THE USE OF CONTEMPORARY MEDIA IN TEACHING AMONG PRIMARY SCHOOL TEACHERS

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Abstract

The zenith of multiliteracy in the 21st century is *information literacy*, the literacy for survival in the digital environment. *A Questionnaire on the Use of Contemporary Media in Teaching* (*QUCMT*) was compiled, intended for teachers, saturated with 3 factors: 1) Use of contemporary media in learning and teaching, 2) Use of contemporary media to facilitate teaching, making it more attractive and making the content easier to master, and 3) Effect of contemporary media on making teaching superficial and memorisation weaker. The results of the research among primary school teachers in Republic of Croatia using this questionnaire show that contemporary media facilitate teaching to a great extent, so that teachers can no longer envisage teaching without them, and use them almost every day. In their schools, media are used increasingly frequently, their introduction is only one of several novelties, and pupils enjoy lessons which include contemporary media and find them more attractive. Using contemporary media, pupils find it easier to learn and memorise the material, and teachers consider multimedia didactics very important. Teachers who have access to contemporary media at home find it facilitates their teaching and makes it more attractive, while their pupils find it easier to memorise methodological-didactic contents with the aid of contemporary media. Teachers with many years of service use more contemporary media in teaching which confirms the importance of *computer experience*.

Key words: contemporary media, information and communication technology (ICT), IT literacy, psychometric characteristics of questionnaire, primary school teachers.

1. INTRODUCTION

Teaching today is geared towards pupils and learning outcomes. To develop pupil competences, teachers use various modern and traditional forms and methods of work, and the technology at their disposal, to make their teaching more attractive and closer to reality. Developing pupil competences enables them to be more independent, preparing them for lifelong learning, thinking critically, and teamwork, which are all linked to *developing motivation* among pupils for a particular subject or subject area. To this end, teachers[1] increasingly turn to contemporary media for help. *Contemporary media*, if used in the right way, make learning and

[1] In this article, 'teachers' refers to class teachers and subject teachers.

teaching much easier and more interesting (El-Gayar, Moran, & Hawkes, 2011). Contemporary media are usually identified as digital media, since *contemporary* means everything that is happening now, in step with the times. Digitalised information is a new form of information which is up-to-date and accessible through digital media. The prerequisites for the development of *digital education* (DE) are a positive organisational climate and excellent computer and human infrastructures. According to Jandrić (2014), the drawbacks are a lack of state policies regarding digital education, and various legal restrictions (e.g. the low level of appreciation for digital education in the teacher promotion system and the lack of information among pupils about the pros and cons of this form of education). The first step is personal preparation for digital education, while professional training is also needed. The role of teacher is utterly critical because the new digital technologies have to be carefully integrated into the classroom. Implementing digital education requires a positive attitude towards ICT, confidence in using ICT and work satisfaction in the sense of achieving personal goals in a socially useful way. El-Gayar et al. (2011) say that problems in accepting ICT may occur if different experts have different opinions on educational goals and the role of technology in teaching. Some consider it intrusive, or a waste of time (Hussein, 2010), while others see it as a useful resource to aid learning (Earle, 2002). Integrating ICT in the classroom helps expand lessons, exploring the subject, increasing flexibility, efficient planning and lesson preparation, adjusting to advanced technology, which results in increasing teacher skills and confidence, while making their lessons fun and up-to-date (Tedla, 2012). Hennessy, Harrison and Wamakote (2010) mentioned that integrating ITC use into subject teaching rather than as a discrete subject in school. They also mentioned that teacher education programmes rather have to be interactive and participatory, rather than transmission-based. Teachers should have sustained, collaborative and active learning opportunities for working together within a supportive professional community of practice. Community is culturally contextualised and practice should be for a particular school and classroom, incorporating tasks linked to participant's professional practices. Emphasising teacher development as the key to effectively implementing policy and curricula, to using ICT to enhance teaching and learning, and to raising educational standards. In many countries, however, a major impediment is the lack of qualified teachers for higher or the highest educational standards (Hennessy et all, 2010: 40).

The 21st century is aptly called the *digital age*. It is an age in which modern information and communication technology is expanding. Therefore, fierce debates are taking place about including contemporary or digital technology in education systems. Earlier research has shown that the gradual introduction of digital technology in teaching makes it easier for teachers to teach and pupils to learn (Croxall & Cummings, 2000; Lisek & Brkljačić, 2012; Topolovčan, Matijević & Dumančić, 2016). Most pupils are more familiar with modern technology than their teachers (and parents). The greatest problems in applying modern technology in the classroom are a lack of information, and insufficiently trained teachers. Professional development policies should support ICT-related teaching models, in particular those that encourage both students and teachers to play an active role in teaching activities (Hennessy et all, 2010). Some countries are developing digital content for use across the curriculum. The psychological factors of a teacher's own beliefs and attitudes to ICT and pedagogical innovation are both primary facilitators and barriers to teacher use of technology in the classroom. Personal teaching styles also play a major role (Hennessy et all, 2010). Many different types of technology can be used to support and enhance learning.

Contemporary media may also make teaching and learning superficial. Some authors call pupils who grew up with contemporary media *digital natives*, while those who were born before the digital age and have gradually acquired knowledge of them are *digital newcomers* (teachers

and parents) (Jandrić, 2014). El-Gayar et al. (2011) list some of the barriers to bringing ICT into the classroom, in spite of its benefits: a lack of computers, software, hardware, and internet access; a lack of motivation on the part of teachers; a lack of skill in navigating and managing new technology; a lack of familiarity with ICT; a lack of knowledge of how to use it, etc. However, the greatest problem is the established pattern of traditional transfer of knowledge, in which the teacher is the source and the pupils receptacles (Tedla, 2012). Knowledge transfer is of limited effect, as it focuses on theory, rather than practice, and there is no cooperation between the classroom actors. Pupil activity is minimal, and the teacher alone decides on what to cover and how to do it, so there is a lack of creativity, critical thought and the use of technology. This situation does not prepare pupils for the modern labour market, where creativity and cooperation are essential in many jobs. Even when ICT is included, it tends to be in the form of drills and exercises in isolated tasks, rather than creative, innovative work. Tedla (2012) also claims that ICT is important for learning quickly and simply how to process, store and retrieve information, i.e. for cognitive skills, along with creating information and ideas, increasing pupil motivation for learning, independent learning, and building self-respect.

