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TEACHERS ATTITUDES ABOUT INTEGRATED APPROACH IN TEACHING

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Abstract. This paper deals with an integrated approach in the modern education system. First, we examine the theoretical starting points and the conceptual definition of integrative teaching. Through the results of theoretical and empirical research, we have looked into the advantages and pedagogical implications of the application of integrative teaching. The aim of the study was to investigate if and how primary teachers perceive the possibilities and outcomes of using integrated approach in class teaching. The sample of N=159 primary teachers was surveyed with the use of a questionnaire. The results show that primary teachers have positive attitudes about the effects of using an integrated approach in regard to the quality of teaching and learning outcomes. The participants who work 13 and more years, feel more confident about the concept of an integrated approach comparing to those who work less than 13 years. However, we have not found a statistically significant difference in individual items in regard to the degree of education and years of work experience. The findings suggest that more attention should be given to the initial teacher preparation programs and that teacher educators should find ways to incorporate integrated activities in both theoretical courses and practice.

Keywords: primary teachers; integrated approach; attitudes; quality teaching

Introduction

Rapid technological advancement and professional demands of the information age constantly increase the challenges we face in the 21st century. Complex tasks and problems, for solving of which we need numerous skills and knowledge in different fields, are very often put before an individual. Accordingly, tasks are also put before education systems to prepare young people for life and work in technologically variable and unstable conditions. For this reason, it is important to improve the quality of teaching and to create schools in which functional knowledge will be adopted in accordance with the needs of modern civilization. Knowledge that is specialised, separated according to various professions and

so restricted that it tends to disintegrate the wholeness of the world, belongs to the past, and is becoming increasingly less understandable, acceptable or useful to the students (Polić, 2005).

The current situation has led to a change in the focus of education and the growing need for strengthening students' interdisciplinary competences in the following areas: ways of thinking (creativity and innovation, critical thinking, problem solving, decision making, learning how to learn, metacognition); ways of working (communication, data and information work, cooperation, team work); tools of working (ICT literacy, digital competence); living in the world civic competences, life skills and career resourcefulness and orientation towards entrepreneurship, personal and social responsibility – responsible participation in a democratic society, responsible attitude towards health, responsible attitude towards the environment, cultural competences, aesthetic competences); lifelong learning. These competences have been globally recognized as a prerequisite for success in life and work in the 21st century¹) (Binkley et al., 2012; Mäkinen, 2009) and education systems around the world have incorporated them into their curricula at all levels of education. These competences are recognized as the need for quality education, at all levels. University educators who prepare pre-service teachers for the organization of educational activities in working with children of pre-school and school age are expected to apply different teaching methods and forms of work, which is a prerequisite for a thematic integrated approach in teaching activities. At the same time, this kind of teaching is also a presumption of students' and pre-service teachers' interest in engaging in teaching activities (Kopas-Vukašinović & Lepičnik-Vodopivec, 2018).

Theoretical approach to the problem

Curriculum integration has become an essential theme in discussions on school reform during the past years (Carnevale, 2004; Erickson, 2001). Educators involved in curriculum integration have become aware of the impact of this approach to education. Accordingly, certain countries have transferred from the subject model in the design of school curricula to the integrated approach. In this respect, it is important to point out that the integrated approach rests on the interdisciplinary connection and thematic planning in teaching, as well as on the approach based on the development of both key and transversal competences. In some countries, the approach based on affirmation and favoring of interdisciplinary fields is more represented, as is the case in the Finnish curriculum, while some other countries – England, Wales, the French part of Belgium – largely apply the approach based on the development of transversal competences (Cekić-Jovanović & Mihajlović, 2018).

Different forms of integrated teaching have emerged in the late 19th century, however, the one thing they all have in common is the emphasis on the need for students' active role in the construction and acquisition of personal knowledge that would be connected to the realities of life (Cudina-Obradović, 2009). Sicherl-Kafol

(2017) defines interdisciplinary integration as an example of holistic learning and teaching which represents the real interactive world and its complexity, abolishes frontiers between individual subjects and promotes the principle that all knowledge is interrelated (Cotić et al., 2015).

