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Teachers' and Students' Evaluation of Selected Didactic Materials According to the Maria Montessori Pedagogy

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Abstract

The goal of this research paper was to explore teachers' and students' perceptions of material, cognitive and affective-motivational characteristics as well as the acceptance of selected didactic materials used in Montessori schools. The participants in this research were students in their final year of the Integrated undergraduate and graduate university Teacher education study programme at the Faculty of Teacher Education in Osijek (N=63) and teachers working in regular primary schools in eastern Croatia (N=47). The results show that both teachers and students are not familiar enough with alternative pedagogical concepts. When student teachers as well as experienced teachers evaluate materials as very valuable, desirable, necessary and useful, as is the case with all evaluated didactic materials in this research made according to the principles of Maria Montessori Pedagogy, they also show greater willingness to use these materials in their teaching. The results have been interpreted in accordance with the need to inform the public about empirically based and educationally successful alternative pedagogical concepts which can be implemented in ordinary educational practice.

Key words: *cosmic education; educational pluralism; language education; mathematics.*

Introduction

Development of society and science, globalisation as a world process and new roles of pupils also set new challenges to the educational system and teacher education. Almost a hundred years ago Maria Montessori recognized the need to reform the

educational system and therefore gradually developed a pedagogy based upon observation and an individual approach to a pupil. The pedagogical principles and didactic materials developed by Maria Montessori have been used and implemented in theory and practice by an increasing number of scientists, pedagogues and teachers, exploring ways in which theory and resulting materials meet developmental, social and emotional needs of modern children.

The Maria Montessori Pedagogy is based on scientific observation of spontaneous learning with children, stimulation of a child's own activity and his/her independence as well as respect of a child's individuality (Philipps, 2003). At the beginning of the last century Stein Ehrlich (1934, p. 8) established that Maria Montessori lead a child with the help of didactic material and by means of a systematic training to universal skill and knowledge. Advocates of the Maria Montessori Pedagogy came to the conclusion that principles of this pedagogical concept give children exactly what they need, i.e. a stimulating environment, order, independence and movement (Ruenzel, 1997). An ideology oriented towards the pupil, advocated by the Maria Montessori Pedagogy, too, has as its purpose and serves as a basis for curriculum development, which places a pupil in the centre, i.e. his/her special needs (Jurčić & Markić, 2011). The most frequent association with the Maria Montessori Pedagogy is her didactic material, divided into practical life, language, sensorial, math and cosmic education material. Didactic material developed by Maria Montessori stimulates the development of senses, gives opportunity to understand abstract terms in a concrete way and makes the bond between brain and hands stronger. Maria Montessori herself describes it best when she calls it a key to unlock the door to the world (Montessori, 2003). For Maria Montessori, a well prepared teacher is the foundation of changes in education. A teacher is the embodiment of a new vision of education as help in life. A teacher in a Montessori school is first and foremost expected to get to know didactic material used in the Maria Montessori Pedagogy, as well as to learn how to use it. Mastering didactic material becomes a basis for gaining the competences needed for widening the purpose of education (Cossentino, 2009). Maria Montessori set very strict rules as to what the environment should look like and how adults should behave in Montessori institutions. The environment which is adequate to meet children's needs and which offers everything they need for a physical, mental and spiritual adjustment, is referred to by Maria Montessori as the prepared environment. Such an environment plays a key role in the development of a child, and by its furnishing, it fulfils real needs of children and encourages the development of their individuality. The prepared environment is filled with educational equipment which attracts a child to use it and is furnished in a special way, i.e. all the equipment is placed in such a way that it leads a child from simple to complicated exercises, from the concrete to the abstract and from a simpler to a more demanding level (Philipps, 2003). According to Seitz and Hallwachs (1996), a stimulating environment is such an environment which comes

to life through children's interaction with it and offers them adequate materials and stimuli. Nash (2011) states that pupils who were given a richly prepared environment, practical teaching of Mathematics as well as diverse material for reading and writing practice, have better results in learning and show a higher level of intrinsic motivation compared to those who were exposed to traditional frontal teaching.

Many research studies (Cossentino, 2005; Dohrman et al., 2007; Else-Quest, 2006; Hinz, 2011; Milinković & Bogovac, 2011; Rathunde & Csikszentmihalyi, 2005; Stoll Lillard, 2006) show that children from Montessori schools, compared to children from traditional schools, are more motivated to learn, have multiple interests, independence and a positive attitude towards learning as well as higher responsibility towards a group. Studies in the fields of neuroscience and developmental psychology confirm the Montessori Pedagogy theories on the individual development plan, which passes through certain levels (sensitive periods, learning windows), as well as theses on the need for didactically shaped environments as a help in individual development (Bašić, 2011). The effects of the Maria Montessori Pedagogy on the abilities of a child are visible at the very beginning of school. Children who attended Montessori kindergartens are better prepared for reading, Mathematics and practical life, they show a greater sense of justice and honesty, are emotionally more positive, and have a stronger feeling of belonging to a group than children who attended traditional kindergartens (Lillard & Else-Quest, 2006; Stoll Lillard, 2006). Milinković and Bogovac (2011) claim that introducing the Maria Montessori Pedagogy into the preschool educational system forms a basis for introducing integrated teaching, which is more frequently being suggested as a base teaching method in lower grades of primary school. Furthermore, they propose connecting the Maria Montessori Pedagogy and integrated teaching methods, and in the end conclude that connecting those two methods in lower grades of primary school would satisfy social needs for functional knowledge and a holistic approach to child development. Hinz (2011) points out that Montessori schools compared to traditional ones make it possible for children to become more socialized, stimulate development and improve individual abilities, which should all be goals of society and public education institutions.

Rajić and Juras (2010) point to organisational possibilities of the Montessori Pedagogy by implementation of Montessori solutions into state schools. The results of their research show possibilities for implementing Montessori Pedagogy elements, accepting these elements by pupils, as well as their satisfaction with implemented Montessori solutions. During the two-year research of creativity development conducted in four Parisian schools (two of them with traditional teaching, two of them applied the Maria Montessori Pedagogy) on a sample of 80 pupils (40 pupils from a Montessori school, 40 from a traditional one) Besancon et al. (2008), by application of the Torrance Test of Creativity (TTCT) and divergent thinking at the end of the first and second year of research, found that pupils from Montessori schools have

significantly higher results on tests of creative thinking compared to pupils from traditional schools. At the end of the testing, five pupils achieved very high scores on the task of toy improvement (four from a Montessori school), six pupils on the task of parallel lines (all coming from a Montessori school), two pupils on the task of storytelling (one pupil from each of the schools) and one pupil on the task of drawing (a Montessori pupil). The sample being one of 80 pupils, which limits generalisation, Besancon and others suggest further research on the influence of the Montessori Pedagogy on the development of creative thinking. Cossentino (2005) states that pupils from Montessori schools show a higher level of independence in work than pupils coming from traditional schools. Furthermore, Dohrman et al. (2007) point out that pupils who attended Montessori schools achieve significantly better results on state graduation exams in Mathematics and Natural Sciences. Rathunde and Csikszentmihalyi (2005), when comparing Montessori and traditional schools, state that pupils attending Montessori schools have a more positive opinion of their teachers and school environment and more often call their colleagues friends than pupils from traditional schools. Lin et al. (2009) proved that the use of didactic material made according to the Maria Montessori Pedagogy, when working with adults, has a great influence on behaviour improvement of older people suffering from dementia. They also claim that everyday use of sensorial materials and materials for fine motor skills has a positive influence on lessening the anxious behaviour of these people. Schneider and Camp (2002) found similar results, i.e. that adults ill with dementia, after using didactic material of the Maria Montessori Pedagogy, show significantly better results when communicating with visitors, and become more active when doing their everyday chores.

Although having much positive experience in working with children and adults, the Maria Montessori method of teaching (has) provoked much criticism from the public and experts. Matijević (2001) points out that Maria Montessori, as well as other representatives of reform pedagogy, is mostly criticized for excessive pedocentrism. Latest reform orientations in Croatia speak in favour of pupil-oriented teaching, the realisation of which is slow and difficult, because school buildings and classrooms are furnished and equipped for the needs of teacher-oriented teaching (Matijević, 2011). Traditional education, as being most common in our schools, does not foster the idea of *educational pluralism* for several reasons. The first one is placing too much emphasis on the revision of knowledge and the abstract curriculum content. Furthermore, it supports the idea that academic achievement is more important than gaining skills and also underestimates the individual approach to a pupil. Having in mind the current financial situation in the country, which, unfortunately reflects on our educational system very much, it is difficult to expect that, in the foreseeable future, our schools will be in the position to purchase ready-made didactic materials as used in Montessori schools. Certain financial resources should be invested in the equipment of workshops at faculties of teacher education and in primary schools.

Faculties of teacher education should introduce new courses and modules which would contribute to acquiring teaching competences needed for teaching practical skills and using specific didactic materials pertaining to various pedagogical concepts. This implies purchase of adequate equipment (furniture), then machines, tools and materials. Of course, in teaching curricula there should be scheduled time and a list of activities which should be organized in a certain grade or a cycle of compulsory education (Matijević, 2009). Pedocentrism (excessive?) and needed investments, can and are being used as criticism for introducing the Maria Montessori Pedagogy concepts in traditional schools.