Literacy has evolved over the years and is constantly evolving. Today, the term *multiliteracy* is increasingly used to cover a large number of literacies - computer, cultural, document, economic, film, IT, mathematical, media, musical, political, scientific, technical, and visual (Kuvač-Levačić, 2016). A combination of several literacies produces abilities and skills in the modern individual, making daily life easier. Stričević (2011) says that the greatest change in recent times in regard to the phenomenon of literacy is that it is no longer viewed as a single-meaning concept. In the 21st hierarchy of literacies, *information literacy* occupies first place. Literacy in the 21st century covers a range of other competences which contribute to educational levels, including mathematical, computer and information literacy. The industrial society of the 20th century has evolved into the IT networked society of today (Jandrić, 2014) or *Scientific Era* of Sapiens in 21th century (Harari, 2015). Literacy has made great leaps forward, so that we now speak of survival literacies which are the key to success. These survival literacies are: 1) *Basic literacy*, 2) *Computer literacy*, 3) *Media literacy*, 4) *Distance learning and e-learning*, 5) *Cultural literacy*, and 6) *Information literacy*. These are the prerequisites for the individual to survive today. They are mutually conditioned and interlinked. *Basic literacy*, which covers reading, writing and arithmetic, is the foundation, and the others are built and shaped on it. *The American Library Association*, apart from formulating the most frequently used definitions of *Information literacy*, stresses the importance of the reconstructive process of learning. To be information literate, a person must be able to recognize when information is needed and have the ability to locate, evaluate, and use effectively the needed information. *Information literacy* is often identified with computer, media, internet or *Digital literacy*. Though they are not the same, they are all related to information literacy.

Information literacy is a prerequisite for lifelong learning and the basic key to personal progress in one's working and daily life. In order to use the necessary skills as an adult, it is necessary to start learning as young as possible, if one wants to keep up with galloping advances. The basic problems in acquiring *Information literacy* are a lack of equipment and bad organisation in the education system. However, even though some countries do not enjoy a high material status, digital technology can be integrated as much as possible in daily life. According to Nikčević-Milković (2017), it is less vital to acquire modern technology, and more important to develop the skills to use it, solve problems, and develop information literacy.

The need to develop *Information literacy* in schools arises from the *Constructivist approach to learning* (based on developing knowledge through personal experience, and focusing on pupil

independence and activity, encouraging critical thought and experimentation) (Nikčević-Milković, 2017).

Before any activity using modern media, the question should be asked, "Does this help create a learning opportunity which would not exist without it?" One danger is the use of attractive visual or audio effects which interrupt activity and disturb the development of important concepts. "Computers would probably improve achievement if they were used in support of basic processes which lead to learning; active involvement, frequent interaction with feedback, authenticity and links with the real world, and productive group work." (Woolfolk, 2016, p. 338) Traditional learning will never be entirely rooted out, nor will computers every replace teachers and their ability to recognise their pupils' needs, however the introduction of e-learning in education systems contributes to the development of self-study. It does not have a separate effect from classic learning, and certainly cannot stand alone. It simply improves classic learning, due to the speed of its information flow and actualisation effect.

There are many indicators of the merits of e-learning. The computer user masters communication with the computer and discovers its positive aspects: digital information is coded and thus encourages and attracts interest in decoding and developing cognitive abilities; the contents are displayed differently, with images or sounds, quite different from a book or other traditional source; the interactive, multimedia approach appeals to several senses, enabling information to be understood better; the contents can be presented from different perspectives, thus helping all users to understand them; and all these encourage the user to be active, solve problems in various ways, and be motivated to learn more.

Modern media are attracting more and more attention in correlation with learning and teaching. They are often welcomed with positive expectations, but there are occasional pessimistic views on the dangers of mass use. Increasingly, they are considered to facilitate learning, raise motivation, and produce improved learning results. "Many studies have been conducted to prove these hypotheses, however Rodek (2011, p. 10) says there is no unambiguous empirical evidence in support, and all the research conducted has only served to prove the complexity of the media. Primarily, several individual factors play a significant role in the effect the media exert, for example, the way in which content is individually prepared and presented, individual experience and pre-knowledge, motivation and the mental effort required, and social norms and values, i.e. the context and situation in which learning takes place." In terms of education, the didactic-methodological approach to learning and teaching makes an important contribution. This author says that recent research has focussed less on the ways in which media affect pupils, and more on what pupils do with the media.

Today, fewer comparisons are made between old and new media, since research has shown that the media do not have a direct effect on learning. They are instead mediators, and their purpose is to contribute to the quality of the didactic-methodological organisation of learning. Comparisons of old and new media try to emphasise the difference between traditional learning, with the teacher in the centre, whose domination leads to the passivity of pupils, and contemporary learning, with the pupil in the foreground. Contemporary forms of learning (including digital media) encourage pupil motivation and independence, as well as cooperation with others. According to Rodek (2011, p. 17), "the assumption that all teaching results in learning has become illusory." The traditional form of teaching is changing, thanks to the introduction of new media. New constructivist learning theories distinguish learning and teaching, emphasising that learning is not necessarily the result of teaching. Modern learning aims to prepare pupils for independent learning, and to organise their own informal learning in order to prepare them for lifelong learning. "Good use of digital media depends on many individual, subjective learning conditions, and on external, objective micro-elements in didactic-

methodological arrangements. In accordance with constructivist philosophy, learning through the application of new media is less important to the learning content, and more important to the didactic arrangement. Less is said about software and learning programmes, and more about the learning environment, so that the emphasis is placed on mutual interaction between pupils, teachers, and learning content." (Rodek, 2011, p. 20).

