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Teacher Assessment Related to the Use of Digital Media and Constructivist Learning in Primary and Secondary Education

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Abstract

The aim of this study was to examine the frequency of use and the motivation to use digital media in teaching and in the organisation of constructivist learning, as well as differences between teachers in elementary and secondary school (N=368). The results of the study show that both subgroups of teachers only sometimes or rarely use various digital media, with the exception of the frequent use of PowerPoint presentations. On the other hand, all teachers are positively motivated to use digital media in teaching. Both elementary and secondary school teachers hold that the teaching they organise is constructivist learning; elementary school teachers assess such forms of learning somewhat more positively. More positive values and expectations from the use of digital media are correlated, in both groups of teachers, with the more frequent use of such media in teaching. The use of certain digital media by both elementary and secondary school teachers is correlated with teaching where pupils learn collaboratively and have control over their own process of learning. It is justified to conclude, based on the interpretation of the results of this study, that despite the positive motivation to use digital media in teaching and the assessment that the learning organised by teachers is constructivist, in general teachers still work to a great extent in a way that is focused on the teacher and the subject, which is confirmed by the frequent use of PowerPoint presentations (frontal teaching). Interpretation and the implications of the results are presented in this paper.

Key words: *constructivist learning; digital media in classroom teaching; e-learning; primary education; role of the teacher; secondary education.*

Introduction

The main participants in the teaching process are pupils and teachers, and their activities in professional literature are referred to as learning and teaching. Only well-informed, trained, and motivated teachers can provide quality teaching. Over the past one hundred years, experts have offered various theories to explain learning, that is, the activities and achievements of learners (Bognar, 2016). However, despite the sheer number of the existing theories of learning, there are still open questions for researchers. New questions arise from the organisation of learning and teaching in the new multimedia environment (Matijević, 2015). In order to understand and explain lifelong learning, it is useful to compare the awareness of learning in various periods of a person's life.

In school, teachers decide what, when and how children and teenagers are to learn. Pupils are dependent on the decisions of teachers, who are the principle agents in running and directing the learning process. This has held true for as long as schools have existed, in conformity with the dominant pedagogical and didactic theories. In making their decisions, teachers use the curriculum. Everything is, therefore, subordinated to the subject-centred curriculum. Teachers design the process of learning, and propose and prepare materials they regard as effective to achieve the desired results (Blake, 2015).

Adults have a different relationship to learning than children and young people. Almost half a century ago, Knowles pointed to the differences (Knowles, 1970; as cited in Hase & Kenyon, 2001). According to Knowles (1970), adults are intrinsically motivated and self-directed. Adults learn by relying on their rich life experience and their previous experience with learning. They focus on a clear goal and on learning what is essential, which is linked to practice. Further, they expect to be acknowledged during the teaching and learning process. Adults are aware of the importance of their own activity during learning and they find a connection between their personal convictions and activities on the one hand, and the content and outcomes of learning on the other. While children and young people resolve problems in education irrespective of their current and future everyday life experience, adults try to align the activity of learning with their personal convictions and activities. Professional literature tells us that it is necessary to differentiate between learning based on the double-loop learning model (with children and young people) and learning based on the single-loop learning model with adult learners (Eberle & Childress, 2005). Moreover, adult learners attempt to identify changes in personal competences in every learning activity. This is explained as transformation learning (Mezirow, 1997). All this can be observed in adults when they decide to develop digital and entrepreneurial competences or improve their competences in foreign languages, etc. Of the things mentioned, what exactly can be applied in organising and facilitating learning and in the teaching of children and young people in a new multimedia environment?

In adult education, the learners are independent. They are "problem solvers" who "find solutions" to arrive at the destination that is decided by others. The goal is their primary motivator. They focus on the task that enables interdisciplinary thinking and autonomy. The teachers are the leaders who set tasks and encourage various routes to the solution by trying to encourage metacognitive activities in the learners. All this is the result of the theories of andragogy, which derives from the practice and theory of pedagogy (Blake, 2015).

A higher level of activity would be if learners were enabled and encouraged to recognise problems. Learning should primarily be self-determined; it results in questions being raised by the learners themselves when they think long-term about the purpose of their own learning. Learners (students) always seek new challenges, complexity and uncertainty. They need a trainer for this. The teacher-cum-trainer consolidates opportunities, context, external importance and complexity, and encourages the culture of cooperation and curiosity. Experts connect such a context of learning, and the behaviour of learners and those providing assistance in such learning with the term heutagogy (from Greek, "heuta" εαυτός – self, and "ago" ἄγω – lead – self-directed leading). The above briefly describes the path from pedagogy through andragogy to heutagogy.

In order to enable learning according to the principles of heutagogy for children and young people, it is necessary to ensure a high level of control, direction and didactic structuring of the content of learning, while recognising the maturity and independence of the learners. Learning how to learn in the digital multimedia environment is an important aim of teaching and school activities.

Nowadays, schools are already hiring teachers who grew up with modern digital media and who would find it difficult to imagine life without electricity, television or a personal computer. At the same time, schools also have teachers who grew up in settings without digital media, especially without computers. This is why studying changes in teaching communication resulting from the possession of modern communication media by both pupils and teachers, as well as the assessment of personal digital competences and opportunities for enriching teaching scenarios with interactive multimedia, is both interesting and useful.

The appearance of digital media in teaching is complemented with extensive research relating to teachers and pupils as the main participants of the teaching process and to didactic strategies and content that the digital media relay to learners. The attitudes and opinions of pupils and teachers about the new media have been examined, but so has the nature of the media (Rodek, 2007). Researchers rely on various methodological solutions and approaches, conditioned by the aims of the research and the nature of the research questions. Many studies have been conducted where the authors neglect the power of the media (hypermedia) that is far above anything that was available to teachers and pupils in the centuries past. People forget that the class-subject-lesson system was developed three hundred and fifty years ago

at a time when the only media, other than man, was the book and various types of the printed media. Not infrequently is experimental research about the efficiency of digital media organised in the settings of the subject-class system with frontal teaching (e.g., Bangert-Drowns, 1993; Kulik & Kulik, 1991).

The ability of teachers to organise constructivist learning (and learning activities) and the frequency and motivation to use digital media are significant precisely for this type of teaching in the multimedia digital environment, fitting to the needs of modern pupils of the net generation.

Constructivist Learning and the Use of Digital Media

The idea of constructivism is not new; it has been around for several millennia, especially in philosophy (Prichard & Woollard, 2010). We can explain it as philosophical, psychological and as didactic theory and practice (Kanselaar, de Jong, Andriessen, & Goodyear, 2002). In this respect, the differentiation, but also the relationship, of the terms of teaching and learning, thus implying the relationship of radical and social constructivism, is significantly emphasised (Rodek, 2011; Tobias & Duffy, 2009). Constructivist learning can be defined as the construction of one's thoughts and knowledge based on one's own previous knowledge, emotions, meanings, but also as an active relationship with the physical and social environment (e.g., Fosnot & Perry, 2005; Yilmaz, 2008). According to constructivist principles: 1) learning is an active process; 2) learning is active adjusting; 3) learning involves situational and contextual learning; 4) knowledge is not passively transferred and received, but constructed by the learner; 5) knowledge is personal; 6) knowledge is socially constructed (in the social context); 7) learning is the basic process for making meaning and understanding of the world; 8) experience and past understanding are key to learning; 9) social interaction is significant for learning; and 10) learning involves resolving meaningful, open and challenging problems (Boethel & Dimock, 2000, as cited in Yilmaz, 2008, pp. 167-168).

From the perspective of constructivist learning, teacher-centred frontal teaching within the subject-class system is undesirable. Constructivist learning is learning where learners handle subjects, rearrange, combine, cooperate, do research, and form and construct new materials. Such learning activities cannot be organised in frontal teaching where the teacher talks and presents information and where pupils sit silently and copy. In other words, the features of constructivist learning are where the learner is provided with the following: 1) an authentic context that reflects the way in which the knowledge will be applied in real life; 2) authentic activities; 3) access to professional activities and formation of the process; 4) multiple roles and observation perspectives; 5) collaborative construction of knowledge; 6) support in learning and scaffolding; 7) reflexions that encourage the formation of abstract terms; 8) the construction of explicit knowledge; and 9) evaluation of learning as a process of practical application and problem-solving (Herrington, Oliver, & Herrington, 2007).

By observing such features of learning and teaching, it can justifiably be claimed that the strategies of learning via research, problem-solving, discovery, collaboration, play, action-oriented learning and project-learning are precisely those of constructivist learning and teaching. Such learning strategies are also supported by modern digital media. This is especially so when what digital media in teaching have to offer is: 1) digital delivery, presentation and storing of information; 2) the performance of activities via digital media; and 3) digitally-mediated communication (Kanselaar, de Jong, Andriessen, & Goodyear, 2002).

It should be pointed out that the use of digital media in teaching does not directly facilitate the realisation of the desired outcomes of learning. They are facilitated by the didactic organisation of learning activities (e.g., Tamim et al., 2011; Topolovčan, Matijević, & Dumančić, 2015). In this respect, it is the interaction of the individual characteristics of pupils and teachers and of the various forms and strategies of learning that is important (Leutner, 1993). Cooperation (collaborative learning) via digital media is also significant (Swaak, van Jooligen, & de Jong, 1998). In order to achieve the desired outcome of learning, the level of pre-knowledge of the content being learnt and attitudes concerning the use of digital media are also key aspects (e.g., Lee & Chen, 2009). In general, constructivist learning also encourages the development of critical thinking, control of the learning process, cooperation and intrinsic motivation for learning (e.g., Bošnjak, 2009; Taylor, Fraser, & Fischer, 1997). It is not appropriate to examine the question of assessing the constructivist process and learning outcomes by using the instruments of teacher-centred classrooms (Rosen & Salomon, 2007), such as tests, testing, etc.

Regardless of the potential benefits of constructivist learning, which is organised, among other aids, with digital media, the use and the motivation to use digital media in the classroom can also come into question. It has been shown that the most modern information equipment (e.g., interactive multimedia software and the smart-board) is subordinated to traditional frontal teaching and didactic theory that advocates the teacher-centred approach (Ćurić et al., 2016; Petko, 2012). This can also be observed in terms of professional terminology and didactic theory used by the mentioned authors to explain the efficiency of modern media in the classroom (e.g., the repetition of material in Ćurić et al., 2016, p. 28). The expression "repetition of material" is appropriate to the didactic theories of the 19th and the first half of the 20th century, but not to the time when the theories of learning and the theories of teaching have come to offer much better explanations of effective learning. Gabriel et al. (2012) are of a similar opinion when they conclude that ways for the creative use of digital technology in the classroom have still not been found. Most of what happens in the classroom relies on the transmission of information (PowerPoint complemented with YouTube presentations). They recommend a more critical relationship towards digital technologies and didactic strategies that enable social constructivism (cf. Topolovčan & Matijević, 2016). In using computer software there are also certain contradictions in

terms of what the digital media can offer (for constructivist learning). Certain program follow a didactic approach that is too traditional, while others follow excessively the logic of printed textbooks. Even program that use touch screen technology do not manage to abandon the logic of learning from traditional textbooks (Choppin et al., 2014). It is interesting that the opinion of future teachers in terms of better organisation of teaching with digital media is that parents should be better acquainted with the content of computer games, that teachers are not sufficiently acquainted with it either, and that the excessive use of computers can lead to bad consequences. The "conservative" attitude of some students concerning the need for permanent education in the field of ICT in their future work is surprising (Ružić Baf, Radetić-Paić, & Zarevski, 2012).

Fahser-Herro and Steinkuehler (2009) hold that traditional teaching neglects the significance of digital literacy, especially the part relating to the use of Web 2.0 tools. Today, teachers are required to have a higher level of digital literacy that enables them to design their own applications that they can perfect and exchange. Further, there are also free or cheap tools that teachers can readily learn to use. Learning should come to include the time outside the classroom (Blake, 2015), which requires a change in the approach to instruction in relation to what happens in the classroom, even when classroom instruction relies on the internet and Web 2.0 tools. Learning organised outside the classroom and school leads to significant non-linear, logical and dynamic advances. This requires new approaches in the organisation of teaching and in the development of a new culture of learning (Rodek, 2011). Gormely and McDermott (2013) are of a similar opinion; they warn that all teachers in compulsory education (primary and secondary) must be well acquainted with, and integrate new digital literacy in their teaching. Screencasting (the preparation of short multimedia presentations on various topics from everyday life and the sciences) is one of such new types of literacy; these forms of digital literacy, in the opinion of the author, have special value and offer particular opportunities to include and motivate pupils to learn.

Further, even with the systematically conducted training of all teachers from the school attended by the respondents and the existence of conditions for using modern multimedia equipment, only 39% of respondents organised teaching in the modern classroom ten times during the school year, therefore, once a month. A lesser percentage of teachers (23%) organise teaching in such a classroom once a week. Other teachers taught in the modern classroom only once or never (Ćurić et al., 2016). Although there is no difference between teachers in terms of their gender and years of service, there is a significant difference between respondents in terms of the time spent training for the use of information technology. Karadağ (2012) obtained similar results, that is, nine out of twenty employed teachers believe that they are competent to use digital media, while six hold that they are not competent to do so, and five consider that they are partly competent. One of the important findings of the study is that future teachers hold that not enough attention is paid to

their preparation for teaching with digital media. Half of the respondents have a low perceived level of their own competence to use digital media in teaching. Gabriel et al. (2012) show that in order to learn pupils mostly use the internet, and they make use of software for learning maths and the natural sciences, emails, text messaging, and electronic databases. Below we present some of the answers that illustrate how pupils view digital media in their lives. Gonzalez-Vera (2016) claims, on the basis of her research, that a high percentage of pupils (92%) use social networks. Although the use of an e-learning platform is relatively new, all respondents stated that they were using it. The aim of this study is to show the positive effects of the use of new technologies in education, especially at university where a large number of students must be provided with active learning and timely feedback on their progress. During the research, positive interaction among students was observed. The students showed great enthusiasm for technology and learning by means of accessing digital media, and they placed great trust in these resources.

