovic@alu.unsa.ba

I. Introduction

The priorities of a contemporary education policy are to improve the quality of education and are focused on studying and applying creativity in the teaching process. This is so due to the fact that formal education constitutes a fundamental pre-requisite for the development of an individual's creative skills. Education is one of the key factors of the quality of intellectual capital, which is crucial for international competitiveness of a national economy and in sustainable development (Education Policy Analysis 2002). The attributes of education systems should strive towards the production of new knowledge while successfully applying existing techniques, which represents a strategic resource for products and services. Such knowledge should be networked, decentralized, interdisciplinary, efficient, and competitive. As such, it constitutes a market good.

To enhance development and form a well-rounded personality, as well as to encourage students' creativeness, the teaching process applied in the fine arts should be based on the tendencies of the new age, bearing in mind that the development of technology has major implications on human creativity. In general, teachers of fine arts assume a rather important role in the development and cultivation of student creativity, because, as claimed by Torrance (as cited in Martić 2009), teachers who act creatively on their own and who are aware of what creativeness is are able to identify and understand students' creative needs and encourage divergent thinking. The quality of an education system such as this will lead to proliferation of creative potential, and the professional development of educators should be of paramount importance. We argue that a focus should be made on the development of competencies to encourage creativity among students using suitable fine arts and visual design computer software at all levels of education. The nature of creative processes could be redefined, and technology assumes an increasingly important role in creative activities while becoming a suitable tool or an extension of a creator's hand and an aid in the integration of new ideas.

2. Encouraging the development of creativity among students using software in teaching fine arts

If creativity is viewed as a general human trait and quality – being universal, yet possessed by individuals to a different degree and with different intensity – and as a foundation for the development of any society, we are responsible as a society to enable and encourage its development in the education system (Gajder and Mlinarević 2010). Creativity, as a human trait, needs to be cultivated and the use of new technologies to facilitate this should be encouraged, arguably leading to a higher quality teaching process while addressing of the needs of individuals and society as a whole. A creative teaching process will be difficult if there is a lack of motivation, explana-

tion, and encouragement; if there are no signposts to possible alternative methods, the facilitation of the flow of ideas and encouragement of project-based problem solving work with be difficult to achieve, both inside and outside school. All of this indicates that teacher creativity and the democracy of the school environment are fundamental prerequisites for the development of creative students.

Abraham H. Maslow believes that the teaching of all school subjects should look up to and follow the model of arts subjects, which encourage the creativity of students to a significant extent. It is a historical coincidence that teachers of arts were the first to go in that direction. The same might be implemented in teaching mathematics, which I hope will happen one day. It is certain that mathematics or history or literature are still taught nowadays in an authoritative manner focused on memorizing... The issue is how to teach children to face here and now, how to help them become creative people who are able to take a creative orientation (Bognar 2012).

Fine arts teaching can encourage creativity in a modern student if it is focused more on the use of new tools, software and applications, and on promoting the features of developed education systems founded on the production of new, and application of the existing, knowledge, or an education:

> „ ...striving to the empowerment of a new type of human being which we need, a person of process, a creative person, a person who knows how to improvise, a self-confident and brave person, and autonomous person." (1976, 95-96, as cited in Bognar 2012).

It was Komensky who pointed out that it is necessary to respect the individuality and distinctiveness of every child and to adapt the teaching content to the child's individual development abilities and needs. Additionally, Komensky indicates that a child's thought develops from the concrete to the abstract. Ever since the discovery of "prescientific developmental psychology", this has become one of the fundamental teaching principles – the principle of vividness and abstractness. In the modern era, this principle has become the backbone of lesson planning and organization, and has become the subject of study by many contemporary authors, such as Arnheim. In his essay, The Perceptual Challenges in Arts Instruction, Arnheim argues:

> "Every object or event in this world is capable of profoundly arousing the human spirit if the conditions are favorable" (Arnheim 2003, 244).