In fact, due to the increasing importance of contemporary media in education, this research attempted to examine the use of contemporary media in teaching by primary school teachers in Republic of Croatia. In order to do so, a measuring instrument was constructed, the psychometric characteristics of questionnaire are checked and the results obtained linked to a range of teacher socio-demographic variables important for the use of contemporary media in teaching. The hypotheses which gave rise to the research were based on the results of earlier research showing that contemporary media facilitate learning and teaching, make content more attractive, and memorisation easier (El-Gayar et al., 2011; Lisek & Brkljačić, 2012; Topolovčan et al., 2016). Socio-demographic variables that proved to be important for the use of contemporary media in teaching are: a) teacher's characteristics such as age, gender, experience in using contemporary media, b) education in using contemporary media (Holden & Rada, 2007), c) property of contemporary media in home and school, d) teacher positive attitudes and beliefs to ICT and compatibility degree of the technological innovation with the teachers' pedagogical beliefs (Zhao, Pugh, Sheldon & Byers, 2002), e) teacher confidence in using contemporary media, personal teaching styles, teacher development, teacher sophisticated professional skills, f) perceived usefulness and perceived ease of use (Raaji & Schepers, 2008), g) perceived contextual value (Tzeng, 2011), h) subject discipline (Teo, 2008), i) anxiety, confidence and liking (Yildrim, 2000), j) general usefulness and behavioural control and pedagogical use of technology (Yuen & Ma, 2002). The research issues were: 1) To establish when class and subject teachers in Croatian primary schools use contemporary media most and how contemporary media helps teachers in teaching? 2) To establish the structure of factors which define the use of contemporary media in teaching (*A Questionnaire on the Use of Contemporary Media in Teaching* - *QUCMT*) and check the psychometric characteristics of the Questionnaire; 3) To examine the correlation between some teacher socio-demographic factors important for using ICT and average values of Questionnaire factors? 4) To establish how some teacher socio-demographic factors important for using ICT as predictors contributed to criteria – factors of Use of Contemporary Media in Teaching?

2. METHODS

2.1. Sample of Participants

The research was conducted among 196 teachers in 6 primary schools in Republic of Croatia: *Dr. Jure Turić Primary School*, Gospić, *Petar Berislavić Primary School*, Trogir, *Dr. Franjo Tuđman Primary School*, Lički Osik, *Trilj Primary School*, *Veliki Bukovec Primary School*, and *Zrinski & Frankopan Primary School*, Otočac. Teachers was mostly female (Nf = 129), average age 45,6 years (SD = 1,06).

2. 2. Instruments

For the research, *A Questionnaire on the Use of Contemporary Media in Teaching* (*QUCMT*) was compiled, to be completed by teachers. The initial version of the questionnaire was discussed with two experts in educational psychology and one linguist. The final version contained 24 statements relating to facilitating teaching using contemporary media, the frequency of their use in the classroom, pupil responses to them, their effect on memorisation and recall, their effect in learning certain school subjects, the learning environment, and multimedia didactics. The factor analysis, reliability and validity test for the questionnaire are presented under *Results.*

Socio-demografic Data for Teachers includes information about profile of teachers, years of employment, gender, level of education, additional education in using contemporary media and property of contemporary media at home.

2. 3. Research design

Before sending out the questionnaire, we requested permission from primary school head-teachers for their teachers to participate. We requested permission from primary school teachers also. The teachers completed the questionnaire anonymously and voluntarily during teacher council meetings. After reading the instructions, the teachers indicated the extent to which they agreed with each statement using a numerical scale (1 – 5: 1 – no, never, 2 – generally no, 3 – neither yes nor no, 4 – generally yes, and 5 – yes, always). The results obtained were entered and processed in the statistical package *Statistica 13.2*.

3. RESULTS

A Questionnaire on the Use of Contemporary Media in Teaching (*QUCMT*): Results of The Exploratory Factor Analysis, Reliability and criteria validity, Basic statistical indicators, Correlation results and Results of Linear Regression Analysis

An Exploratory Factor Analysis was carried out. The first procedure was to establish the Kaiser-Meyer-Olkin test (KMO) and Barlett sphericity test in order to determine whether the sample was suitable for factorisation. Table 1 shows the KMO measure of adequacy of the sample and the Barlett sphericity test for the Survey.

Table 1. *KMO and Barlett sphericity test for A Questionnaire on the Use of Contemporary Media in Teaching*

Kaiser-Meyer-Olkin measure of adequacy of the sample		.843
Barlett sphericity test	Approximate chi-square	2515.629
Degrees of freedom		325
Signif.		.000

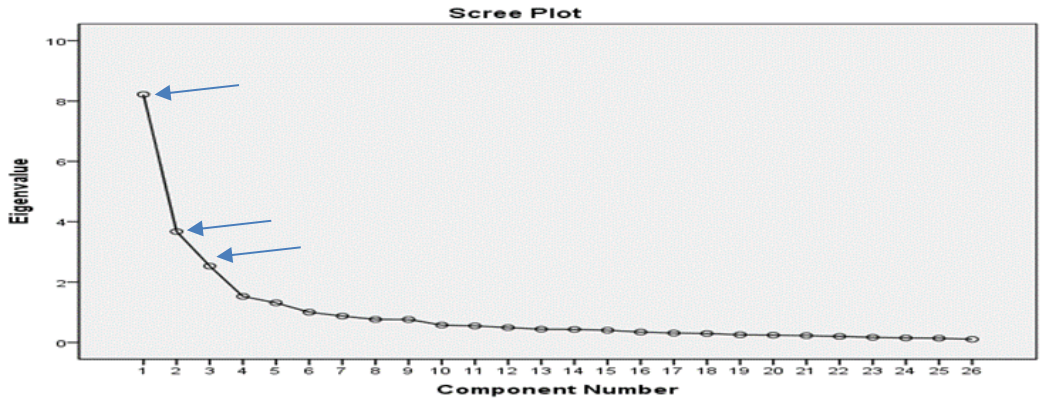
N = 196

The results shown in *Table 1* indicate that the adequacy of the sample was suitable at .843. The Barlett sphericity test is statistically significant ($x^2 < 0.00$). Accordingly, the information received showed that the sample was suitable for factor analysis. An exploratory factor analysis (analysis of the main components with Varimax rotation), revealed three different factors which explained 55.48 % variance. All the statements had a weighting of over 0.30.