The research by Stephen, Henry, Deborah, and Coaster (2012) shows that students who own a personal computer and who have previous experience with tools important for the use of digital media have a significantly more positive attitude towards the role of digital media in their studies. Such students showed greater trust in digital media and assessed more favourably the importance of these media for studying. Further, students who study in the field of ICT have an even more positive attitude than other students. Ownership of a personal computer is a significant factor for positive attitudes and for belief in the efficacy of digital media, so researchers recommend that the state should find ways of enabling students to purchase computers at more affordable prices, including through credit lines. Researchers further recommend that more attention should be paid to the acquisition during secondary education of digital competences to serve as preparation for future studies.

It is evident from the studies shown that digital media are used to organise teacher-centred rather than pupil-centred instruction, which is determined to a significant extent by the competence of the teacher. The use, the reasons for use, and the frequency of such use greatly depend on the teacher and his or her motivation to use digital media. Jacquelynne S. Eccles and her associates (e.g., Eccles, 2005; Eccles & Harold, 1991; Wigfield & Eccles, 2000) developed a theory of values and expectations that was shown as optimal for the explanation of certain phenomena in instruction (e.g., Marušić, Jugović, & Pavin Ivanec, 2011; Wozney, Venkatesh, & Abrami, 2006). Namely, this theory places motivation to implement novelties, work, a certain type of behaviour or any other activity in the context of the interaction of three elements. The elements have been empirically confirmed (Eccles, 2005; Eccles & Harold, 1991; Wigfield & Eccles, 2000) and relate to the values, expectations, and the effort exerted. Expectations relate to conviction in one's own ability to perform a certain task or the expected successful outcome; the values relate to the intrinsic values correlated to a certain activity or task; and the effort exerted relates to the relationship between the

complexity of the task to be performed and the effort needed to perform the task (according to Marušić, Jugović, & Pavin Ivanec, 2011).

The theory of values and expectations was applied by Wozney, Venkatesh, and Abrami (2006) to the use of digital technology and media in the classroom, and they constructed a corresponding scale. They also applied three dimensions (values, expectations, and the effort exerted). In this respect, expectations relate to the expectations of the teacher related to the extent to which the implementation and the ability to use digital media will be successful. In other words, this is the relationship between the strategy of using digital media and the expected outcome of such use. It includes computer self-efficacy and the individual characteristics of the teacher and the environment in which the teacher works. Values relate to an assessment by the teacher of the value of digital media in the classroom. This includes the personal values and the conviction of the teacher. The third dimension relates to an assessment of the effort that will be needed in the (innovative) use of digital media in the classroom, that is, the relationship between the assessment of the complexity of the tasks performed with digital media and the effort used to perform such tasks.

This theoretical approach can justifiably be considered optimal for the study of the use of digital media in specific circumstances, such as teaching. This is particularly so since it is not possible to talk about a single universal type of teaching for everybody. This especially relates to the relationship and differences in teaching between the elementary and secondary school, i.e., the de-contextualisation of the teaching content and learning outcomes. For this reason, it is justified to examine the types and frequency of the use of digital media and the motivation to use them, but in relation to constructivist learning. It is especially important to examine the differences in the said phenomena between elementary and secondary school teachers, since insufficient research has been conducted in this area in Croatia.

Methodology

The aim of this paper is to examine the characteristics and differences in the frequency of use and the motivation to use digital media in teaching and in the organisation of constructivist learning between elementary and secondary school teachers in the Republic of Croatia.[1]

The research was conducted on a sample of groups consisting of elementary and secondary school teachers from several regions of the Republic of Croatia (*N*=368). In the subject sample, there were 62 (16.8%) male and 306 (83.2%) female teachers. Of the 191 (51.9%) elementary school teachers, 98 (51.3%) teach grades 1-4, 84 (44%) teach subject-based grades 5-8, and 9 (4.7%) work in extended stay. On the other hand, of the 177 (48.1%) secondary school teachers in the sample, 28 (15.8%)

[1] In Croatia, elementary education lasts eight years (primary and lower secondary education) and secondary education lasts 4 or 5 years (higher secondary education according to ISCED).

work in *gymnasiums*[2] and 149 (84.2%) work in vocational schools. There are 334 (90.8%) teachers in city schools and 34 (9.2%) in country schools. In terms of their initial training, 129 (35.1%) completed a faculty of teacher education/teacher training (pedagogy) college, 136 (37%) completed a teaching programme at one of the other faculties (e.g., Faculty of Science, Faculty of Humanities and Social Sciences, etc.), and 103 (28%) completed a study with subsequent training in pedagogy/psychology. The highest number of years of service was 42 years, and the lowest was the first/initial year of service (M=16.07; SD=10.39).

In terms of demographics, data were collected on gender (male/female), type of school where the teachers work (elementary/secondary school), the place where the school is located (village/city), the years of service and the type of initial education (faculty of teacher education /teacher training (pedagogy) college), a teaching programme at one of the other faculties (e.g., Faculty of Science, Faculty of Humanities and Social Sciences, etc.), some other study (Faculty of Mechanical Engineering and Naval Architecture) with subsequent training in pedagogy/psychology. In this paper, we analyse only the results in view of the type of school in which the subjects are employed.

Data on the frequency with which teachers implement certain digital media in class were collected using a six-point Likert scale (1- *never*, 2 – *rarely*, 3 – *sometimes*, 4 – *often*, 5 – *very often*, 6 – *always*) with 19 items. Items used by Petko (2012) in his research in Switzerland were used as an example to form the items in this study, and they related to the following: presenting video recordings, filming video recordings, using PowerPoint presentations, using various specialised computer programs, using writing programs, using Excel, playing computer games, using drawing programs, searching for information on the internet, presenting homework, designing various types of multimedia content, programming, using digital media for writing homework, using online platforms (e.g., *Moodle*), making audio recordings, presenting audio recordings, using social networks, and using printers.

The *Constructivist Learning Environment Scale* (Taylor, Fraser, & Fischer, 1997) was used to collect data on constructivist learning, and the *Technology Implementation Questionnaire* (Wozney, Venkatesh, & Abrami, 2006) was used for data on the motivation to use digital media in teaching.

The *Constructivist Learning Environment Scale* was constructed by Taylor, Fraser, and Fischer (1997).The scale was translated from English to Croatian, back translated with the permission of the authors, and adapted to the cultural and linguistic context of the Croatian sample. This scale was primarily constructed for pupils, so for this research it was adapted to the sample of teachers, and for an examination of teaching processes. Originally, the scale consisted of five latent subscales and thirty-five manifest items on a four-point Likert scale (1– *completely disagree* through 4 – *completely agree*).

[2] *Gymnasiums* are more academically oriented secondary schools in Croatia

Each subscale consists of seven manifest items, and the subscales are as follows: personal relevance, uncertainty, critical voice, shared control and student negotiation. In view of the nature of the problem and cultural differences in the sample, in this study we used only four dimensions. We did not use the dimension of uncertainty. The dimension "personal relevance" relates to the intrinsic motivation in learning, the correlation between what the pupil is learning in school and the outside world and practical application. The dimension "critical voice" relates to the possibility of an independent thinking process about what is being learnt, voicing one's opinion, assessing the importance of information and connecting what is being learnt. "Shared control" relates to activities that enable the pupil to organise his or her own learning process and how and where to study (in general, this relates to the individualisation of work). "Student negotiation" relates to the possibility of collaborative learning. Since the scale was translated and since certain parts were modified, an exploratory factor analysis (EFA) was conducted with oblique rotation and an eigenvalue greater than 1.00 and saturation of 4.0. The data were appropriate for analysis (KMO=.95; Bartlett's sphericity test was significant, χ^2=5483.23; p=.000).

The five latent factors together account for 61.39% of the total variance. Although five factors were identified, the structure may be regarded to indicate four (original) factors. The scree plot confirms the indications, because it points to four possible factors. Therefore, a confirmatory factor analysis with four factors was conducted. The four factors account for 57.79% of the common variance and they somewhat satisfactorily replicate the original factor structure, although the distribution of manifest items per factor is not completely identical to the original factor structure. Therefore, four composite factors were constructed according to the original factors on this scale. In this respect, all further caution and implications concerning the interpretation of the final results are accepted. The factors show satisfactory internal reliability according to the Cronbach α test (Table 1). Correlations between the composite formed factors are personal relevance and critical voice r=.65; personal relevance and shared control r=.53; personal relevance and student negotiation r=.62; critical voice and shared control r=.60; critical voice and student negotiation r=.61; shared control and student negotiation r=.70 (all correlations are statistically significant at the level p<.01).

Data on the use of digital media in teaching were collected via the *Technology Implementation Questionnaire* (TIQ) developed by Wozney, Venkatesh, and Abrami (2006) based on the expectancy-value theory. The scale was also back-translated with the permission of the authors and certain terms were modified in the cultural and linguistic context of the sample of subjects. The scale includes thirty-three manifest items that comprise three latent subscales. The first dimension is expectancy, which includes ten items. The second is value, and it includes fourteen items. The third is cost, and includes nine items. The dimension "expectancy" relates to what teachers expect from using digital media, that is, their positive expectations and that the use of

such media will improve and rationalise their teaching. The dimension "value" relates to the general personal values correlated with digital media, that is, whether teachers consider them good or not. The dimension "cost" relates to the assessment of whether the use of digital media in teaching requires additional effort, learning and work on their part compared to teaching without digital media. The items are constructed in the form of an original six-point Likert scale. For the purposes of this research, the authors used four points (1 – *completely disagree* through 4 – *completely agree*). The authors conducted an exploratory factor analysis (EFA) with promax rotation and an eigen value greater than 1.0 and saturation of 4.0. The data were suitable for analysis (KMO=.90; Bartlett's sphericity test was significant, χ^2=4305.75; p=.000).

The seven latent factors that were obtained account for 58.58% of the total variance. It is evident that the original factor structure did not appear, so a confirmatory factor analysis with three fixed factors was conducted. The scree plot test also points to the three factors, although the EFA also showed four components with saturation at two manifest statements respectively. This conditionally points to three factors. The three factors account for 40.51% of the total variance and they replicate the original factor structure to a relatively satisfactory level. Since we can hold that such components are not completely interpretative but that they do point to the three factors, the authors made a composite construction of the three factors based on the original factor structure of the questionnaire. Just as in the previous scale, all further caution and implications concerning the interpretation of final results were accepted. Table 1 shows mostly satisfactory α reliability. The intercorrelations of the composite-formed factors are Value and Expectancy, r=.55; Value and Cost, r=.71; Expectancy and Cost, r=.55 (all correlations are statistically significant at the level p<.01).

Table 1
Features of the scales used

Scales and subscales	*N* items	*M*	*SD*	Cronbach α
Constructivist Learning Environment Scale				
Personal relevance	7	3.36	.52	.86
Critical voice	7	3.44	.50	.85
Shared control	7	2.96	.55	.83
Student negotiation	7	3.08	.49	.84
Technology Implementation Questionnaire				
Value	14	2.89	.65	.88
Expectancy	10	2.83	.59	.71
Cost	9	2.83	.66	.68

Results

It was shown that teachers, in general, *sometimes or rarely* organise learning activities with digital media for pupils (Table 2). The only exception is that, at the level of the whole sample, teachers *often* organise learning activities for pupils where they use PowerPoint presentations, computer programmes for text-writing, and the internet

Table 2

Differences in using certain types of digital media between elementary and secondary school teachers

Use of digital media	Whole sample			Elementary school			Secondary school			z	U
	M	*SD*	*Mdn*	*M*	*SD*	*Mdn*	*M*	*SD*	*Mdn*		
Showing video recordings	2.94	1.32	3	2.79	1.32	3	3.10	1.31	3	-1.92	15009.0
Making video recordings	1.90	1.02	2	1.83	.98	1	1.97	1.05	2	-1.26	15713.0
Using PowerPoint presentations	3.87	1.36	4	3.66	1.42	4	4.08	1.26	4	-2.65	14275.5**
Using specialised computer programmes	2.41	1.27	2	2.23	1.24	2	2.61	1.27	3	-3.03	13925.0**
Using text-processing computer programmes	3.58	1.6	4	3.34	1.64	3	3.85	1.49	4	-3.04	13870.5**
Using Excel	2.32	1.32	2	2.09	1.27	2	2.56	1.34	3	-3.71	13271.0**
Playing computer games	2.35	1.68	1.5	2.52	1.67	2	2.16	1.67	1	-2.54	14486.0*
Using drawing programmes	2.15	1.26	2	2.18	1.26	2	2.11	1.26	2	-.69	16242.0
Searching for information on the internet	4.02	1.36	4	3.90	1.44	4	4.16	1.26	4	-1.69	15227.5
Communicating via the internet	3.39	1.75	3	2.96	1.71	3	3.84	1.69	4	-4.82	12068.5**
Presenting homework	3.06	1.44	3	2.76	1.44	3	3.38	1.36	3	-3.99	12931.5**
Designing multimedia content	2.42	1.19	3	2.27	1.19	2	2.59	1.17	3	-2.59	14356.0*
Programming	1.43	.87	1	1.40	.90	1	1.46	.84	1	-1.39	15829.0
Using digital media for doing homework	2.76	1.25	3	2.55	1.22	3	2.98	1.13	3	-3.18	13766.5**
Using online platforms	1.64	1.02	1	1.54	.91	1	1.75	1.13	1	-1.91	15235.0
Making audio recordings	1.73	.99	1	1.68	.99	1	1.79	.99	1	-1.39	15634.5
Presenting audio recordings	1.78	1.03	1	1.73	.98	1	1.86	1.08	1	-1.22	15785.5
Using social networks	2.95	1.71	3	2.45	1.53	2	3.49	1.73	4	-5.68	11252.0**
Using the printer	2.63	1.61	3	2.52	1.59	2	2.75	1.62	3	-1.36	1557.0

*$p < .05$; **$p < .01$

(searching for information on the internet). Non-parametric Mann-Whitney U test was used to explore differences in the assessment of the frequency of the use of specific media between primary school and secondary school teachers. This test was used due to the method of data collecting (a questionnaire with an ordinal scale - Likert type scale), thus the data were not appropriate for analysis with parametric t test (Opić, 2010). In certain cases (in terms of the frequency) of organising learning activities where pupils can also use digital media, there are statistically significant differences between elementary and secondary school teachers. It was shown that secondary school teachers organise learning activities where pupils use PowerPoint presentations, specialised computer program, text-processing program (Word), Excel tables, the internet, and present homework, make multimedia content, do homework with digital media, and use social networks somewhat more often. On the other hand, elementary school teachers allow pupils to play computer games more often. In other

words, secondary school teachers usually also organise learning activities with digital media somewhat more often. Nonetheless, it is important to point out that, with a few exceptions in the *frequent* use of digital media (PowerPoint presentations, text-processing program, and internet communication), all other uses and any differences in such use lie in the domain of *sometimes*.