Arnheim's analysis of artistic form and an attempt to make the visual categories "intelligible" in regular arts instruction may and does serve as a means with which we can make some arts issues understandable to students. However, as Arnheim himself cautions, we must not fall into a trap, as his analyses are not and should not be a "recipe" either for artistic production or for perception or an aesthetic experi-

ence of a work of art (Arnheim 1987, 15). As a Gestaltist, in his essay The Perceptual Challenges in Arts Instruction, Arnheim addresses directly educators, emphasizing that it is necessary to differentiate between sensory stimulation and perceptual challenge, and that in regular instruction children do not have sufficient perceptual challenges, whereas in everyday life they have too much sensory stimulation, developing as a result the mechanism of "sensory numbness". To create a perceptual challenge in instruction, the materials used must possess internal order, and allow for the creation or order understandable to students. Those scenes of order must visually be associated with something students can relate to and that is present in their daily lives, such as new applications, software, games, that is, everything which takes part in building the visual identity of their reality. What is affirmed as crucial is that children understand what they see, because that is the only way they can use the sense of sight as a path to knowledge, and not only as a mere "entertainment with minute spectacles" (Arnheim 2003, 249-250). Stanley Greenspan (2013) maintains that developing the ability of visual-spatial processing is the first step to developing reflexive thinking and understanding of the world. He adds that a teacher's task is to help students engage all segments of their visual-spatial world, and to encourage them to analyze it using their emotions. Further, teachers should familiarize their students with different spatial dimensions, encourage them to use space creatively and to view logical relationships between space entities. This is followed by the development of higher-orders thinking skills, such as multi-causal thinking, thinking in the gray zone and reflexive thinking. Greenspan concludes:

> "The ability to comprehend the world lies not only in the verbal understanding but in the visual and spatial understanding too" (Greenspan, 2013, 161).

According to Piaget, a child's symbolic thought which occurs at pre-school age is the most important; phantasy and language open new possibilities for thinking. Each symbol contains new feelings and ideas and packages thoughts so that they can be quickly analyzed (as cited in Handukić 2008, 112). The stage of full expression is marked by the visual expression which can be identified by the following features: objectivity of perception, particularly that of space, which is determined by three-dimensional recognition and mastering perspective; to a certain extent cultivated creative nature of imagination becomes used for the purpose of creation in different branches of art; expression at significantly higher expressive visual level, aspiring to express through works of fine arts both mood and internal life. This indicates that it is preferable at this age to introduce students to the use of software and applications when creating fine arts and visual works, as the system of supported creation will be rather empowering for a student. In the adolescence period, the fine arts work of young people reflect their susceptibility to perception and a wish to experiment. Panić (1989) defines this phase as a reawakening of creativity, when the

independent artistic has a need for originality. A convincing visual representation reflects a student's focus and interest in the performance and creation of fine art, and facilitates a potent shaping of personal semantics with the use of computer software.

For the creativity, expressive, and receptive abilities to develop, teachers have to not only be well acquainted with the findings of contemporary pedagogy, developmental psychology, didactics, psychology of art, new technologies and multimedia, but they themselves, being creative individuals, must find ways to implement the conclusions into their own educational work:

> "The data about the nature of a child's talent offers a possibility for a focused intervention to develop preferred dispositions. Such a system must also include extremely talented teachers inclined to creativity. Otherwise, as claimed by Goethe, what happens is that a teachers becomes afraid of a student, in which case the teacher inhibits and delays the child's development" (Panić 1989, 44).

3. Didactics of fine arts instruction faced with contemporary challenges

Due to its complexity and multifactor determination, instruction is defined in multiple ways in didactic reference books; however, the majority of authors define it as the most organized activity of teaching and learning. Muminović (1998) maintains that instruction is a dialectic blend of the past, present and future, and in it he sees its contradiction. According to its basic function, instruction has to be oriented towards the future, otherwise it does not justify its existence. While preparing young people for the future, instruction is implemented in the present and draws on the past for its content; however, it must not linger there. Its ultimate purpose is to prepare young people for life in an uncertain future. Implementation of such instruction requires competent teachers engaged in permanent and life-long professional and expert development, listening to the needs of their students, and appropriately responding to them in a creative artistic process such as teaching.

In the implementation of the teaching process, all of the teaching competences come under the spotlight, particularly the didactical-methodological competencies and the sense of creating optimum conditions for teaching and learning. Writing about what good instruction is, Meyer (2005) lists ten of its features: clear structuring of instruction; large portion of actual learning time; a stimulating learning environment; clarity of content; establishing sense through communication; diverse methods; individual encouragement; intelligent practicing; clarity of expected achievement; and a prepared environment. Implementing in practice a quality instruction with all of the above (alongside many other features) has always been the top creative and artistic skill, however there are new challenges if we bear in mind the digital world being implemented, and even imposed, in teaching environments.