Table 2. *Factors of A Questionnaire on the Use of Contemporary Media in Teaching (QUCMT) extracted by analysing the main components with Varimax rotation (Eigen value greater than 1)*

Factor	Eigen value	Cumulative %	Total %	% of variance	Cumulative %
FACTOR 1	8.219	31.612	5.900	22.691	22.691
FACTOR 2	3.674	45.745	5.661	21.774	44.465
FACTOR 3	2.531	55.478	2.863	11.013	55.478

Picture 1. *Cattellov Scree plot test*



Cattellov *Scree plot test* also shows the existence of three factors (*Picture 1*).

Table 3. *Factor structure of A Questionnaire on the Use of Contemporary Media in Teaching (QUCMT)*

FACTOR SATURATION					STATEMENT
VARIABLE	Factor 1	Factor 2	Factor 3	FACTOR NAME	
v11	.783	-.006	-.017	USE OF CONTEMPORARY MEDIA IN LEARNING AND TEACHING	My school is making increasing progress in the use of CM.
v12	.773	.047	-.102		My pupils use CM in learning at home and at school.

v13	.746	.127	.056		Our pupils learn mathematics with the help of CM.
v10	.744	-.029	.031		My school environment is full of CM.
v23	.737	.114	-.065		I use a computer every day in the classroom.
v15	.704	.186	.216		Our pupils learn their mother tongue and foreign languages using CM.
v14	.636	.177	.163		Our pupils learn to read and write using CM.
v16	.634	.325	.135		Our pupils learn science subjects using CM.
v18	.623	.330	-.328		I like it when the environment in which I teach contains plenty of CM.
v9	.544	.379	-.254		I notice a difference in what I have taught using CM compared to not using it.
v2	.476	.467	-.147		
v3	.435	.430	.090		
v7	.035	.820	-.161	**USING CONTEMPORARY MEDIA MAKES LEARNING AND MEMORISING MORE ATTRACTIVE AND EASIER**	My pupils remember the material better when I use CM in the classroom.
v6	.224	.810	-.078		My pupils find lessons more attractive when I use CM.
v5	.141	.791	-.019		My pupils really enjoy lessons when I use CM.
v1	.269	.767	-.107		CM make it easier for me to teach.
v4	.163	.717	-.040		As a teacher, I like to introduce new things, including CM.
v8	.165	.706	-.149		Contemporary media help pupils to master the material more easily.
v22	.044	.663	-.070		Learning using CM is closer to real life.
v25	.070	.625	.151		Pupils learn more easily using CM than from printed material.
v26	.343	.444	-.331		I consider multimedia didactics to be important in the teaching process.
v21	.154	-.054	.886	**CONTEMPORARY MEDIA MAKES LEARNING MORE SUPERFICIAL AND MEMORISING WEAKER**	Learning using CM is too superficial.
v24	.273	.005	.747		CM make learning too virtual and unreal.
v20	.279	-.250	.692		Pupils learn and remember less using CM.
v19	.257	-.196	.580		CM make it more difficult for me to teach.
v17	.267	.340	.435		Our pupils use CM when reading and writing for book reports.

In *Table 3* the factor saturation for all three factors of *A Questionnaire on the Use of Contemporary Media in Teaching*, which were extracted using the analysis of main components with Varimax rotation method can be seen (with Eigen values greater than 1). Variables 2 and 3 show saturation for two factors and were therefore excluded from the Survey. Variables 11, 12, 13, 10, 23, 15, 14, 16, 18 and 9 have the greatest saturation for the first factor, *Use of CM in Learning and Teaching*. Variables 7, 6, 5, 1, 4, 8, 22, 25, and 26 have the greatest saturation for the second factor, *Use of Contemporary media to facilitate teaching, make it more attractive, and making memorisation easier*. Variables 21, 24, 20, 19 and 17 have the greatest saturation for the third factor, *Contemporary media makes teaching superficial, and learning and memorisation weaker*.

Reliability and criteria validity of the Scale QUCMT

The reliability of the Scale *QUCMT* expressed using Cronbach's alpha test was 0.88, and of the individual subscales, the first was 0.89, the second 0.89 and the third 0.74, indicators of high reliability.

Table 4. *Coefficients of correlation of subscales QUCMT and Property of CM at school and at home as a variables of criteria validity*

Subscales	Property of Contemporary Media at school	Property of Contemporary Media at home
Use of CM in Learning and Teaching	,80**	,72**
Use of CM to facilitate teaching, make it more attractive, and making memorisation easier	,84**	,74**
CM makes teaching superficial, and learning and memorisation weaker	-,21	-,24

N = 196; **p < 0,01

The criteria validity of Scale QUCMT was measured by coefficients of correlation of subscales QUCMT and Property of CM at school and at home as a criteria variables. From *Table 4* the coefficients of correlation (Sperman's) between the first and the second subscales and the first criteria – *Property of Contemporary media at school* are positive, statistically significant and high; between the first and the second subscales and the second criteria - *Property of Contemporary media at home* are also positive, statistically significant and high; the coefficients of correlation between the third subscale and the first and the second criteria are negative and low (*Table 4*).

Table 5. *Basic statistics for A Questionnaire on the Use of Contemporary Media in Teaching (QUCMT)*

Number of item	Content of item	Min	Max	M	SD
1.	My school is making increasing progress in the use of CM.	1	5	3.71	1.055
2.	My pupils use CM in learning at home and at school.	1	5	3.34	0.905

