

Online Math Lessons in Junior Grades of Primary School amid the COVID-19 Pandemic

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The COVID-19 pandemic forced schools to switch to online teaching and learning from home. In this situation, everyone had to adapt to the new conditions and the way of teaching. In this paper a survey was conducted on a sample of class teachers who taught mathematics during the state of emergency ($N = 188$) in order to examine the following: how teachers implemented online mathematics teaching; what difficulties they had when harmonizing their work plan with the plan determined by the state; how they prepared for online teaching of mathematics; whether they are satisfied with their own organization and implementation of online teaching of mathematics and what their views on the implementation of online learning in regular teaching of mathematics are. The results of the research have shown that the majority of teachers implemented the teaching of mathematics through *Viber groups* and using the national platform; most of them had difficulties in harmonization of the curricula with their own work plans; they independently prepared for teaching; most of them are not completely satisfied with online teaching of mathematics, yet, they would use online contents as an assistance to regular teaching.

Keywords: teaching mathematics online, distance learning, primary teaching of mathematics, class teacher, Covid-19

Introduction

The COVID-19 pandemic created conditions in which teachers and students had to face a great challenge – online teaching and learning. Both teachers and students were made to leave their classrooms, the traditional way of teaching mathematics, and to quickly adapt to the new circumstances and

conditions of teaching. Educational institutions were forced to look for different alternative approaches through 'digital or online learning,' i.e. learning 'from home.' The place of learning moved from the classroom to the students' homes, so that the learning process did not occur in the same surroundings and at the same time, but in several different places. The switch to such organization of teaching has brought many changes for schools. International studies conducted in early 2020 showed that teachers felt stressed when these changes occurred and were concerned that students' academic and social needs were not met (Hamilton, Kaufman, and Diliberti 2020). In such a situation, teachers were looking for the best solution for communication and teaching.

During the last decade, the Republic of Serbia has made many steps featuring strategically stated goals for the development of digital competencies of teachers. *Strategija razvoja obrazovanja u Srbiji do 2020. godine* 2012 (2012) also emphasized the importance of digital competencies development within the development of the education system, but also of the society as a whole. The Ministry of Education, Science and Technological Development of the Republic of Serbia, in cooperation with the Institute for the Advancement of Education and the Institute for Evaluating the Quality of Education, published for the first time in 2017 and then in 2019 a revised document *Okvir digitalnih kompetencija: nastavnik za digitalno doba*. (Ministarstvo prosvete, nauke i tehnološkog razvoja 2019). The main objective of this document was to support teachers from the education system in the process of integrating digital content into everyday practice. Additionally, the acquisition of digital competencies within the system of compulsory education is prescribed by the Law on the Fundamentals of the System of Education and Upbringing of the Republic of Serbia (*Zakon o osnovama sistema obrazovanja i vaspitanja* 2019). The intentions were focused not only on raising the digital competence of teachers, but also on raising digital literacy among students, from the first level of the education system, i.e. from preschool education. Through various competitions, for example, 'Digital Class,' the Ministry of Education, Science and Technological Development of the Republic of Serbia sought to encourage the use of information technology in the teaching process. During the 2018/2019 school year, a pilot project, '2000 Digital Classrooms,' was launched, aimed at improving digital skills of teachers in order to include digital materials and e-textbooks in the teaching process, which would thus result in the development of students' skills. The project was successfully implemented by training and improving the digital competencies of large numbers of teachers.

Theoretical Framework

With the introduction of the state of emergency and the transition of the work of schools to distance learning, we faced the situation that the entire educational system, as well as digital technologies were 'put to the test' (Lepp et al. 2021, 5). 'Teachers from all around the world were confronted with the sudden need to adapt to online education' (Mihajlović, Vulović, and Maričić 2021, 503). This situation provoked the following question: How did mathematics education in the younger grades of primary school and all the actors in the process – students, teachers, parents and the wider community – cope with such circumstances?

