REVIJA ZA ELEMENTARNO IZOBRAŽEVANJE
JOURNAL OF ELEMENTARY EDUCATION
Vol. 13, No. 1, pp. 1–18, Marec 2020

STUDENT PERCEPTIONS OF THE IMPORTANCE OF ART CONTENT AND ACTIVITIES IN SCHOOLS OF GENERAL EDUCATION AND VOCATIONAL SCHOOLS IN CROATIA AND BOSNIA AND HERZEGOVINA

MIROSLAV D. DRLJAČA[1], SINIŠA OPIĆ[2] & MILAN MATIJEVIĆ[2]

[1] University of Banja Luka, Faculty of Arts, Banja Luka, Bosnia and Herzegovina
[2] University of Zagreb, Faculty of Teacher Education, Zagreb, Croatia

CORRESPONDING AUTHOR/KORESPONDENČNI AVTOR/
milan.matijevic@ufzg.hr

Potrjeno/Accepted
3. 2. 2020

Objavljeno/Published
27. 3. 2020

Abstract/Povzetek The aim of research was to examine how students in higher secondary education estimate the importance of visual arts subjects for the acquisition of general knowledge and the importance of visual arts for their future profession. The participants (N=605) were students in the third year of higher secondary education. Although the participants in the sample did not attach importance to visual arts for their future professions, they assessed that during their education, activities that necessitated working with their hands helped them in developing their memorization skills and the ability to learn other subjects.

Dojemanje pomembnosti vsebin in dejavnosti likovne vzgoje pri dijakih splošnoizobraževalnih in poklicnih šol na Hrvaškem ter v Bosni in Hercegovini Cilj raziskave je bil proučiti na eni strani, kako učenci in dijaki v srednjih šolah ocenjujejo pomembnost predmetov likovne umetnosti za usvajanje splošnega znanja, na drugi pa pomembnost likovne umetnosti za njihov bodoči poklic. Udeleženci raziskave (N = 605) so bili dijaki tretjega letnika srednjih šol. Čeprav udeleženci likovni umetnosti ne pripisujejo pomena za bodoči poklic, so ocenili, da so jim v izobraževanju dejavnosti, ki so zahtevale delo z rokami, pomagale razvijati veščine pomnjenja in sposobnost učenja drugih predmetov.

Keywords:
visual arts, general education, educational neuroscience, educational sciences, brain development

Ključne besede:
likovna umetnost, splošno izobraževanje, izobraževalna nevroznanost, pedagoške znanosti, razvoj možganov

UDK/UDC
37.015.31:7(497.5+497.6)

https://doi.org/10.18690/rei.13.1.1-18.2020

University of Maribor Press

Introduction

Recent research in the area of neuroscience presents scientific knowledge relating to the exposure of children at an early age to various activities involving the hands: painting, drawing, and modelling. The involvement of children in music and kinesiology activities is encouraged because such activities contribute to the development of the brain, i.e., brain cells relevant for learning and work in adulthood (e.g. Armstrong, 2009; Arnold, 2009; Baureis, 2015; Caine & Caine, 1991; Gardner, 1983; Hermann, 2009; Jensen, 2001 and 2005, Rajović, 2013 and 2017). It is claimed that art develops neural systems that can persist for months and years; i.e., art fosters the development of valuable human neurobiological potential (Jensen, 2001). Over one hundred years ago, similar positions were advocated by representatives of the projects and movements in reform pedagogy, particularly Maria Montessori (1988), John Dewey (1934; as cited in Jensen, 2001) and Rudolf Steiner (Carlgren, 1991, for more see Topolovčan, Rajić & Matijević, 2017; Maras, Topolovčan & Matijević, 2018). Contemporary neuroscientists often remind us that a child's brain develops most intensively before the age of four and that it is important to observe the stimulating environment to which a child was exposed during those years (Jensen, 2001 and 2005; Norton; Ulrich; Bell & Cate, 2018; Rosenberg-Lee, 2018; Watagodakumbura, 2017). For those years, and later during their compulsory education, it is important to encourage children to engage in various activities, movement, and play and to manipulate varied tools and materials (Jensen, 2005; Norton; Ulrich; Bell; Cate, 2018; Rajović, 2013). Movement and play are emphasized as important activities for brain development and for preparing a child for lifelong learning and work (Baureis, 2015). Although that knowledge is hardly news, today when the *Net*-generation is growing up, such experiential and scientific knowledge have a new place and significance (for more, see Britton, 2000; Carlgren, 1991; Montessori, 1988 and 2007; Lawrence, 2003; Philipps Reichherzer, 2003). Lawrence (2003: 14) points out that children primarily learn through the senses and by movement. The author also emphasizes that children learn best if they do something themselves (Lawrence, 2003: 24). In other words, she highlights the importance of learning by doing. That approach has been advocated for more than one hundred years by representatives of the Montessori and Steiner pedagogy (Carlgren, 1991; Montessori, 1988).