Numerous theoretical and empirical research (MacMath et al., 2010; Applebee et al., 2007; Harrell, 2010; Satiansiriwawat, Intorrathed & Siriwan, 2018, Chehlarova, 2019) in the field of education point to the fact that integrative teaching has many advantages. The aforementioned research confirm the positive effects of applying an integrated approach to teaching in the context of developing the problem solving and reasoning skills (Kerry, 2011); not only does it apply knowledge and skills learned within one topic to another, but it also synthesizes information and ideas from different sources (Barnes, 2011); develops cognitive skills, critical thinking and constructive knowledge (Repko, 2009); develops the ability to perceive and understand the problem from several aspects; develops team spirit and work habits (MacIver, 1990); acquires qualitative and practically applicable knowledge, mobilizes existing knowledge and experiences, develops and encourages discussion, self-evaluation, initiative, openness, flexibility, critical thinking, self-criticism and adaptability to new situations (Buljubašić-Kuzmanović, 2007: 159). In addition, "the interdisciplinary approach to learning best complies with real-life learning that integrates and connects different areas of development, and gives a new quality to learning" (Buljubašić-Kuzmanović, 2007: 148). Another major quality of the integrated approach is the interweaving of content and procedures of different disciplines in order to achieve a deeper understanding of each discipline, as well as linking knowledge from different areas within a given subject (Milinković, 2011). Integrated teaching (correlation, thematic or project teaching) is more effective than the traditional ways of teaching since the student explores a phenomenon or a problem, observing them from different perspectives and connecting different areas of knowledge, while being an active participant in all the stages of the teaching process (Tomljenović & Novaković, 2012; Aristya Putra & Kumano, 2018).

Observed as part of the education system, integration implies the formation of a complete representation among students of the world surrounding them, in the way that certain components which correspond to unique concepts of phenomena and processes that manifest in the environment are isolated from the content of education. At the same time, it is important to keep in mind that children are more successful in learning and better motivated if the learning content is "life-related and if it meets their needs, goals and interests" (Buljubašić-Kuzmanović, 2007: 150). In the framework of integrative teaching students are at the centre of the teaching process and, because their learning comes through personal experience, they are the instigators of their own education. Integrated approach to learning emphasizes intellectual, social, emotional and aesthetic development, supports the overall development of students, does not focus on isolated, mostly cognitive aspects. At the center of integrative

learning is “an individualized program directed towards the student, not a program directed towards the subject and managed by teachers.” (Buljubašić-Kuzmanović, 2007: 148). Erickson (2001) stated that the aim of the integrated curriculum is to cause students to integrate their thinking at a conceptual level by seeing the patterns and connections between transferable, conceptual ideas and the topic under study (p. 69). Focused on the adoption of comprehensive knowledge and on the development of functional skills, integrative teaching involves an innovative teaching model which enables the achievement of meaningful links between similar aspects of different disciplines. Mutual integration of disciplines and understanding the problem from different perspectives contributes to the overall learning process which is inherent to human knowledge and which is more than the sum of individual parts. In this way, such knowledge is acquired in the classroom which represents the system where these new learnt facts affect the existing ones creating a new, more advanced, and more complete knowledge system. (Jovanović & Kovčić, 2017)

Analyzing the situation in Serbia, the deficiencies of education can be noticed within the results of PISA (Programme for International Student Assessment) and TIMSS (Trends in International Mathematics and Science Study) tests. The aforementioned tests have shown that students' knowledge in Serbia is mainly at the level of reproduction and recognition, and that therefore it is not functional and practically applicable. A small percentage of students have the skills and knowledge needed to solve relatively difficult problem assignments (Pavlović Babić & Baucal, 2013) that require the practical application of knowledge from different subjects. In order to overcome these problems, strategic documents in Serbia²) envisage the development of divergent thinking among students, creative abilities, creative potentials and the acquisition of greater, practically applicable knowledge from different fields, and at the same time a tendency towards inter-curricular planning and linking of teaching contents, thematized curricula aimed at more adequate and complete expression of the connection and integrity of natural, social and other sociocultural areas that are being studied in primary schools.