Digital competencies enable a teacher to meet the requirements of modern society by way of didactically and methodologically designed models of both traditional and modern instruction.

Traditional models of teaching, most commonly implying the didactic model of school functioning in which students are grouped in classes, taught by subjects for periods of 45 minutes, and in which the dominant method is frontal teaching and an expressed verbal method or lecturing by the teacher, have been criticized ever since the reform of pedagogy to date (Bjelan-Guska 2017). On the other hand, the modern paradigm of teaching is founded on the scientific knowledge of how the brain learns best and implies that teaching and learning processes are complex; that they include social interaction, group work, individual research assignments, and methods such as reflection and role-play, etc. Instruction based on the characteristics of the one primarily being taught (the student) is organized in a thematic, integrative, cooperative problem-based and exploratory manner. The teacher is no longer the only source of knowledge in the classroom and an unquestionable authority the students are afraid of, but the one who leads and steers the process, motivates, encourages, discusses, questions, doubts, explores, learns and creates a pleasant and warm classroom environment in which the students feel safe and in which learning takes place. Such instruction is based on learning outcomes oriented on competences, implying reorganization of information in unique, creative ways, with foreseen and unforeseen solutions, encouraging divergent, creative, critical and reflexive thinking with the use of the acquired skills in variable every day contexts.

By applying elements of multimedia, appropriate software, and online communication in classroom instruction, schools can increase their efficiency and effectiveness. The most basic application of Information and Communication Technologies (ICT) is reflected in the instruction carried out in interpersonal relations (f2f) with the use of appropriately created digital instruction materials. The instruction carried out with the application of ICT and certain digital materials (such as digital books, collections and catalogues, presentations, virtual tours, simulations, etc.) is referred to as hybrid instruction (Recommendations for E-Learning Education Materials Design, 2009). Such instruction inevitably uses different database search engines and online support which enables the information and experience sharing amongst students in forums, via electronic mail, chat rooms, etc. A well-balanced direct contact and hybrid instruction, with appropriate facilitation and well-designed methodological instructions, with the use of modified material resources, i.e. technological-didactic and fine arts materials can neither harm nor contribute to the stagnation of teaching process. Tokuhama-Espinoza (2014) argues that, despite 125 years of progress in formal education, we have still failed to find the right answers to meet the needs of all the learners. Hence, the best time to seek methodological answers to our questions is always the present – the only time we have - and the most suitable field of school teaching can be argued to be the artistic field, since this is the "cultural core". This is defined by Julian Steward as the aspects

of culture directly associated with a community's survival and economy. We will now provide a brief overview of specific software solutions the students should be or already use in the teaching process, which will facilitate their integration into mainstream society and labor market.

The computer software most successfully used in fine arts instruction is Microsoft Paint. Its widespread usage is probably due to its availability to nearly all schools and students by being an integral component of the Windows operating system. It is suitable for graphic design, illustrations and logotypes, as well as blending images and texts or creating comic books or larger portfolios. Its presence in fine arts instruction provides a higher quality relationship in teaching classes based on visual-problem-solving units involving dots and lines, planes, surfaces and living environments. For dynamic comic book designing, the CLIP Studio software can be used to stir the students' imagination and their visual expression skills, offering high-color designs and excellent visual communication tools. The Adobe package, meanwhile, represents a collection of software programs and tools suitable for teaching certain fine arts problem-based units. However, it is important to single out Adobe Photoshop as one of the most suitable computer software for the manipulation of photographs, the creation of strip boards, and posters, while the Adobe Flash and Animation software enables the creating of computer animations that may reflect the visual identity of the student's reality. Elsewhere the stop-motion technique is suitable for the completion of assignments related to mass and space, as these techniques can build bridges between the direct clay shaping (claymation), digital photography, and computer manipulation software to create video montages. Each movement of a sculpture is recorded with the help of a camera and a tripod, followed by the creation of an animated movie composed of a series of sequences using the computer software ShotClip. Finally, learning in fine arts classes may also be assisted by using video games created on the H5P Games platform and Appsgeyser.com application, which can be used to develop a personalized game or a quiz.

The more that students enjoy these experiences in the classroom, the more schools can become the space for life itself, rather than simply for the preparation for life, as the students will be able to experience in real-time the tools and techniques they will later move on to use. The key issue is whether we prepare the teachers for such an instruction in the classrooms, for the life at schools and the school which is life itself.