Key factors influencing early brain development and educational achievement are exercise, nutrition, genes, challenges, love and feedback. Solving tasks is the best way to develop a better brain (Jensen, 2005: 44). In addition to the previous statement by Jensen, "present-day biology shows that art can assist in setting foundations for future success in education and professional career. Strong art foundations ease solving tasks, build creativity, concentration, self-efficacy, coordination, self-discipline and develop affinity towards values" (Jensen, 2005: 46; similar to Nikolić, 2018). Furthermore, this author holds that teaching music and the visual arts has positive, measurable and permanent pedagogical and social benefits. Art education improves language development, increases creativity, helps children develop social skills and acquire general intellectual achievement, and helps them develop positive attitudes towards school (ibid.: 47). General education refers to the acquisition and adoption of learning, habits and skill in addition to values in various areas of science, culture, art, language, social life and work, relationship between people, sports, recreation, entertainment and similar, i.e. those scientific, cultural and other values and heritage necessary for all people of a particular social community regardless of their future professio (Potkonjak, 1989: 153). In addition, the author suggests expanding the notion of "general education" with content from economics, information sciences, knowledge of production and the humanities. He further emphasizes that general education is carried out at the primary and secondary level of the educational system (*ISCED - International Standard Classification of Education*). This paper will deal with the position of visual arts in the context of general education in vocational schools and grammar schools and the relationship of art to other subjects of general education and general culture in compulsory education. The area of visual arts generally comprises drawing, painting, modelling, sculpture, applied arts, arranging, designing and architecture. This paper will refer to visual arts in the sense of concrete content involving these constituents. The previous statements illustrate, to some extent, the research carried out by authors in Bosnia and Herzegovina and Croatia. We point to the results of a few selected studies (Drljača, 2018; Brajčić & Arnautović, 2002; Brajčić & Antunović, 2007; Dobrota, Kuščević & Burazer, 2010; Matijević, Drljača & Topolovčan, 2016a and 2016b).

There is research around the world relating to the position of visual arts education in general schools (Jensen, 2001). Several studies will be illustrated in the following section. Gardiner, (1996; according to Jensen, 2001: 59) claims that visual arts improve results in reading and mathematics. In a study of third-grade pupils, they observed how drawing well can supplement the process of writing and thinking.

Pupils were asked to read, then draw, then think, read again and draw again. The pupils discovered that the drawing enabled them to clarify their ideas, which improved comprehension and clarity. Of the 14 participants, each showed improvement through the application of this method (Davidson, 1996; according to Jensen, 2001:59). Contemporary educational theory and neuroscience point to the great significance of visual art for learning subjects from the STEM area, as well as subjects from the social sciences and humanities. However, countries such as Croatia, Bosnia and Hercegovina and surrounding countries placed visual arts in schools of general education in the margins, along with a modest time allocation in the curricula. In Bosnia and Hercegovina, children had 11 teaching hours allocated for Visual Arts, whereas children in Finland had 14 teaching hours. Children in Finland had 2 hours of handcraft (a total of 12 hours) per week, whereas such activity is not anticipated in the Teaching curricula of Bosnia and Hercegovina and Croatia. Kinesiology activities (Kinesiology Education) in Finland occupy 15 hours per week, which is the same as in Croatia, while the number of hours for kinesiology activities in Bosnia and Hercegovina is 13. In Bosnia and Hercegovina, preschool, or grade "0", schedules a total of 5 teaching lessons per week for kinesiology education, rhythmic activity and music (for more, see Drljača, 2018). Because of that, we revise some relevant knowledge in the area of educational sciences and neurosciences that indicates the influence of visual arts in the syllabi for generalist compulsory schools and generalist subjects in high school. American expert on learning and brain science, Eric Jensen, gives the most complete analysis of the role of art in general education: *Arts with the Brain in Mind* (2001), *Super Teaching* (2003) and *Teaching with the Brain in Mind* (2005). In all three books the author points to the importance of art activities and movement for brain development and improvement of competences relevant for learning in all areas. We will provide some of the most representative statements from these studies. The neural circuits responsible for mathematics and music are linked; exposure to music at an early age can later help in learning mathematics (Weinberger, 1994; according to: Jensen, 2005: 29; cf. Norton, A.; Ulrich et al., 2018). In order to improve the learning environment, the presence of art, music and kinesiology education should thus be reaffirmed in school. Art, music and kinesiology education can often create exceptional challenges and feedback. Norman Weinberger suggests 'broad pedagogical examination' in art and music. In the same way new medicine is tested in controlled studies, under scrutiny of the Food and Drug Administration, schools should undergo systematic and appropriate research checks for art and music education (according to Jensen, 2005: 49). Jensen

(2005: 19) states that neural activity can have and excitatory (activating) or inhibiting (hindering) effect. Researchers in the area of educational sciences seek to address the question "How does the activity of learning in STEM (*Science, Technology, Engineering and Mathematics)* reflect on learning in the area of art and vice versa?" Many researchers claim that activity in the art areas has an excitatory effect on learning in the STEM area (Jensen, 2001; Huzjak, 2006; Nikolić, 2018). One of the most original alternative pedagogies in Europe and the world (Waldorf pedagogy) frequently emphasizes that all topics in the area of general culture can be taught through integration with art or relying on art. Many subjects–even mathematics, grammar and geography--can be presented through short sketches that can later be performed for parents or "monthly events" (Carlgren, 1991: p. 51).