In terms of assessing the motivation to implement digital media in teaching, in general, teachers at the level of the whole sample view the values and expectations connected with the use of digital media in teaching positively and consider that the use of such digital media does not require additional effort on their part. In other words, teachers hold that digital media are something valuable and significant and they have positive expectations that their potential use in the classroom might significantly contribute to learning outcomes. Further, teachers hold a positive view of the effort needed to use digital media, that is, they hold, in general, that in teaching with digital media they can achieve better learning outcomes for pupils (Table 1). Such results are projected even when we compare the motivation to use digital media in teaching between elementary and secondary school teachers (Table 3). Since a questionnaire with an ordinal scale - Likert type scale - was used for data collection, Mann Whitney U test was used for data analysis. Elementary and secondary school teachers hold the values of digital media and their expectations from the potential benefits that the media might provide in learning activities equally positively and consider that the use of digital media does not require additional effort on their part.

In terms of constructivist learning, teachers at the level of the whole sample (Table 1) positively assessed its four dimensions (personal relevance, critical voice, shared control, and student negotiation, that is, collaborative learning). In other words, teachers hold that the teaching and learning activities they organise are constructivist instruction and learning. Further, when we compare the assessments of constructivist instruction between elementary and secondary school teachers, there are certain statistically significant differences (Table 3). Also, since a questionnaire with an ordinal scale - Likert type scale - was used for data collection, Mann Whitney U test was used for data analysis to compare the results in constructivist instruction and learning. It was shown that elementary school teachers hold that their teaching is somewhat more intensively organised according to the principles of constructivism in terms of the dimensions of the personal relevance of learning, critical voice in learning, and student negotiation (collaborative learning) than secondary school teachers. It should be pointed out that regardless of the statistically significant differences, the assessments of elementary and secondary school teachers are within the domain of positive assessments of constructivist learning (Table 3).

Table 3

Differences in constructivist learning and the implementation of digital media in the classroom between elementary and secondary school teachers

Scales	Elementary school			Secondary school			z	U
	M	*SD*	Mdn	M	SD	Mdn		
Constructivist Learning Environment Scale								
Personal relevance	3.45	.48	3,57	3.26	.55	3.43	-3.42	13436.0**
Critical voice	3.52	.47	3.57	3.36	.52	3.43	-3.28	13585.0**
Shared control	3.01	.57	3	2.90	.53	3	-1.91	14960.0
Student negotiation	3.17	.49	3.14	2.99	.49	3	-3.98	12877.5**
Technology Implementation Questionnaire								
Value	3.07	.46	3.07	2.99	.45	3.00	-1.79	15080.50
Expectancy	3.01	.40	3.00	2.98	.40	3.00	-.94	15946.50
Cost	2.98	.41	3.00	2.96	.39	3.00	-.71	16180.00

*p< .05; **p< .01

In terms of the correlation between motivation to use digital media and the frequency of its use in teaching, the Spearman's correlation test conducted on elementary school teachers (Table 4) showed that teachers who hold more positive values connected with the use of digital media in teaching also more frequently organise lessons where pupils show video recordings, use PowerPoint presentations, play computer games, search for information on the internet, communicate via the internet, make multimedia content, use digital media for doing homework, use online learning platforms, make audio recordings and use social networks. Further, it was shown that more positive expectations from using digital media in the classroom are generally connected with the more frequent presenting of audio recordings, playing of computer games and the use of social networks on the part of pupils. Teachers who hold that the use of digital media in the classroom does not require additional effort and investment on their part also more frequently organise lessons where pupils show video recordings, use PowerPoint presentations, play computer games, search for information on the internet, communicate via the internet, make multimedia content, do homework with the help of digital media, use online learning platforms, make and present audio recordings, use social networks, and use the printer.

The following statistically significant correlations appeared in terms of the correlation between constructivist learning and the frequency of teaching where pupils can use certain types of digital media: teachers who organise lessons that allow pupils to develop a higher level of personal relevance also enable pupils to present their video recordings and to design multimedia content more often in their learning activities. Teaching that helps pupils in the development of critical voice is also correlated with the more frequent showing of video recordings, the making of multimedia content, and the making of audio recordings. Teaching that enables pupils to control their own learning processes is correlated with the more frequent showing of video recordings, the making of video recordings, playing computer games, using computer drawing

programmes, searching for information on the internet, internet communication, making multimedia content, using digital media in order to do homework, using social networks, and using the printer. Teaching that enables collaborative learning is correlated with the more frequent showing of video recordings, using specialised computer programmes, making multimedia content, making audio recordings, presenting audio recordings, and using online learning platforms (Table 4).

In terms of the correlation between the dimensions of the motivation to use (implement) digital media in teaching and to organise constructivist learning, it was seen that higher levels of expectation from digital media and their value, but also the view that it was not expected that greater effort would be needed to use them, are correlated with teaching that provides pupils in learning activities with intrinsic motivation (a sense of importance) to learn, critical voice, shared control and collaborative learning (Table 4).

Table 4

Correlation in constructivist teaching, implementation, and the frequency of using certain digital media in relation to elementary school teachers

	Value	Expectancy	Cost	Personal relevance	Critical voice	Control	Student negotiation
Showing video recordings	.22**	.15*	.30**	.21**	.21**	.33**	.23**
Making video recordings	.08	.06	.08	.08	.14	.23**	.123
Using PowerPoint presentations	.15*	.09	.15*	.11	.02	.14	.12
Using specialised computer program	.14	.11	.12	.06	.08	.09	.16*
Using text-processing computer program	.06	.05	.10	.03	.01	.14	.05
Using Excel	.06	.03	.023	.06	-.02	.10	.06
Playing computer games	.18*	.15*	.18*	.02	.02	.18*	.10
Using drawing programmes	.13	.05	.10	-.01	.06	.15*	.09
Searching for information on the internet	.18*	.06	.15*	.09	.11	.28**	.14
Communicating via the internet	.17*	.11	.16*	.08	.12	.22**	.08
Presenting homework	.12	.01	.11	.07	.13	.13	.07
Making multimedia content	.26**	.13	.20**	.18*	.21**	.24**	.21**
Programming	.09	.03	.12	.02	.06	.10	.07
Using digital media for doing homework	.16*	-.01	.17*	.02	.18*	.15*	.13
Using online platforms	.15*	.05	.16*	.05	.14	.24**	.14
Making audio recordings	.17*	.08	.16*	.04	.14*	.17*	.14*
Presenting audio recordings	.18*	.08	.16*	.039	.12	.17*	.14*
Using social networks	.21**	.17*	.24**	.06	.13	.19**	.11
Using the printer	.10	.06	.19**	.04	.09	.20**	.08
Value	1.00	.62**	.67**	.32**	.36**	.39**	.40**
Expectation	.62**	1.00	55**	.23**	.30**	.32**	.30**
Cost	.67**	.55**	1.00	.25**	.23**	.31**	.24**

*p< .05; **p< .01

The following statistically significant correlations were determined with reference to secondary school teachers in terms of their motivation to use digital media and the frequency of their use (Table 5): teachers who assign a higher level of value to

digital media more often organise learning activities where pupils can make video recordings, search for information on the internet, communicate via the internet, make multimedia content, use digital media for doing homework, use online learning platforms, make audio recordings, present audio recordings, and use the printer. Teachers who assign a higher level of expectation to digital media also more often enable pupils to make video recordings, search for information on the internet, communicate via the internet, make audio recordings, and present such recordings. Teachers who hold that the use of digital media requires no additional effort and investment on their part more frequently, to a statistically significant degree, organise classes where pupils present video recordings, use PowerPoint presentations, make multimedia content, make audio recordings, present audio recordings and use the printer.

In terms of the correlation between the frequency of using digital media and constructivist learning (Table 5), it was shown that teachers who organise learning activities that are intrinsically important to pupils also more frequently organise learning activities where pupils can use PowerPoint presentations, design multimedia

Table 5

Correlation in constructivist learning, implementation, and the frequency of using certain digital media in relation to secondary school teachers

	Value	Expectancy	Cost	Personal relevance	Critical voice	Control	Collaborative learning
Showing video recordings	.14	.53	.15*	.12	.15	.19*	.21**
Making video recordings	.17*	.15*	.06	.05	.14	.1**	.17*
Using PowerPoint presentations	.11	.01	.17*	.18*	.15*	.171	.23**
Using specialised computer programmes	.15	.02	.11	.04	-.01	.11	.11
Using text-processing computer programmes	.09	-.14	.08	.04	.09	.11	.08
Using Excel	.05	.05	.06	-.09	-.06	.01	.08
Playing computer games	.02	.09	-.01	-.10	.02	.08	.02
Using drawing programmes	.09	.12	.07	-.02	.01	.05	.01
Searching for information on the internet	.19*	.28**	.14	.09	.15*	.14	.12
Communicating via the internet	.18*	.20**	.15	.04	.08	.16*	.09
Presenting homework	.14	.08	.08	.14	.09	.1	.23**
Making multimedia content	.24**	.05	.15*	.19*	.20**	.22**	.30**
Programming	.03	.06	.05	-.02	.09	.18*	.14
Using digital media for doing homework	.20**	.13	.16*	.24**	.16*	.15*	.21**
Using online platforms	.22**	.08	.11	.10	.07	.14	.16*
Making audio recordings	.27**	.27**	.17*	.02	.09	.15	.09
Presenting audio recordings	.25**	.20**	.16*	.08	.11	.16*	.13
Using social networks	.11	.14	.11	.03	.11	.15*	.14
Using the printer	.20**	.14	.23**	.02	.10	.12	.08
Value	1.00	.39**	.70**	.31**	.15*	.23**	.25**
Expectation	.39**	1.00	42**	.09	.17*	.21**	.22**
Cost	-.70**	.42**	1.00	.32**	.20**	.29**	.26**

*$p < .05$; **$p < .01$

content, and use digital media to do their homework. Further, teachers who enable pupils to use their critical voice in learning also enable them more frequently to use PowerPoint presentations, search for information on the internet, design multimedia content, and use digital media for doing their homework. Teachers who enable pupils to have higher shared control in learning processes also more frequently enable them to show video recordings, make video recordings, communicate via the internet, design multimedia content, program, use digital media for doing their homework, present audio recordings, and use social networks. It was found that teachers who enable collaborative learning also more frequently enable pupils to show video recordings, make video recordings, use PowerPoint presentations, present homework with digital media, design multimedia content, use digital media for doing their homework, and use online learning platforms.

In terms of secondary school teachers, it was shown that an assessment of higher value of and expectations from digital media in teaching, also not expecting the need for greater effort in the use of such media, is correlated with teaching that enables pupils during learning activities to have a higher level of personal relevance in learning, critical voice, shared control, and collaborative learning (Table 5).

Discussion

The journey from teaching to independent learning, from instruction to self-instruction, from traditional to constructivist didactics is not straightforward. It is difficult to replace teaching that is dominated by the activities of the teacher with learning where the pupil is more active than the teacher, even with the help of numerous and powerful digital media (Blake, 2015). The results of this research confirm the above statement and the explanation of certain causes and conditions in the process of the transformation of the teacher-oriented approach to the pupil-oriented approach.

In Croatian schools, the curricula change slowly, so we have obsolete curricula that do not inform teachers on learning about and via digital media. The school is still dominated by instruction from the front of the classroom or frontal teaching, so teachers put pupils in a situation where they prepare PowerPoint presentations, resulting in the fact that even in that activity the pupil is reduced to supporting frontal teaching.