4. Methodology of empirical research

4.1. Research aim and questions

The aim of this research was to establish the possibilities for the application of computer software in fine arts instruction amongst subject teachers. The research questions were focused on the following: the extent to which fine arts teachers are

introduced to the software appropriate for fine arts design; whether they use this software in their own teaching; and the discovery of specific methodological features needed to teach fine arts classes using computer software. Additionally, differences have been investigated in respect to the socio-demographic features of subjects.

4.2. Research instrument and data processing

A questionnaire designed and created for the purpose of this research consisted of 14 questions sent out to fine arts teachers, which was divided into three sections. The first section asked questions relating to the socio-demographic features of subjects, such as age, sex, length of teaching, the education level of employment and the weekly workload. The second section consisted of four questions relating to the pedagogical strategies and different aspects of teaching and learning, and the materials/resources used. The third section focused on the questions surrounding the possibilities to use computer software in fine arts teaching, the specific methodological features of teaching while using the software, and the perceived advantages and challenges. The data was collated in Google Forms and was then analyzed.

4.3. Research sample and procedure

The empirical research was conducted in April 2020 by means of an anonymous survey on a voluntary basis. The link was sent to 80 fine arts teachers employed with elementary schools and high schools in the Sarajevo Canton but only 17 teachers completed the questionnaire. The breakdown of subject sample according to their age, sex, length of work experience and education level is shown in Table 1. Although the intention of the research was to include the total population of the fine arts teachers in the Sarajevo Canton, the results obtained cannot be considered representative; however, they are illustrative for some pedagogical-methodological phenomena and contribute to creating recommendations for improving teaching in fine arts.

Table 1. Structure of the subject sample

	Age				**Sex**		**Years of teaching experience**				**Education level of employment**	
	<30	31-35	36-45	46-55	M	F	1-3	4-10	11-20	21-30	Elementary School	High School
f	1	3	8	5	5	12	2	3	8	4	8	9
Σ	17											

As the results indicate, the majority of the teachers who participated in the research are females aged between 36 and 45. Almost one half of the subjects is employed with the elementary schools, with the other half in high schools in the Sarajevo Canton. In terms of the years of experience working as a teacher, the majority (8), have between 11 and 20 years of experience. If this information is compared to Huberman's roadmap of the professional teaching career development stages (as cited in Ajanović and Stevanović, 1998:207), those 8 subjects belong to the stage of turbulent period of activism and experimentation; therefore, it is rather illustrative, but not unusual, that they are the majority in our sample.

4.4. Results and discussion

4.4.1. Pedagogical strategies of teaching and learning in fine arts instruction

The second section of the questionnaire related to the application of the pedagogical strategies and the different aspects of teaching and learning that are adopted, as well as the extent to which they are present in the respondents' teaching. The results are presented below.

The results of the research indicate that 10 fine arts teachers sometimes and often use traditional teaching methods, while seven do so seldom. The majority of the subjects often use teaching with demonstration and exploratory learning, while the majority sometimes use collaborative learning, peer teaching, personalized learning, integrated learning, differentiated learning and problem-based learning. It is not insignificant that three teachers never use peer teaching, integrated teaching or problem-based learning.

Table 2. Aspects of teaching and learning

How much do you use the following aspects of teaching and learning in the classroom? (N=17)	Never	Seldom	Sometimes	Often
	f	*f*	*f*	*f*
I present and explain a fine arts problem or a movement to the whole class	0	0	3	**14**
I provide additional explanations and support each student's ideas	0	0	3	**14**
Students work on their own and at their own pace	0	1	6	**10**
Students do an exercise or assignment individually at the same time	0	2	7	**8**
Students are encouraged to experiment	0	1	4	**12**
Students discuss ideas with other students and teacher	0	2	4	**11**
Students decide how and at what pace they will learn	0	**7**	**7**	2
Students conduct their own artistic research and fine arts activities	0	3	4	**10**
Students work in groups on clearly defined fine arts problems	0	1	**14**	2
Students collaborate on finding solutions for fine arts problems	0	4	6	**7**
I use different types of material (visual, audio, written) in my classes	0	0	5	**12**
I use content from different subjects to explain fine arts phenomena and concepts	0	0	8	**9**
I encourage other teachers teaching different subjects to coordinate teaching on certain common topics	2	**6**	**6**	3
I organize field classes / visits to museums and galleries	1	5	**9**	2
I provide feedback to students during a learning activity	0	0	3	**14**
Students write tests and pass the assessment	4	**6**	5	2
Students take part in evaluating their own work and the work of their peers	0	1	**10**	6