Some authors point out that there is a limited amount of research on teachers' view, perceptions, beliefs, prerequisite skills, knowledge bases, and experiences about integrated instruction (Srikoom, Hanuscin & Faikhamta, 2017; Stohlmann, Moore & Roehrig, 2012). Another interesting thing is the research data of Russian authors who did a study which confirmed the importance of the self-concept of teachers, which determines their communication skills and professional achievements (Glotova & Wilhelm, 2014). Given that numerous studies show that teachers' attitudes influence their teaching practice (Kim, 2014, Stipek, Givin, Salmon & MacGyvers, 2001) and readiness to innovate teaching (Handal & Herrington, 2003; Haney, Lumpe, Czernaik & Egan, 2002), we have decided to examine the primary teachers' attitudes about the effects and outcomes of using integrated approach in class teaching.

Research Methodology

In our research we wanted to explore primary teachers' attitudes about effects of using integrated approach in regard to the quality of teaching and learning outcomes. The *main aim* was to investigate if and how primary teachers perceive the possibilities and outcomes of using integrated approach in class teaching. The aim was realized through the following *research questions*:

1. To examine if primary teachers are acquainted and to what degree with the concept of integrated approach.

2. To determine if and how teachers recognize effects of using integrated approach in class teaching (in terms of increased motivation, effective use of classroom time and energy of students and teachers, allowing students to express individual characteristics, abilities and interest) and to investigate if there are statistically significant differences in teachers' attitudes in regard to the degree of education and years of work experience.

3. To determine if and how teachers recognize effects of using integrated approach in class teaching (in terms of acquisition of quality, long-term and functional knowledge by students) and to investigate if there are statistically significant differences in teachers' attitudes in regard to the degree of education and years of work experience.

The survey technique was used in empirical research, and a instrument was created to examine the attitudes of teachers about the effects of using integrated approach in class teaching. The respondents were asked to fill in an anonymous survey instrument, which consisted of two parts. The first part included demographic characteristics of a chosen sample (such as years of work experience and degree of education). The second part contained one scale question and a Teachers Attitudes Toward Integrated Approach Scale (TATIA). The TATIA is five-point Likert-type scale that contained 6 items. The respondents selected from among 5 degrees of the intensity of a given feature. The overall Cronbach alpha coefficient of the Scale, $\alpha=0.860$, indicates a good reliability.

The items included in TATIA concerned teachers attitudes about different effects of using integrated approach on students knowledge and it's quality, motivation, effective use of classroom time and energy of students and teachers (Table 1).

Table 1. TATIA Items definition and item codes

Item Codes	Items
I1	Use of integrated approach increases students' motivation.
I2	Use of integrated approach increases the quality of students' knowledge.
I3	The knowledge acquainted through the use of integrated approach are long-term.
I4	Use of integrated approach enables acquisition of functional knowledge.

15	The application of the integrated approach enables a more economical and rational use of students' and teachers' time and energy.
16	Through the application of the integrated approach, the individual characteristics, abilities and interests of the students become notable.

Data collected by the instrument were analysed quantitatively. The statistical analyses were conducted using the Statistical Package for the Social Sciences (SPSS) for Windows, version 19.0. For statistical analysis, *p* values lower than 0.05 were considered statistically significant. The normality of the item scores was evaluated with the use of the Shapiro-Wilk test of normality. Reliability was assessed using Cronbach's alpha coefficient. For the quantitative analyses of data, methods of descriptive statistics were used (frequency, percentage, mean, median, standard deviation, mean ranks, coefficient of variation), Kruskal-Wallis H test. The independent variables in the data analysis were the degree of education and years of work experience. The research was conducted during the school year 2017/2018 and included the sample of 159 primary teachers from Serbia.