The teaching of mathematics in the younger grades of primary school requires a special approach to the contents, both because of its specificity and the characteristics of thinking of students of that age. Mathematics education at this level requires the teacher and the student to be face to face during the teaching process. This is a consequence of the nature of mathematics, which is abstract and needs pedagogical approaches that enable the student to adopt abstract forms and build mathematical knowledge and experience. Learning in such teaching requires concreteness, clear obviousness and good guidance of students in the process of learning and construction of knowledge. The situation in which teachers found themselves in the changed circumstances called for a different approach to teaching, which relied heavily on methods and technologies that had not been in the forefront until then. The teachers were confronted with the great variety of approaches provided by modern technology in the process of teaching and learning mathematics in the online environment, and they realized that their role in that process was crucial. 'Choosing a particular curriculum area might lead itself to a particular digital learning environment, and choosing a particular learning environment might lead to choosing a particular pedagogical approach' (Clark-Wilson et al. 2021, 2). The conditionality of the content of mathematics, pedagogical approach and learning models in the online environment required specific teachers' competencies that they had to show as organizers and implementers of teaching.

The constraints caused by the COVID-19 pandemic provided an opportunity for teachers, students and parents to work together, sharing their ideas, views, experiences and knowledge. The different experiences and ideas used by all participants in such organized teaching and learning created an internal diversity, which in turn enabled innovative ways of learning mathematics. Online platforms replaced classrooms, but also offered opportunities for in-

teractions within the math community in order to create ideas for teaching and learning. Switching to technology in the form of video lessons or situating math problems in real-world contexts were instances where stakeholders communicated with each other (Khirwadkar et al. 2020).

Distance learning in the Republic of Serbia during the state of emergency was organized by the Ministry of Education, Science and Technological Development on the national television channels and the Internet portal 'Moja škola' as well as within the school learning management systems owned by each school; in primary schools, the Google classroom platform was mainly used. The specificity of mathematics, as a school subject in the younger grades of primary school, requires greater clarity in teaching and the use of synchronous forms of communication technologies to enable visualization, but also mutual communication among teachers and students. In these conditions, direct, two-way video interaction was the most adequate replacement for math lessons in the classroom, because teachers had real-time feedback from students, but also students from teachers. In addition, some synchronous platforms, like *Microsoft Teams* and *Google Classroom* enabled posting materials and various available online resources to support online learning, which students were able to use after the video conference. On the other hand, asynchronous models of communication technology did not enable simultaneous communication. The way these models work in mathematics teaching is more suitable for practice classes or consolidation of knowledge.

With the introduction of the state of emergency, teachers were largely left on their own, so they independently decided on the way that best suited their and their students' abilities, but also the specifics of the environment in which they worked in terms of digital resources. They were put in a position of providing basic conditions for online education, i.e. to provide direct access to learning materials for students and create more opportunities for interaction among students and teachers, as well as among students themselves, and for students to work in groups (Ally 2008; Fakhrunisa and Prabawanto 2020).

The focus of our research attention was how teachers in the younger grades of primary school coped with the changed circumstances and the ways in which they taught mathematics online.

Research Methodology

The research attention of this paper focused on how the teachers in the younger grades of primary school coped with the changed circumstances

during the COVID-19 pandemic and the ways in which they taught mathematics online. The research aimed to examine the following:

1. In what ways the class teachers implemented online teaching of mathematics;
2. What difficulties the teachers came across when harmonizing their work plan in mathematics teaching with the plan brought in by the state;
3. How the teachers prepared for the teaching of mathematics;
4. Whether the teachers are satisfied with their own organization and implementation of online teaching of mathematics and what their views on the implementation of online learning in regular teaching of mathematics are.

The research sample was selected from the population of class teachers who taught mathematics during the state of emergency introduced due to the COVID-19 pandemic in the Republic of Serbia. The sample included 188 class teachers from the territory of the Zlatibor district. The research involved teachers with different work experience, different levels of education and those who taught different grades during online teaching, in order to get a more comprehensive picture and more complete answers within the research tasks. Insight into table 1 shows that the majority of teachers who participated in the research were those with over 20 years of work experience in teaching (31.9%), followed by teachers with 10 to 20 years of work experience (24.5%) and those working for 5 to 10 years (23.4%), while the least number of respondents have worked for less than 5 years (20.2%).