The goal of this research paper is to explore ways in which didactic materials made according to the Maria Montessori Pedagogy postulates are rated by student teachers and teachers as experienced carriers of the educational process on a sequence of characteristics relevant to the educational process, and whether these characteristics are significant guidelines for the purpose of their use in teaching in traditional schools.

Method

Problem

To explore teachers' and students' perceptions of material, cognitive, affective-motivational characteristics and acceptance of selected sets of didactic materials made according to the Maria Montessori Pedagogy in the field of Mathematics, Language and Cosmic Education of primary school children.

Participants

The sample of participants consisted of 47 teachers and 63 students in their final year of the Integrated Undergraduate and Graduate University Teacher Education Study Programme of the Faculty of Teacher Education in Osijek in 2013. The age of students (female 96.8%) was 22-28 years with a median of 23 years. In the sample of 47 teachers working in lower grades of primary schools in eastern Croatia (female 91.5%), the median work experience was 17 years (range 0-42 years). The majority of teachers in the sample (male and female) were aged between 23-32 years (15, 31.9%), followed by groups in the following age ranges 43-52 (27.7%), 33-42 (23.4%), 53-62 (10.6%) and 63-72 years (6.4%).

Instrument and Research Procedure

All of the research interviews were conducted anonymously, voluntarily and having written consent from all of the participants. All of the participants completed the general information questionnaire which also included open questions on knowledge of alternative pedagogical concepts (Table 2), and they afterwards rated the presented didactic materials. Didactic materials used in this study were selected because of their representativeness and regular use in teaching in Montessori primary schools. The materials were independently made according to models and descriptions, based

upon experience in work with materials in an authentic Croatian Montessori School (4 materials for Cosmic Education, 3 for Mathematics and 3 for Language Education). Due to the size and objective difficulties with transportation of the prepared didactic materials, participants in the study did not assess the actual didactic materials but were made familiar with the materials by means of colour photographs and detailed descriptions in the materials folder with, if it proved necessary, further clarification from the authors. Materials were described in detail, each on its own A4 sheet of paper and stacked in a map. The map consisted of a description of each of the 10 materials, randomized for each subsequent research participant to lessen the order effect of the material presented for evaluation. Each participant had thirty minutes to review and evaluate all of the materials on a series of 20 pairs of bipolar adjectives, with the median value of zero (0) and the values 1, 2 and 3 to both ends. Adjectives were given to participants in the same order in all situations. For example, a pair of adjectives used was: useless - 3 - 2 - 1 0 1 2 3 useful. Positive poles of adjectives are listed in Table 1 under the corresponding characteristics. Adjectives were divided into superior characteristics according to Bloom's taxonomy of educational objectives. Although in the initial analysis more detailed and partly independent estimates of six characteristics were used, as stated in Table 1, subsequent analyses resulted in four broad categories of characteristics: material, cognitive and affective-motivational characteristics, and acceptance. The gross result on six characteristics (Table 1), for each of the ten materials, was computed as a linear combination of teachers' (for teachers) and students' (for students) evaluations, divided by the number of adjectives in the characteristic (because of the different number of adjectives per characteristic), with the aim of standardizing the average values for comparison. Characteristics were oriented so that higher values indicated more favorable assessments on each of the pairs of adjectives. In order to take into account specific differences of materials intended for the same educational field, assessments of ten materials were averaged so as to obtain more valid and reliable assessments of different materials intended for education in each area (i.e. assessments for three materials in Mathematics, three for Language, and four for Cosmic Education). Through the use of several different but representative materials from each area, an opportunity was created for generalization of findings to the general group of materials used for Mathematics, Linguistic and Cosmic Education.

Material value and motivational characteristics of Cosmic, Mathematics and Language Education proved to be very similar constructs, $r(110)=.76$, $p<.001$; $r(110)=.75$, $p<.001$; $r(110)=.94$, $p<.001$. Therefore, they were aggregated into one measure for each material (i.e. affective-motivational characteristics). Preference of materials and willingness to use them proved to be much less correlated for Cosmic, Mathematics and Language Education, $r(110)=.30$, $p<.01$; $r(110)=.29$, $p<.01$, $r(110)=.37$, $p<.001$, so they were handled separately, focusing on determinants of the willingness to use them in the classroom.

Table 1

Operationalization of characteristics of chosen sets of DMPMM (Didactic Materials according to the Pedagogy of Maria Montessori) based on adjectives and short descriptions

Evaluated characteristics of chosen didactic materials	MATERIAL	COGNITIVE	AFFECTIVE-MOTIVATIONAL	ACCEPTANCE
Operationalization of the characteristics by adjectives and descriptions	**1. Ease of making materials:** a) easy to make b) does not require major investment c) does not require a lot of time to make	**2. Concreteness:** a) concrete b) explainable c) understandable d) logical e) meaningful f) clear	**3. Value of materials:** a) valuable b) preferrable c) necessary d) useful **4. Stimulativeness:** a) motivating b) inspiring c) interesting	**5. Preferrence:** a) I like it b) My students would like it **6. Willingness to use:** a) I would use it in the class b) I would use it in the class without any modifications

Results

Students' and Teachers' Familiarity with Alternative Pedagogical Concepts

Most of the students were informed about alternative pedagogical concepts during their undergraduate university studies (60, 95.2%), while 58 (92.1%) would like to learn more. A total of 54 (85.7%) students answered that the number of alternative schools in Croatia was too small, while nine (14.3%) stated that the number was sufficient. A total of 37 (78.7%) teachers reported that the number of alternative schools in Croatia was too small. These results portray students as informed and interested in learning more, and teachers as informed about prominent alternative pedagogical concepts (the Montessori and Waldorf Pedagogy). Students and teachers commonly specified Montessori (78, 34%) and Waldorf (77, 33%), while other pedagogical concepts, listed clockwise in Figure 1 have a significantly smaller specification. Teachers, in comparison to students, were less familiar with the pedagogical concepts (one-quarter of teachers specified no concept, one-quarter only one, and one-third two concepts), while two-thirds of students specified three or more pedagogical concepts.

It is clear that the pedagogical concepts differed significantly in number, $\chi 2$ (7, N=230)=239.5, $p<.001$, that is, they were not equally represented in the total sample of all participants' answers. The Maria Montessori Pedagogy and Waldorf Pedagogy were the concepts most often specified. There was no statistically significant difference between the number of answers on Summerhill-Freinet-Jenna plan pedagogical concepts, $\chi 2$ (2, N=64)=3.50, $p>.05$, nor in the number of Glasser-Forest School-Step by step pedagogical concepts, $\chi 2$(2, N=11)=1.27, $p>.05$. Montessori-Waldorf, Summerhill-Freinet-Jenna plan, and Glasser-Forest School-Step by step, made concept groups according to their frequency, with two-thirds of all of the answers addressed to the

Montessori and the Waldorf. The phrase didactic material used in Maria Montessori schools will be hereinafter replaced by the abbreviation DMPMM (Didactic Materials according to the Pedagogy of Maria Montessori).

Table 2
Frequency distribution of teachers' and students' familarity with alternative pedagogical concepts

Which pedagogical concepts are you familiar with?	Number of teachers	Percentage of teachers	Number of students	Percentage of students
Specified a concept (regardless of type)	12	25.5	2	3.2
Specified two concepts	16	34.1	12	19.0
Specified three concepts	5	10.6	24	38.1
Specified four or more concepts	2	4.3	14	22.2
None	12	25.5	11	17.5
Total	47	100	63	100

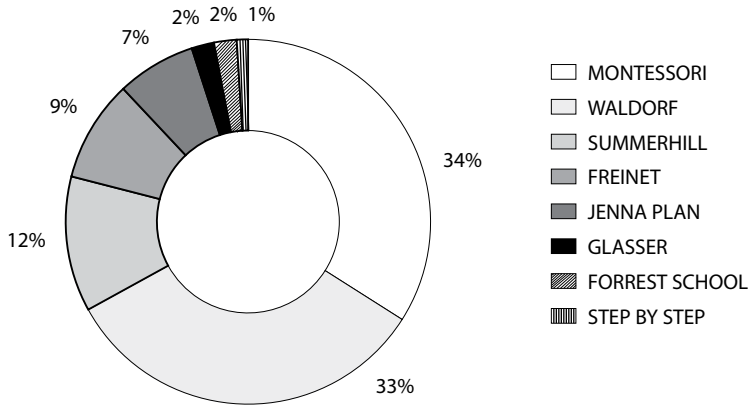

Figure 1. The total percentage breakdown of alternative pedagogical concepts in the overall pattern of answers provided by students and teachers.

Differences between Students and Teachers in the Evaluation of Material, Cognitive and Affective-Motivational Characteristics of Didactic Material for Cosmic Education, Mathematics and Language Education

The averages for students' and teachers' evaluations for three DMPMM sets on three characteristics are shown in Figure 2, with higher values indicating more favorable evaluations. Concerning material characteristics, the results indicate evaluations on the perceived ease of making the materials. A repeated measurement analysis of variance was calculated (mixed design ANOVA), with an independent group formed by students and teachers, and evaluations of three characteristics for three sets of materials as dependent variables. Given that the requirement of sphericity was not met, the Greenhouse-Geisser corrections were reported. In the presence of significant main or interaction effects, simple contrasts were calculated.