Results and Discussion

Structure of the sample, according to degree of education and years of work experience is given in Table 2.

Table 2. Structure of the sample in relation to the degree of education and years of work experience

	Degree of education			Years of work experience		
	College	BA	MA	0 – 12	13 – 24	25 and more
f	14	118	27	73	54	32
%	8.8	74.2	17.0	45.9	34.0	20.1

First of all, we wanted to determine what is the level of understanding the integrated approach concept by the participants. The teachers were asked to indicate their level of understanding the concept of integrated approach on a scale from 1 to 5 (1 = not understand at all, 5 = completely understand). Findings, given in Table 3, suggests that primary teachers level of self-reported understanding of the integrated approach is satisfying ($M=4.27$, $SD=0.86$). The majority of teachers (88.1%) replies that they understand or completely understand the concept of integrated approach in teaching. However, we cannot neglect the fact that there are also teachers who reported that they are not certain if they understand this approach (7.5%) and those who do not understand the integrated approach (4.4%).

Table 3. The self-reported level of understanding the concept of integrated approach by teachers

N		not understand at all	not understand	not certain	understand	completely understand	Mean (M)	Std. Deviation (SD)	Coefficient of variation (Cv)
159	f	3	4	12	68	72	4.27	0.86	20.14
	%	1.9	2.5	7.5	42.8	45.3			

The teachers with college and master degree expressed higher level of understanding the concept of integrated approach comparing to the teachers with bachelor degree (Table 4). Also, teachers who work 13 and more years, feel more confident in understanding the integrated approach concept comparing to those who work less than 13 years. However, there were no statistically significant differences in regard to the degree of education ($\chi^2=4.807$, $df=2$, $p=0.90$) nor years of work experience ($\chi^2=2.108$, $df=2$, $p=3.49$).

Table 4. The level of understanding the concept of integrated approach in regard to the degree of education and years of work experience

		Median	Mean Rank	Shapiro-Wilk test		Kruskal-Wallis Test		
				W	Sig.	χ^2	df	Sig.
Degree of education	college	5.00	98.50	0.616	0.000	4.807	2	0.90
	B.A.	4.00	75.97	0.768	0.000			
	M.A.	5.00	88.02	0.681	0.000			
Years of work experience	0-12	4.00	74.77	0.800	0.000	2.108	2	3.49
	13-24	4.50	84.22	0.683	0.000			
	25-	4.00	84.81	0.686	0.000			

Results show that, in general, the attitudes of teachers in regard to integrated approach were positive and homogeneous, and this is encouraging (Table 5). The overall average for the Means of teachers' attitudes toward integrated approach was $M=4.34$ and standard deviation $SD=0.74$. Coefficient of variation value

($C_v = 17.05$) indicates that teachers' attitude towards integrated approach is relatively the same.

Table 5. Distribution of teachers' replies

Item Codes	N		I totally disagree	I disagree	I am not certain	I partially agree	I totally agree	Mean (M)	Std. Deviation (SD)	Coefficient of variation (Cv)
I1	159	f	0	8	8	68	75	4.32	0.79	18.29
		%	0	5	5	42.8	47.2			
I2	159	f	0	2	23	63	71	4.28	0.75	17.52
		%	0	1.3	14.5	39.6	44.7			
I3	159	f	0	1	15	64	79	4.39	0.68	15.49
		%	0	0.6	9.4	40.3	49.7			
I4	159	f	0	2	8	72	77	4.41	0.65	14.74
		%	0	1.3	5.0	45.3	48.4			
I5	159	f	0	8	17	64	70	4.23	0.84	19.86
		%	0	5.0	10.7	40.3	44.0			
I6	159	f	0	1	14	61	83	4.42	0.68	15.38
		%	0	0.6	8.8	38.4	52.2			

In line with our research objectives, the variables were tested for possible differences concerning degree of education and years of work experience. First, the data were tested for the distribution normality of all the variables studied (Shapiro-Wilk test) in regard to the degree of education of teachers and years of work experience. Our data did not meet the condition of normal distribution, so non-parametric statistical procedures were used (Kruskal-Wallis tests).