Methodology

Research aim and hypotheses

In the previous paragraphs we have indicated interesting observations and findings in educational science and neuroscience that refer to brain development and learning in early and middle childhood. In that context, significant attention was given to the position of the visual arts in compulsory schools of general education or general knowledge subjects within vocational schools. Over the last hundred years, authors have warned of the importance of art activities, particularly the influence of visual arts education on the acquisition of knowledge and skills in other subjects and areas of general education.

The aim was to examine how high school students comprehend, perceive and estimate the importance of visual art subjects for the acquisition of knowledge and skills in the area of general education and for their future life and occupation.
The paper advances the following hypotheses:

> H1 – Participants do not find that what they learned through their education in the area of visual arts is important for their future lives and professional workplaces (with a university degree).
>
> H2 – Participants do not find that what they learned through their education in the area of visual arts is important for their future lives and professional

workplaces (completed secondary education – higher secondary education), that is, for vocational education.

H3 – Participants do not find that what they learned through their education in the area of visual arts is useful in carrying out tasks in particular teaching subjects.
H4 – Students' grade-point average is a predictor of the estimate of the importance of visual arts for academic and vocational occupations.

Sample and population

The population that our research covers comprises students in the third grade of grammar schools and vocational schools in northern Bosnia and Hercegovina and the centrally located counties in the Republic of Croatia. It can be estimated that it includes approximately 4000 students in both countries. The participants (N=605) are students in the third grade of vocational schools and grammar schools from the northern part of Bosnia and Hercegovina and central Croatia. The participants were selected from nine schools from six towns in the Republic of Croatia (Čakovec, Koprivnica, Pregrada, Zagreb, Novska and Petrinja) and three towns in Bosnia and Hercegovina (Banja Luka, Prijedor and Novi Grad). The third year of high school (higher secondary education) was selected, since all these students had experienced some form of visual are or art instruction during their previous education – some had a subject in the area of visual arts or arts during their primary school and the first two years of high school. This sample of groups has the characteristics of a deliberate sample, since the two states were selected on purpose, along with high schools where the principals or support professionals had agreed to participate. In Bosnia and Hercegovina, the sample consisted of 240 participants, while the sample from Croatia comprised 400 participants. The number of participants attending grammar school was 250, while 400 participants attended vocational schools. Participants from vocational schools were distributed across eleven different programs: economist (commercial worker), dental technician, physical therapist, cook, architecture technician, media technician, designer, computer technician, mechatronic technician, pharmacist and nurse.

The sample (N=605) of participants comprises 376 (62.1%) high school students in the Republic of Croatia and 229 (37.9%) from the Republic of Bosnia and

Hercegovina. Of that number, 253 (41.8%) are grammar school students and 352 (58.2%) are vocational school students. As was previously mentioned, the population are students in the third grade of grammar schools and vocational schools in the area of northern Bosnia and Hercegovina and counties located in the central part of Croatia. The total distribution of the type of school is shown in Figure 1.

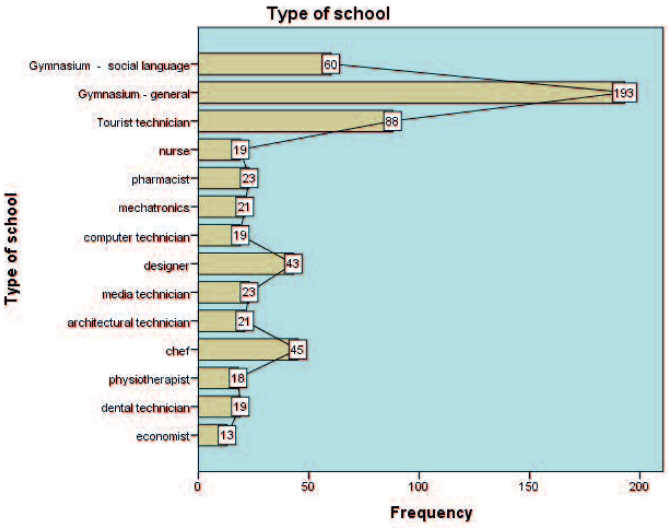

Figure 1: Distribution variable *Type of school*

Instrument and procedure

A questionnaire that complies with the aim, problem, hypotheses, and dependent and independent variables was developed for the purpose of this research. The instrument comprised 58 items and contained 52 dependent variables and 6 independent variables. The dependent variables refer to estimates of the importance of knowledge and competences in the area of visual arts for professions that are acquired upon completion of the high school attended by the student (20 high-school occupations); knowledge and competences that should be acquired by those enrolled in higher education (20 academic professions); and two questions relating to estimates of *interest in and satisfaction with* participation in activities in the subject Visual Arts and estimates of the *usefulness* of knowledge; and finally, competences acquired in subjects relating to visual arts for the development of memory and the

ability to learn other subjects, particularly in the 10 selected subjects in the third set of dependent variables. All the dependent variables were selected in agreement with the relevant theoretical and conceptual starting points for emphasizing the aim and research problem. Responses took the form of graphic five-degree scales, where one represents the lowest value and 5 the highest. The independent variables concerned participants' belonging to a particular subsample with respect to country, city, type of high school, educational program, gender and grade point average in the previously completed grade level. We opted for quantitative research methodology, with a non-experimental empirical research draft. For statistical calculation, questions from the questionnaire were numbered from 1 to 69. In addition to the descriptive analysis (MCT, MV, characteristic of sampling distributions), tests in the area of inferential statistics were used; One sample t test and linear regression analysis (in SEM). Data collection took place in November and December in 2018. With permission from the school management, the students were surveyed during one school lesson, i.e. 30 minutes.