The results indicate that the majority of subjects **often** use strategies for active teaching and learning, including aspects such as: I present and explain a fine arts problem or a movement to the whole class; I provide additional explanations and support each student's ideas; Students work on their own and at their own pace; Students do an exercise or assignment individually at the same time; Students are encouraged to experiment; Students discuss ideas with other students and teacher; Students conduct their own artistic research and fine arts activities; Students

collaborate on finding solutions for fine arts problems; I use different types of material (visual, audio, written) in my classes; I use content from different subjects to explain fine arts phenomena and concepts; I provide feedback to students during a learning activity. The research results indicate that the majority of subjects **sometimes** uses strategies for active teaching and learning, including aspects, such as: Students work in groups on clearly defined fine arts problems; and I organize field classes / visits to museums and galleries. The results which draw our attention in particular are those in which the majority of subjects state that the students **seldom** and **sometimes** decide how and at what pace they will learn; further that there is an almost equal number of those subjects who **never** and **seldom**, and **sometimes** and **often** encourage other teachers teaching different courses to coordinate teaching on certain common topics. The majority of subjects **never** and **seldom** ask their students to take written tests and assessments.

The results obtained indicate that teachers are introduced to the appropriate pedagogical strategies in the process of teaching and learning; however, not entirely to how these strategies can be applied. Namely, considering the potential of differentiated teaching and problem-based learning, it would certainly be recommended that a significantly higher percentage of teachers should use it in their own teaching processes to raise the quality of their teaching and to make lessons more challenging, while also increasing the level of engagement from students. The reasons for such results are probably multiple. One is the fact that for many years now, a number of fine arts teachers in the Sarajevo Canton have not attended any professional development programs held by renowned pedagogues. This information could definitely be used as a basis for a more intensive introduction of current and future teachers to all pedagogical strategies and potentials in the teaching process, intended to improving and raising the quality of education process in fine arts instruction in the Sarajevo Canton.

4.4.2. Teaching materials/resources

In the remaining part of section two, the subjects were asked about the learning materials/resources they preferred to use in their teaching and about those they would like to use but which were unavailable to. The majority of subjects **often** use video/audio materials in their daily teaching practice. The majority of subjects often use materials/resources for children with special needs/disability; however, there are those who never do so. In their fine arts instruction 12 teachers often use Power Point presentations. The majority of teachers, (8) seldom use reproductions on paper in their teaching. Fine arts materials are used often in the teaching process by the majority of subjects, while some only use these sometimes, when required to by the teaching unit. Internet collaboration tools are sometimes used by the majority of teachers either as internet or computer simulations. 10 subjects never or sometimes

used special software for fine arts design, and 7 subjects never used any tools for extended / virtual reality. Table 3 presents the results regarding the teachers' views about the learning materials/resources they would like to use but cannot.

Table 3. Learning materials/resources

INDICATORS	KEY FINDINGS FROM OF THE RESPONSE ANALYSIS
Learning materials/resources teachers would like to use but are not available to them	The majority of subjects state that they need an appropriately equipped classroom for fine arts instructions, with the equipment primarily enabling the fulfillment of the traditional fine arts-practical assignments (different materials for sculpture, graphics and painting) and fine-arts-digital works. The learning materials/resources they need to support their teaching practice are the following: computers, tablets, projector, smart boards, digital boards for visual expression, Wacom, iPad Pro with pencil, software for visual design, 3D and video applications, VR (glasses).

It is clear from the above responses that the subjects sometimes need basic materials, didactic and fine arts realia to teach, but that there are also those who clearly anticipate and verbalize their desire for additional teaching and learning materials/resources.

4.4.3. The potential for application of computer software in the fine arts instruction

To get a detailed insight into all individual features relevant for the application of software in fine arts instruction, we asked questions relating to teachers' professional development in the field of information and digital technology. Some 12 subjects did not attend training programs for software and applications for virtual design and virtual environment in the past two school years, while only five subjects did attend such programs. In the past two school years 14 subjects did not attend training in the use of applications and simulations, while only three did attend. Only two subjects attended training program relating to the use of multimedia and equipment for audio and video recording, while 15 subjects did not attend a similar training program. When asked how often they used a computer, tablet or a smart phone to prepare for class (before the changes to online teaching applied due to Covid-19 pandemic) 12 subjects said they used those devices on a daily basis, while 4 said they used them every week, and 1 subject said that he/she used them almost every month. Additionally, questions were asked as to the extent to which the subjects agreed with the claims about the use of software in fine arts instruction, and the results are presented in Table 4.