Table 6. Teachers' attitudes in regard to degree of education

Item codes	Degree of Education	Median	Mean Rank	Shapiro-Wilk test		Kruskal-Wallis Test		
				W	Sig.	χ^2	df	Sig.
I1	college	5,00	96,46	0,616	0.000	2.404	2	0.301
	B.A.	4,00	78,45	0,751	0.000			
	M.A.	4,00	78,22	0,724	0.000			
I2	college	5,00	95,29	0,639	0.000	4.898	2	0.086
	B.A.	4,00	75,66	0,811	0.000			
	M.A.	5,00	91,04	0,727	0.000			
I3	college	5,00	91,64	0,688	0.000	3.985	2	0.136
	B.A.	4,00	76,13	0,780	0.000			
	M.A.	5,00	90,87	0,626	0.000			
I4	college	5,00	94,39	0,616	0.000	5.388	2	0.068
	B.A.	4,00	75,56	0,755	0.000			
	M.A.	5,00	91,93	0,675	0.000			
I5	college	5,00	100,57	0,616	0.000	3.816	2	0.148
	B.A.	4,00	77,25	0,803	0.000			
	M.A.	4,00	81,33	0,746	0.000			
I6	college	5,00	92,29	0,616	0.000	1.368	2	0.505
	B.A.	5,00	78,73	0,755	0.000			
	M.A.	5,00	79,17	0,750	0.000			

The findings indicate that there is no statistically significant difference in regard to the teachers' educational degree. However, it is notable that teachers with college education express more positive attitude toward the effects of integrated approach than teachers with B. A. and M. A. degree. These results are in line with the already obtained findings that teachers with college degree expressed higher level of

understanding the concept of integrated approach comparing to the teacher with master and bachelor degree. This indicates that more attention should be given to preparation of future primary teachers. Most teacher preparation programs are still discipline-specific which results in not preparing future teachers enough for the complexity of teaching disciplines in integrated manner (Cain, 2014). As Basista & Matthews (2002) state, if teachers do not experience integration themselves, it is unlikely that they will integrate curricula in their classroom.

In regard to the years of work experience we determined that there were no statistically significant difference.

Table 7. Teachers' attitudes in regard to years of work experience

Item codes	Years of work experience	Median	Mean Rank	Shapiro-Wilk test		Kruskal-Wallis Test		
				W	Sig.	χ^2	df	Sig.
I1	0-12	4	73.26	0.782	0.000	3.542	2	0.107
	13-24	5	85.79	0.711	0.000			
	25-	5	85.61	0.680	0.000			
I2	0-12	4	79.62	0.794	0.000	0.753	2	0.927
	13-24	4	81.65	0.772	0.000			
	25-	4	78.09	0.771	0.000			
I3	0-12	5	83.24	0.741	0.000	1.730	2	0.421
	13-24	4	73.97	0.767	0.000			
	25-	5	82.78	0.740	0.000			
I4	0-12	4	80.43	0.741	0.000	2.955	2	0.228
	13-24	4	73.80	0.756	0.000			
	25-	5	89.48	0.687	0.000			
I5	0-12	4	75.86	0.801	0.000	1.373	2	0.503
	13-24	4	84.54	0.763	0.000			
	25-	5	81.80	0.762	0.000			
I6	0-12	5	79.27	0.753	0.000	0.971	2	0.615
	13-24	5	83.92	0.714	0.000			
	25-	4	75.06	0.769	0.000			