3.	Our pupils learn mathematics with the help of CM.	1	5	3.01	0.987
4.	My school environment is full of CM.	1	5	3.34	1.110
5.	I use a computer every day in the classroom.	1	5	3.73	1.236
6.	Our pupils learn their mother tongue and foreign languages using CM.	1	5	3.16	1.056
7.	Our pupils learn to read and write using CM.	1	5	2.84	0.980
8.	Our pupils learn science subjects using CM.	1	5	3.26	0.971
9.	I like it when the environment in which I teach contains plenty of CM.	1	5	3.63	1.049
10.	I notice a difference in what I have taught using CM compared to not using it.	1	5	3.40	0.893
11.	My pupils remember the material better when I use CM in the classroom.	1	5	3.74	0.864
12.	My pupils find lessons more attractive when I use CM.	1	5	4.15	0.844
13.	My pupils really enjoy lessons when I use CM.	1	5	4.20	0.790
14.	Contemporary Media make it easier for me to teach.	1	5	4.05	0.928
15.	As a teacher, I like to introduce new things, including CM.	1	5	4.11	0.800
16.	CM help pupils to master the material more easily.	1	5	3.77	0.802
17.	Learning using CM is closer to real life.	1	5	3.43	0.965
18.	Pupils learn more easily using CM than from printed material.	1	5	3.51	0.876
19.	I consider multimedia didactics to be important in the teaching process.	1	5	3.77	0.949
20.	Learning using CM is too superficial.	1	5	2.37	1.004
21.	CM make learning too virtual and unreal.	1	5	2.70	0.980
22.	Pupils learn and remember less using CM.	1	5	2.10	0.976
23.	CM make it more difficult for me to teach.	1	5	2.12	1.086
24.	Our pupils use CM when reading and writing for book reports.	1	5	3.50	0.891

Legend: M - Minimum score; M - Maximum score; M - Arithmetic mean; SD - Standard deviation; N=196

In *Table 5*, there are basic statistical indicators of *A Questionnaire on the Use of Contemporary Media in Teaching* (*QUCMT*). It is seen that the maximum range of results is achieved on each particle, which implies that the particles cover a good range of possible responses, from the extremely negative to the highly positive teacher's assessment of the use of CM in teaching. The highest average results show that contemporary media greatly facilitate teaching (M = 4.05; SD = 0.928), teachers want to include new things, so new

contemporary media also (M = 4.11, SD = 0.800), students prefer teaching when teachers use contemporary media (M = 4.20; SD = 0.790) and lessons are more attractive for students when teachers used contemporary media (M = 4.15; SD = 0.844).

Table 6. *Coefficients of correlation between factors of Survey on the Use of CM in Teaching*

Factors	F1	F2	F3
F1: *Use of CM in learning and teaching*	**,71****	**,63****	-,14
F2: *Use of CM to facilitate teaching, making it more attractive and making the content easier to master*	**,67****	**,60****	**,45***
F3: *Effect of CM on making teaching superficial and memorisation weaker*	-,23	**,41***	**,88****

N = 196; *p < 0,05; **p < 0,01

These factors are mutually moderate to higher predominantly positive correlations. There are statistically significant Pearson's coefficient correlations among the factors: Factor 1 (*Use of CM in learning and teaching*) r = 0,71, p < 0,01 with itself; Factor 1 and Factor 2 (*Use of CM to facilitate teaching, making it more attractive and making the content easier to master*) r = 0,63, p <0,01; Factor 2 and Factor 1 r = 0,67, p < 0.01; Factor 2 r = 0,60, p < 0,01 with itself; Factor 2 and Factor 3 r = 0,45, p < 0,05; Factor 3 and Factor 2 r = 0,41, p <0,05 and the highest one on Factor 3 r = 0,88, p < 0,01 with itself (*Table 6*).

Table 7. *Spearman Coefficient Correlations (r_s) between some Socio-demographic Data of Teachers and the Average Values of the Factors of Survey on the Use of CM in Teaching*

Variables	**M F1** *Use of CM in learning and teaching*	**M F2** *Use of CM to facilitate teaching, making it more attractive and making the content easier to master*	**M F3** *Effect of CM on making teaching superficial and memorisation weaker*
Profile of teachers	-0.07	-0.06	-0.02
Years of employment	**0.27***	-0.08	0.03
Gender	0.00	0.05	0.04
Level of education	0.00	-0.06	0.03
Additional education in using CM	0.03	0.01	-0.12
Property of CM at home	0.06	**0.26***	-0.11

N = 196; *p < 0,05; M F1–Average Factor value 1; M F2-Average Factor value 2; M F3-Average Factor value 3

According to the results from *Table 7*, the only statistically significant positive and low correlations between *Years of employment* and *factor F1* (*Use of CM in learning and teaching*) (r_s = 0.27, p < 0,05) and *The Property of Contemporary media at home* and *factor F2* (*Using CM facilitates teaching, makes it more attractive, and memory less readable*) (r_s = 0.26, p < 0,05). This means that teachers who have more teacher's service in teaching use more contemporary media in learning and teaching and teachers who own these media at home significantly more such media facilitate teaching, make them more attractive, and their students can easily remember the methodical-didactic formatted materials they teach using contemporary media.

Table 8. *The Significance of Linear Regression Analysis Predictors in Assessing Three Criteria for Using Contemporary media in Teaching*

	Criteria	
Predictors	**F1** *Use of CM in learning and teaching*	**F2** *Use of CM to facilitate teaching, making it more attractive and making the content easier to master*
Profile of Teachers	-0.10	0.01
Years of Employment	**0.26***	-0.17
Gender	-0.03	0.04
Level of Education	0.17	-0.11
Additional Education in Using CM	0.05	-0.04
Property of CM at Home	0.06	**0.15***
R =	1.19	0.22
R^{2} =	0.05	0.05
$F_{(6,194)}$	0.90	1.23

*p < 0,05

From *Table 8* we can see that the coefficient of multiple correlations between the set of predictors (*Socio-demografic Data for Teachers*) and criteria *Use of Contemporary media in Learning and Teaching* (first factor of Questionnaire) amounts to R = 1.19, and this set of predictors explains 5 % of the variance of the criteria. Significant predictor is *Year of Employment* ($\beta = 0.26$, $p < 0.05$), which means that more teacher's service in teaching means greater use of contemporary media for teaching. The coefficient of multiple correlations between the set of predictors (*Socio-demografic Data for Teachers*) and criteria *Using Contemporary media facilitates teaching, makes it more attractive, and memory less readable* (second factor of Questionnaire) amounts to R = 0.22, and this set of predictors explains 5 % of the variance of the criteria. Significant predictor is *Property of Contemporary media at Home* ($\beta = 0.15$, $p < 0.05$), which confirms the result of the bivariate analysis that teachers who own contemporary media at home significantly more such media facilitate teaching, make them more attractive, and their students can easily remember the methodical-didactic formatted materials they teach using these media. The coefficients of correlation of the third factor of the Questionnaire as criteria were not statistically significantly related to socio-demographic variables (*Table 7*), therefore no regression analysis for the third factor of Questionnaire needs to be done.