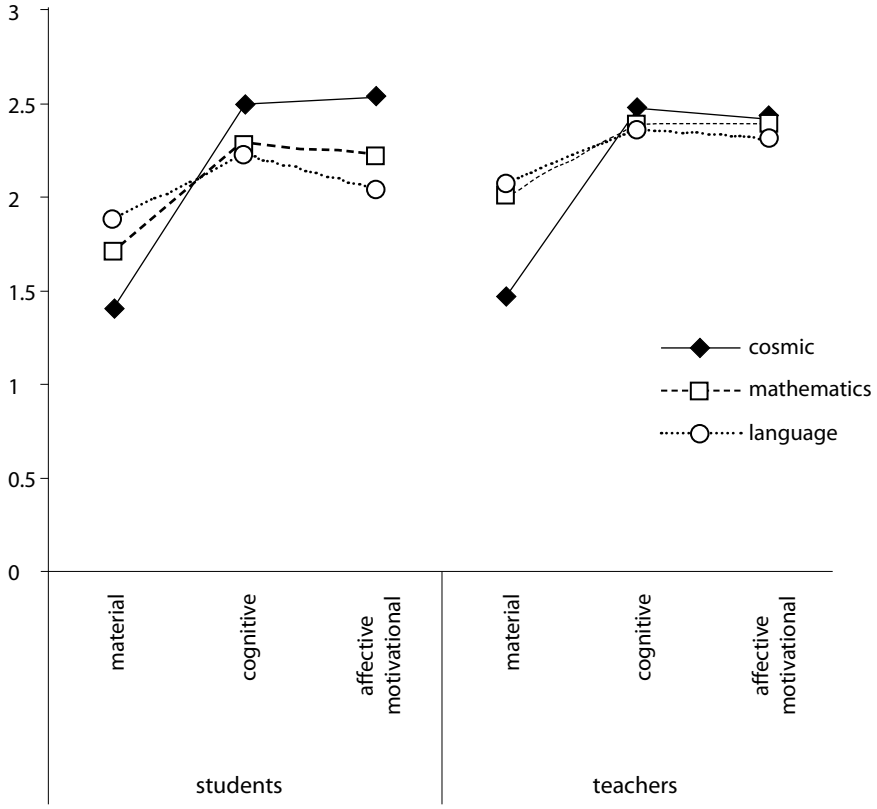

Figure 2. Students' and teachers' estimates of the material, cognitive and affective-motivational characteristics of DMPMM for the Cosmic Education, Mathematics and Language Education.

The main effect of DMPMM was not statistically significant, $F(1.89, 204.28)=0.21$, $p>.05$, $\eta 2=.002$. This means that when all other variables are ignored, DMPMM for Cosmic ($M=2.13$, SE=.05), Mathematics ($M=2.16$, SE=.06) and Language Education ($M=2.14$, SE=.06), according to the means, generally received positive evaluations. The main effect of the independent group (students and teachers) was also not significant, $F(1, 108)=1.32$, $p>.05$, $\eta 2=.01$, which speaks in favour of equal general, positive evaluations by students ($M=2.09$, SE=.07) and teachers ($M=2.21$, SE=.08). The main effect of the characteristics was statistically significant, $F(1.36, 146.99)=100.30$, $p<.001$, $\eta 2=.48$. This means that when we ignore all other variables, material ($M=1.75$, SE=.07), cognitive ($M=2.37$, SE=.05) and affective-motivational ($M=2.32$, SE=.06) characteristics of DMPMM strongly differed. Contrasts revealed that evaluation of material characteristic differed from evaluation of cognitive characteristic of DMPMM, $F(1, 108)=122.63$, $p<.001$, $\eta 2=.53$, material differed from the affective-motivational, $F(1, 108)=100.74$, $p<.001$, $\eta 2=.48$, and evaluation of cognitive differed from affective-motivational characteristic of DMPMM, $F(1, 108)=3.91$, $p=.05$, $\eta 2=.035$. These findings were in line with the recognized cognitive base of DMPMM (i.e. 2.37)

and finance and time requirements (1.75) made by DMPMM in their construction. For example, making of the Solar System, which is one example of DMPMM for Cosmic Education, or a set of vowels and consonants for Language Education which require time, effort and initial material resources. After reviewing the main effects, we established that the interaction characteristics × group was not statistically significant, $F(1.36, 146.99)=.69$, $p>.05$, $\eta 2=.006$. Figure 2 shows the relationships between the means of the entire, statistical model (DMPMM × characteristics × group) used in this study, but this interaction is also not statistically significant, $F(2.22, 239.86)=1.16$, $p>.05$, $\eta 2=.011$.

Although the main effect of DMPMM was not significant, there was a statistically significant DMPMM × group (students and teachers) interaction, $F(1.89, 204.28)=4.00$, $p<.05$, $\eta 2=.036$. To break down this interaction, contrasts were performed which showed the significant interaction between students› and teachers› evaluations for cosmic material in relation to material for Language, $F(1, 108)=5.02$, $p<.05$, $\eta 2=.044$, and cosmic material in relation to material for Mathematics Education, $F(1, 108)=6.44$, $p<.05$, $\eta 2=.056$, with no significant interaction for materials for Language and Mathematics Education, $F(1, 108)=0.009$, $p>.05$, $\eta 2=.00$. The reason for these interaction effects lies in the fact that teachers gave comparatively highest evaluations to Mathematics and Language material, and students gave highest evaluation to material for Cosmic Education. A statistically significant DMPMM × characteristics interaction was found, $F(2.21, 239.86)=41.77$, $p<.001$, $\eta 2=.28$, with all the simple contrasts presented in Table 3. In summary, significant interaction effects listed in Table 3 were primarily due to the comparatively lowest scores of all DMPMM on their material characteristic (more demanding) in comparison to cognitive and affective-motivational characteristics (Table 3, in bold $\eta 2$ of .34 to .39), with the difference most prominent for DMPMM for Cosmic Education. It is also interesting to note that DMPMM that was evaluated as most difficult to make, and in this research it proved to be the one for Cosmic Education ($M=1.44$, SE=.10), followed by DMPMM for Mathematics ($M=1.85$, SE=.08) and then for Language Education ($M=1.97$, SE=.08), was also evaluated by teachers and students as the one with the best cognitive and affective-motivational characteristics, with this reverse order being more prominent in students' evaluations, as partly evident in the Figure 2. The more demanding material (concerning time, money and effort), the more positive evaluations of its cognitive and affective-motivational characteristics.

In conclusion, although materials were generally positively evaluated by both students and teachers, they recognized that different DMPMM required different time and money investment in their making, with materials for Cosmic Education evaluated as comparatively most demanding. However, in accordance with optimal educational outcomes, the effort needed to be invested in making of DMPMM materials, especially when the focus is placed on cognitive and affective-motivational advantages of these materials, is, based on students' and teachers' evaluations and metaphorically speaking, worth it.

Table 3

Simple contrasts for the DMPMM × characteristics (material, cognitive and affective-motivational) following their significant overall interaction

	F(1, 108)	*p*	*η*2	*F*(1, 108)	*p*	*η*2	*F*(1, 108)	*p*	*η*2
Compared DMPMM characteristics	Cosmic vs. Mathematics			Cosmic vs. Language			Mathematics vs. Language		
Material vs. Cognitive	54.88	***	**.34**	53.86	***	.34	4.21	*	.04
Material vs. Affective-motivational	67.54	***	**.39**	65.88	***	**.38**	10.14	**	.09
Cognitive vs. Affective-motivational	.41	*n.s.*	.00	6.59	*	.06	5.72	*	.05

***$p < .001$. **$p < .01$. *$p < .05$.

Determinants of DMPMM Acceptance and Use in Ordinary Classrooms

The materials themselves are not the objectives, but are used to achieve the set goals. The choice of didactic materials depends partly on the characteristics of materials, but also on teachers who teach and children who are taught by means of these materials in the given educational setting. Under the affirmative assumption of empirical foundedness and developmental appropriateness of DMPMM for work with children in achieving educational goals, the question arose whether the willingness of students and teachers to use materials was associated with characteristics of these materials. The responses to this question are listed in Table 4, where it is evident that the willingness to use the presented DMPMM, although significantly positively correlated with all the characteristics of the materials, had the strongest correlations with perceived value of these materials in the classroom (*r* from .78 to .92). When students and teachers ascribed high value to the materials (valuable, desirable, necessary, useful), they, at the same time, expressed greater willingness to use these materials in the classroom. Whether the materials were valuable for achieving goals or not was an important determinant of the willingness to use them in the classroom. Interestingly, preference and willingness to use materials for Mathematics and Language Education were not significantly correlated in the teacher group. That is, expressing preference (liking) of some material, for teachers did not compare to greater willingness to use the same materials in the classroom, except for materials for Cosmic Education. It is possible that teachers have developed preferred and ready to use methods for teaching Language and Mathematics, which has made them less prone to express willingness to use new materials in the classroom, while, at the same time, they did recognize the favorable affective-motivational characteristics (value and motivation) of these new materials. By practical demonstration exercises of using these materials for teaching linguistic

and mathematical concepts, particularly emphasizing the value of materials, it could help teachers identify strengths and weaknesses in their present work compared to the work with DMPMM, directly leading to flexible teachers open to teaching innovations aimed at success. It is possible that teachers' insufficient familiarity, which we referred to in the first part of the analysis of knowledge of alternative pedagogical concepts, prevents the introduction of these and similar innovations and use in the classroom, even when they are favourably evaluated, such as the case in this study. Namely, prior to the very evaluation of DMPMM, one-fourth of the teachers surveyed could not specify any alternative pedagogical concept.