Table 4. Use of software in the fine arts instruction

To what extent do you agree with each of the following statements about the use of software in fine arts instruction? (N=17)	I strongly disagree	I disagree	I agree	I strongly agree
	f	*f*	*f*	*f*
Software should be used for students to complete assignments and practice	0	1	**11**	5
Software should be used to improve the classroom environment and collaborative relations	1	1	**9**	6
Software should be used for the students to learn independently and remember the units more easily	1	5	**7**	4
The use of software in teaching and learning has a positive effect on student motivation and development of critical thinking	2	2	**8**	5
The use of software in teaching and learning has a positive effect on student success	1	5	**8**	3
The use of software in teaching and learning has a positive effect on students' higher order thinking skills	1	4	**7**	5
The use of software in teaching and learning has a positive effect on students' competences for multiple skills	0	2	**9**	6
The use of software in teaching and learning is necessary for the preparation of students for life and work	1	2	6	**8**

Of the total number of subjects, 11 agree that software should be used for the students to complete assignments and practice, while five strongly agreed and one disagreed. Some nine respondents agreed that software should be used to improve the classroom environment and collaborative relations while six subjects strongly agreed. The majority of subjects agree and strongly agree with the statement that software should be used for students to learn independently, while six subjects disagree and strongly disagree. It is interesting that four subject disagree and strongly disagree with the statement that the use of software has a positive effect on student motivation and the development of critical thinking. Some six respondents disagree or strongly disagree that software and its usage has a positive effect on student success, while 11 subjects agree or strongly agrees. Most subjects to a greater extent agree or strongly agree that the use of software in teaching and learning will have a positive effect on students' higher order thinking skills, that the use of software will have a positive effect on students' competences for multiple skills, and that the use of software in teaching and learning is necessary for the preparation of students for life and work. The results obtained are positive in the context of implementation of a quality teaching process in fine arts instruction, and in respect to the expressed awareness that the use of software can only improve educational practice and bring it closer to addressing the life challenges students face on a daily basis. Additionally, it is significant that teachers are aware of the benefits and importance of the appropriate application of software in shaping their classroom.

Although teachers acknowledge the possibility to use software in fine arts teaching, Table 5 presents in detail the indicators that hinder or completely disable

the teaching of classes with the use of software for fine arts and visual activities.

Table 5. Challenges for teaching the classes using software

Does anything listed below affect your teaching with the use of software suitable for visual design? (N=17)	Not at all	Very little	Somewhat	A great deal
	f	*f*	*f*	*f*
Lack of computer equipment	**8**	2	2	5
Lack of the Internet or Internet speed	4	2	5	**6**
Insufficient number of portable computers	4	1	3	**9**
Lack of the teacher's appropriate training	**9**	1	4	3
Insufficient technical support by IT coordinator	2	3	**9**	3
Insufficient pedagogical support for teachers	4	**6**	5	2
Management of school timetable	3	3	**8**	3
Management of teaching space	2	2	**7**	6
Insufficient interdisciplinary support by colleagues from school	4	3	**7**	3
Lack of content in the native language	5	2	**9**	1
Lack of teacher motivation	**6**	**6**	5	0
Lack of student motivation	3	6	**7**	1

When the subjects respond to statements relating to the challenges they face in teaching classes using software for fine arts and visual activities, the majority acknowledge the lack of Internet or its low speed, as well as an insufficient number of portable computers. Interestingly, the majority of subjects see few challenges in insufficient pedagogical support to teachers and no challenges at all or very few challenges in the lack of computer equipment, lack of appropriate training of teachers, and lack of teacher motivation. These are somewhat contradictory results in reference to appropriate training of teachers, while in the previous sections many teachers report about the lack of professional development training in the field which could offer them such competences. This could be an interesting area for further research, to ask why teachers do not spend more time the practical instruction of software to teach fine arts if there are no or few challenges in the lack of equipment, teacher training or teacher motivation.