In this paper the authors compare the results of the assessment of the characteristics and differences of using certain digital media between elementary and secondary school teachers as well as the differences in the assessment of constructivist learning and the use of digital media in the classroom between elementary and secondary school teachers. In order to understand the results published in this paper, it is important to bear in mind that Croatian elementary (eight-year) school is compulsory for all children, but secondary school is not. Compulsory schools in Europe are characterised by non-selectivity and the "pedagogy of success for all" which are ensured through the didactic paradigm encapsulated in the expression "didactic contract" (Baert, 1989).

Secondary school is selective, since pupils enrol in a particular secondary school through a selection process that is based on school grades from compulsory elementary school, and the selection continues throughout secondary education via a rigid system of school grades. School grades are mostly used to grade the quantity of information acquired, and less the quality and quantity of competences acquired.

Teachers are aware of the importance of constructivist learning, but the whole school system is embedded in the paradigm of programme-centrism: the programme must be covered. Elementary school teachers have a little more leeway than the rigid paradigm described in secondary education, because elementary schools are general education schools where the aim is to work within the framework of pedagogy of success for all and where the didactic solution is characterised by learning based on agreement, that is, a didactic contract. Elementary school teachers provide more opportunities and freedom for the creativity of pupils and for their own creative deviation from school programmes.

Bearing in mind the previous statements, the way in which teachers encourage pupils' independence and the use of computer program and tools is commendable. The programmes of some secondary vocational schools are by their very nature fit for the use of digital media (pupils search for information on the internet, do their homework by using the internet and various computer program, play highly attractive and pedagogically valuable computer games). However, this is still not sufficient to satisfy the developmental needs and learning styles of the net generations (research and creative activities of pupils via digital media). Some research papers admonish teachers that they are not sufficiently aware of the content and advantages of computer games, and there are more papers that warn about the harm and danger of playing computer games than those that present the didactic and pedagogic value of such games (Ružić Baf, Radetić-Paić, & Zarevski, 2012).

Teachers are aware of the advantages of digital media, but they are excessively encumbered by the paradigm of instruction that is focused on the programme and the teacher (the syllabus must be covered, and the syllabus will be covered if there is a lot of talking and demonstration and if the pupils listen and watch carefully). This shows that constructivist learning in Croatian schools is still far from what is desirable (Ćurić et al., 2016).

Factual and reproduced knowledge, rather than creative and research competence, is still more valued as a learning outcome in the school evaluation system. Such stereotypes and misconceptions cannot be eliminated without the ongoing training of both teachers and staff who work on the external evaluation of learning outcomes in elementary and secondary schools (Bognar, 2016).

Although we are dealing with the same education system, the context in which secondary school teachers have to work is different from that of elementary school teachers. Secondary school teachers are in a quite different position from elementary school teachers, especially when it comes to the curriculum, the purpose of education,

and the fact that the secondary school is not compulsory but is heavily marked by selection (Fahser-Herro & Steinkuehler, 2009; Gonzalez-Vera, 2016; Karadağ, 2012). They are more exposed to pupils' questions about the purpose of learning in school: "What is the point of what I am learning here?" There are too few teachers who are professionally confident enough to steer away from the traditional understanding of learning outcomes in instruction (factual and reproduced knowledge).

Teachers do not differentiate between the purpose of using digital media in the form of presentation techniques (PowerPoint) and the creatively active participation of pupils in the design and making of multimedia materials, audio-visual content or participation in social networks for learning purposes. They look highly upon the making of PowerPoint presentations, the searching for information on the internet, and learning by means of online platforms. However, the aesthetic, didactic and communicative quality of PowerPoint presentations used by pupils and teachers in the classroom is questionable.

Showing video recordings and making multimedia programmes are two significantly different activities: in one of them, pupils are passive consumers of something that was made by someone else, and, in the other, they are active creators and authors of their own values. Of course, the second situation encourages pupils to a greater extent to embrace a critical voice and to gain more self-control over their learning. Teachers accept instruction with PowerPoint presentations, but one should be aware of the limitations of "covering the programme" in this way, which is far removed from constructivist learning.

Playing computer games, using computer program for drawing, searching for information on the internet, communicating on the internet, making multimedia content, using digital media for the purpose of doing homework, using online learning platforms, making audio recordings, presenting audio recordings, using social networks, and various other forms of collaborative learning contribute to a much greater extent to the realisation of the ideal of the pupil-centred approach: more learning – less instruction (Petko, 2012).

This is the basic motto of constructivist learning and constructivist didactics, but many teachers in Croatian schools are still far from accepting the didactic paradigm in question. With more activities using digital media, pupils find it easier to understand the purpose of learning and feel the importance of their own initiative and activity.

Teachers who have become aware of the value of digital media and who express a higher level of expectation from digital media ask pupils to engage in activities that rely on digital media more often, while teachers who are not satisfied with their work and who are not keen to embrace further work are also not keen to give assignments to pupils that will result in diverse types of work that have to be graded and discussed. Of course, this also requires teachers to prepare more extensively and in different ways from what they have done previously. Teachers find it difficult to change, particularly their usual habits.

Conclusion

Further to a comparative analysis of the previous studies and theoretical tenets of the phenomena that are researched and the interpretation of the results obtained, it is possible to draw certain conclusions. It has been shown that teachers only sometimes or rarely use various types of digital media, with the exception of the frequent use of PowerPoint presentations and searching for information on the internet. In general, secondary school teachers use digital media somewhat more frequently, but this is still in the domain of using them only sometimes. Elementary and secondary school teachers make a similarly positive assessment of their motivation to use digital media in teaching. Both subgroups, elementary and secondary school teachers, hold that the teaching they provide is also constructivist, although elementary school teachers are somewhat more inclined to believe this. It is justified to claim that elementary and secondary school teachers who hold positive views regarding digital media, and if they organise collaborative learning and enable pupils to control their own processes of learning, also use certain digital media more often.

By linking the conclusions from individual results, it is justified to conclude that regardless of the fact that elementary and secondary school teachers are characterised by positive motivation to use digital media, they still do so only sometimes or rarely. On the other hand, although both groups of teachers hold that their teaching is constructivist, it is not, which is confirmed by the frequent use of PowerPoint presentations, that is, the domination of frontal teaching. The frequent use of PowerPoint presentations is a substitute for the use of "blackboard and chalk" or the overhead projector and it shows that instruction is organised along the lines of frontal teaching and lecturing, and that it is teacher-oriented, i.e., it involves pupils sitting, keeping silent and copying information stated in the syllabus into their notebooks. Therefore, it can be concluded that there is a discrepancy between what teachers believe are the characteristics of their method of teaching and the actual teaching they deliver.

In this respect, professional training is recommended for elementary and secondary school teachers in the form of practical workshops based on the content and outcomes of multimedia and constructivist didactics. The implementation of constructivist and multimedia didactics into the programmes of teaching studies is also indispensable, that is, it is necessary for elementary and secondary school teachers to intensify their acquisition of new didactic literacy. Such literacy should be based on the heutagogical and constructivist scientific paradigm (Blaschke, 2012).

Finally, it is necessary to point out the limitations of this study. The first is that it does not analyse the differences in the phenomena researched in terms of the location of the school, the teachers' years of service, the type of teaching in grades 1-4 and subject-based teaching in the elementary school, and the types of secondary schools. Thus, better insight into the studied matter would have been obtained. Another limitation is the absence of a sample of pupils that would enable a comparison to be made between

what teachers believe and how pupils experience it (see Matijević, Opić, & Rajić, 2015). Despite these limitations, the results of the research present valuable insight into the educational context and the characteristics of teaching in elementary and secondary schools, and the said limitations are at the same time recommendations for further research.

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Nastavničke procjene upotrebe digitalnih medija i konstruktivističke nastave u primarnom i sekundarnom obrazovanju

Sažetak

Cilj istraživanja bio je ispitati učestalost i motivaciju za upotrebu digitalnih medija u poučavanju i organizaciji konstruktivističke nastave i razlike između nastavnika osnovne i srednje škole (N=368). Rezultati istraživanja pokazali su da se obje podskupine nastavnika rijetko ili gotovo nikada ne koriste različitim digitalnim medijima s iznimkom čestog korištenja PowerPoint prezentacija. S druge strane, svi nastavnici su pozitivno motivirani za korištenje digitalnih medija u nastavi. I osnovnoškolski i srednjoškolski nastavnici procjenjuju da je nastava koju organiziraju konstruktivistička nastava, s time da je nešto pozitivnije procjenjuju nastavnici osnovnih škola. Pozitivnije vrijednosti i očekivanja od upotrebe digitalnih medija kod obje su skupine nastavnika povezani i s njihovom učestalijom upotrebom u nastavi. I kod osnovnoškolskih i srednjoškolskih nastavnika učestalija je upotreba pojedinih digitalnih medija povezana s nastavom na kojoj učenici suradnički uče i imaju kontrolu nad vlastitim procesom učenja. Na temelju interpretacije rezultata istraživanja opravdano je zaključiti da unatoč pozitivnoj motivaciji za upotrebu digitalnih medija u nastavi, kao i procjenama da je nastava koju nastavnici organiziraju konstruktivistička, generalno nastavnici još uvijek u velikoj mjeri organiziraju nastavu koja je orijentirana na njih ili na predmet, što potvrđuje česta upotreba PowerPoint prezentacija (frontalna nastava). Interpretacije i implikacije rezultata prikazane su u radu.

Ključne riječi: *digitalni mediji u nastavi; e-učenje; konstruktivističko učenje; primarno obrazovanje; sekundarno obrazovanje; uloga nastavnika.*

Uvod

Glavni subjekti u nastavnom procesu su učenici i učitelji, a njihove aktivnosti u stručnoj literaturi označavamo izrazima učenje i poučavanje. Kvalitetno poučavati

mogu samo dobro informirani, osposobljeni i motivirani učitelji. U proteklih stotinu godina stručnjaci su nudili različite teorije za objašnjenje učenja, odnosno aktivnosti i postignuća subjekata koji uče (Bognar, 2016). Međutim, i uza sve ponuđene teorije učenja još uvijek ima otvorenih pitanja za istraživače. Nova se pitanja javljaju uz organiziranje učenja i poučavanja u novom multimedijskom okruženju (Matijević, 2015). Za razumijevanje i objašnjavanje cjeloživotnog učenja korisno je uspoređivati spoznaje o učenju u različitim razdobljima čovjekova života.

U školi za djecu i tinejdžere učitelji odlučuju što, kada i kako će se učiti. Učenici su ovisni o odlukama učitelja. Učitelji su glavni u vođenju i usmjeravanju učenja. To je tako od kada postoji škola, u skladu s dominantnim pedagoškim i didaktičkim teorijama. Pri donošenju tih odluka učitelju je od pomoći nastavni kurikul. Sve je podređeno, dakle, kurikulima nastavnih predmeta (engl. *subject centred*). Nastavnici dizajniraju proces učenja te predlažu i pripremaju materijale koje smatraju djelotvornima za postizanje željenih rezultata (Blake, 2015).

Odrasli se odnose prema učenju različito u odnosu na djecu i mlade. Prije gotovo pola stoljeća na te je razlike ukazao Knowles (Knowles, 1970; prema Hase i Kenyon, 2001). Prema Konowlesu odrasli su intrinzično motivirani i samousmjereni (engl. *self-directed*). Odrasli uče oslanjajući se na bogata životna iskustva i prethodna iskustva s učenjem. Oni su usmjereni na jasan cilj i na učenje bitnog koje je povezano s praksom. Osim toga oni očekuju da ih se tijekom poučavanja i učenja uvažava. Odrasli su svjesni važnosti vlastite aktivnosti tijekom učenja te nalaženja veze između osobnih uvjerenja i aktivnosti sa sadržajem i ishodima učenja. Dok djeca i mladi rješavaju probleme u nastavi neovisno o trenutnim i budućim svakodnevnim životnim aktivnostima, odrasli nastoje aktivnost učenja uskladiti s osobnim uvjerenjima i aktivnostima. U stručnoj se literaturi ukazuje na potrebu razlikovanja učenja po modelu jednostruke povratne veze (kod djece i mladih) od učenja po modelu dvostruke povratne veze kod odraslih učenika (prema Eberle i Childress, 2005). Dalje, odrasli učenici u svakoj aktivnosti učenja nastoje uočiti promjene u osobnim kompetencijama. To se objašnjava kao transformacijsko učenje (Mezirow, 1997). Sve spomenuto možemo uočiti kod odraslih koji se odlučuju na učenje radi stjecanja digitalnih i poduzetničkih kompetencija ili radi poboljšanja kompetencija u služenju nekim stranim jezikom itd. Što bi se od nabrojanoga moglo primijeniti pri organiziranju i pomaganju učenja i poučavanja djece i mladih u novom multimedijskom okruženju?

U obrazovanju (nastavi) za odrasle subjekti koji uče su samostalni. Oni su „rješavatelji problema" koji "pronalaze rješenja" dolaska na odredište o kojem su drugi odlučili. Cilj je njihov glavni pokretač. Oni su usredotočeni na zadatak koji omogućuje interdisciplinarno razmišljanje i autonomiju. Nastavnici su voditelji koji postavljaju zadatke te potiču različite putove do rješenja nastojeći poticati metakognitivne aktivnosti kod subjekata koji uče. Sve to je rezultat andragoških teorija, koji predstavlja određeni otklon od pedagoške prakse i teorija (Blake, 2015).