Table 4

Intercorrelations of evaluated characteristics of DMPMM for Cosmic, Mathematics and Language Education with the willingness to use these materials in the classroom

		Willingness to use the materials in the ordinary classroom		
Participants	Characteristics of materials	Cosmic	Mathematics	Language
Students				
N = 63	Ease of making materials	.58**	.80**	.45**
	Concreteness	.80**	.76**	.74**
	Value	.78**	.89**	.87**
	Motivation	.74**	.73**	.83**
	Preference	.50**	.38**	.72**
Teachers				
N = 47	Ease of making materials	.44**	.69**	.61**
	Concreteness	.66**	.63**	.76**
	Value	.79**	.92**	.85**
	Motivation	.74**	.82**	.81**
	Preference	.66**	.13	.10

The results of this study point to the practical conclusion that can be used when the teachers are introduced into the work with DMPMM - the possible starting point could be materials for Mathematics and Language and finally, materials for Cosmic Education. This recommendation is in line with the expressed willingness to use materials in teaching as well as with students' and teachers' perception of the value of materials, as listed in Table 4. The average scores shown in Figure 2 are consistent with this recommendation. Namely, despite the high ratings given to materials for Cosmic Education, these materials were estimated as demanding to make, and that may be offputting to beginners. On the other hand, materials for Mathematics, estimated as easier to make by teachers, were rated almost equally favourable on the affective-motivational characteristics. It would be commendable to make teaching of Mathematics motivational or inspiring, at least to the extent to which the exploration of exotic worlds in the Solar System is inspiring (as a part of Cosmic Education). Didactic materials for Mathematics and Language made according to the

Maria Montessori Pedagogy, at least judging by the evaluations done by students and teachers, offer that as an opportunity.

Discussion and Conclusion

Of the total number of teachers examined (47), 12 (25.5 %) did not give any answer to the open question: ″Which alternative pedagogical concepts have you heard of?″, while out of 63 examined students 11 of them (17.5%) could not think of any alternative pedagogical concept. The first Croatian alternative pedagogical concept, developed by Franjo Higy Mandić under the name of Model Forest (People's) School at Tuškanac, which the participants named incorrectly is also the evidence of insufficient competence. The results of the research show that both teachers and students are familiar with a smaller number of pedagogical concepts, two of most often mentioned alternative concepts being the Maria Montessori and Waldorf Pedagogy, the rest of the concepts being significantly rarely mentioned. The two most frequently mentioned alternative concepts are the only ones present in the Croatian primary school system as well. Whether that fact is the reason for gained positive results cannot be claimed with certainty, but through promotion of Educational Pluralism in our educational system different pedagogical concepts would surely be more heard of, known of and appreciated. The results of this research, similar to the results of the research by Rajić (2008), show the importance of informing the public about alternative types of education if we want to improve school and pedagogical pluralism. The fact that even 85.7% of students and 78.7% of teachers assume that there is a small number of alternative schools in Croatia advocates the above-mentioned. Students i.e. future teachers were informed about alternative schools during their undergraduate university studies (95.2%), but the fact that is encouraging is that as many as 92.1% of them wish to learn more about alternative pedagogical concepts.

As the first direction of data analysis, an analysis of differences between teachers working in schools and future teachers (student teachers) was conducted concerning their perception of the six characteristics of selected didactic materials used in Montessori schools, regarding the three education fields. It is obvious that the averages of materials for Cosmic Education, Mathematics and Language Education on the six characteristics are positive and very similar in students' and teachers' evaluations. All the materials were very highly rated regarding all of the characteristics. Does that fact result from giving socially desirable answers or is it an authentic perception, remains to be confirmed by additional research. It is important to emphasize that both teachers and students accept materials and would like to use them in their teaching, where affective-motivational attraction of didactic material as well as its simplicity in making is being crucial.

By analysing only material perceptions and their characteristics, it was observed that students rate Cosmic Education materials to be most demanding to make, but more concrete as well, more stimulating and more valuable than materials for Mathematics

and Language Education. Taking as the key idea of this research the intention i.e. readiness to use didactic materials developed according to didactic materials used in Montessori schools, the question to be asked is, which material characteristic in teachers' and students' evaluations is positively and statistically significantly correlated with readiness to use these materials. Data shown in Table 4 show that, considering the correlation coefficient size, the estimated material value is, regardless of education field (Cosmic Education, Mathematics or Language Education), most strongly positively correlated with willingness to use chosen materials in teaching. As both of the examinee groups evaluated materials to be valuable, desirable, necessary and useful in teaching (value), and material value is most strongly connected with statement of readiness to use these materials, a possible recommendation is, when representing Montessori didactic materials, to emphasize their value strongly and thus increase readiness to use them. The initial demanding nature in terms of time and finances when making materials which can be used repetitively and fully developed as well, is justified by their endurance and by students' and teachers' recognition of their educational value and their proportional readiness to use them in teaching. Regardless of the educational field, both teachers and students, according to this research, prefer concrete and non-demanding materials i.e. ones which can easily be made, which do not call for big financial resources and are not time-consuming.

To sum up, examined teachers are, when compared to students, not sufficiently familiar with alternative pedagogical concepts, although both groups rate very positively in this research paper on the examined materials which follow from one of them (the Maria Montessori Pedagogy). Most of the participants, both teachers and students, are familiar with the Maria Montessori Pedagogy, which can be exploited as a starting point for research and introduction of remaining pedagogical concepts into traditional primary school teaching, considering their differential advantages. Participants evaluate characteristics of shown DMPMM in a very positive way. When they find materials valuable and useful, they also show readiness to introduce DMPMM into ordinary teaching. Positive evaluation and interest of participants for introducing DMPMM materials into teaching can be starting points for introducing alternative pedagogical concept contents into studies at all faculties of teacher education in Croatia, as well as in lifelong education of teachers, which is the goal of education of a flexible, open, well-informed and competent teacher.

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Učiteljska i studentska procjena odabranoga didaktičkog materijala prema pedagogiji Marije Montessori

Sažetak

U radu su ispitane učiteljske i studentske percepcije materijalnih, kognitivnih i afektivno-motivacijskih karakteristika Montessori didaktičkih materijala za područja matematičkoga, jezičnoga i kozmičkoga odgoja i obrazovanja osnovnoškolske djece. U istraživanju su sudjelovali studenti završne godine Integriranoga preddiplomskoga i diplomskoga sveučilišnoga Učiteljskog studija Učiteljskoga fakulteta u Osijeku (N = 63) i učitelji zaposleni u osnovnim školama u istočnoj Hrvatskoj (N = 47). Rezultati pokazuju da učitelji i studenti nedovoljno poznaju alternativne pedagoške koncepcije. Kada i početnici (studenti) i iskusni učitelji procjenjuju materijale vrlo vrijednima, poželjnima, potrebnima i korisnima, kao što je to slučaj sa svim u ovom istraživanju procijenjenim didaktičkim materijalima izrađenim prema načelima pedagogije Marije Montessori, tada ujedno izjavljuju i veću spremnost za njihovo korištenje i u svojoj nastavi. Rezultati su interpretirani u skladu s potrebom obaviještenosti javnosti o empirijski utemeljenim i odgojno-obrazovno uspješnim alternativnim pedagoškim koncepcijama čije je postavke moguće implementirati u redovitu odgojno-obrazovnu praksu.

Ključne riječi: *kozmički odgoj; matematika; pluralizam u odgoju i obrazovanju; poučavanje jezika.*

Uvod

Razvoj društva i znanosti, globalizacija kao svjetski proces i nove uloge učenika postavljaju i nove zahtjeve pred školstvo i izobrazbu učitelja. Prije gotovo stotinu godina Maria Montessori prepoznala je potrebu reforme odgojno-obrazovnoga sustava i postupno razvijala pedagogiju utemeljenu na promatranju i individualnom pristupu učeniku. Pedagoška načela i didaktički materijal koji je osmislila Maria Montessori sve veći broj znanstvenika, pedagoga i učitelja implementira u teoriju i praksu, istražujući na koji način teorija i iz nje proizašli materijali odgovaraju razvojnim, socijalnim i emocionalnim potrebama suvremene djece.