The survey included 55.3% of teachers who completed master academic studies and 44.7% who completed basic academic studies. The structure of the sample of teachers according to the grade they led was quite balanced: grade I – 21.3%, grade II – 26.6%, grade III – 28.7% and grade IV – 23.4%.

For the purposes of the research, a closed-ended questionnaire was constructed (Google Forms). The survey was anonymous to ensure that respondents were impartial in choosing answers that reflected their opinion. In some questions, teachers had the opportunity to choose more items as an answer, since the implementation of online teaching was not based only on one element. In the questions where the attitudes of teachers about their satisfaction with online teaching and experiences related to the implementation were examined, the teachers chose only one of the offered answers. The value of Cronbach's alpha coefficient of the survey questionnaire ($\alpha =$

Table 1 Structure of the Research Sample

Item	Category	<i>f</i>	<i>f</i> %
Years of work experience	Less than 5	38	20.2
	5–10	44	23.4
	10–20	46	24.5
	More than 20	60	31.9
	Total	188	100.0
Grade of class	I	40	21.3
	II	50	26.6
	III	54	28.7
	IV	44	23.4
	Total	188	100.0
Level of studies	Basic academic studies	84	44.7
	Master academic studies	104	55.3
	Total	188	100.0

0.82) indicates good reliability and good internal consistency of the measuring instrument. The data obtained with the help of survey questionnaires were processed qualitatively and quantitatively.

Research Results and Discussion

Ways of Teaching Online Mathematics

The first research task was to determine the ways in which teachers taught mathematics online during the COVID-19 pandemic. The results have shown that the teachers implemented the online teaching of mathematics through different types of communication channels, i.e. their combination. Most of the respondents taught mathematics using *Viber groups* (85.1%) (figure 1). This result makes sense, especially if we keep in mind that this type of communication is very common in everyday communication of people. Actually, the largest number of teachers used this tool even before the introduction of the state of emergency, for everyday communication. Also, parents and students are familiar with and used to it. Easy to use, it enables communication with a larger number of students in a short interval, so teachers chose this medium to communicate with students, because they felt safer. Similar results were obtained in a survey of teachers in Slovakia, who stated that they most often used *Messenger* as a form of communication, because they had previously used it in everyday communication (Csachová and Jurečková 2020). Secondly, the largest number of teachers (73.4%) decided to rely on the teaching of mathematics provided by the state to support distance learning

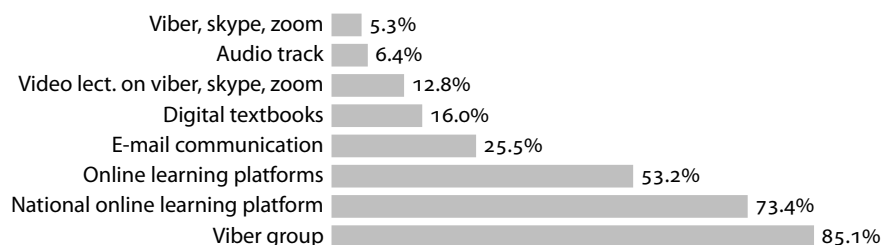


Figure 1 Ways of Teaching Online Mathematics

through lessons uploaded on the *national platform for online learning 'Moja škola'*, which students watched on the national television channels. This result is also expected, given that the teaching contents distributed in this way were available to all students and did not require the possession of certain equipment and additional prior knowledge of the users. The platform 'Moja škola' was actually a classroom where teachers taught math lessons. Just over half of the teachers (53.2%) taught mathematics using the *online learning platforms Microsoft Teams and Google Classroom*. All schools were obliged to form online classrooms and set a virtual place for communication and work with students. However, we see that not all teachers used this type of support in the implementation of online mathematics teaching. A quarter of the surveyed teachers (25.5%) used *e-mail* to send assignments, work instructions and the like. The obtained results show that a small number of teachers (5.3%) had direct individual contact with a student through video lectures provided by some tools like Skype, Zoom, etc., or group video lectures (12.8%) with all students. Such results show that in the process of online teaching, students were left to themselves and had very little direct communication with teachers.