4. DISCUSSION

In order to research The use of contemporary media in teaching by elementary school teachers, first *A Questionnaire on the Use of Contemporary Media in Teaching* (*QUCMT*) was compiled. A Questionnaire measured three latent dimensions: 1) *Use of Contemporary media in learning and teaching, 2) Use of Contemporary media facilitates teaching, makes it more attractive, and makes memorisation easier, and 3) Contemporary media make teaching superficial, and learning and memorisation weaker*. These factors are mutually moderate to higher predominantly positive correlations, and their reliability of internal consistency is satisfactory. In order to examine the validity of the contemporary media measurements, their relationship between *Property of CM at school and home* with *Use of CM in Teaching* were

calculated. The obtained results are in line with the expectations, with the teachers who have had the equipment of contemporary media at schools, as well as at home expressed greater use of contemporary media in teaching.

It was confirmed by a descriptive analysis using *A Questionnaire on the Use of Contemporary Media in Teaching* that CM make teaching easier for teachers, and learning easier for pupils, that contemporary media are increasingly being used in their schools, that teachers systematically keep up with novelties, including among contemporary media, and therefore use computers on a daily basis in the classroom, that their teaching is more attractive using contemporary media, that pupils memorise teaching contents better with the aid of media, and use it in particular when reading and writing book reports, and that teachers think multimedia didactics are important in the teaching process. Thus the first hypothesis was confirmed. Earlier research confirmed the results of this research, which indicated that contemporary media facilitate learning, making it more interactive and closer to reality, and that pupils and teachers like being surrounded by contemporary media (Lisek & Brkljačić, 2012; Schulz-Zander & Tulodziecki, 2011; Topolovčan et al. 2016). Topolovčan et al. (2016) researched the significant predictors of *constructivist learning*, which are fundamentally the use of ICT. Constructivist learning is based on projects, games, problem-solving, research, cooperative learning and practical learning. Constructivism means that all the knowledge created by an individual is in interaction with his own environment. That research confirmed that some sociodemographic data concerning pupils and teachers, higher levels of independent computer use, positive attitudes towards new media, and their frequent use, are significant predictors of constructivist learning. Using the Internet has led to a completely new learning style. The *net generation* born in the digital, multimedia environment, who possess and use inquisitiveness to the best ends, are most self-directed to learning. These pupils are more analytically focused, think more critically, and question the strong authorities (primarily teachers) of previous generations. Learning based on the Internet is interactive, rather than based on knowledge transfer. New media enable situational and cooperative learning, learning orientated towards creativity, individualisation and learning based on problem-solving (Kanselaar, 2013; Schulz-Zander & Tulodziecki, 2011). Research by Lisek & Brkljačić (2012) among Croatian pupils showed that pupils who started to use computers at an early age showed trends towards a more holistic approach to learning, had greater concentration spans, non-linear learning capabilities and multitasking skills, and experienced learning as a game. Teachers who had a positive attitude towards the use of computers used them better themselves, had higher computer self-efficiency, and less anxiety about using them; in other words, they were cognitively and motivationally more focused on using them. In contrast to the *old* education style, which focused on teachers who represented authority in the transfer of knowledge, education based on CM is non-linear, focuses on pupils, and is based on discovery rather than knowledge transfer. The teacher in *contemporary education* has become a leader and mediator (Jandrić, 2014). The new orientation towards information is natural and spontaneous, and is not experienced as learning. Research by Pović, Veleglavac, Čarapina, Jagušt, & Botički (2015) on a sample of 1101 pupils and teachers in elementary and secondary schools in Republic of Croatia showed that 93.2 % of teachers used modern educational technology; the average of teachers using ICT in the classroom was between 30 and 40; the e-register option was used in schools where 48.2 % of the teachers were working, but that 12.9 % said they would prefer to go back to paper registers (due to intermittent, poor internet connections, the ease of reading paper registers, their contribution to the authority of the teacher, and better relations and trust between teachers and parents); some teachers thought it was a positive thing, and other a negative one, not to be able to see pupils' progress

in other subjects, which is the case with e-registers (some teachers thought they would assess pupils more fairly with this insight), while most of the teachers surveyed thought the e-register was an improvement in the education system and stressed that pupils and parents were more satisfied with it; 60.4 % of teachers surveyed used computers in almost every lesson, while 70 % did not use tablets or smartphones; the most widely used digital material came from Croatian publishers (*Školska Knjiga* & *Profil*); the greatest quantity of digital material was created by teachers themselves, 92.7 % of them, of whom 89.7 used PowerPoint presentations. The on-line contents which teachers use more than once a month are mostly *YouTube* and *Wikipedia*, followed to a much lesser extent by intelligent games, *Hrvatska Enciklopedija*, higher education institution web pages, and e-libraries, and least of all, *Nikola Tesla*, *Baltazar*, *Proleksis* & *Eduvizija*. 30 % of the teachers surveyed did not communicate with pupils outside school, and those who did used email messages or invitations, and increasingly, social networks. Smartboards are present in 52.2 % of schools but are only used by 22.8 % of teachers. The reasons for this are that often, only one or two smartboards are available in each school, and it is difficult to schedule their use, they require much more (classroom) time to set up, and one of the worrying reasons is that teachers find them hard to use, because even if they have been trained, the instructions have been gone through hurriedly and some schools do not even have the appropriate software installed, so they are useless. Of the teachers in schools where there are no smartboards, 90.8 % said they would use them if they were available. The problems teachers face in using ICT are the lack of technical equipment in schools, problems with internet connections, out-dated equipment, poor training (if any), the fact that too much time is required to set up, poor equipment maintenance, too little digital content available in Croatian, pupil adaptation to ICT, financial inequality among pupils, and computers infected by viruses[2].