Pedagogija Marije Montessori temelji se na znanstvenom promatranju spontanog učenja djece, na poticanju vlastitog djelovanja djeteta i njegove samostalnosti, kao i na poštovanju djetetove osobnosti (Philipps, 2003). Stein Ehrlich (1934, str. 8) je početkom prošloga stoljeća utvrdila da Maria Montessori putem didaktičkoga materijala vodi dijete sustavnim treningom do svestranog umijeća i znanja. Zagovornici pedagogije Marije Montessori zaključuju da načela tog pedagoškog koncepta pružaju djeci upravo ono što im je potrebno, a to je poticajna okolina, red, samostalnost i kretanje (Ruenzel, 1997). Ideologiji usmjerenoj k učeniku, čiji je predstavnik i pedagogija Marije Montessori, cilj je da postane osnova za kreiranje kurikula koji u središte stavlja učenika, tj. njegove posebne interese (Jurčić i Markić, 2011). Najčešća je asocijacija na pedagogiju Marije Montessori njezin didaktički materijal podijeljen na materijal za vježbe praktičnog života, materijal za jezik, materijal za razvoj osjetila, materijal za matematiku i materijal za kozmički odgoj. Didaktički materijal koji je osmislila Maria Montessori potiče razvoj osjetila, pruža mogućnost konkretnog razumijevanja apstraktnih pojmova i učvršćuje vezu mozga i ruku. Najbolje ga opisuje sama Maria Montessori kada ga naziva ključem kojim se otključavaju vrata u svijet (Montessori, 2003). Za Mariju Montessori pripremljeni je učitelj temelj promjena u obrazovanju. Učitelj je utjelovljenje nove vizije obrazovanja kao pomoći za život. Osnovno što se očekuje od učitelja u Montessori školi jest da upozna didaktički materijal koji se koristi u pedagogiji Marije Montessori te da njime nauči rukovati. Ovladavanje didaktičkim materijalom postaje temeljem za stjecanje kompetencija potrebnih za produbljivanje svrhe odgoja i obrazovanja (Cossentino, 2009). Maria Montessori postavila je vrlo stroga pravila za izgled okoline i ponašanje odraslih osoba u Montessori ustanovama. Okolinu koja je primjerena potrebama djeteta i nudi sve što mu treba za tjelesnu, umnu i duhovnu prilagodbu Maria Montessori zove pripremljenom okolinom. Takva okolina ima ključnu ulogu u razvoju djeteta i uređenjem ispunjava stvarne potrebe djeteta te dopušta razvoj njegove ličnosti. Pripremljena je okolina ispunjena priborom koji dijete privlači da se njime koristi i uređena je na poseban način, tj. sav je pribor postavljen tako da vodi dijete od jednostavnih prema složenim vježbama, od konkretnog prema apstraktnom i od lakše prema zahtjevnijoj razini (Philipps, 2003). Prema Seitz i Hallwachs (1996) poticajna je okolina ona koja oživi preko djece i nudi im odgovarajuće materijale i poticaje. Nash (2011) utvrđuje da učenici kojima su nastavnici omogućili bogato pripremljenu okolinu, praktičnu nastavu matematike i raznovrstan materijal za vježbe čitanja i pisanja, postižu bolje rezultate učenja te iskazuju veći stupanj intrinzične motivacije od onih koji su bili izloženi tradicionalnoj frontalnoj nastavi.

Brojna istraživanja (Cossentino, 2005; Dohrman i sur., 2007; Else-Quest 2006; Hinz, 2011; Milinković i Bogovac, 2011; Rathunde i Csikszentmihalyi, 2005; Stoll Lillard 2006) pokazuju da djeca iz Montessori škola u usporedbi s djecom iz tradicionalnih škola pokazuju bolju motivaciju za učenje, višestruke interese, samostalnost i pozitivan odnos prema učenju, kao i veću odgovornost prema zajednici. Istraživanja u području neuroznanosti i razvojne psihologije potvrđuju postavke Montessori pedagogije o

individualnom planu razvoja koji prolazi određene stupnjeve (senzibilna razdoblja, prozori učenja) i o potrebi didaktički oblikovane okoline kao pomoći u individualnom razvoju (Bašić, 2011). Već pri samom polasku u školu vidljivi su učinci pedagogije Marije Montessori na sposobnost djeteta. Djeca koja su pohađala Montessori vrtiće bolje su pripremljena za čitanje, matematiku i praktični život, pokazuju veći osjećaj pravednosti i poštenja, emocionalno su pozitivnija i imaju snažniji osjećaj pripadnosti zajednici od djece koja su pohađala tradicionalne vrtiće (Lillard i Else-Quest, 2006; Stoll Lillard 2006). Milinković i Bogovac (2011) tvrde kako uvođenje pedagogije Marije Montessori u predškolski sustav odgoja i obrazovanja stvara temelje za uvođenje integrirane nastave, koja se sve češće spominje kao temeljna nastavna metoda u nižim razredima osnovne škole. Nadalje, predlažu povezivanje metoda pedagogije Marije Montessori i integrirane nastave te zaključuju kako bi povezivanje tih dviju metoda u razrednoj nastavi zadovoljilo društvene potrebe za funkcionalnim znanjem i holističkim pristupom u razvoju djeteta. Hinz (2011) zaključuje kako Montessori škole u odnosu na tradicionalne omogućuju djeci bolju socijalizaciju, potiču njihov razvoj i usavršavanje individualnih sposobnosti, što bi trebali biti ciljevi društva i javnih obrazovnih institucija.

Rajić i Juras (2010) ukazuju na organizacijske mogućnosti Montessori pedagogije implementacijom Montessori rješenja u državnu školu. Rezultati istraživanja koje su proveli pokazuju mogućnost implementacije elemenata Montessori pedagogije, prihvaćenost tih elemenata od učenika i njihovo zadovoljstvo implementiranim Montessori rješenjima. U dvogodišnjem istraživanju razvoja kreativnosti u četiri pariške škole (dvije su izvodile tradicionalnu nastavu, dvije su primjenjivale pedagogiju Marije Montessori) na uzorku od 80 učenika (40 iz Montessori škole, 40 iz tradicionalne) Besancon i sur. (2008) primjenom Torranceova testa kreativnog (TTCT) i divergentnog mišljenja na kraju prve i na kraju druge godine istraživanja zaključuju da učenici koji su pohađali Montessori škole postižu značajno više rezultate na testovima kreativnog mišljenja od učenika koji su pohađali tradicionalne škole. Na kraju testiranja petero je učenika postiglo vrlo visoke rezultate na zadatku poboljšanja igračke (četvero iz Montessori škole), šestero u zadatku paralelnih linija (svi iz Montessori škole), dvoje na zadatku pričanja priče (po jedno iz svake škole) i jedno na zadatku crtanja (Montessori učenik). Kako se radi o uzorku od 80 učenika koji ograničava generaliziranje, Besancon i sur. predlažu daljnja istraživanja o utjecaju Montessori pedagogije na razvoj kreativnog mišljenja. Cossentino (2005) tvrdi kako učenici koji pohađaju Montessori škole iskazuju veći stupanj samostalnosti u radu od učenika tradicionalnih škola. Nadalje, Dohrman i sur. (2007) tvrde kako učenici koji su pohađali Montessori škole pokazuju značajno bolje rezultate na državnim ispitima iz matematike i prirodnih znanosti. Rathunde i Csikszentmihalyi (2005) uspoređujući Montessori i tradicionalne škole zaključuju kako učenici koji pohađaju Montessori škole imaju pozitivniju sliku o svojim učiteljima i školskom okruženju, kao i da razredne kolege češće nazivaju prijateljima od učenika tradicionalnih škola. Lin i sur. (2009) dokazuju kako primjena didaktičkog materijala izrađenog prema pedagogiji Marije Montessori, u radu s odraslima, značajno utječe na poboljšanje ponašanja

starijih osoba koje pate od demencije. Utvrđuju kako svakodnevna upotreba materijala za razvoj osjetila i fine motorike ima pozitivan utjecaj na smanjenje anksioznih ponašanja u takvih osoba. Do sličnih rezultata dolaze i Schneider i Camp (2002), koji su utvrdili da odrasle osobe s demencijom nakon korištenja didaktičkog materijala koji se koristi u pedagogiji Marije Montessori pokazuju značajno bolje rezultate u komunikaciji s posjetiteljima i postaju aktivniji u obavljanju svakodnevnih zadataka.

Uz brojna pozitivna iskustva s djecom i odraslim osobama, metode odgoja i obrazovanja Marije Montessori izazivale su i izazivaju brojne kritike javnosti i stručnjaka. Matijević (2001) navodi kako se Mariji Montessori, kao i ostalim predstavnicima reformne pedagogije, najviše zamjera pretjerani pedocentrizam. Najnovija reformska opredjeljenja u Hrvatskoj zagovaraju nastavu orijentiranu na učenika, što se sporo i teško ostvaruje jer su školske zgrade i učionice uređene i opremljene za potrebe nastave orijentirane na učitelje (Matijević, 2011). Tradicionalno obrazovanje, kakvo je u našim školama najprisutnije, ne promiče ideju *pluralizma u odgoju i obrazovanju* zbog nekoliko razloga. Prvi je preveliko naglašavanje reproduktivnog ponavljanja znanja i apstraktnost nastavnog sadržaja. Nadalje, podržava ideju kako je akademsko postignuće važnije od stjecanja vještina te podcjenjuje individualni pristup učeniku. Imajući na umu trenutačnu financijsku situaciju u državi, koja se, nažalost, u velikoj mjeri odražava i na školstvo, teško je očekivati da će u bliskoj budućnosti škole moći kupiti gotove didaktičke materijale koji se koriste u školama koje primjenjuju pedagogiju Marije Montessori. Trebalo bi uložiti određena sredstva za opremanje radionica na učiteljskim fakultetima i u osnovnim školama. Učiteljski bi fakulteti trebali uvesti nove kolegije ili module koji bi pridonijeli stjecanju metodičkih kompetencija za poučavanje praktičnih vještina i upotrebu specifičnih didaktičkih materijala različitih pedagoških koncepcija. To znači kupnju odgovarajuće opreme (namještaj), strojeva, alata i materijala. Naravno, u nastavnim planovima i programima treba predvidjeti vrijeme i popis aktivnosti koje je poželjno organizirati u određenom razredu ili ciklusu obveznoga školovanja (Matijević, 2009). Pedocentrizam (pretjerani?) i potrebne investicije mogu se koristiti i koriste se kao kritike uvođenju koncepta pedagogije Marije Montessori u tradicionalne škole.