Johannes and colleagues, in a study they conducted with teachers of 20 high schools in Indonesia (Yohannes et al. 2021), obtained similar results. Their results have shown that teachers used *Google Classroom* (the majority of them – 85% of teachers), *WhatsApp* (80% of teachers) and *YouTube* (55% of teachers). We can see that teachers more often used asynchronous communication channels (Google Classroom and YouTube) as well as that they did not have direct real-time communication with students. On the other hand, the results of research conducted in Spain and Germany with mathematics teachers during the COVID-19 pandemic show less use of asynchronous tools. Video conferencing was used as a synchronous tool by two-thirds of German teachers during the pandemic. In Spain, as many as 82% of teachers said they used video conferencing to discuss homework assignments with the whole

class. This is a significant increase in the use of this type of tool compared to distributing assignments asynchronously. The use of synchronous communication tools has been conditioned by the need for explanations related to the assigned tasks that students needed to solve (Barlovits et al. 2021).

One should bear in mind that the choice of media by teachers in online teaching has been based on different needs, but also on the capabilities of both teachers and students. The dominance of the Viber group and the platform 'Moja škola' in online teaching can be explained by the practical features of the platforms as well as the ease of use in terms of sharing information and organizing materials for teaching and learning. If we keep in mind the research results showing that 90% of teachers did not have any, or had insufficient, knowledge needed for organization and implementation of online mathematics teaching (Maričić and Milinković 2022, 57), then we can say that teachers have coped well with the time and the system in which they had to teach mathematics.

Based on the obtained results, we can conclude that a large number of teachers combined different ways of implementing online teaching, most likely due to the specific content or common needs of teachers and students. If we take into account the type of resources used and shared in working with students, based on the characteristics of the platforms, we can say that sharing textual content was dominant while communication was most often asynchronous.

Harmonization of the online teaching of mathematics implementation with the plan determined by the Ministry of Education, Science and Technological Development of the Republic of Serbia

During the state of emergency, the Ministry of Education, Science and Technological Development of the Republic of Serbia prepared an operational plan for the continuation of the work of schools in difficult conditions, through the realization of educational work at a distance. According to this operational plan, schools were obliged to find alternative ways of teaching, but also 'one-way mass broadcasting was organized through TV channels for primary and secondary school students while teachers were instructed to conduct distance and online teaching in support of these resources' (Mihajlović, Vulović, and Maričić 2021, 507). This type of support was supposed to be a relief for everyone, but the problem for the teachers was to make their personal operational plans comply with the curriculum contents that were broadcast to the students. For that reason, we decided to examine the opinions of teachers on the harmonization of their own work plan with the plan

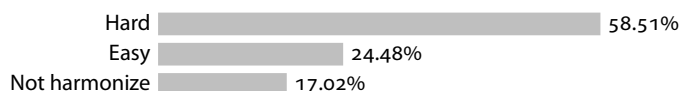


Figure 2 Harmonization of the Mathematics Curriculum

developed by the Ministry of Education, Science and Technological Development of the Republic of Serbia.

The obtained results show that more than half of the teachers (58.51%) said it was difficult to harmonize the curriculum realized on the platform 'Moja škola' with their own work plan (figure 2). A quarter of the surveyed teachers (24.47%) had no difficulties, and 17.02% of teachers stated they did not harmonize their plans with TV lessons. We can conclude that the lessons broadcast on television did not follow the plan of the majority of teachers and that teachers in such circumstances had to pay extra attention to bridging that gap and organizing additional work with students.

If we analyse the response of teachers according to independent variables, we can observe that teachers with more work experience expressed the opinion that they had more difficulties in aligning their plan with the plan brought in by the Ministry of Education, while on the other hand, this job was easier for teachers with less than 10 years of work experience (table 2). It is interesting that teachers with work experience of more than 10 years and over 20 years stated to a greater extent that they did not harmonize their work plan with the plan that was uniform for everyone in the Republic of Serbia. The observed differences in teacher responses are statistically significant ($\chi^2 = 45.556$, $df = 6$, $p = 0.000$).