Result and discussion

Empirical part

Descriptive values for the scale *importance of visual arts for academic professions* shown in Table 1. As can be seen in Table 1, students' acquired knowledge in visual arts is most significant for the teaching profession, followed by textile engineers, managers in tourism and marine engineers and least significant for livestock engineers and veterinarians. The 20 professions upon completion of tertiary education were selected because these are frequent and popular occupations in the region where the sample originates, and each student is quite familiar with the nature and reputation of these professions. The MCT values, pursuant to the direction and degree and scale, show that students to not place importance on visual arts for these academic occupations (according to the skewness value). For confirmation, a composite variable for all occupations was constructed (M=2.56; Std.D=0.91), and the One sample t test with a criterion value of 3 (neutral value) was applied. The values of the One sample t test (t= -11.715; df=604; p=0.000; m_{diff}=-.43802) confirm that students do not find visual arts to be significant preparation for academic professions, thus confirming H1.

Table 1: Descriptive Statistics (academic profession).

	N	Min	Max	Mean	Standard deviation	Skewness		Kurtosis	
	Stat	Stat	Stat	Stat	Stat	Stat	Std. Err.	Stat	Std. Err.
Primary or secondary school teacher	605	1	5	3.90	1.25	-1.00	.09	-.002	.19
Textile engineer	605	1	5	3.36	1.42	-.39	.09	-1.14	.19
Manager in tourism	605	1	5	3.22	1.44	-.24	.09	-1.28	.19
Marine engineer	605	1	5	3.13	1.56	-.15	.09	-1.49	.19
Traffic engineer	605	1	5	2.81	1.43	.16	.09	-1.28	.19
Mechanical engineer	605	1	5	2.78	1.40	.12	.09	-1.25	.19
Railway transport engineer	605	1	5	2.69	1.45	.28	.09	-1.26	.19
Wood technology eng.	605	1	5	2.65	1.41	.28	.09	-1.23	.19
Maritime traffic eng.	605	1	5	2.60	1.39	.34	.09	-1.14	.19
Computer and inf. science engineer	605	1	5	2.59	1.38	.31	.09	-1.17	.19
Electrical engineer	605	1	5	2.51	1.36	.43	.09	-1.04	.19
Dentist	605	1	5	2.45	1.48	.55	.09	-1.15	.19
Doctor	605	1	5	2.20	1.38	.85	.09	-.577	.19
Forestry engineer	605	1	5	2.20	1.27	.74	.09	-.612	.19
Bachelor of business and sales	605	1	5	2.20	1.27	.80	.09	-.429	.19
Agricultural engineer	605	1	5	2.11	1.20	.84	.09	-.270	.19
Food technology eng.	605	1	5	2.07	1.19	.93	.09	-.034	.19
Horticulture engineer	605	1	5	2.01	1.13	.91	.09	-.149	.19
Veterinarian	605	1	5	1.99	1.19	1.08	.09	.214	.19
Livestock engineer	605	1	5	1.79	1.04	1.29	.09	.982	.19

In other words, the time dedicated to Visual Arts education during their previous education did not contribute to their understanding the importance of the content and competences learned in that subject for the continuation of their education and future profession.

Descriptive values for the scale importance of visual arts for occupations are shown in Table 2. Table 2 shows that students gave knowledge assigned the most importance to visual arts in professions such as photographer, technician (graphic, textile, construction) and the least importance to professions such as livestock, veterinary, agricultural and forestry technician.

Table 2: Descriptive statistics (vocational school).

	Min	Max	Mean	Standard deviation	Skewness		Kurtosis	
	Stat	Stat	Stat	Stat	Stat	Std. Err.	Stat	Std. Err.
Photographer	1	5	4.05	1.29	-1.18	.09	.18	.19
Graphic tech.	1	5	3.98	1.31	-1.16	.09	.17	.19
Textile technician	1	5	3.46	1.35	-.49	.09	-.90	.19
Construction tech.	1	5	3.37	1.46	-.38	.09	-1.22	.19
Chiropodist	1	5	3.16	1.51	-.16	.09	-1.40	.19
Surveyor	1	5	3.08	1.45	-.10	.09	-1.32	.19
General grammar school	1	5	3.03	1.50	-.03	.09	-1.40	.19
Hairdresser	1	5	3.02	1.44	-.06	.09	-1.32	.19
Horticultural technician	1	5	2.97	1.48	.008	.09	-1.40	.19
Confectioner	1	5	2.90	1.53	.08	.09	-1.46	.19
Blacksmith	1	5	2.73	1.41	.20	.09	-1.25	.19
Engineering technician	1	5	2.57	1.34	.35	.09	-1.07	.19
Bookbinder	1	5	2.56	1.38	.39	.09	-1.07	.19
Baker	1	5	2.52	1.45	.46	.09	-1.14	.19
Electrical tech.	1	5	2.44	1.32	.51	.09	-.91	.19
Natural sciences grammar school	1	5	2.30	1.26	.66	.09	-.62	.19
Forestry tech.	1	5	2.27	1.20	.58	.09	-.66	.19
Agricultural tech.	1	5	2.12	1.14	.78	.09	-.18	.19
Veterinary tech.	1	5	2.04	1.19	.99	.09	.06	.19
Livestock tech.	1	5	1.86	1.08	1.22	.09	.84	.19

These 20 occupations are obtained upon completion of higher secondary education and were selected because those are popular occupations in the region from which the sample of participants comes. It was assumed that students had sufficient information on the nature and reputation of those occupations.