Cilj je ovoga rada istražiti na koji su način didaktički materijali izrađeni prema postavkama pedagogije Marije Montessori procijenjeni od početnika (studenata) i iskusnih nositelja odgojno-obrazovnog procesa – učitelja, na nizu za odgojno-obrazovni proces relevantnih karakteristika i jesu li te karakteristike značajne odrednice za namjeru njihova korištenja u nastavi u tradicionalnim školama.

Metoda

Problem

Istražiti učiteljske i studentske percepcije materijalnih, kognitivnih, afektivno-motivacijskih karakteristika i prihvaćenosti odabranih skupova didaktičkih materijala koji su izrađeni na temelju pedagogije Marije Montessori za područje matematičkoga, jezičnoga i kozmičkoga odgoja i obrazovanja osnovnoškolske djece.

Sudionici

U istraživanju je sudjelovalo ukupno 47 učitelja i 63 studenta završne godine Integriranoga preddiplomskoga i diplomskoga sveučilišnoga Učiteljskog studija Učiteljskoga fakulteta u Osijeku u 2013. godini. Studenti (studentice 96.8%) su bili u dobi od 22 do 28 godina s medijanom od 23 godine. U uzorku od 47 učitelja (učiteljice 91.5%) razredne nastave zaposlenih u osnovnim školama istočne Hrvatske medijan je godina radnoga staža 17 (raspon 0 – 42 godine). Po kronološkoj dobi u uzorku je najviše učiteljica i učitelja koji su u dobi od 23 do 32 godine (15; 31.9%), a slijede ih skupine dobnih raspona 43 – 52 (27.7%), 33 – 42 (23.4%), 53 – 62 (10.6%) i 63 – 72 godine (6.4%).

Instrument i postupak istraživanja

Ispitivanja su provedena anonimno, dobrovoljno i uz pisanu suglasnost sudionika. Svi su sudionici ispunili obrazac koji se sastojao od pitanja o općim podatcima i od otvorenoga pitanja o poznavanju alternativnih pedagoških koncepcija (tablica 2). Didaktički materijali korišteni u ovom istraživanju odabrani su zbog reprezentativnosti i redovite upotrebe u nastavi u Montessori osnovnim školama. Materijali su samostalno izrađeni prema predlošcima, opisima i na temelju iskustava s materijalima u autentičnoj hrvatskoj Montessori školi (4 materijala iz kozmičkoga odgoja, 3 iz matematike i 3 iz jezika). Zbog veličine i objektivnih poteškoća s prijevozom izrađenih materijala sudionici istraživanja nisu procjenjivali stvarne didaktičke materijale, već su s materijalima upoznati posredstvom fotografija u boji i detaljnih opisa u mapi, kao i, ako se pokazalo potrebnim, pojašnjenjem ispitivača. Materijali su bili detaljno opisani, svaki na svom A4 listu papira te složeni u jednu povezanu mapu. Mapa se sastojala od opisa svakoga od ukupno 10 materijala na način da je u svakoj sljedećoj primjeni, na svakom sljedećem sudioniku istraživanja, redoslijed materijala variran kako bi se umanjio učinak redoslijeda prezentiranih materijala na dane procjene. Svaki je sudionik u tridesetak minuta pregledao i procijenio sve materijale na nizu od 20 parova bipolarnih pridjeva sa središnjom vrijednošću nula (0) i vrijednostima 1, 2 i 3 prema ekstremima polova. Pridjevi su sudionicima dani na procjenu jednakim redoslijedom u svim situacijama procjene. Primjerice, par je korištenih pridjeva glasio: *beskoristan - 3 - 2 - 1 0 1 2 3 koristan*. Pozitivni su polovi pridjeva navedeni u tablici 1 pod pripadajućim nadređenim karakteristikama. Pridjevi su razvrstani u nadređene karakteristike prema Bloomovoj taksonomiji obrazovnih ciljeva. Karakteristike odabranih didaktičkih materijala podijeljene su na široj razini na materijalne, kognitivne i afektivno-motivacijske karakteristike te prihvaćanje, ali su u početnim analizama korištene detaljnije i dijelom nezavisne procjene šest karakteristika. Bruto je rezultat na 6 užih karakteristika (tablica 1), za svaki od 10 materijala, izražen kao linearna aditivna kombinacija danih učiteljskih (za učitelje) i studentskih (za studente) procjena, podijeljena brojem pridjeva u karakteristici (zbog različitog broja pridjeva po karakteristici), s ciljem standardiziranja vrijednosti

radi usporedbe prosjeka. Karakteristike su po smislu orijentirane na način da više vrijednosti znače povoljniju procjenu na svakom od parova pridjeva, odnosno na ukupnoj karakteristici koju pridjevi čine. Kako bi se u obzir uzele specifične razlike materijala namijenjenih za isto područje odgoja, procjene su materijala uprosječene kako bi se dobile valjanije i pouzdanije skupne procjene različitoga materijala namijenjenog odgoju i obrazovanju u tom području (tj. ocjene za 3 materijala iz matematike kao predstavnici matematičkoga odgoja i obrazovanja, odnosno 3 iz jezika i 4 iz kozmičkog odgoja). Cilj je korištenja, po nekoliko različitih ali reprezentativnih materijala iz svakoga područja, bio stvoriti mogućnost generalizacije nalaza na opće skupine materijala korištenih za matematički, jezični i kozmički odgoj i obrazovanje u skladu s pedagogijom Marije Montessori. Vrijednost su se i poticajnost materijala za kozmički, matematički i jezični odgoj pokazali kao vrlo slični konstrukti, $r(110) = ,76$, $p < ,001$; $r(110) = ,75$, $p < .001$; $r(110) = ,94$, $p < .001$. Zbog toga su agregirani u po jednu mjeru za svaki materijal. Preferiranje materijala i spremnost na njihovo korištenje pokazali su se znatno niže povezanima, za kozmički, matematički i jezični odgoj, $r(110) = ,30$, $p < ,01$; $r(110) = ,29$, $p < ,01$; $r(110) = ,37$, $p < ,001$, pa su obrađene zasebno, s naglaskom na odrednice spremnosti za korištenje u nastavi.

Tablica 1.

Rezultati

Upoznatost studenata i učitelja s alternativnim pedagoškim koncepcijama

Većina je studenata o alternativnim školama informirana tijekom studija (60; 95,2%), dok ih ukupno 58 (92,1%) želi više naučiti o pedagogiji alternativnih škola. Ukupno 54 (85,7%) studenta smatra da u Hrvatskoj postoji premalen broj alternativnih škola, dok ih 9 (14,3%) smatra da ih je dovoljan broj. Ukupno 37 (78,7%) učitelja smatra da u Hrvatskoj postoji premalen broj alternativnih škola. Riječ je, dakle, o informiranim studentima koji pokazuju interes naučiti više i učiteljima koji su informirani o prominentnim pedagoškim koncepcijama poput Waldorfske pedagogije i pedagogije Marije Montessori. Uočljivo je da studenti i učitelji na upit o alternativnim pedagoškim koncepcijama najčešće navode pedagogiju Marije Montessori (78; 34% od svih navoda) i Waldorfsku pedagogiju (77; 33% od svih navoda), uz znatno rjeđe navođenje preostalih koncepcija, brojkom u smjeru kazaljke na satu 28, 20, 16, 5, 4 i 2 navoda (slika 1). U tablici 2 je uočljiv manji raspon navoda poznavanja pedagoških koncepcija kod učitelja (četvrtina učitelja uopće ne navodi koncepcije, četvrtina navodi jednu, a trećina dvije koncepcije) u usporedi sa studentima (gotovo dvije trećine studenata navode tri i više pedagoških koncepcija).

Tablica 2.

Slika 1.