Table 2 Teachers' Opinion on Harmonization of the Mathematics Curriculum

Opinion		Years of work experience				Levels of studies	
		0-5	5-10	10-20	>20	(1)	(2)
Hard	<i>f</i>	16	32	28	34	58	52
	<i>f%</i>	42.1	72.7	60.9	56.6	69.1	50.0
Easy	<i>f</i>	22	10	4	10	10	36
	<i>f%</i>	57.9	22.7	8.7	16.7	11.9	34.6
Not Harmonize	<i>f</i>	0	2	14	16	16	16
	<i>f%</i>	0.0	4.5	30.4	26.7	19.0	15.4
Total	<i>f</i>	38	44	46	60	84	104
	<i>f%</i>	100.0	100.0	100.0	100.0	100.0	100.0

Notes Column headings are as follows: (1) basic academic studies, (2) master academic studies.

The obtained results also show that teachers who completed master studies (34.6%) harmonized their own mathematics teaching plan with the one brought by the state more easily compared to those who completed basic academic studies (11.9%). These differences are also statistically significant ($\chi^2 = 22.46$, $df = 3$, $p = 0.000$). The variable referring to the grade the teachers taught did not statistically significantly affect teachers' attitudes about this issue. We can observe that in the conditions of distance learning, teachers with less work experience and those who acquired a higher level of education did better in harmonizing their plan with the plan that was uniform for all schools. This is also a consequence of easier adjustment of younger teachers to changes. On the other hand, older teachers, working for a long time, have got used to certain practices and do not accept changes gladly.

We see that the support provided by the Ministry of Education, Science and Technological Development of the Republic of Serbia was not a relief for all teachers and their students, and that the plan for implementation did not match the plans of most teachers. Such discrepancies arose due to the existence of a large number of mathematics textbooks approved for use in teaching, but also the autonomy of teachers in the process of planning the order of mathematical content to be learned. For these reasons, difficulties have arisen in the mismatch of plans on the state level.

Preparing Teachers for Online Mathematics Teaching

The Ministry of Education, Science and Technological Development of the Republic of Serbia, in the Instructions for the implementation of educational work, instructed teachers to 'provide additional guidelines and explanations to students and to prepare learning materials in various forms, e.g. presentations, exercises, homework, etc. in order to maintain interaction and communication with students and help them master the learning goals' (Mihajlović, Vulović, and Maričić 2021, 507). For these reasons, we wanted to examine how teachers coped with this situation and how they prepared additional content and learning materials.

The results of the survey conducted among teachers have shown that they mostly (95.7%) independently developed teaching materials for learning (figure 3). In addition to their own materials, slightly more than one third of teachers (36.2%) used the materials created by textbook publishers, and only one in four teachers used in their work the materials offered by the national platform 'Moja škola' or materials prepared by other colleagues. If we take into account the fact that only 4.3% of teachers did not independently prepare teaching materials for online mathematics teaching, we can conclude

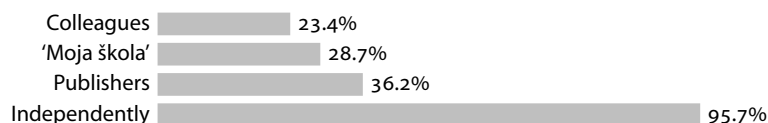


Figure 3 Preparation of Teaching Materials for the Implementation of Online Mathematics Teaching



Figure 4 Self-Satisfaction with Online Mathematics Teaching

that teachers, despite their lack of experience in the implementation of this type of teaching, understood their role in achieving mathematics teaching goals and prepared appropriate contents for it.

Teachers' Satisfaction with Online Mathematics Lessons

With the last research task, we wanted to examine how satisfied teachers were with their own online teaching of mathematics and whether they saw any possibilities of its implementation as a supplement to regular direct teaching. The largest percentage of teachers (53.2%) were *not satisfied* with the online teaching of mathematics, while 46.8% of teachers expressed satisfaction with the online teaching (figure 4).