To confirm the total estimate of the importance of visual arts for these vocational occupations, a composite variable of all vocational occupations was constructed (M=2.82; Std.D=0.91), and the One sample t test with a criterion value of 3 (neutral value) was applied. The value from the One sample t test ($t = -4.793$; $df=604$; $p=0.000$; $m_{diff}=-,17826$) confirms that students do not find visual arts to be relevant for vocational careers, thus confirming H2. Therefore, teachers who have taught content and competences relating to visual arts and the Visual Arts subject curricula have not significantly contributed to developing awareness and strengthening the

perception of the importance and value of the knowledge and skills being acquired for further education and for work in the selected vocational career. Although participants in the sample do not assign significance to visual arts for academic and vocational occupations, they have estimated that throughout their education, cutting paper, thin-sheet metal work, needlework, knitting, creating models of buildings or cars, making mosaics, shaping clay, plasticine or wire, did to some extent help in memory development and the ability to learn other subjects (M=3.17, SD=1.238). We further researched the extent to which activities in visual arts helped students to complete assignments in a particular subject. These results are shown in Table 3.

Table 3: Descriptive statistics.

	Range	Min	Max	Mean		Std. Deviat.	Variance	Skewness		Kurtosis	
	Stat	Stat	Stat	Stat	Std. Err.	Stat	Stat	Stat	Std. Err.	Stat	Std. Err
V60 Foreign language	4	1	5	2.09	.051	1.24	1.54	.93	.09	-.19	.19
V61 Physics	4	1	5	2.10	.050	1.22	1.50	.81	.09	-.44	.19
V62 Mathematics	4	1	5	2.13	.049	1.20	1.46	.76	.09	-.46	.19
V63 Biology	4	1	5	2.23	.053	1.31	1.71	.73	.09	-.66	.19
V64 Mother tongue	4	1	5	2.27	.055	1.35	1.84	.73	.09	-.71	.19
V65 Music	4	1	5	2.60	.061	1.51	2.27	.38	.09	-1.31	.19
V66 History	4	1	5	2.65	.060	1.46	2.14	.32	.09	-1.26	.19
V67 Geography	4	1	5	2.65	.055	1.35	1.83	.24	.09	-1.14	.19
V68 Technical education	4	1	5	3.26	.061	1.51	2.28	-.29	.09	-1.35	.19

As can be seen in Table 3, the distributions (except for v68) are right asymmetric, which according to the direction of the scale, i.e. mean values indicates low estimates of the importance of visual arts in completing assignments in particular school subjects. These are platykurtic distributions, which is in accordance with greater variability. The range of answers is maximal (range = 4), which indicates that for each variable, the participants estimated the range of lowest to highest the importance of visual arts in helping students to complete assignments in different subjects. The mean values show that students assign the least importance to visual arts for assignments in Foreign languages, while visual arts is assigned the highest importance for the subject Technical Education. It was also expected that students, upon completion of compulsory education, are unaware of the importance of

subjects they have studied, particularly the subject Visual Arts, which most teachers think of as a second-rate subject with unimportant content. Even in casual communication within professional circles, one can hear a division of subjects into main and subjects and "other subjects", the latter generally comprising art subjects, including Technical Education.

The reason behind this division can be seen in the fact that vocational school students already perceive the usefulness of competences acquired during their previous compulsory education for their future occupations. Grammar school students (generalist school) as a rule, while this research was being conducted (10th year of schooling), know neither which higher education or tertiary education institution they will attend upon completion of grammar school, nor what occupation they will have in life. It is indicative that visual arts teachers have not managed to develop in students (after ten years of schooling) an awareness of the importance and usefulness of the competences students acquire through the subject Visual Arts. It is particularly important to focus on the fact that students in vocational schools did not recognize the utility of competences acquired in the subject Visual Arts for their future occupations.

To establish the total estimates of the importance of visual arts in completing assignments in other subjects, a composite variable was constructed (M=2.40; Std.D=0.99), and the One sample t test with a criterion value of 3 (neutral value) was applied. The value of the One sample t test (t= -14.968; df=604; p=0.000; m_{diff}=-,60248) confirms that students do not find visual arts important for completing assignments in other subjects, thus confirming H3.
For testing H4 – Students' grade-point average is a predictor of the estimate of importance of visual arts for academic and vocational occupations, we proceeded with linear regression analysis.
Matrices of covariances and corr (r) are shown - predictors and outcomes variables (Table 4).