Jasno je da se pedagoške koncepcije statistički značajno razlikuju u broju, $\chi^2(7, N = 230) = 239{,}5$, $p < ,001$, tj. nisu jednako zastupljene u ukupnom uzorku svih navoda sudionika istraživanja. Pedagogija Marije Montessori i Waldorfska pedagogija su statistički jednako često, $\chi^2(1, N = 155) = 0{,}006$, $p > ,05$, ali ujedno i u usporedbi s drugima, najčešće navedene koncepcije. Ne postoji statistički značajna razlika između broja navoda Summerhill-Freinet-Jenna plan pedagoških koncepcija, $\chi^2(2, N = 64) = 3{,}50$, $p > ,05$, kao ni u broju navoda Glasser-Šumska škola-Step by step pedagoških koncepcija, $\chi^2(2, N = 11) = 1{,}27$, $p > ,05$. Montessori-Waldorf, Summerhill-Freinet-Jenna plan, te Glasser-Šumska škola-Step by step, čine time blokove koncepcija po učestalosti navoda, pri čemu dvije trećine svih navoda čine Waldorfska i ovdje istraživana, pedagogija Marije Montessori. Sintagma didaktički materijal koji se koristi u školama koje primjenjuju pedagogiju Marije Montessori bit će u daljnjem tekstu zamijenjena skraćenicom DMPMM (Didaktički Materijal Pedagogije Marije Montessori).

Razlike između studenata i učitelja u procjeni materijalnih, kognitivnih i afektivno-motivacijskih karakteristika didaktičkih materijala za kozmički, matematički i jezični odgoj i obrazovanje

Prosjeci su ocjena tri materijala na tri karakteristike za studente i učitelje prikazani slikom 2, na način da više vrijednosti znače povoljnije ocjene. Za materijalne karakteristike vrijedi, što je viša vrijednost to su DMPMM materijali procijenjeni lakšima za izradu. Za obradu je podataka korišten miješani nacrt ANOVA-e, pri čemu su nezavisnu skupinu činili studenti i učitelji, a zavisne varijable procjene triju karakteristika za tri skupa materijala. S obzirom da nije zadovoljen uvjet sfericiteta, navedene su Greenhouse-Geisser korekcije. U slučaju značajnog glavnog ili interakcijskog efekta, izračunati su jednostavni kontrasti.

Slika 2.

Glavni efekt materijala (DMPMM) nije statistički značajan, $F(1{,}89, 204{,}28) = 0{,}21$, $p > ,05$, $\eta^2 = ,002$. To znači da su, kada zanemarimo sve druge varijable, DMPMM za kozmički (M=2,13, SE=,05), matematički (M=2,16, SE=,06) i jezični odgoj (M = 2,14, SE = ,06) ocijenjeni podjednakim, pregledom aritmetičkih sredina, općim pozitivnim ocjenama. Glavni efekt nezavisne skupine (studenti i učitelji) također nije značajan, $F(1, 108) = 1{,}32$, $p > ,05$, $\eta^2 = .01$, što govori u prilog podjednake opće, pozitivne procjene od strane studenata (M = 2,09, SE = ,07) i učitelja (M = 2,21, SE = ,08). Glavni je efekt karakteristika statistički značajan, $F(1{,}36, 146{,}99) = 100{,}30$, $p < ,001$, $\eta^2 = ,48$. To znači da su, kada zanemarimo sve druge varijable, materijalne (M = 1,75, SE = ,07), kognitivne (M = 2,37, SE = ,05) i afektivno-motivacijske (M = 2,32, SE = ,06) karakteristike DMPMM materijala snažno različito procijenjene. Kontrasti pokazuju da se razlikuju opći prosjeci svih karakteristika, tj. materijalnih u usporedbi s kognitivnim, $F(1, 108) = 122{,}63$, $p < ,001$, $\eta^2 = ,53$, materijalnih u usporedbi s afektivno-

motivacijskim, $F(1, 108) = 100{,}74$, $p < {,}001$, $\eta^2 = {,}48$, te kognitivnih u usporedbi s afektivno-motivacijskim karakteristikama, $F(1, 108) = 3{,}91$, $p = {,}05$, $\eta^2 = {,}035$. Ti su nalazi u skladu s prepoznatom kognitivnom utemeljenošću DMPMM (tj. 2,37) i realnim financijskim i vremenskim zahtjevima (tj. 1,75) koje materijali postavljaju pri svojoj inicijalnoj izradi. Primjerice, izrada *Sunčeva sustava*, što je jedan primjer materijala za kozmički odgoj i obrazovanje, ili skupa samoglasnika i suglasnika za jezični odgoj, zahtijevaju vrijeme, trud i početna materijalna sredstva. Nakon pregleda glavnih efekata, utvrđeno je da interakcija karakteristika × skupine, nije statistički značajna, $F(1{,}36, 146{,}99) = {,}69$, $p > {,}05$, $\eta^2 = {,}006$. Slika 2 prikazuje odnos aritmetičkih sredina cjelokupnoga, u istraživanju korištenog, statističkog modela (DMPMM × karakteristike × skupina), ali ta interakcija također nije statistički značajna, $F(2{,}22, 239{,}86) = 1{,}16$, $p > {,}05$, $\eta^2 = {,}011$.

Premda glavni efekt materijala (DMPMM) nije značajan, utvrđena je statistički značajna interakcija DMPMM i skupine (studenti i učitelji), $F(1{,}89, 204{,}28) = 4{,}00$, $p < {,}05$, $\eta^2 = {,}036$. Kako bi se razjasnio ovaj interakcijski efekt, provedeni su jednostavni kontrasti koji su pokazali značajnu interakciju između ocjene materijala za kozmički u odnosu na materijal za jezični, $F(1, 108) = 5{,}02$, $p < {,}05$; $\eta^2 = {,}044$, i materijala za kozmički u odnosu na materijal za matematički odgoj i obrazovanje, $F(1, 108) = 6{,}44$, $p < {,}05$, $\eta^2 = {,}056$, pri čemu interakcija za materijale za jezik i matematiku nije bila značajna, $F(1, 108) = 0{,}009$, $p > {,}05$, $\eta^2 = {,}00$. Razlog je ovim interakcijskim efektima taj što su učitelji dali komparativno veće procjene materijalima za matematiku i jezik, a studenti materijalu za kozmički odgoj i obrazovanje. Utvrđena je i statistički značajna interakcija DMPMM i karakteristika materijala, $F(2{,}21, 239{,}86) = 41{,}77$, $p < {,}001$, $\eta^2 = {,}28$, za koju su kontrasti prikazani u tablici 3.

Sažeto rečeno, značajni su interakcijski efekti navedeni u tablici 3. utvrđeni ponajprije zbog komparativno najnižih procjena svih DMPMM na materijalnim karakteristikama (zahtjevniji) u usporedbi s kognitivnim i afektivno-motivacijskim karakteristikama (Tablica 3, tiskano masno η^2 od ,34 do ,39), s razlikama najizraženijim za materijal za kozmički odgoj. Važno je i zanimljivo navesti da je onaj materijal koji je procijenjen kao najzahtjevniji za izradu, a to je u ovom istraživanju materijal za kozmički odgoj i obrazovanje ($M = 1{,}44$, SE = ,10), koji po zahtjevnosti za izradu slijedi matematički ($M = 1{,}85$, SE = ,08) pa jezični materijal ($M = 1{,}97$, SE = ,08), također prema procjeni studenata i učitelja procijenjen i kao onaj s najpovoljnijim kognitivnim i afektivno-motivacijskim karakteristikama, s ovim obrnutim redom procjena izrazitijim u studenata, što je dijelom uočljivo na slici 2. Što je DMPMM bio zahtjevniji (po vremenu, novcu i trudu) to je povoljnije procijenjen na kognitivnim i afektivno-motivacijskim karakteristikama.

Zaključno, premda su materijali općenito pozitivno vrednovani i od studenata i od učitelja, i jedni i drugi prepoznaju da različiti materijali zahtijevaju različito ulaganje vremena i novca u izradu, s materijalima za kozmički odgoj i obrazovanje kao komparativno najzahtjevnijima. Ipak, u skladu s optimalnim odgojno-obrazovnim

ishodima, trud se, koji je, prema procjeni i studenata i učitelja potrebno uložiti u izradu DMPMM, posebno kad se u žarište postave kognitivne i afektivno-motivacijske prednosti svih tih materijala, metaforički rečeno – isplati.

Tablica 3.