Viši stupanj aktivnosti bio bi ako se omogući i potiče subjekte koji uče da uočavaju probleme. Učenje treba biti prije svega osobno uvjetovano (engl. *self-determined learning*). Na učenje pokreću pitanja koja učenici sami postavljaju razmišljajući dugoročno o svrsi vlastitog učenja. Učenici (polaznici, studenti) traže uvijek nove izazove, složenost i neizvjesnost. Za takvo ponašanje potreban im je trener. Učitelj-trener ujedinjuje mogućnosti, kontekst, vanjsku važnost i složenost te potiče kulturu suradnje i znatiželje. Takav kontekst učenja i ponašanja subjekata koji uče i onih koji im u tome pomažu stručnjaci u novije vrijeme vezuju uz pojam heutagogija (engl. *heutagogy*; grč. „heuta" εαυτός – samo i „ago" ἄγω – voditi , samostalno voditi). Prethodne rečenice ukratko opisuju put od pedagogije, preko andragogije do heutagogije.

Da bi se za djecu i mlade omogućilo učenje prema načelima heutagogije, potrebno je osigurati visoku razinu kontrole, vođenja i didaktičkog strukturiranja sadržaja učenja, uz uvažavanje zrelosti i samostalnosti subjekata koji uče. Važan cilj nastavnih i školskih aktivnosti je učiti kako se uči u digitalnom multimedijskom okruženju.

U školama se već zapošljavaju učiteljice i učitelji koji su odrastali uz suvremene digitalne medije i koji sebi teško mogu dočarati život bez električne energije, bez televizije ili nekog računala u stanu. Istodobno, u školama su još uvijek zaposleni učitelji i nastavnici koji su odrastali u okruženju bez digitalnih medija, osobito bez računala. Zato su zanimljiva i korisna istraživanja promjena u nastavnoj komunikaciji uvjetovanih posjedovanjem suvremenih komunikacijskih medija i od učenika i od nastavnika, kao i procjenama osobnih digitalnih kompetencija i mogućnosti obogaćivanja nastavnih scenarija interaktivnim multimedijima.

Uz pojavu digitalnih medija u nastavi javlja se velik broj istraživanja koja se odnose na učitelje i učenike kao glavne subjekte nastavnog procesa, zatim na didaktičke strategije i sadržaje koje digitalni mediji posreduju subjektima koji uče. Ispituju se stavovi i mišljenja učenika i učitelja o novim medijima, ali i priroda samih medija (Rodek, 2007). Istraživači se oslanjaju na različita metodološka rješenja i pristupe, što je uvjetovano ciljevima istraživanja i prirodom istraživačkih pitanja. Dosta je istraživanja u kojima autor zanemaruju da se radi o moćnim medijima (hipermediji) koji su daleko iznad svega što je bilo na raspolaganju učiteljima i učenicima u proteklim stoljećima. Zaboravlja se da je razredno-predmetno-satni sustav razvijen prije tristo i pedeset godina, u doba kada je od svih medija, osim čovjeka, postojala samo knjiga, odnosno različite varijante tiskanih medija. Nije rijetkost da se organiziraju i eksperimentalna istraživanja o djelotvornosti digitalnih medija u uvjetima predmetno-satnog sustava s frontalnom nastavom (npr. Bangert-Drowns, 1993; Kulik i Kulik, 1991).

Upravo za takvo poučavanje u multimedijskom digitalnom okruženju koje odgovara potrebama današnjih učenika net-generacije za nastavnike je važna sposobnost organiziranja konstruktivističke nastave (i aktivnosti učenja), kao i učestalost, a time i motivacija za upotrebu digitalnih medija.

Konstruktivistička nastava i upotreba digitalnih medija

Ideja konstruktivizma nije nova, stara je nekoliko tisućljeća, posebice u filozofiji (Prichard i Woollard, 2010). Možemo ga objašnjavati kao filozofsku, psihološku i didaktičku teoriju i praksu (Kanselaar, de Jong, Andriessen, i Goodyear, 2002). U tom se pogledu bitno naglašava diferencijacija, ali i suodnos, pojmova poučavanja i učenja, čime se implicira odnos radikalnog i socijalnog konstruktivizma (Rodek, 2011; Tobias i Duffy, 2009). Konstruktivističko je učenje moguće definirati kao konstruiranje vlastitih spoznaja i znanja na temelju vlastitih prethodnih znanja, emocija, značenja, ali u aktivnom odnosu s fizičkom i društvenom okolinom (npr. Fosnot i Perry, 2005; Yilmaz, 2008). Prema konstruktivističkim postavkama, učenje je: 1) aktivan proces, 2) aktivno prilagođavanje, 3) situacijsko i kontekstualno učenje, 4) znanje nije pasivno preneseno i primljeno, već konstruirano od onog koji uči, 5) znanje je osobno, 6) znanje je društveno konstruirano (u društvenom kontekstu), 7) temeljni je proces stvaranja smisla i razumijevanja svijeta, 8) iskustvo i prijašnja razumijevanja ključna su za učenje, 9) za učenje je značajna društvena interakcija i 10) rješavanje smislenih, otvorenih i izazovnih problema (Boethel i Dimock, 2000, prema Yilmaz, 2008, str. 167 – 168).

Iz perspektive konstruktivističkog učenja nastava usmjerena učitelju smještena u frontalno poučavanje predmetno-satnog sustava nije poželjna. Konstruktivističko učenje je ono učenje u kojem učenik barata predmetima, preslaguje, kombinira, surađuje, istražuje, izrađuje i gradi nove materijale. Takve aktivnosti učenja nije moguće organizirati u frontalnoj nastavi u kojoj učitelj usmeno izlaže informacije nastavnog sadržaja, a učenici sjede u klupama, šute i prepisuju. Odnosno, obilježja konstruktivističke nastave jesu da se učeniku omogućuju: 1) autentičan kontekst koji reflektira način na koji će naučeno znanje biti primijenjeno u stvarnom životu, 2) autentične aktivnosti, 3) pristup stručnom djelovanju i oblikovanju procesa, 4) višestruke uloge i perspektive promatranja, 5) suradničko konstruiranje znanja, 6) potpora u učenju i „postavljanju skela" (engl. *scaffolding*), 7) refleksije koje potiču formiranje apstraktnih pojmova, 8) konstruiranje eksplicitnog znanja i 9) vrednovanje učenja kao praktične primjene i rješavanje zadataka (Herrington, Oliver, i Herrington 2007).

Razmatrajući ta obilježja učenja i nastave, opravdano je tvrditi da su strategije učenja istraživanjem, učenja rješavanjem problema, učenja otkrivanjem, suradničkog učenja, učenja igrom, djelovanja usmjerenog učenja i projektnog učenja upravo konstruktivističke strategije učenja i nastave. Takve strategije učenja potpomažu i suvremeni digitalni mediji. Posebice kad je novo ono što digitalni mediji nude u nastavi: 1) digitalno dostavljanje, prezentiranje i pohranjivanje informacija, 2) obavljanje aktivnosti s pomoću digitalnih medija i 3) digitalno posredovanu komunikaciju (Kanselaar, de Jong, Andriessen, i Goodyear, 2002).

Valja naglasiti da sama upotreba digitalnih medija u nastavi direktno ne pospješuje postizanje željenih ishoda učenja. Pospješuje ih didaktička organizacija aktivnosti

učenja (npr. Tamim i sur., 2011; Topolovčan, Matijević, i Dumančić, 2015). U tom pogledu je bitna interakcija individualnih obilježja učenika i učitelja te različitih oblika i strategija učenja (Leutner, 1993). Bitna je i suradnja (suradničko učenje) s pomoću digitalnih medija (Swaak, van Jooligen, & de Jong, 1998). Za postizanje željenih ishoda učenja bitni su i razina predznanja o sadržaju koji se uči, kao i stavovi o upotrebi digitalnih medija (npr. Lee i Chen, 2009). Općenito, konstruktivističko učenje potiče i razvoj kritičkog mišljenja, kontrole procesa učenja, suradnju i intrinzičnu motivaciju za učenjem (npr. Bošnjak, 2009; Taylor, Fraser, i Fischer, 1997). I pitanje vrednovanja konstruktivističkog procesa i ishoda učenja nije primjereno ispitivati instrumentima nastave koja je usmjerena na učitelja (Rosen i Salomon, 2007), kao što su testovi, ispitivanje i sl.

Bez obzira na sve eventualne dobrobiti konstruktivističke nastave koja je organizirana, između ostalog, i s pomoću digitalnih medija, upitna je upotreba i motivacija upotrebe digitalnih medija u nastavi. Tako se pokazalo da se najsuvremenija informatička oprema (npr. interaktivni multimedijski softver i pametna ploča) podređuju tradicionalnoj frontalnoj nastavi i didaktičkoj teoriji koja zagovara nastavu usmjerenu na nastavnika (Ćurić i sur., 2016; Petko, 2012). To se može uočiti i s obzirom na stručnu terminologiju i didaktičku teoriju kojom autori objašnjavaju djelotvornost suvremenih medija u nastavi (npr. ponavljanje nastavnog gradiva kod Ćurić i sur., 2016, str. 28). Sintagma „ponavljanje nastavnog gradiva" primjerena je didaktičkim teorijama iz 19. i prve polovine 20. stoljeća, ali ne i vremenu u kojem su teorije učenja i teorije nastave ponudile mnogo bolja objašnjenja za učinkovito učenje. Sličnog su mišljenja i Gabriel i sur. (2012) kad zaključuju da još uvijek nisu pronađeni načini za kreativnu uporabu digitalne tehnologije u nastavi. Većina onoga što se događa u nastavi oslanja se na prijenos informacija (PowerPoint koji se obogaćuje prezentacijama s YouTubea). Oni preporučuju više kritičkog odnosa prema digitalnim tehnologijama i didaktičkim strategijama koje omogućuju socijalni konstruktivizam (usp. Topolovčan i Matijević, 2016). I kod primjene računalnih programa postoje određene kontradikcije u odnosu na ono što digitalni mediji mogu ponuditi (za konstruktivističko učenje). Tako u pojedinim programima ima previše tradicionalnog didaktičkog pristupa, a u drugima se previše slijedi logika tiskanih udžbenika. Čak i programi koji se koriste tehnologijom zaslona osjetljivog na dodir ne uspijevaju napustiti logiku učenja iz tradicionalnih udžbenika (Choppin i sur., 2014). Zanimljivo je da i budući učitelji, s obzirom na bolju organizaciju nastave s digitalnim medijima, imaju stav da bi roditelji trebali biti bolje upoznati sa sadržajem računalnih igara i da učitelji nisu dovoljno upoznati sa sadržajima računalnih igara i s negativnim posljedicama prekomjerne uporabe računala. Iznenađuje „konzervativan" stav dijela studenata o potrebi permanentnog obrazovanja u području ICT-a u njihovu budućem radu (Ružić Baf, Radetić-Paić, i Zarevski, 2012).

Fahser-Herro i Steinkuehler (2009) smatraju da tradicionalna nastava zanemaruje značaj digitalne pismenosti, napose onaj dio koji se odnosi na uporabu Web 2.0 alata. Danas se od nastavnika traži viša razina digitalne pismenosti koja omogućuje da

nastavnici dizajniraju vlastite aplikacije koje dalje mogu usavršavati i razmjenjivati. Osim toga, dostupni su i besplatni ili jeftini alat koje učitelji mogu upoznati i njima se svakodnevno koristiti. Učenje treba proširiti i na vrijeme izvan učionice i nastave (Blake, 2015), a to traži mijenjanje pristupa nastavi u odnosu na ono što se događa u učionici, čak i kada se učionička nastava oslanja na internet i Web 2.0 alate. Učenje organizirano izvan učionice i škole znatno obogaćuje nelinearan, logičan i dinamičan napredak. Sve to traži nove pristupe u organizaciji nastave i razvijanje nove kulture učenja (Rodek, 2011). Sličnog su mišljenja i Gormely i McDermott (2013) koji upozoravaju da svi nastavnici obvezne škole (primarna i sekundarna razina) moraju dobro poznavati i integrirati nove digitalne pismenosti u svoju nastavu. Screencasting (priprema kratkih multimedijalnih prezentacija na različite teme iz svakodnevnog života i znanosti) jedan je od tih novih pismenosti, a taj vid digitalne pismenosti, prema mišljenju autora, ima posebne vrijednosti i mogućnosti za uključivanje i motiviranje učenika u učenju.

Nadalje, i osim sustavno provedenog osposobljavanja svih nastavnika škole iz koje su ispitanici te postojanja objektivnih mogućnosti za uporabu suvremene multimedijske opreme, samo je 39% ispitanika nastavu organiziralo u suvremenoj učionici deset puta tijekom nastavne godine, dakle jednom mjesečno. Nešto manje nastavnika (23%) organizira nastavu u takvoj učionici jednom tjedno. Ostali su nastavnici nastavu u suvremenoj učionici organizirali tek jednom ili nikada (Ćurić i sur., 2016). Iako nema razlike među nastavnicima s obzirom na spol i godine radnog staža, utvrđena je značajna razlika među ispitanicima s obzirom na vrijeme provedeno na osposobljavanju za uporabu informacijske tehnologije. Do sličnih rezultata došao je i Karadağ (2012), odnosno da devet od dvadeset zaposlenih učitelja smatra da su sposobni za upotrebu digitalnih medija, da ih šest smatra da su nesposobni, a pet da su djelomično sposobni. Jedan od važnih nalaza studije jest da budući nastavnici procjenjuju da se nedovoljno pažnje posvećuje njihovu pripremanju za organiziranje nastave s pomoću digitalnih medija. Polovina ispitanika ima nisku percepciju vlastite osposobljenosti u upotrebi digitalnih medija u nastavi. Gabriel i sur. (2012) ukazuju na to da se učenici najviše u učenju koriste internetskim uslugama, programima za učenje matematike i prirodnih znanosti, e-mail-om, SMS-om i elektroničkim bazama podataka. Evo i nekih odgovora koji ilustriraju gledišta studenata na digitalne medije. Gonzalez-Vera (2016) na temelju svog istraživanja tvrdi da se visok postotak studenata (92%) koristi društvenim mrežama. Iako je služenje platformom za e-učenje relativno nova pojava, svi su ispitanici izjavili da se njome već služe. Ova je studija pokušala pokazati pozitivne učinke upotrebe novih tehnologija u obrazovanju, posebno u sveučilišnoj nastavi kada treba velikom broju studenata organizirati aktivno učenje i pravodobno pružanje povratnih informacija o napredovanju. Tijekom istraživanja uočena je pozitivna interakcija među studentima. Studenti su pokazali velik entuzijazam za tehnologiju i učenje, pristupajući digitalnim medijima s puno povjerenja.