Table 4: Matrices of covariances and correlations of variables in the regression model

		state	city	type of school	gender	average grade	Comp academic occup	Comp vocational occup
state	Corr.	1	,88**	-,24**	,09*	-,09*	,37**	,49**
	Cov.	,23	1,18	-,05	,02	-,03	,16	,21
city	Corr.	,88**	1	-,27**	,14**	-,03	,37**	,46**
	Cov.	1,18	7,62	-,37	,19	-,06	,95	1,17
type of school	Corr.	-,24**	-,27**	1	-,07	-,29**	-,04	-,04
	Cov.	-,05	-,37	,24	-,01	-,10	-,01	-,02
gender	Corr.	,09*	,14**	-,07	1	,18**	,05	,12**
	Cov.	,02	,19	-,01	,23	,06	,02	,05
average grade	Corr.	-,09*	-,03	-,29**	,18**	1	-,08*	-,06
	Cov.	-,03	-,06	-,10	,06	,54	-,05	-,04
Comp academic occup	Corr.	,37**	,37**	-,04	,05	-,08*	1	,79**
	Cov.	,16	,95	-,01	,02	-,05	,84	,67
Comp vocational occup	Corr.	,49**	,46**	-,04	,12**	-,06	,79**	1
	Cov.	,21	1,17	-,02	,05	-,04	,67	,83

Using linear regression analyses (in SEM), predictors of estimates of the importance of visual arts for academic study and occupations were tested (Figure 2).

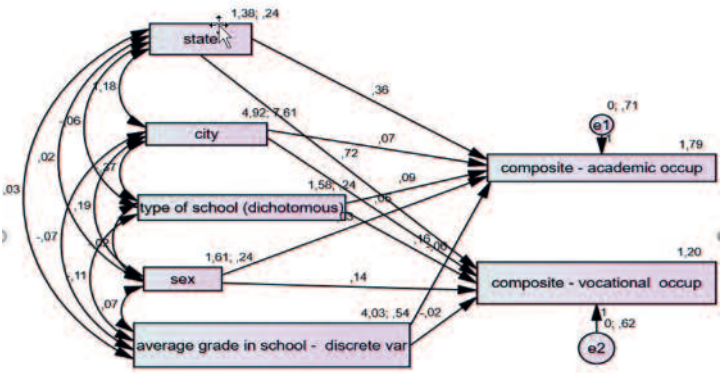

Figure 2: Regression model in SEM (with 2 DV)

Initial predictors of country, city, type of school, gender and grade-point average were used in both regression models. In the first regression equation (R^2=0.155; R^2_{adj}=0.148) where the dependent variable is *importance of visual arts for academic occupations*, the statistically significant predictors are country ($\beta_{unstandardized}$=0.36,

t=2.339; p=0.02), and city ($\beta_{unstandardized}$=0.07; t=2.628; p=0.009). The value of coefficient determination indicates that 15% of the total variance in the estimate of the importance of visual arts for academic occupations is predicted by the five predictors (which is not a low percentage). Considering the quantification of *country* predictor characteristics (and the value), participants from Bosnia and Hercegovina assign more importance to visual arts for academic occupations than participants from Croatia. Collinearity was not established (VIF=<5) and neither was auto-correlation (DurbinW=1,465). Linear dependence was not disrupted (P-P plot). This difference in results between participants in Bosnia and Hercegovina and Croatia can be ascribed to the fact that ten years ago, Bosnia and Hercegovina underwent a curricular reform of all subjects in compulsory schooling, during which compulsory schooling was extended from eight to nine years. Significant curriculum changes were observed in the curricula for art subjects. In Croatia, such curricular reform is still in the preparation phase. In the second regression equation (R^2=0.258; R^2_{adj}=0.251), the dependent variable is *importance of visual arts for vocational occupations*. Statistically significant predictors are country ($\beta_{unstandardized}$=0.72; t=4.979; p=0.000), type of school ($\beta_{unstandardized}$=0.16; t=2.275; p=0.023) and gender (sex) ($\beta_{unstandardized}$=0.14; t=2.009; p=0.045). As in the previous regression equation, participants from Bosnia and Hercegovina assign more importance to visual arts for academic and vocational professions. This difference can also be ascribed to the influence of curricular changes implemented in Bosnia and Hercegovina some ten years ago. The type of school as a statistically significant predictor, and in agreement with quantifiable category characteristics, indicates that students in vocational schools, more so than their peers in grammar school, find visual arts to be important for professional occupations. This was expected, as grammar school students still do not know what they will be studying in tertiary education, nor their future jobs, while vocational school students have already decided on the occupation they will have, depending on their selection of vocational school, in addition to knowing the nature of work. They can thus estimate the utility of knowledge gained through previous education including visual arts. Gender also predicts estimates of the importance of visual arts for vocational occupations; i.e., female students, more so than their male peers, understand the importance of visual arts for vocational occupations. According to Herzog (2017: 358), this can be attributed to differences in the intensity of development of boys and girls during compulsory education (similar to Duh & Korošec, 2014a and Duh, Zupančič & Čagran, 2014b). Collinearity was not confirmed (VIF=<5), nor was autocorrelation (Durbin

W=1,470). Linear dependence is not disrupted. (P-P plot). However, one should be careful in making generalizations, considering that the predictors are category variables. It is interesting that for both regression equations, grade point average did not prove to be a predictor of estimated importance of visual arts for academic and vocational occupations, which rejects H4. School grades are frequently used as an independent variable in research because these should reflect the totality of achievement in learning, including attitudes and various aspects of estimates. We thus predicted that the same would apply in this study, i.e. that the average grade could serve as a predictor of the estimate of the importance of visual arts for academic and vocational occupations. In our case, grade-point average did not emerge as a predictor of estimates of importance of visual arts. Here, we could more seriously examine the logic and significance of calculating grade-point average and perhaps of using such calculations for serious statistical calculations and conclusions.