Odrednice prihvaćanja DMPMM-a u redovitoj nastavi

Materijali sami sebi nisu svrha, već se koriste radi ostvarenja postavljenih ciljeva. Izbor didaktičkih materijala dijelom ovisi o karakteristikama materijala, ali i učitelja i djece koja su s tim materijalima poučavana u danim odgojno-obrazovnim uvjetima. Pod afirmativnom pretpostavkom empirijske utemeljenosti i razvojne primjerenosti DMPMM za rad s djecom na ostvarivanju odgojno-obrazovnih ciljeva postavlja se pitanje je li spremnost studenata i učitelja za korištenje materijalom povezana s karakteristikama tog materijala. Na to su pitanje odgovori navedeni u tablici 2. U tablici 4 uočljivo je da je spremnost za korištenje predstavljenim DMPMM, premda značajno pozitivno povezano sa svim karakteristikama materijala, i kod studenata i kod učitelja najsnažnije povezano s procijenjenom vrijednošću tih materijala u nastavi (*r* od ,78 do ,92). Kada studenti i učitelji procijene vrijednost materijala visokom (vrijedno, poželjno, potrebno, korisno), tad ujedno iskazuju i veću spremnost na korištenje tim materijalom u nastavi. Jesu li materijali vrijedni za postizanje ciljeva ili nisu – bitna je stoga odrednica spremnosti njihovim korištenjem u nastavi. Zanimljivo je da preferiranje nije kod učitelja statistički značajno povezano sa spremnošću korištenja materijalom za matematički i jezični odgoj i obrazovanje. Izraziti preferiranje (sviđanje) nekog materijala ne znači za učitelje i veću spremnost njegove upotrebe u nastavi, osim za kozmički odgoj. Moguće je da učitelji imaju razvijene preferirane i spremne metode poučavanja jezika i matematike, koje ih čine manje spremnima na korištenje novih materijala u nastavi, premda istodobno prepoznaju povoljne afektivno-motivacijske karakteristike (vrijednost i poticajnost) tih materijala. Praktičnim pokaznim vježbama upotrebe tih materijala za poučavanje jezičnih i matematičkih koncepata, posebno naglašavajući njihovu vrijednost, moglo bi se pomoći učiteljima da utvrde prednosti, odnosno nedostatke dosadašnjega rada u odnosu na rad s DMPMM, čime bi se izravno radilo na fleksibilnosti učitelja za inovacije u nastavi u funkciji uspješnosti. Moguće je da učitelje nedovoljna informiranost, na što smo upućeni prvim dijelom analize o poznavanju alternativnih pedagoških koncepcija, sprečava u uvođenju takvih i sličnih inovacija u nastavi, čak i kada ih povoljno procjenjuju. Naime, prije same procjene DMPMM, četvrtina ispitanih učitelja nije mogla navesti nijednu alternativnu pedagošku koncepciju.

Tablica 4.

Rezultati ovoga istraživanja navode na praktičan zaključak da je, kad se učitelje uvodi u rad s DMPMM, moguće započeti najprije s matematičkim, pa jezičnim i na kraju s materijalima za kozmički odgoj i obrazovanje. Ta je preporuka u skladu s

odvaganim odnosom spremnosti na korištenje materijala u nastavi te studentskom i učiteljskom percepcijom vrijednosti tih materijala navedenom u tablici 4. Prosječne ocjene prikazane u slici 2 u skladu su s tom preporukom. Naime, unatoč visokim ocjenama materijala za kozmički odgoj, taj je materijal procijenjen kao zahtjevan za izradu, što početnicima može djelovati odbojno. S druge strane, procijenjen kao lakši za izradu, materijal za matematički odgoj i obrazovanje od učitelja je procijenjen kao materijal gotovo jednako povoljnih afektivno-motivacijskih karakteristika. Bilo bi pohvalno učiniti nastavu matematike motivirajućom ili inspirativnom, barem u tolikoj mjeri koliko je inspirativno istraživanje egzotičnih svjetova u Sunčevu sustavu. Didaktički materijali za matematiku i jezik, izrađeni prema postavkama pedagogije Marije Montessori, to nam, barem ako je suditi prema procjenama studenata i učitelja – nude kao priliku.

Rasprava i zaključak

Od ukupno 47 ispitanih učitelja njih 12 (25,5%) nije ponudilo nijedan odgovor na pitanje otvorenoga tipa: „Za koje ste alternativne pedagoške koncepcije čuli?“, a od 63 ispitana studenta njih 11 (17,5%) nije se moglo sjetiti neke alternativne pedagoške koncepcije. Prvu hrvatsku alternativnu pedagošku koncepciju, koju je utemeljio Franjo Higy Mandić pod imenom Ogledna šumska (narodna) škola na Tuškancu, nepravilno su imenovali, što je također dokaz nedovoljnog poznavanja alternativnih pedagoških koncepcija. Rezultati istraživanja pokazuju da su studenti i učitelji upoznati s manjim brojem pedagoških koncepcija, pri čemu su dvije najčešće navođene koncepcije pedagogija Marije Montessori i Waldorfska pedagogija, uz znatno rjeđe navođenje drugih koncepcija. Dvije najčešće navođene alternativne pedagoške koncepcije ujedno su i jedine prisutne u hrvatskom osnovnoškolskom sustavu. Je li ta činjenica uzrokom dobivenih pozitivnih rezultata, ne možemo sa sigurnošću tvrditi, ali svakako bi se promicanjem pluralizma u našem obrazovnom sustavu više čulo, znalo i cijenilo različite pedagoške koncepcije. Rezultati ovoga istraživanja, slično kao i rezultati istraživanja Rajić (2008), pokazuju koliko je važno informirati javnost o alternativnim oblicima obrazovanja ako želimo unaprijediti školski i pedagoški pluralizam. U tom smjeru ide podatak da 85,7% studenata i 78,7% učitelja smatra kako u Hrvatskoj ima premalen broj alternativnih škola. Studenti, tj. budući učitelji, o alternativnim su školama informirani tijekom studija (95,2%), a podatak koji ohrabruje jest da njih čak 92.1% želi naučiti više o alternativnim pedagoškim koncepcijama.

Kao prvi smjer obrade podataka učinjena je analiza razlika između učitelja zaposlenih u školi i budućih učitelja (studenata) u percepciji karakteristika odabranih didaktičkih materijala koji se koriste u školama koje primjenjuju pedagogiju Marije Montessori, a s obzirom na tri područja odgoja i obrazovanja. Vidljivo je da su prosjeci materijala za kozmički, matematički i jezični odgoj na karakteristikama materijala pozitivni i vrlo slični u procjenama studenata i učitelja. Svi su materijali vrlo visoko procijenjeni s obzirom na sve karakteristike. Je li to rezultat davanja socijalno poželjnih

odgovora ili autentična percepcija, ostaje nam da potvrdimo dodatnim istraživanjem. Važno je istaknuti kako i učitelji i studenti prihvaćaju materijale i njima bi se rado koristili u svojoj nastavi, pri čemu je presudna afektivno-motivacijska atraktivnost didaktičkog materijala i jednostavnost njegove izrade.

Analizom isključivo percepcija materijala i njihovih karakteristika uočeno je da studenti i učitelji materijale za kozmički odgoj procjenjuju najzahtjevnijim za izradu, ali i konkretnijim, poticajnijim i vrednijim od materijala za matematiku i jezik. Uzmemo li kao ključnu ideju ovoga istraživanja nakanu, tj. spremnost na korištenje didaktičkih materijala koji su izrađeni po uzoru na didaktičke materijale koji se koriste u školama koje primjenjuju pedagogiju Marije Montessori, postavlja se pitanje s kojom karakteristikom materijala spremnost na korištenje ostvaruje statistički značajne povezanosti u procjenama studenata i učitelja. Podatci prikazani u tablici 4. pokazuju da je, s obzirom na veličinu koeficijenta korelacije, procijenjena vrijednost materijala, neovisno o području odgoja i obrazovanja (matematika, jezik ili kozmički odgoj), najsnažnije pozitivno povezana sa spremnošću za korištenjem odabranih materijala u nastavi. Kako su obje skupine sudionika procijenile materijale vrijednima, poželjnima, potrebnima i korisnima u nastavi (vrijednost), a vrijednost materijala jest najsnažnije povezana s izjavom spremnosti na njihovu upotrebu, moguća preporuka je, pri predstavljanju Montessori didaktičkih materijala, upravo snažno naglašavati njihovu vrijednost i time povećati spremnost na njihovo korištenje. Početna vremenska i financijska zahtjevnost izrade višekratno upotrebljivih i dogradivih materijala opravdana je njihovom trajnošću i od studenata i od učitelja prepoznatom odgojno-obrazovnom vrijednošću i u skladu s tim spremnošću za korištenje. Neovisno o području odgoja i obrazovanja učitelji i studenti, na temelju ovoga istraživanja, preferiraju konkretne i nezahtjevne materijale, tj. one koje je lako izraditi, koji ne zahtijevaju velika materijalna sredstva i velik utrošak vremena.

Zaključno, ispitani su učitelji, u usporedbi sa studentima, nedovoljno upoznati s alternativnim pedagoškim koncepcijama, premda u ovom radu istraživane materijale proizašle iz jedne od njih (pedagogije Marije Montessori) i jedni i drugi vrlo pozitivno vrjednuju. Najveći broj sudionika, i učitelja i studenata, upoznat je s pedagogijom Marije Montessori, što se može iskoristiti kao polazište za istraživanje i uvođenje preostalih pedagoških koncepcija u tradicionalnu osnovnoškolsku nastavu, uvažavajući njihove diferencijalne prednosti. Sudionici procjenjuju karakteristike prikazanih DMPMM na vrlo pozitivan način. Kada materijale smatraju vrijednima i korisnima, pokazuju i spremnost na uvođenje DMPMM u redovitu nastavu. Pozitivno vrednovanje i interes sudionika za uvođenje DMPMM materijala u nastavu mogu biti polazišta i za uvođenje sadržaja alternativnih pedagoških koncepcija u studijske programe svih učiteljskih fakulteta u Hrvatskoj, kao i u cjeloživotnu izobrazbu učitelja, što jest u cilju obrazovanja fleksibilnog, otvorenog, temeljito obaviještenog i stručnog učitelja.