Istraživanje Stephen, Henry, Deborah, i Coaster (2012) pokazalo je da studenti koji posjeduju osobno računalo i koji imaju prethodna iskustva s alatima koji su važni za uporabu digitalnih medija imaju znatno pozitivnije stavove prema ulozi digitalnih medija tijekom studiranja. Takvi su studenti pokazali veće povjerenje u digitalne medije i procjenu njihove važnosti za studiranje. Također, pozitivnije stavove u odnosu na druge studente imaju oni studenti koji studiraju programe koji su u području ICT. Posjedovanje osobnog računala važan je čimbenik za pozitivne stavove i uvjerenje u djelotvornost digitalnih medija pa istraživači preporučuju da država treba pronalazi načine da se studentima omogući kupovanje računala po povoljnijim cijenama, uključujući i kreditiranje. Istraživači, osim toga, preporučuju posvećivanje više pažnje stjecanju digitalnih kompetencija tijekom sekundarnog obrazovanja koje priprema buduće studente.

Iz prikazanih je studija vidljivo da su se digitalni mediji koristili za organizaciju nastave usmjerene na nastavnika, a ne na učenika, što je bitno određeno kompetentnošću nastavnika. Upotreba, razlozi upotrebe i učestalost upotrebe bitno ovise o nastavniku i njegovoj motiviranosti za upotrebom digitalnih medija. Jacquelynne S. Eccles je sa suradnicima (npr. Eccles, 2005; Ecsles i Harold, 1991; Wigfield i Eccles, 2000) razvila teoriju vrijednosti i očekivanja koja se pokazala optimalnom za objašnjavanje pojedinih fenomena u nastavi (npr. Marušić, Jugović i Pavin Ivanec, 2011; Wozney, Venkatesh, i Abrami, 2006). Naime, ta teorija pozicionira motivaciju za implementacijom noviteta, radom, određenim ponašanjem ili bilo kojom drugom aktivnošću u kontekstu interakcije tri elementa. Ti su elementi i empirijski potvrđeni (Eccles, 2005; Ecsles i Harold, 1991; Wigfield i Eccles, 2000), a odnose se na vrijednosti, očekivanja i ulaganje napora. Očekivanje se odnosi na uvjerenje o vlastitim sposobnostima obavljanja određenog zadatka ili očekivanje uspjeha, vrijednost se odnosi na intrinzične vrijednosti vezane uz određenu aktivnost ili zadatak, a ulaganje napora se odnosi na odnos težine zadatka koji treba obaviti i ulaganje napora i truda da se taj zadatak izvede (prema Marušić, Jugović, i Pavin Ivanec, 2011).

Teoriju vrijednosti i očekivanja Wozney, Venkatesh, i Abrami (2006) primijenili su na upotrebu (implementaciju) digitalne tehnologije i medija u nastavi te konstruirali takvu skalu. Isto su primijenili tri dimenzije (vrijednosti, očekivanje i ulaganje napora). U tom se pogledu očekivanje odnosi na to kakva su očekivanja nastavnika o tome koliko će implementacija i sposobnost upotrebe digitalnih medija biti uspješni. Odnosno to je odnos strategije upotrebe digitalnih medija i očekivanih ishoda njihove upotrebe. Tu se uključene i računalna samodjelotvornost, kao i individualna obilježja nastavnika i okoline u kojoj radi. Vrijednosti se odnose na procjenu nastavnika o vrijednosti digitalnih medija u nastavi. To uključuje i osobne vrijednosti nastavnikovih uvjerenja. Treća se dimenzija odnosi na procjenu koliko će napora morati uložiti u (inovaciju) upotrebe digitalnih medija u nastavi, tj. na odnos procjene težine zadataka obavljanih digitalnim medijima i ulaganja napora da se ti zadaci obave.

Opravdano je taj teorijski pristup smatrati optimalnim za istraživanje upotrebe (implementacije) digitalnih medija u specifičnim okolnostima kao što je nastava.

Osobito zbog toga što nije moguće govoriti o jednoj univerzalnoj nastavi za sve. To se posebno odnosi na odnos i razlike između osnovnoškolske i srednjoškolske nastave. Pritom se misli na dekontekstualizaciju od nastavnih sadržaja i ishoda učenja. Stoga je opravdano istraživati vrste i učestalosti upotrebe digitalnih medija, motivacije za njihovu upotrebu, ali u odnosu na konstruktivističku nastavu. Posebice razlike u navedenim fenomenima između nastavnika osnovne i srednje škole, budući da u Hrvatskoj nedostaje takvih istraživanja.

Metodologija

Cilj istraživanja bio je ispitati obilježja i razlike u učestalosti i motivaciji upotrebe digitalnih medija u poučavanju i organizaciji konstruktivističke nastave između nastavnika osnovne i srednje škole u Republici Hrvatskoj[3].

Istraživanje je provedeno na uzorku skupina nastavnika osnovnih i srednjih škola zastupljenih u nekoliko regija Republike Hrvatske (N=368) početkom 2016. godine. U uzorku ispitanika bilo je 62 (16,8%) muških i 306 (83,2%) ženskih nastavnika. Od 191 (51,9%) učitelja koji rade u osnovnoj školi, njih 98 (51,3%) radi u razrednoj, 84 (44%) u predmetnoj nastavi, a 9 (4,7%) u produženom boravku. S druge strane, od 177 (48,1%) nastavnika srednjih škola, 28 (15,8%) ih radi u gimnazijama, a 149 (84,2%) u strukovnim školama. U školama u gradu radi 334 (90,8%), a u školama na selu 34 (9,2%) nastavnika. U pogledu inicijalnog obrazovanja 129 (35,1%) je onih koji su završili učiteljski fakultet/učiteljsku (pedagošku) akademiju, 136 (37%) onih koji su završili nastavnički smjer na nekom drugom fakultetu (npr. PMF, filozofski fakultet i sl.) i 103 (28%) onih koji su završili određeni studij s naknadnim pedagoško-psihološkim obrazovanjem. Maksimalan broj godina radnog staža bio je 42 godine, a minimalan je bio tek prva/početna godina rada (M=16,07; SD=10,39).

U pogledu demografskih podataka prikupljani su podaci o rodu (muški / ženski), vrsti škole u kojoj nastavnici rade (osnovna / srednja škola), mjestu gdje se škola nalazi (selo / grad), godinama radnog staža i vrsti inicijalnog obrazovanja (učiteljski fakultet (učiteljska/pedagoška akademija), nastavnički smjer na nekom drugom fakultetu (npr. PMF, filozofski fakultet i sl.), neki drugi studij (npr. strojarski fakultet, FER i sl.) uz naknadno pedagoško-psihološko obrazovanje). U ovom radu analiziramo samo rezultate s obzirom na vrstu škole u kojoj su ispitanici zaposleni.

Podaci o tome koliko nastavnici često učenicima organiziraju služenje pojedinim digitalnim medijima na nastavi prikupljani su skalom Likertova tipa sa šest stupnjeva (1 – *nikada*, 2 – *gotovo nikada*, 3 – *rijetko*, 4 – često, 5 – *veoma često*, 6 – *uvijek*) na devetnaest čestica. Za njihovo formiranje poslužio je primjer čestica kojima se koristio Petko (2012) u svom istraživanju u Švicarskoj, a odnosile su se na: prikazivanje videosnimaka, snimanje videosnimaka, upotrebu PowerPoint prezentacija, upotrebu

[3] U Hrvatskoj osnovna škola traje osam godina (primarno i niže sekundarno obrazovanje), a srednja škola traje 3, 4 ili 5 godina (više sekundarno obrazovanje prema ISCED).

različitih specijaliziranih računalnih programa, upotrebu programa za pisanje, upotrebu excel-a, igranje računalnih igara, upotrebu programa za crtanje, traženje informacija na internetu, prezentiranje domaćih zadaća, dizajniranje različitih multimedijskih sadržaja, programiranje, upotrebu digitalnih medija za izradu domaćih zadaća, upotrebu *online* platformi (npr. Moodle), snimanje audiosnimaka, prezentiranje audiosnimaka, upotrebu društvenih mreža i upotrebu pisača.

Za prikupljanje podataka o konstruktivističkoj nastavi upotrijebljena je Skala konstruktivističke nastave (Taylor, Fraser, i Fischer, 1997), a za podatke o motivaciji za upotrebu digitalnih medija u nastavu koristio se Upitnik implementacije novih tehnologija u nastavu (Wozney, Venkatesh, i Abrami, 2006).

Skalu konstruktivističke nastave, odnosno učenja (engl. *Constructivist learning environment scale*), konstruirali su Taylor, Fraser, i Fischer (1997). Skala je uz dopuštenje autora povratno prevedena s engleskog na hrvatski jezik te prilagođena kulturno-jezičnom kontekstu hrvatskog uzorka. Ova je skala primarno konstruirana za učenike pa je za ovo istraživanje prilagođena uzorku nastavnika, tj. ispitivanju procesa poučavanja u nastavi. Skala se originalno sastoji od pet latentnih podskala i trideset i pet manifestnih tvrdnji skale Likertova tipa od četiri stupnja (1 – *u potpunosti se ne odnosi na mene*, do 4 – *u potpunosti se odnosi na mene*). Svaka se podskala sastoji od sedam manifestnih tvrdnji, a podskale su: osobna važnost (engl. *personal relevance*), nesigurnost (engl. *uncertainty*), kritičko mišljenje (engl. *critical voice*), kontrola (engl. *shared control*) i učeničko pregovaranje (engl. *student negotiation*). Zbog prirode problematike i kulturalnih razlika uzorka u ovom su se istraživanju koristile samo četiri dimenzije. Nije se koristila dimenzija nesigurnosti učenja. Dimenzija 'Osobna važnost učenja' odnosi se na intrinzičnu motivaciju u učenju, povezanost onoga što učenik uči u školi s vanjskim svijetom i praktičnom primjenom. Dimenzija 'Kritičko mišljenje u učenju' odnosi se na mogućnost samostalnog promišljanja onoga što se uči, iskazivanje vlastitog mišljenja, procjenu važnosti informacija i povezivanja onoga što se uči. 'Kontrola u učenju' odnosi se na aktivnosti koje učeniku omogućuju da sam organizira vlastito učenje, kako i gdje će učiti (generalno se odnosi na individualizaciju rada). Dimenzija 'učeničko pregovaranje' odnosi se na mogućnost suradničkog učenja. Budući da je skala prevedena, a pojedini su joj dijelovi modificirani, provedena je eksploratorna faktorska analiza (PCA) s oblimin rotacijom i korijenom većim od 1.0 te zasićenjem od 4,0., podaci su bili primjereni za analizu (KMO=,95; a Bartletov test sferičnosti bio je značajan, χ^2=5483,23; p=,000).

Dobivenih pet latentnih faktora zajedno objašnjava 61,39% ukupne varijance. Iako se pokazalo pet faktora, moguće je smatrati da takva struktura indicira četiri (originalna) faktora. U prilog takvim indicijama ide i *skree plot* jer je ukazao na moguća četiri faktora. Stoga je provedena i konfirmatorna faktorska analiza s četiri faktora. Ta četiri faktora objašnjavaju 57,79% zajedničke varijance koji donekle zadovoljavajuće repliciraju originalnu faktorsku strukturu, iako raspored manifestnih tvrdnji po faktorima nije u potpunosti identičan originalnoj strukturi. Budući da dobivene

faktorske strukture, s jedne strane, nisu pokazale interpretirajuće samostalne faktore, a s druge strane donekle repliciraju originalnu faktorsku strukturu, odlučilo se na korištenje originalne faktorske strukture. Stoga su konstruirana četiri kompozitna faktora prema originalnim faktorima ove skale. U tom se pogledu prihvaćaju sve daljnje opreznosti i implikacije interpretacije krajnjih rezultata. Faktori pokazuju zadovoljavajuće unutarnje pouzdanosti prema Cronbach α testu (Tablica 1,). Korelacije među kompozitno formiranim faktorima su Osobna važnost i Kritičko mišljenje r=,65; Osobna važnost i Kontrola r=,53; Osobna važnost i učeničko pregovaranje r=,62; Kritičko mišljenje i Kontrola r=,60; Kritičko mišljenje i Učeničko pregovaranje r=,61; Kontrola i Učeničko pregovaranje r=,70 (sve povezanosti statistički su značajne na razini $p<,01$).