Alongside these problems linked to ICT in the teaching process, teachers mentioned others. A key issue involves the technical conditions in the school. Most teachers thought that differences between conditions in schools discriminated against pupils, or rather, that all pupils should have the same learning conditions regardless of where they go to school. The teachers stressed that they had been insufficiently trained in the use of contemporary technology, and what little they had received was confined to the same topics (*PowerPoint* & *Word*), which they know is hardly the peak of 21st-century technology. They thought it was unacceptable to expect pupils to do homework using the most up-to-date technology, which not all of them have. In the research by Topolovčan et al. (2016) it was established that most teachers possessed a computer and had internet access, and that 90 % of pupils had a profile on a social network site. On the basis of his research, Simel Pranjić (2013) concluded that teachers who cared about their professional development would take steps to make progress. He cites lack of time and ignorance as the main reasons for the lack of training among teachers, which are directly connected with the desire for lifelong learning. The results of research by Rajić & Lapat (2010) showed that teachers thought lifelong learning was important to professional advancement. Mesić & Topolovčan (2016) cite individualism as the cause of interest or lack of it in lifelong learning, while the need for lifelong learning is usually prompted by promotion at work. The fact that one in six pupils uses a computer to complete school tasks may indicate the lack of use of educational technology by teachers, but also insufficient education of pupils in its use for educational purposes. These authors, however, cite the lack of national guidelines in Republic of Croatia for the use of contemporary media by pupils and teachers. They also say that though the curriculum for the

[2] https://bib.irb.hr/datoteka/809522.9_7_CUC-Upotreba_IKT_u_kolama_final.pdf)

safe use of the internet and educational technology does not require great material resources, many schools do not implement it.

Topolovčan et al. (2016) stress the need to create training programmes for teachers, where they would be prepared to teach focusing on pupils, while using contemporary media, in order to teach using media and constructivist didactics. The authors claim that teachers in Croatia have a more positive attitude towards contemporary media than their pupils, because pupils do not see them as anything special, but rather ordinary. Many teachers have never used a tablet, smartphone or social network in the teaching process. Although many teachers are computer literate and have digital competences, and have many contemporary media at home and at school, they still tend to use traditional methods and media in the classroom. Pupils assessed the use of media in the classroom as more frequent than teachers thought. In general, pupils have a higher level of computer self-efficiency in comparison with their teachers. Teachers still tend to be rather euphoric about new media, while pupils who use them more and more, with more competence, do not regard them as special. Teachers who have more positive attitudes, but a lower level of computer self-efficiency use contemporary media less intensively in the classroom, while pupils who have negatives attitudes, but higher levels of computer self-efficiency use them more intensively. Teachers rate their self-efficiency high in basic computer skills, while using contemporary media on the whole for direct teaching from the front. Culen & Gasparini (2011) say that if teachers and the education institution have more positive attitudes towards the use of ICT, this is conveyed to pupils, and influences them and their families' attitudes. Very often, negative attitudes towards the use of ICT are a factor in hindering their use in education.

Recent research, primarily meta-analyses, has shown that contemporary media are not significantly responsible for success in achieving desired learning outcomes. According to Tamin, Bernard, Borokhovski, Abrami & Schmid (2011), desired learning outcomes are achieved primarily by setting the teaching content and learning goals, then taking into the account the individual characteristics of pupils and teachers. Contemporary media are just one of many factors which may make a positive contribution to learning outcomes if used appropriately, but should not have a direct influence on learning and teaching. Their role in the classroom, learning and teaching, has an essentially relativising effect on formal education, highlighting the importance of informal learning (Mesić & Topolovčan, 2016), that is, in order to develop certain knowledge, skills and abilities, pupils no longer need to go to school, but can have alternative *computer* school at home (Velički & Topolovčan, 2017).

Matijević, Topolovčan & Rajić (2017) claim that the research of the past few years shows that teachers in Croatia and the methodological scenarios seen in school buildings leave much to be desired in terms of the needs of the net (or Z) generation of pupils. The advantages provided by new digital and communications media are insufficiently exploited to improve teaching communication, while the textbooks used by primary and secondary school pupils are not appropriate to their expectations and needs. In comparison to their pupils, who are *digital natives*, that is, have been using digital media from an early age, their teachers are *digital newcomers*, gradually acquiring competences in using digital media privately and in their work. In recent times, teaching from the front has been increasingly condemned as the least effective teaching method, as pupils master only 20 % of the content. The more they are involved in the teaching process, the better they remember. If teachers try to introduce more audiovisual aids, their teaching will produce better pupil success. It is important for pupils to create their own assignments, participate in the choice of material, and use teamwork to good effect. Therefore it is important to educate teachers about these methods, so they can include contemporary technology more effectively in the teaching process. The level of use of

contemporary media in the teaching process should be that of *information literacy*, which means the integrated use of media from various, multidisciplinary sources, in various forms, and a cooperative but critical relationship with information, most frequently for the purpose of creating new knowledge. This type of advanced use of media, rather than a lower *communication level* or lowest *behavioural level*, has been present in more developed education systems since the late 1990s.

In this research, the correlation between some socio-demographic characteristics of teachers (important for using ICT) and the average values of three factors in a Questionnaire QUCMT was only significant in terms of *Availability of CM at home* and Factor 2 (*Use of CM facilitates teaching, makes it more attractive, and makes memorisation easier*). This means that teachers who have access to CM at home find it greatly facilitates teaching, makes it more attractive, and their pupils find it easier to remember the methodological-didactically formed material learned this way. This result is in line with expectations, successful integration of tehnological innovations in school is more or less a reflection of teachers' level of computer literacy and frequency of computer use (at home and in schools) (Jenkins, Mimbs & Kitchel, 2009).