However, teachers who work more than 13 and less than 24 years expressed more positive attitudes in items I1, I2, I5 and I6 comparing to other two groups. We believe that this might be related to the fact that this is the period when teachers have enough knowledge, both those theoretical acquainted during university education and those gained through practice and experience. This is also the period of intense professional development and the period when teachers are most efficient in their work. They poses high level of aspiration and self-confidence, and are able to evaluate the quality of their teaching work, both advantages and disadvantages, and possibilities for improvement. Since teaching experience plays important role in acquiring teaching competences, perhaps embodying integrated activities into obligatory teaching practice in teacher preparation programs could prepare future teachers to use integrated approach in a more qualitative way and to better understand the benefits.

Conclusion

The results we obtained show that primary teachers express positive attitudes about effects of using integrated approach in regard to the quality of teaching and learning outcomes. Teachers' self-reported understanding of the concept of integrated approach indicates a high level. Nevertheless, the fact that teachers who work 13 and more years, feel more confident about the concept of integrated approach comparing to those who work less than 13 years implies that more attention should be given to the initial teacher preparation programs and teaching in integrated manner. The attitudes of teachers in regard to the effects of using integrated approach were in general positive and homogeneous. We have not found statistically significant difference in individual items in regard to the degree of education and years of work experience. However, the findings suggest that teacher educators should find ways to incorporate integrated activities in both, theoretical courses and practice. This could be the starting point for some future studies which could investigate the effects of experimental programs that use integrated activities.

NOTES

1. Strategy of the Finnish National Board of Education (2011). Education Policy Outlook Finland, OECD.
2. Strategy for Education Development in Serbia 2020, Official Gazette of RS, No. 107/2012.
3. Mäkinen, M. (2009). Perspectives on teacher competences, Retrieved 16, July 2019, from <https://www.european-agency.org/sites/default/files/Finland.pdf>.

REFERENCES

- Applebee, A. N., Adler, M. & Flihan, S. (2007). Interdisciplinary curricula in middle and high school classrooms: case studies of approaches to curriculum and instruction. *American Educational Research Journal*, 44 (4), 1002 – 1039.
- Aristya Putra, P.D. & Kumano, Y. (2018). Energy learning progression and STEM conceptualization among pre-service science teachers in Japan and Indonesia, *The New Educational Review*, 53 (2), 153 – 162.
- Barnes, J. (2011). *Cross-curricular learning 3 – 14*. Second edition. London: Sage.
- Basista, B. & Mathews, S. (2002). Integrated science and mathematics professional development programs. *School Science and Mathematics*, 102 (7), 359 – 370.
- Binkley, M., Erstad, O., Herman, J., Raizen, S., Ripley, M., Miller-Ricci, M. & Rumble, M. (2012). Defining twenty-first century skills. In: *Assessment and teaching of 21st century skills* (pp.17 – 66).
- Buljubašić-Kuzmanović, V. (2007). Students' judgement of the effectiveness of interactive learning, *Odgojne znanosti*, 9 (2), 147 – 160 [In Croatian].
- Cain, R. J. (2014). *Teachers' understanding about science and mathematics integration* (Doctoral Dissertation). Houston: University of Houston
- Carnevale, D. (2004). Professors seek compensation for online courses. *Chronicle of Higher Education*, 50 (49), A27.
- Cekić-Jovanović, O. & Mihajlović, A. (2018). Integrated approach in pedagogical and methodical views of Sreten M. Adžić, *Uzdanica*, 15 (2), 95 – 107 [In Serbian].
- Cehlarova, T. (2019). Op art in mathematics education or counting of quadrilaterals. *Pedagogy*, 91 (1), 8 – 16.
- Cotić, N., Cotić, M., Felda, D. & Vodopivec, J. L. (2015). An example of integrated teaching of mathematics and environmental education in the second grade of basic school. *The New Educational Review*, 41 (3), 17 – 26.
- Cudina-Obradovic, M. & Brajkovic, S. (2009). *Integrated teaching*. Zagreb: Biblioteka korak po korak.
- Erickson, H. L. (2001). *Stirring the head, heart, and soul: redefining curriculum and instruction* (2nd ed.). Thousand Oaks, CA: Corwin Press.
- Glotova, G. & A. Wilhelm (2014). Teacher's self-concept and self-esteem in pedagogical communication. *Procedia – Social and Behavioral Sciences*, 132: 509 – 514.
- Handal, B. & Herrington, A. (2003). Mathematics teachers; beliefs and curriculum reform. *Mathematics Education Research Journal*, 15 (1), 59 – 69.