Insight into table 3 shows that teachers who taught the third and fourth grades expressed greater satisfaction with online teaching compared to teachers who taught the first two grades of primary school. The observed differences in teachers' opinions are not statistically significant ($\chi^2 = 4.008$, $df = 3$, $p < 0.261$). The obtained data can be explained by the fact that students in the first two grades of primary school need more support in their learning, greater use of obviousness in work and more practical activities

Table 3 Self-Satisfaction with Online Mathematics Teaching

Self-satisfaction		Years of work experience				Grade of class			
		0-5	5-10	10-20	>20	I	II	III	IV
Satisfied	<i>f</i>	24	14	26	24	18	18	28	24
	<i>f%</i>	63.2	31.8	56.5	40.0	45.0	36.0	51.9	54.5
Not satisfied	<i>f</i>	14	30	20	36	22	32	26	20
	<i>f%</i>	36.8	68.2	45.5	60.0	55.0	64.0	48.1	45.5
Total	<i>f</i>	38	44	46	60	40	50	54	44
	<i>f%</i>	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0

Table 4 Teachers' Opinion on Implementation of Online Mathematics Teaching as a Supplement to Regular Teaching

Opinion		Years of work experience				Levels of studies	
		0–5	5–10	10–20	>20	(1)	(2)
Yes, I could use online classes, but to aid with regular classes	<i>f</i>	36	38	32	30	52	84
	<i>f%</i>	94.7	86.4	69.6	50.0	61.9	80.8
I don't like it at all, I don't want to use this	<i>f</i>	2	6	14	30	32	20
	<i>f%</i>	5.3	13.6	30.4	50.0	38.1	19.2
Total	<i>f</i>	38	44	46	60	84	104
	<i>f%</i>	100.0	100.0	100.0	100.0	100.0	100.0

Notes Column headings are as follows: (1) basic academic studies, (2) master academic studies.

in which they form mathematical concepts, while older students are more independent in their work, and are able to learn on their own, so teachers believe their success is not just the result of working directly with them.

Analysing the opinions of teachers with different lengths of work experience, we notice that teachers who have less work experience in teaching expressed greater satisfaction with the organization and implementation of online teaching. The more work experience the teacher had, the less satisfied they were with online teaching. The observed differences in teachers' opinions are statistically significant ($\chi^2 = 10.91$, $df = 3$, $p < 0.05$). The result is a consequence of the fact that younger teachers have greater digital competencies acquired during formal education, but also due to the use of digital technologies in everyday activities compared to older teachers who have worked longer.

A study conducted among teachers in high schools in Spain shows similar results. The results of this research have shown that more than three quarters of the surveyed teachers believe they have a medium or advanced level of digital teaching competence and they are able to easily organize this type of teaching (Rodríguez-Muñiz et al. 2021).

The results of the survey have shown that 72% of teachers believe they could use online teaching content, but as an aid to regular classes, while the remaining 28% of teachers said that online classes did not suit them at all and they could would not use it in their future work (table 4). It is interesting that none of the surveyed teachers answered that online teaching suits them and that they could completely replace regular teaching with online lessons. This attitude of the teachers is completely justified. Everyone who finds themselves in a situation of implementing online teaching becomes

aware of the numerous shortcomings it brings. Teachers in our country are not alone in their satisfaction with this type of teaching. A survey conducted in Spain has shown that 81% of mathematics teachers state they are very or completely satisfied with their teaching (Marchesi et al. 2020).

The analysis of the opinions of teachers with different lengths of work experience shows that an increase in work experience decreases teachers' willingness to use online teaching as a supplement to direct teaching to a greater extent than in teachers with less work experience ($\chi^2 = 28.99$, $df = 3$, $p = 0.00$) (table 4). The same differences are observed between teachers of different levels of education, where master teachers are more positive towards the implementation of online teaching as a supplement to direct teaching ($\chi^2 = 8.26$, $df = 1$, $p < 0.05$).

Based on the results, we can conclude that teachers are satisfied with their implementation of online mathematics teaching, as well as that they are ready to continue to use hybrid (mixed) teaching in their work. Satisfaction and willingness decline with increasing years of teaching experience. The reason for this high percentage of satisfaction with such forms of organized mathematics teaching can be found in the fact that teachers have recognized the usefulness of the Internet and various web platforms as a form of distinctive assistance in their work.