Using Linear regression analysis, in which the socio-demographic characteristics of the teachers (important for using ICT) were entered as predictors, to test how they contributed to the criteria of *using CM in teaching*, it was established that 5 % of variance criteria were explained by this group of predictors. The only significant predictor was *Years of service*, so that with more years of service, teachers used contemporary media more for learning and teaching. In the literature, results relating to years of service and use of ICT are inconsistent: the findings of some researchers indicate that younger teachers (30-40 years of age) use technology more (Pović et al. 2015), while others claim that *computer experience* is important, i.e. the length of time a person has been using a computer, which affects their positive attitude towards its use. The significance of computer literacy in teachers' use of technology is not a new issue because the ability to use computer-technologies has been emphasised to be a function of teachers' level of computer skills and knowledge (Lam, 2000; Oh & French, 2007; Shin & Son, 2007). This is in line with the findings of this research. Using same analysis, in which the socio-demographic characteristics of the teachers were entered as predictors, to test how they contributed to the criteria *Use of CM facilitates teaching, makes it more attractive, and makes memorisation easier*, it was established that 5 % of variance criteria were explained by this group of predictors. The only significant predictor was *Availability of Contemporary media at home*, so that means, like in bivariate analysis, that teachers who have access to contemporary media at home find it greatly facilitates teaching, makes it more attractive, and their pupils find it easier to remember the methodological-didactically formed material learned this way.

Finally, we should turn to some of the limitations of this research, primarily the fact that it relates to a transverse study of measures of self-assessment, with all the attendant shortcomings (e.g. retroactive observation of mental processes, honesty of answers). Future research should cover a greater number of teachers from different primary schools throughout the Republic of Croatia, should be multidisciplinary, and if possible, longitudinal, so that teachers would be monitored at several measurement points (from the beginning of their teaching careers to praiseworthy levels of experience), and transverse, given the different levels of experience in using ICT (low, medium and high). This research, also, is predominantly correlative in nature. In spite of the limitations of this research, it may serve as a guideline for future research, and we consider it important in explaining the use of contemporary media in teaching by primary school teachers.

5. CONCLUSION

For the purposes of this research, a measuring instrument was compiled (*A Questionnaire on the Use of Contemporary Media in Teaching - QUCMT*) intended for teachers, and we attempted to establish when class and subject teachers in Croatian primary schools most use contemporary media in learning and teaching, and to link their use with teaching for some socio-demographic data on teachers (important for using ITC). After conducting a factor analysis, the latent structure of a Questionnaire was confirmed. A Questionnaire measured three dimensions: 1) Use of CM in learning and teaching, 2) Use of CM facilitates teaching, makes it more attractive and makes memorisation material easier, and 3) Contemporary media make teaching superficial and learning and memorisation weaker. The results shows that contemporary media greatly facilitated teaching and learning, that schools are increasingly using contemporary media, that teachers systematically introduce novelties, including CM, that they enjoy an environment in which contemporary media are present, that their pupils enjoy lessons using media, so that computers or other media are used every day in the classroom, and that pupils find lessons more attractive when contemporary media are used. According to the teachers, their pupils remember the teaching content better when media are used. They also note that their pupils use media for reading and writing book reports. The teachers think multimedia didactics are important in the teaching process. In contrast to the former educational approach, which focused on the teacher as the representative of authority in the transfer of knowledge and the main enactor of the curriculum, education based on contemporary media is non-linear, pupil-focused, and based on discovery rather than knowledge transfer. The teacher in contemporary education becomes a leader and mediator. The research confirmed that teachers who have access to contemporary media find they facilitate teaching more and make it more attractive to their pupils, while their pupils find the methodological-didactic material easier to remember. Bivariate and multivariate analysis were also confirmed that teachers who have access to contemporary media at home find it greatly facilitates teaching, makes it more attractive, and their pupils find it easier to remember the methodological-didactically formed material. Teachers with more years of service use contemporary media much more in learning and teaching, and this supports the importance of *computer experience*.

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ISTRAŽIVANJE NASTAVNIKA OSNOVNIH ŠKOLA O UPORABI SUVREMENIH MEDIJA ZA POUČAVANJE

Sažetak

Pismenost koja je na vrhu koncepta raznopismenosti (engl. *multiliteracy*) u 21. stoljeću je *informacijska pismenost* koja predstavlja pismenost opstanka kao nužnost opstanka u digitalnom okruženju. Zbog toga je konstruiran *Upitnik korištenja suvremenih medija u nastavi* namijenjen nastavnicima koji mjeri 3 latentne dimenzije: 1) Korištenje suvremenih medija za učenje i poučavanje, 2) Korištenje suvremenih medija olakšava poučavanje, čini ga atraktivnijim, a pamćenje gradiva lakšim i 3) Suvremeni mediji poučavanje čine površnim, a učenje i pamćenje slabijim. Rezultati istraživanja nastavnika osnovnih škola u Republici Hrvatskoj korištenjem ovog upitnika pokazuju da im suvremeni mediji znatno olakšavaju poučavanje, da više ne mogu ni zamisliti nastavu bez tih medija te da ih koriste gotovo svakodnevno. U njihovim školama mediji se koriste sve intenzivnije, njihovo uvođenje samo je jedna od novina, učenici jako vole nastavu u kojoj se oni koriste i ona im je atraktivnija. Učenici pomoću ovih medija lakše uče i pamte gradivo te multimedijsku didaktiku smatraju vrlo važnom u procesu poučavanja. Nastavnicima koji posjeduju suvremene medije kod kuće takvi mediji značajno olakšavaju poučavanje i čine ga atraktivnijim, a njihovi učenici lakše pamte metodičko-didaktičko oblikovano gradivo uz pomoć ovih medija. Nastavnici s više radnog staža više koriste suvremene medije za poučavanje čime se potvrđuje značaj *računalnog iskustva*.

Ključne riječi: suvremeni mediji, informacijska i komunikacijska tehnologija, ICT, informacijska pismenost, psihometrijska obilježja upitnika, nastavnici osnovnih škola.

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Sanja Perkušić, Master of Primary Education has graduated on Integrated undergraduate and graduate study program of *Primary Teacher Education* in Gospić at the University of Zadar in 2017. She is currently in process of professional training in the Elementary School of Trilj. During her study period, she was a part of a successful student choir *Degenija* which had a lot of noticed appearances in Croatia as well as on the international level,

they had a successful tour in Slovenia, where they presented themselfs to other related academies from Zagreb, Ljubljana and Maribor. She took a part in the International scientific-professional conference that was held on October in 2017 *Innovation, creativity and enterprise in educational and upbringing sistem* at the University of Zadar. The subject of this article is also the subject of her graduate thesis.