- Haney, J. J., Lumpe, A. T., Czernaik, C. M. & Egan, V. (2002). From beliefs to actions: the beliefs and actions of teachers implementing change. *Journal of Science Teacher Education*, 13(3), 171 – 187.
- Harrell, P. E. (2010). Teaching an integrated science curriculum: linking teacher knowledge and teaching assignments, *Teacher Education*, 19 (1), 145 – 165.
- Jovanović, M. & Kovčić, V. (2017). Contemporary society challenges of integrative teaching. *Sinteze*, 11, 39 – 71.
- Kerry, T. (2011). *Cross-curricular teaching in the primary school: planning and facilitating imaginative lessons*. London: Routledge.
- Kim, M. (2014). A comparison of pedagogical practices and beliefs in international and domestic mathematics teaching assistants. *Journal of International Students*, 4 (1), 74 – 88.
- Kopas-Vukašinović, E. & Lepičnik-Vodopivec, J. (2018). Teacher as a conception of enhancing the quality of university education. In: Emina Kopas-Vukašinović and Jurka Lepičnik-Vodopivec (eds.), *Innovative Teaching Models in the System of University Education: Opportunities, Challenges and Dilemmas* (pp. 23 – 38). Jagodina: Faculty of Education; Koper: Faculty of Education.
- MacIver, D. J. (1990). Meeting the needs of young adolescents: advisory groups, interdisciplinary teaching teams, and school transition programs. *Phi Delta Kappan*, 71 (6), 458 – 464.
- MacMath, S., Roberts, G., Wallace, J. & Chi, X. (2010). Curriculum integration and at-risk students. *British Journal of Special Education*, 37 (2), 87 – 94.
- Milinković, J. (2011). Elements of integrative approach in textbooks, *Journal Teaching Innovations*, 24 (1), 53 – 63.
- Pavlović Babić, D. & Baucal, A. (2013). *PISA 2012 in Serbia: the first results: support me, inspire me*. Belgrade: University of Belgrade.
- Polić, M. (2005). Integral schooling as an answer to the needs of contemporary education. Integralna nastava kao odgovor na suvremene obrazovne potrebe. *Methodical Review: Journal of Philosophy of Education*, 12 (2), 61 – 72 [In Croatian].
- Satiansiriwat, S., Intorrathed, S. & Siriwan, S. (2018). Integration of agricultural knowledge with the Thai Language, Mathematics, and Science subjects for first-year elementary school of Thailand. *The New Educational Review*, 51 (1), 41 – 52.
- Srikoom, W., Hunuscin, D. & Faikhamta, C. (2017). Perceptions of in-service teachers toward Teaching STEM in Thailand. *Asia-Pacific Forum on Science Learning and Teaching*, 18 (2), 14 – 23.
- Stipek, D. J., Givvin, K. B., Salmon, J. M. & MacGyvers, V. L. (2001). Teachers' beliefs and practices related to mathematics instruction. *Teaching and Teacher Education*, 17, 213 – 226.

Stohlmann, M., Moore, T. J. & Roehrig, G. H. (2012). Considerations for teaching integrated STEM education. *Journal of Pre-College Engineering Education Research*, 2 (1), 28–34.

Tomljenović, Z. & Novaković, S. (2012). Integrated teaching – a project in primary school elective art classes. *Metodicki obzori*, 7, 119 – 134.

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