Conclusions

We reiterate that the aim of our empirical study was to examine how high school students comprehend, perceive and estimate the importance of visual arts subjects for the acquisition of knowledge and skills in general knowledge and for their future life and profession. This aim was formulated into the research question: Are there differences between schools of general education (primary school and grammar school) and vocational schools in estimated importance and effect of the subject Visual Arts for the acquisition of competences for future life and occupations and on learning other subjects.

The relevant conclusions are as follows:
Participants (students in higher secondary education – 11th and 12th years of schooling) do not generally perceive the importance of visual arts for vocational and academic occupations; students assign most importance to knowledge acquired from visual arts in the case of the teaching profession, textile workers, engineers, managers in tourism, and marine engineers, while assigning the least importance in the case of livestock engineers and veterinarians.

Participants assign the most importance of visual arts knowledge for occupations such as graphic technician, engineer (textile, building), and the least importance in the case of occupations such as livestock, veterinary, agricultural and forestry technician.

Although the participants in the sample assign little importance to visual arts for academic and vocational occupations, they did estimate that during their education, cutting paper, thin metal sheeting, needle work, knitting, making models of buildings and cars, creating mosaics, and shaping clay, plasticine or wire, helped them somewhat in developing memorization skills and the ability to learn other subjects. The first regression equation, where the dependent variable was the importance of visual arts for academic occupations, yields country and city as statistically significant predictors. Considering the quantified characteristic of the predictor (and the value) country, participants from Bosnia and Hercegovina assign more importance to visual arts for academic occupations than participants from Croatia.

In the second regression equation (R^2=0.258; R^2_{adj}=0.251), the dependent variable was the importance of visual arts for vocational occupations. Statistically significant predictors were country, type of school and gender. As in the previous regression equation, participants from Bosnia and Hercegovina give more importance to visual arts as preparation for academic occupations

Statistically significant predictors are country, type of school and gender (sex). As in the previous regression equation, participants from Bosnia and Hercegovina assign more importance to visual arts as preparation for vocational professions. Type of school, as a statistically significant predictor, and in agreement with quantified category characteristics, showed that vocational school students find visual arts more relevant for vocational occupations as opposed to their peers in grammar school. Gender was a predictor of estimated importance of visual arts for vocational occupations; i.e., female students assign more importance to visual arts as preparation for vocational occupations than do male students.

The values of the arithmetic means show that students assign least importance to visual arts in completing tasks in Foreign language, and most importance in the case of Technical Education. We have confirmed that students do not assign great importance to visual arts for vocational occupations and for learning other subjects.

The results indicate the need to give more importance and more time to visual arts in the curricula of generalist and vocational schools. The content and activities in visual arts subjects are equally important for well-rounded development of personality as are other generalist subjects.

References

Armstrong, T. (2006). *Višestruke inteligencije u razredu*. Zagreb: Educa.

Arnold, M. (2009). Brain-based Learning and Teaching – Prinzipien und Elemente. In Neurodidaktik, Hrsg Ulrich Herrmann, *Neurodidaktik* (182-195). Weinheim und Basel: Beltz Verlag.

Baureis, H. (2015). *Djeca bolje uče uz kineziologiju*. Split: Harfa.

Brajčić, M. & Arnautović, D. (2007). Učenička evaluacija unutar predmeta likovne kulture. *Napredak*, 148(2), 258–266.

Brajčić, M. & Arnautović, D. (2002). Učenik aktivni subjekt u realizaciji i vrednovanju odgojno-obrazovnih ciljeva predmeta likovna kultura u osnovnoj školi. *Školski vjesnik*, 51 (1–2), 19–25.

Britton, L. (2000). *Montessori učenje kroz igru*. Zagreb: Hena com.

Caine, R.N., & Caine, G. (1991). *Making Connections: Teaching and the human brain.* Alexandria, VA: Association for Supervision and Curriculum Development.

Carlgren, F. (1991). *Odgoj ka slobodi.* Zagreb: Društvo za waldorfsku pedagogiju.

Dobrota, S.; Kuščević, D. & Burazer, M. (2010). Stavovi učenika četvrtih razreda osnovne škole o likovnoj kulturi i ocjenjivanju u nastavnom predmetu likovna kultura. *Godišnjak Titus*, 3(3), 215–227.

Drljača, D. M. (2018). *Konstruktivistička nastava likovne kulture*. Laktaši: Grafomark.

Duh, M. & Korošec, A. (2014). The development of art appreciation abilities of pupils in primary school. *The New Educational Review*, 36(2), 42–54.