In the last section of the questionnaire, teachers showed interest in attending a professional development program on the use of various suitable software, applications, and tools for visual manipulation and design, which is extremely motivating and encouraging. In the last open-type question, respondents were

asked to share their observations and thoughts and list the software applications they already use in their daily teaching practice, with a particular focus on the methodological features related to their use, as well as on the advantages and challenges they see in such a teaching process (Table 6).

Table 6. Software for visual design, advantages and challenges

INDICATORS	KEY FINDINGS OF THE RESPONSE ANALYSIS
Which software suitable for visual design do you use in your teaching? List the methodological features of conducting the instruction when using them.	The majority of subjects state that they use in their teaching process in fine arts the following software suitable for visual design: Adobe Photoshop, Adobe Illustrator, Corel Draw, Paint, Photo Editor, CAD, Power Point, Sketchbook, Procreate ios, Microsoft Word, software for the video and audio material montage, Google Forms (written tests), and Office 365 platform, virtual interactive museum exhibitions, online games, quizzes, audio-video recording on YouTube.
What are the advantages, what are the challenges?	Teachers state that the **advantages** of the use of software for instruction are clearer identification of a fine arts problem, blending creativity and technical skills, the ability to visualize tasks, because each software has a wide range of tools for teaching most of the fine arts content. Additionally, they believe that those are the tools necessary in the daily teaching and to encourage creativity and motivation among students; the combination of practical work and work on a computer can have a positive learning outcome; the illustration of other forms of work will result in better understanding of a fine arts problem and expressing a visual identity in a different way. According to the subjects, the **challenges** are primarily related to the equipment in the classrooms, because they do not have the appropriate multimedia equipment and software, which are provided by the teachers themselves from their own pocket. They also state that another challenge is the possibility for the technology to transform their teaching.

5. Conclusion

The application of computer software in fine arts instruction in a developed educational system has shown to be truly important in education and upbringing. It has made a special contribution and proved to have extensive didactic value in higher grades of elementary school children as well as in high school education. The aforementioned system of supported creation is empowering for students, enabling them to acquire new abilities and a broad spectrum of creative skills, as well as a facilitated forming of personal semantics. The question is raised as to what extent today's fine arts teachers in the Sarajevo Canton are introduced to the application of computer software and how much they use them in their instruction to focus their teaching towards students and to encourage active learning, which is the foundation of a modern teaching process.

The aim of the research presented her was to establish the possibility for the application of computer software in fine arts instruction by fine arts teachers. The aim was fulfilled by asking research questions to establish the extent to which fine arts teachers are introduced to software suitable for visual design, whether they use

this software in their own direct instruction work, and to identify the methodological features of conducting the instruction using computer software.

The research results have indicated that fine arts teachers are mostly familiar with the possibilities for the application of computer software in visual design, as well as with the fact that the usage of different software will encourage creativity among students. This is an excellent indicator of intrinsic motivation, a pre-requisite for quality instruction. The research has also shown that teachers use software suitable for visual design to an extent that is not yet sufficient. The analysis of the socio-demographic characteristics of subjects has produced interesting results showing that there are no significant differences between the older and the younger subjects, although the initial research expectations were to find that younger subjects would be more familiar with the use of computer software in fine arts instruction, and its application would be more frequent among the younger than the older teachers. However, the results show that age, as a socio-demographic feature of the subjects, is not a crucial factor for the application of software suitable for fine arts and visual design in the education process.

The research results and the teachers' interest indicate that it is necessary to put effort in further professional development and training of teachers in the application of computer software, especially those suitable for fine arts and visual design. The acquisition of new competences will promote the existing education process and contribute to better learning outcomes. Additionally, the results of this research are important for designing programs of initial university education, but also of life-long professional education of teachers, aimed at introducing teachers to the possibilities for the use of computer software and their effect on increased creativity among students.

The challenges of educational work in the 21st century certainly demands permanent professional development and training. This is the only way for teachers to work continuously on the development and improvement of their skills, and to improve the quality and creativity of their teaching activity. The way in which professional development and training is organized, prepared and implemented in practice is defined greatly by the changes in the classroom itself, that is, it affects how and to what extent the acquired knowledge in the field of creativity and multimedia will be applied in work with children and youth. Within the reforms in our education system, it is important to acknowledge that the basic link of quality of the teaching process in which full potential and creativity of each student would be developed and encouraged is a quality teacher.

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