Podaci o implementaciji digitalnih medija u nastavi prikupljeni su Upitnikom implementacije digitalnih medija (engl. *Technology implementation questionnaire – TIQ*) koji su razvili Wozney, Venkatesh i Abrami (2006) na temelju teorije vrijednosti i očekivanja. Skala je, također, uz dopuštenje autora povratno prevedena, a pojedini su pojmovi modificirani kulturno-jezičnom kontekstu uzorka ispitanika. Skala sadrži trideset i tri manifestne tvrdnje koje sačinjavaju tri latentne podskale. Prva dimenzija je 'očekivanje' (engl. *expectancy*) i sadrži deset tvrdnji, druga je 'vrijednost' (engl. *value*) i sastoji se od četrnaest tvrdnji, treća je 'ulaganje' (engl. *cost*) i sadrži devet tvrdnji. Dimenzija 'Očekivanje' odnosi se na to što nastavnici očekuju od upotrebe digitalnih medija, odnosno pozitivna očekivanja i da će im njihova upotreba poboljšati i racionalizirati nastavu. Dimenzija 'Vrijednosti' odnosi se na općenito osobne vrijednosti vezane uz digitalne medije, tj. smatraju li ih nastavnici nečim dobrim ili ne. Dimenzija 'Ulog' odnosi se na procjenu hoće li upotreba digitalnih medija u nastavi od njih kao nastavnika tražiti dodatni napor, učenja i rad u odnosu na nastavu bez digitalnih medija. Tvrdnje su konstruirane u formi skale Likertova tipa originalno od šest stupnjeva. Za potrebe ovog istraživanja koristila su se četiri stupnja (1 – *u potpunosti se ne slažem*, do 4 – *u potpunosti se slažem*). Provedena je eksploratorna faktorska analiza (PCA) s promax rotacijom i korijenom većim od 1,0 sa zasićenjem od 4,0. Podaci su bili pogodni za analizu (KMO=,90; a Bartletov test sferičnosti bio je značajan, $\chi^2=4305,75$; $p=,000$).

Dobivenih sedam latentnih faktora objašnjava 58,58% ukupne varijance. Vidljivo je da se nije pojavila originalna faktorska struktura, pa je provedena i konfirmatorna faktorska analiza s tri zadana faktora. Na tri faktora ukazuje i *skree plot test*, iako su se i u EFA pokazale četiri komponente koje imaju zasićenja s po dvije manifestne tvrdnje. To uvjetno ukazuje na tri faktora. Zadana tri faktora objašnjavaju 40,51% ukupne varijance i relativno zadovoljavajuće repliciraju originalnu faktorsku strukturu. Budući da možemo smatrati da takve komponente nisu u potpunosti interpretirajuće, ali ukazuju na tri faktora, kompozitno su konstruirana tri faktora prema originalnoj faktorskoj strukturi upitnika. Isto kao i u prethodnoj skali prihvaćaju se sve daljnje opreznosti i implikacije na interpretacije krajnjih rezultata. U tablici 1 prikazane su,

uglavnom, zadovoljavajuće α pouzdanosti. Međukorelacije kompozitno formiranih faktora su Vrijednost i Očekivanje r=,55; Vrijednost i Ulaganje r=,71; Očekivanje i Ulaganje r=-,55 (sve povezanosti su statistički značajne na razini $p<,01$).

Tablica 1

Rezultati

Pokazalo se da nastavnici, općenito, učenicima *rijetko* ili *gotovo nikada* ne organiziraju aktivnosti učenja u okviru kojih bi se oni koristili pojedinim digitalnim medijima (Tablica 2.). Jedino je iznimka da, na razini cijelog uzorka, nastavnici često učenicima organiziraju aktivnosti učenja tijekom kojih se oni koriste PowerPoint prezentacijama, računalnim programima za pisanje teksta i internetom (traženje informacija na internetu). Za ispitivanje razlika u procjeni učestalosti učeničkog korištenja pojedinim digitalnim medijima između nastavnika osnovne i srednje škole koristio se neparametrijski Mann-Whitney U test. Taj se test koristio zato jer su u istraživanju podaci prikupljeni Likertovom skalom (ordinalna skala), čime nisu zadovoljeni cjeloviti uvjeti za parametrijski t test (Opić, 2010). U pojedinim slučajevima (učestalosti) organizacije aktivnosti učenja tijekom kojih se učenici mogu koristiti i digitalnim medijima postoje statistički značajne razlike između nastavnika osnovnih i srednjih škola. Tako se pokazalo da nastavnici srednjih škola nešto češće organiziraju aktivnosti učenja itjekomm kojih se učenici koriste PowerPoint prezentacijama, specijaliziranim računalnim programima, programima za pisanje (Word), excel tablicama, komuniciraju internetom, prezentiraju domaće zadaće, izrađuju multimedijske sadržaje, domaće zadaće s pomoću digitalnih medija, koriste se društvenim mrežama. Nastavnici osnovne škole učenicima češće dopuštaju igranje računalnih igara. Odnosno, u pravilu nastavnici srednjih škola nešto češće organiziraju aktivnosti učenja i uz korištenje digitalnim medijima. Važno je naglasiti da su uz nekoliko iznimaka čestog korištenja digitalnim medijima (PowerPoint prezentacije, programa za pisanje i komunikacije internetom) sve navedene učestalosti i njihove razlike u domeni *rijetkog* korištenja.

Tablica 2

U pogledu procjene motivacije za implementiranje digitalnih medija u nastavu, općenito, nastavnici na razini cijelog uzorka, pozitivno procjenjuju vrijednosti, očekivanja vezana uz upotrebu digitalnih medija u nastavi i da njihova upotreba od njih ne zahtijeva ulaganje dodatnog napora. Drugim riječima, nastavnici smatraju digitalne medije nečim vrijednim i značajnim te imaju pozitivna očekivanja da bi njihova eventualna upotreba u nastavi mogla znatno doprinijeti postizanju ishoda učenja. Nadalje, nastavnici pozitivno procjenjuju ulaganje truda u služenju digitalnim medijima, odnosno, općenito smatraju da organizacijom nastave s digitalnim medijima mogu postići bolje ishode učenja kod učenika (Tablica 1.). Takvi se rezultati projiciraju i kad uspoređujemo motivaciju za korištenje digitalnim medijima u nastavi

između nastavnika osnovne i srednjih škola (Tablica 3.). Budući da se i za prikupljanje podataka o motivaciji za implementaciju digitalnih medija koristila Likertova skala, za ispitivanje razlika koristio se neparametrijski Mann-Whitney U test. Nastavnici i osnovnih i srednjih škola jednako pozitivno procjenjuju vrijednosti digitalnih medija, svoja očekivanja eventualnih dobrobiti koji bi oni mogli pružiti u aktivnostima učenja i da upotreba digitalnih medija od njih ne zahtijeva ulaganje dodatnog napora.

U pogledu konstruktivističke nastave nastavnici na razini cijelog uzorka (Tablica 1.) pozitivno procjenjuju sve njezine četiri dimenzije (osobnu važnost učenja, kritičko mišljenje u učenju, kontrolu učenja i učeničko pregovaranje, tj. suradničko učenje). Drugim riječima, nastavnici procjenjuju, tj. smatraju da su nastava i aktivnosti učenja koje oni organiziraju upravo konstruktivistička nastava i učenje. Nadalje, kad se usporede procjene konstruktivističke nastave nastavnika osnovne i srednjih škola, pokazuju se određene statistički značajne razlike (Tablica 3.). Također, budući da su i ovdje podaci o konstruktivističkoj nastavi prikupljeni Likertovom skalom, za ispitivanje razlika koristio se neparametrijski Mann-Whitney U test. Pokazalo se da nastavnici osnovne škole procjenjuju da je nastava koju oni organiziraju nešto intenzivnije organizirana po principima konstruktivizma u pogledu dimenzija osobne važnosti učenja, omogućavanja kritičkog mišljenja u učenju i učeničkog pregovaranja (suradnička nastava) nego nastavnici srednjih škola. Naravno, treba naglasiti da su bez obzira na statistički značajne razlike, procjene nastavnika i osnovne i srednjih škola u domeni pozitivnih procjena konstruktivističke nastave (Tablica 3.).

Tablica 3

U pogledu povezanosti motivacije upotrebe digitalnih medija i njihove učestalosti upotrebe u nastavi Spearmanovim testom povezanosti kod nastavnika osnove škole (Tablica 4.) pokazalo se da nastavnici koji imaju pozitivnije vrijednosti vezane uz upotrebu digitalnih medija u nastavi nešto učestalije organiziraju nastavu na kojoj učenici prikazuju videosnimke, koriste se PowerPoint prezentacijama, igraju računalne igre, traže informacije na internetu, komuniciraju internetom, dizajniraju multimedijske sadržaje, koriste se digitalnim medijima za izradu domaćih zadaća, koriste se *online* platformama učenja, snimaju audiosnimke i koriste se društvenim mrežama. Nadalje, pokazalo se da su pozitivnija očekivanja od upotrebe digitalnih medija u nastavi povezana s učestalijim učeničkim prikazivanjem audiosnimaka, igranjem računalnih igara i upotrebom društvenih mreža. Nastavnici koji smatraju da upotreba digitalnih medija u nastavi od njih ne zahtijeva dodatni napor i ulaganja truda ujedno i češće organiziraju nastavu na kojoj učenici prikazuju videosnimke, koriste se PowerPoint prezentacijama, igraju računalne igre, traže informacije na internetu, komuniciraju internetom, dizajniraju multimedijske sadržaje, izrađuju domaće zadaće s pomoću digitalnih medija, koriste se *online* platformama učenja, snimaju i prezentiraju audiosnimke, koriste se društvenim mrežama i koriste se pisačem.

U vidu povezanosti konstruktivističkog učenja i učestalosti organizacije nastave gdje učenici mogu koristiti pojedine digitalne medije pokazale su se sljedeće statistički značajne povezanosti: Nastavnici koji organiziraju nastavu koja učenicima omogućuje razvoj više razine osobne važnosti učenja ujedno omogućuju da učenici u aktivnostima učenja češće prikazuju video snimke i dizajniraju multimedijske sadržaj. Organizacija nastave koja omogućuje učenicima razvoj kritičkog mišljenja je povezana i s češćim prikazivanjem video snimaka, pravljenjem multimedijskog sadržaja te snimanjem audio snimaka. Organizacija nastave koja učenicima omogućuje kontrolu nad vlastitim procesima učenja je povezana s češćim prikazivanjem video snimaka, snimanjem video snimaka, igranjem računalnih igara, korištenjem računalnih programa za crtanje, traženjem informacija na internetu, komunikacije internetom, pravljenjem multimedijskog sadržaja, korištenjem digitalnih medija u svrhu izvršavanja domaćih zadaća, korištenjem online platforma za učenje, snimanjem audio snimaka, prezentiranjem audio snimaka, korištenjem društvenih mreža i upotrebom pisača. Organizacija nastave koja omogućuje suradničko učenje, odnosno suradničko učenje, povezana je s češćim prikazivanjem videosnimaka, upotrebom specijaliziranih računalnih programa, izradom multimedijskih sadržaja, snimanjem audiosnimaka, prezentiranjem audiosnimaka i upotrebom *online* platformi učenja (Tablica 4.).

U pogledu povezanosti dimenzija motivacije upotrebe (implementacije) digitalnih medija u nastavi i organiziranja konstruktivističke nastave, pokazalo se da su više razine očekivanja od digitalnih medija i njihovih vrijednosti, ali ne i očekivanje većeg ulaganja napora u njihovu upotrebu povezano s organiziranjem nastave koja učenicima u aktivnostima učenja omogućuje učeniku intrinzičnu motivaciju (važnost) učenja, kritičko mišljenje, kontrolu u procesu učenja i suradničko učenje (Tablica 4.).

Tablica 4

Kod nastavnika srednjih škola u pogledu motivacije za upotrebu (implementaciju) digitalnih medija i učestalost njihove primjene pokazale su se sljedeće statistički značajne povezanosti (Tablica 5.): Nastavnici koji procjenjuju višu razinu vrijednosti digitalnih medija češće organiziraju aktivnosti učenja na kojima učenici mogu snimati videosnimke, tražiti informacije na internetu, komunicirati internetom, dizajnirati multimedijske sadržaje, koristiti se digitalnim medijima za izradu domaćih zadaća, koristiti se *online* platformama učenja, snimati audiosnimke, prezentirati audiosnimke i koristiti se pisačem. Nastavnici koji procjenjuju višu razinu očekivanja od digitalnih medija ujedno i omogućuju učenicima da češće snimaju videosnimke, traže informacije na internetu, komuniciraju internetom, snimaju audiosnimke i prezentiraju ih. Nastavnici koji smatraju da služenje digitalnim medijima od njih ne traži dodatni napor i ulaganje, statistički značajno češće organiziraju nastavu tijekom koje učenici češće prikazuju videosnimke, koriste se PowerPoint prezentacijama, dizajniraju multimedijske sadržaje, snimaju audiosnimke, prezentiraju audiosnimke i služe se pisačem.