Duh, M., Zupančič, T. & Čagran, B. (2014). Development of art appreciation in 11-14-year-old students. *The International Journal of Art & Design Education*, 33(2), 208–222., doi: 10.1111/j.1476-8070.2014.01768.x

Gardner, H. (1983). *Frames of mind: the theory of multiple intelligences*. New York: Basic Books.

Herzog, J. (2017). Monitoring the Artistic Development of Students in the Third Education Cycle of Primary School – Analysis of the Current Situation from a Gender Perspective (Spremljava likovnega razvoja učencev v tretjem vzgojnoizobraževalnem obdobju osnovne šole – analiza stanja z vidika spola). *Revija za elementarno izobraževanje / Journal of Elementary Education*. 10(4), pp. 349–364.

Huzjak, M. (2006). Darovitost, talent i kreativnost u odgojnom procesu. *Odgojne znanosti*, *8*(1), 232–238.

Jensen, E. (2001). *Arts with the Brain in Mind.* Alexandria, VA: Association for Supervision and Curriculum Development.

Jensen, E. (2003). *Super nastava (Super teaching)*. Zagreb: Educa.

Jensen, E. (2005). *Poučavanje s mozgom na umu*. Zagreb: Educa. (Teaching with the Brain in Mind. Association for Supervision and Curriculum Development. Alexandria, VA, 1998).

Lawrence, L. (2003). *Čitanje i pisanje: Kako pomoći djetetu da nauči čitati i pisati*. Zagreb: HENA COM.

Maras, N., Topolovčan, T. & Matijević, M. (2018). Konstruktivistička didaktika i neurodidaktika u diskursu reformne pedagogije: Teorijska polazišta, dileme i komparacija. *Nova prisutnost*, 16(3); 561–577.

Matijević, M., Drljača, M. & Topolovčan, T. (2016a). Učenička evaluacija nastave likovne kulture. *Život i škola*, 61(1), 179–193.

Matijević, M., Drljača, M. & Topolovčan, T. (2016b). Moje nastavne aktivnosti u nastavi likovne kulture. *Učenje i nastava*, 2(1), 129–150.

Montessori, M. (1988). *The Montessori Method.* New York: Schocken Books.

Montessori, M. (2007). *Dijete: tajna djetinjstva*. Zagreb: Akademija za razvojnu rehabilitaciju. Jastrebarsko: Naklada Slap.
Nikolić, L. (2018). Utjecaj glazbe na opći razvoj djeteta. *Napredak*. 159(1-2), 139–158.
Norton, A., Ulrich, C., Bell, M. A., Cate, A. (2018). Mathematics at Hand. *The Mathematics Educator*, 27(1), p33–59. EJ1186141
Philipps Reichherzer, S. (2003). *Montessori priprema za život: odgoj neovisnosti i odgovornosti*. Jastrebarsko: Naklada Slap.
Potkonjak, N. (1989). "Opšte obrazovanje" (153–154). In *Pedagoška enciklopedija*, 2. Vol. Beograd: Zavod za udžbenike i nastavna sredstva.
Rajović, R. (2013). *IQ djeteta – briga roditelja: za predškolski uzrast: MENSA – NTC sistem učenja*. Zagreb: Hrvatska MENSA.
Rajović, R. (2017). *Kako igrom uspješno razvijati djetetov IQ*. Split: Harfa
Rosenberg-Lee, M. (2018). Training Studies: An Experimental Design to Advance Educational Neuroscience. *Mind, Brain, and Education*, 12(1), 12–22. EJ1184817
Topolovčan, T., Rajić, V. & Matijević, M. (2017). *Konstruktivistička nastava: teorija i empirijska istraživanja*. Zagreb: Učiteljski fakultet Sveučilišta u Zagrebu.
Watagodakumbura, C. (2017). Principles of Curriculum Design and Construction Based on the Concepts of Educational Neuroscience. *Journal of Education and Learning*; Vol. 6, No. 3; EJ1139264 doi:10.5539/jel.v6n3p54

Authors

Miroslav Drljača, PhD
Assistant professor, University of Banja Luka, Faculty of Arts, Bulevar vojvode Petra Bojovića 1a, 78000 Banja Luka, Republic of Srpska, e-mail: miroslavdrljaca@yahoo.com
Docent, Univerza v Banja Luki, Bulevar vojvode Petra Bojovića 1a, 78000 Banja Luka, Republika Srbska, e-pošta: miroslavdrljaca@yahoo.com

Siniša Opić, PhD
Full professor, University Zagreb, Faculty of Teacher Education, Savska 77, 10000 Zagreb, Croatia, e-mail: sinisa.opis@ufzg.hr
Redni profesor, Univerza v Zagrebu, Fakulteta za izobraževanje učiteljev, Savska 77, 10000 Zagreb, Hrvaška, e-pošta: sinisa.opic@ufzg.hr

Milan Matjević, PhD
Emeritus, University of Zagreb, Faculty of Teacher Education, Savska 77, 10000 Zagreb, Croatia, e-mail: milan.matijevic@ufzg.hr
Zaslužni profesor, Univerza v Zagrebu, Fakulteta za izobraževanje učiteljev, Savska 77, 10000 Zagreb, Hrvaška, e-pošta: milan.matijevic@ufzg.hr