U pogledu povezanosti učestalosti upotrebe digitalnih medija i konstruktivističke nastave (Tablica 5.) pokazalo se da nastavnici koji organiziraju aktivnosti učenja koje su učenicima intrinzično važne ujedno i češće organiziraju aktivnosti učenja tijekom kojih se učenici mogu koristiti PowerPoint prezentacijama, dizajnirati multimedijske sadržaje i koristiti se digitalnim medijima za izradu domaćih zadaća. Nadalje, nastavnici koji prilikom učenja učenicima omogućuju kritičko mišljenje omogućuju im da se češće koriste PowerPoint prezentacijama, da traže informacije na internetu, dizajniraju multimedijske sadržaje i da se koriste digitalnim medijima za izvršavanje domaćih zadaća. Nastavnici koji učenicima omogućuju višu kontrolu u procesima učenja ujedno im češće omogućuju prikazivanje videosnimaka, snimanje videosnimaka, komuniciranje internetom, dizajniranje multimedijskog sadržaja, programiranje, služenje digitalnim medijima za izradu domaćih zadaća, prezentiranje audiosnimaka i korištenje društvenim mrežama. Pokazalo se da nastavnici koji učenicima omogućuju suradničko učenje učenicima ujedno češće omogućuju prikazivanje videosnimaka, snimanje videosnimaka, služenje PowerPoint prezentacijama, prezentiranje domaćih zadaća s digitalnim medijima, dizajniranje multimedijskih sadržaja, primjenu digitalnih medija za izradu domaćih zadaća i upotrebu *online* platformi učenja.

Tablica 5

Kod nastavnika srednjih škola pokazalo se da su procjena viših vrijednosti i očekivanja od digitalnih medija u nastavi, ali ne i očekivanje ulaganja većeg napora u njihovu upotrebu, povezana s organiziranjem nastave koja učenicima u aktivnostima učenja omogućuje višu razinu osobne važnosti učenja, kritičkog mišljenja, kontrole u procesu učenja i suradničkog učenja (Tablica 5.).

Rasprava

Put od poučavanja do samostalnog učenja, od instrukcije do samoinstrukcije, od tradicionalne do konstruktivističke didaktike nije jednostavan. Nastavu u kojoj dominiraju aktivnosti učitelja teško je zamijeniti nastavom u kojoj je aktivniji učenik od učitelja, čak i uz pomoć brojnih i moćnih digitalnih medija (Blake, 2015). Rezultati ovog istraživanja omogućuju potvrdu prethodne tvrdnje i objašnjenja nekih uzroka i uvjetovanja u procesu transformacije nastave usmjerene na učitelja prema nastavi usmjerenoj na učenika.

U hrvatskim školama se sporo mijenjaju nastavni kurikuli pa imamo zastarjele kurikule koji ne sugeriraju nastavnicima učenje o digitalnim medijima i učenje s pomoću tih medija. Još uvijek u školi dominira frontalna nastava pa nastavnici i učenike stavljaju u situaciju da pripremaju PowerPoint prezentacije, a aktivnost učenika svodi se na podržavanje frontalne predavačke nastave.

Ovdje uspoređujemo rezultate procjene obilježja i razlika u upotrebi pojedinih digitalnih medija između nastavnika osnovne i srednje škole kao i razlike u procjeni konstruktivističke nastave te implementacije digitalnih medija u nastavu između

nastavnika osnovne i srednje škole. Za razumijevanje ovdje objavljenih rezultata važno je imati u vidu da je u Hrvatskoj osnovna (osmogodišnja) škola obvezna za svu djecu, a srednja škola nije obvezna. Obvezne škole u Europi karakterizira neselektivnost i „pedagogija uspjeha za sve" koja se osigurava didaktičkom paradigmom koju označavamo izrazom „didaktički ugovor" (Baert, 1989). Srednja je škola selektivna jer se učenici upisuju u određenu srednju školu selekcijom koja se temelji na školskim ocjenama u prethodno završenoj obveznoj osnovnoj školi, a selekcija se nastavlja i tijekom trajanja srednjoškolske nastave strogim sustavom školskih ocjena. Školskim ocjenama se uglavnom ocjenjuje količina usvojenih informacija, a manje kvaliteta i količina stečenih kompetencija.

Nastavnici su svjesni važnosti konstruktivističke nastave, ali je čitav školski sustav postavljen na paradigmi programocentrizma: program se mora realizirati. Nešto više slobode od te krute paradigme imaju nastavnici osnovnih škola jer je to općeobrazovna škola u kojoj se nastoji osigurati pedagogija uspjeha za sve, a na didaktičkom rješenju koje označavamo sintagmom učenja po dogovoru, odnosno didaktičkog ugovora. Nastavnici osnovnih škola osiguravaju više prilika i slobode za kreativnost učenika i vlastitog kreativnog odstupanja od školskih programa.

Imajući u vidu prethodne konstatacije, treba pohvaliti nastavničko poticanje samostalnosti učenika i upotrebu računalnih programa i alata. Programi dijela srednjih strukovnih škola po prirodi su pogodni za uporabu digitalnih medija (učenici traže informacije na internetu, pišu domaće zadaće upotrebom interneta i različitih računalnih programa, igraju izuzetno atraktivne i pedagoški vrijedne računalne igre). Međutim, još uvijek nedovoljno za zadovoljavanje razvojnih potreba i stilova učenja pripadnika net-generacija (istraživačke i kreativne aktivnosti učenika s pomoću digitalnih medija). Neka istraživanja upozoravaju na to da nastavnici nisu dovoljno upoznati sa sadržajem i prednostima računalnih igara, a više je radova koji upozoravaju na štetnosti i opasnosti igranja računalnih igara od onih koji prikazuju didaktičke i pedagoške vrijednosti tih igara (Ružić Baf, Radetić-Paić i Zarevski, 2012).

Nastavnici su svjesni prednosti koje donose digitalni mediji, ali su previše opterećeni paradigmom nastave usmjerene na program i nastavnika (mora se realizirati nastavni program, a ta „realizacija" je dobra ako se mnogo govori i prikazuje, a učenici to sve pažljivo slušaju i gledaju). To ukazuje na to da je konstruktivistička nastava u hrvatskim školama još uvijek daleko od poželjnog stanja (Ćurić i sur., 2016).

Kao ishodi učenja u školskim vrednovanjima još uvijek su na cijeni činjenično i reproduktivno znanje, a ne kreativne i istraživačke kompetencije. Ti stereotipi i zablude ne mogu se ukloniti bez stalnog usavršavanja zaposlenih nastavnika i službenika koji rade na vanjskoj evaluaciji ishoda učenja u osnovnim i srednjim školama (Bognar, 2016).

Iako je u pitanju isti odgojno-obrazovni sustav, kontekst nastavnika srednjih škola drugačiji je od konteksta nastavnika u osnovnoj školi. Nastavnici srednjih škola u prilično su drukčijem položaju u odnosu na nastavnike osnovnih škola, napose kada je u pitanju nastavni program, svrha srednjoškolskog obrazovanja i činjenica da se radi o

neobveznoj školi u kojoj je selekcija važno obilježje (Fahser-Herro i Steinkuehler, 2009; Gonzalez-Vera, 2016; Karadağ, 2012). Oni su više pod pritiskom učeničkih pitanja o svrhovitosti učenja školskih sadržaja: „Za što će mi to što učim trebati u životu?" Premalo je nastavnika koji se na temelju stručne samouvjerenosti mogu udaljiti od tradicionalnog shvaćanja ishoda učenja u nastavi (činjenično i reproduktivno znanje).

Nastavnici ne razlikuju smisao primjene digitalnih medija u vidu prezentacijskih tehnika (PowerPoint) u odnosu na kreativno aktivno sudjelovanje učenika u dizajniranju i izradi multimedijskih materijala, audiovizualnih sadržaja ili sudjelovanju radi učenja na društvenim mrežama. Oni veoma cijene izradu PowerPoint prezentacija, traženje informacija na internetu i učenje na *online* platformama. Međutim, upitna je estetska, didaktička i komunikološka kvaliteta PowerPoint prezentacija kojima se u nastavi koriste učenici i nastavnici.

Prikazivanje videosnimaka i izrada multimedijskih programa dvije su bitno različite aktivnosti: u jednoj su učenici pasivni konzumenti nečega što je netko drugi napravio, a u drugom slučaju oni su aktivni kreatori i proizvođači novih vrijednosti. Naravno, druga situacija znatnije potiče učenike na kritičko mišljenje i na više samokontrole vlastitog učenja. Nastavnici prihvaćaju nastavu s PowerPoint prezentacijama, ali treba biti svjestan ograničenja takve 'realizacije programa' koja je daleko od konstruktivističke nastave.

Igranjem računalnih igara, upotrebom računalnih programa za crtanje, traženjem informacija na internetu, komunikacijom na internetu, izradom multimedijskog sadržaja, upotrebom digitalnih medija s ciljem izvršavanja domaćih zadaća, upotrebom *online* platformi za učenje, snimanjem audiosnimaka, prezentiranjem audiosnimaka, korištenjem društvenih mreža i raznih drugih vidova suradničkog učenja znatno se više omogućuje ostvarivanje ideala nastave usmjerene na učenika: više učenja – manje poučavanja (Petko, 2012).

To je osnovni moto konstruktivističke nastave i konstruktivističke didaktike, ali još uvijek su mnogi nastavnici u hrvatskim školama daleko od prihvaćanja te didaktičke paradigme. Uz više aktivnosti s digitalnim medijima učenik lakše razumije smisao učenja i osjeća važnost vlastite inicijative i aktivnosti.

Nastavnici koji su postali svjesni vrijednosti digitalnih medija i koji procjenjuju višu razinu očekivanja od digitalnih medija, češće traže od učenika aktivnosti koje se oslanjaju na digitalne medije, a nastavnici koji nisu zadovoljni svojim poslom i nerado prihvaćaju dodatne radne napore, nerado daju učenicima zadatke koji će rezultirati različitim učeničkim radovima i koje će trebati ocjenjivati i o njima s učenicima raspravljati. Naravno, to od njih traži više i druge načine pripremanja od onoga što su radili u proteklim godinama svoga radnog vijeka, a nastavnici se teško mijenjaju, odnosno teško mijenjaju dugogodišnjim radom stečene navike.

Zaključak

Na temelju komparativne analize prethodnih studija i teorijskih postavki istraživanih fenomena te interpretacije dobivenih rezultata moguće je donijeti određene

zaključke. Pokazalo se da se nastavnici rijetko ili gotovo nikada ne koriste različitim vrstama digitalnih medija, s iznimkom česte upotrebe PowerPoint prezentacija i traženja informacija na internetu. Generalno, nastavnici srednjih škola se nešto češće koriste digitalnim medijima, ali je to i dalje u domeni rijetkog korištenja. Nastavnici i osnovnih i srednjih škola procjenjuju podjednako pozitivno svoju motivaciju za korištenje digitalnim medijima u nastavi. Obje podskupine nastavnika, i osnovnoškolski i srednjoškolski, procjenjuju da je nastava koju oni organiziraju ujedno i konstruktivistička, s time da su tome u nešto većoj mjeri skloniji nastavnici osnovne škole. Opravdano je tvrditi da se nastavnici i osnovne i srednje škole koji imaju pozitivne vrijednosti vezane uz digitalne medije te ako organiziraju suradničko učenje i omogućuju učenicima kontrolu nad vlastitim procesom učenja ujedno i češće koriste pojedinim digitalnim medijima.

Povezujući navedene zaključke iz navedenih pojedinačnih rezultata opravdano je zaključiti da se njima, bez obzira na to što osnovnoškolski i srednjoškolski nastavnici imaju pozitivnu motivaciju za upotrebu digitalnih medija u nastavi, ipak rijetko ili gotovo nikada ne koriste. S druge strane, iako obje skupine nastavnika smatraju da je nastava koju oni organiziraju konstruktivistička, ona to nije, što potvrđuje česta upotreba PowerPoint prezentacija, odnosno dominacija predavačke nastave. Česta upotreba PowerPoint prezentacija samo je zamjena za upotrebu „ploče i krede" ili grafoskopa te ukazuje na to da je nastava koju oni organiziraju frontalna, predavačka, usmjerena na nastavnika, tijekom koje učenici sjede, šute i prepisuju informacije nastavnog sadržaja u bilježnice. Stoga je moguće zaključiti da postoji nekonzistentnost onoga što nastavnici procjenjuju kao obilježja svoje nastave i stvarne nastave koju organiziraju.

U tom je pogledu preporuka da se i osnovnoškolskim i srednjoškolskim nastavnicima osigura stručno usavršavanje u vidu praktičnih radionica utemeljenih na sadržajima i ishodima multimedijske i konstruktivističke didaktike. Neophodna je, također, i implementacija konstruktivističke i multimedijske didaktike u programe nastavničkih i učiteljskih studija, odnosno da se intenzivira stjecanje nove didaktičke pismenosti nastavnika osnovne i srednje škole. Ta pismenost treba biti utemeljena na heutagogijskoj i konstruktivističkoj znanstvenoj paradigmi (Blaschke, 2012).

Na kraju, valja naglasiti nedostatke ove studije. Prvobitni je nedostatak u tome što se nisu analizirane razlike u istraživanim fenomenima s obzirom na mjesto škole, radni staž nastavnika, razrednu i predmetnu nastavu osnovne škole, kao i vrstu srednjih škola. Time bi se dobio bolji uvid u istraživanu problematiku. Nadalje, nedostatak je izostanak uzorka učenika čime bi bila omogućena usporedba onoga što nastavnici procjenjuju i onoga kako to učenici doživljavaju (vidi Matijević, Opić, i Rajić, 2015). Unatoč navedenim nedostacima rezultati istraživanja daju vrijedan uvid u odgojno-obrazovni kontekst i obilježja nastave u osnovnim i srednjim školama, a navedeni nedostaci ujedno su i preporuke za daljnja istraživanja o navedenoj problematici.