Conclusion

The pandemic has significantly disrupted education. However, it also provided opportunities to transform educational practices, introduce new ways of teaching and learning and new ways of communicating with children and families, and imposed new roles with the goal of greater overall care for the well-being of students. Due to the fact that teachers suddenly found themselves in a new situation, various types of support were provided by the Ministry of Education, Science and Technological Development of the Republic of Serbia, including webinars and online meetings, as well as various types of training, guidelines and manuals for using different platforms and online learning tools.

The results of the research showed that the class teachers implemented online teaching of mathematics using different types of communication, i.e. their combination. Most respondents taught mathematics through Viber groups, followed by lessons broadcast on national television and the platform 'Moja škola,' although in the opinion of most teachers, lessons shown on television did not follow their personal plans. The teachers also used online classrooms – Google Classroom and Microsoft Teams. The obtained re-

sults also showed that 95.7% of teachers independently prepared materials used in the implementation of online mathematics teaching. We can say that the class teachers, despite their lack of experience in the implementation of this type of teaching, still coped well with the use of certain tools and techniques.

Whatever online model of teaching is used, it is necessary to provide opportunities and ways for teachers to maintain regular contacts with students and achieve relationships of mutual trust, care and support. Only in this way, can positive effects of online teaching and digital environment be expected. Based on that, we can conclude that both students and teachers need continuous training and professional development in using various tools, applications and platforms for the organization of online teaching and learning. Therefore, it is necessary to work on the development of unique platforms and high-quality online contents and materials that would enable greater independence in use by students. In this way, the position of students in the learning process moves from the one where they only accept ready-made facts, to the one where students actively participate in the learning process and are encouraged to think actively.

Whether distance learning will remain an integral part of school practice or it will disappear with the cessation of the epidemiological situation which caused it, is a question that bothers all participants in the educational process (teachers, students and parents). It is interesting that the research of the Institute for the Advancement of Education of the Republic of Serbia (Zavod za unapređivanje obrazovanja i vaspitanja 2020) shows that 52.4% of respondents believe that distance learning should be systematically introduced in schools, but as a supplement to the regular teaching process, while 29.65% believe that teaching should return to the format carried out before the introduction of the state of emergency. Our research showed that as many as 72.3% of surveyed teachers would gladly use online teaching as a supplement to regular classes. These results showed that teachers were able to recognize the value of online teaching, but despite all that, they still prefer regular teaching in which they see the use of digital resources and online teaching as a supplement. It is certain that 'learned from this experience [is that] educators must be prepared for future challenges' (Mihajlović, Vulović, and Maričić 2021, 514). The real effects, as well as the quality of knowledge students acquired in such teaching, are certainly principal questions for all those who directly or indirectly deal with the theory and practice of education. One should bear in mind that continuous training and professional development need to be an imperative of education.

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Pouk matematike po spletu v nižjih razredih osnovne šole v času pandemije covida-19

Pandemija covida-19 je prisilila šole, da preidejo na spletno poučevanje in učenje od doma. V tej situaciji so se morali vsi prilagoditi novim pogojem in načinom poučevanja. V okviru tega prispevka je bila izvedena raziskava na vzorcu razrednih učiteljev, ki so v izrednih okoliščinah poučevali matematiko ($n = 188$), in sicer da bi preučili naslednje: kako učitelji izvajajo spletno poučevanje matematike; kakšne težave so imeli pri usklajevanju svojega delovnega načrta z načrtom, ki ga določa država; kako so se pripravljali na spletno poučevanje matematike; ali so zadovoljni s svojo organizacijo in izvajanjem spletnega poučevanja matematike ter kakšni so njihovi pogledi na izvajanje spletnega učenja pri rednem poučevanju matematike. Rezultati raziskave so pokazali, da je večina učiteljev izvajala pouk matematike preko *Viber skupin* in z uporabo nacionalne platforme; večina jih je imela težave pri usklajevanju učnih načrtov z lastnimi delovnimi načrti; samostojno so se pripravljali na poučevanje; večina jih ni povsem zadovoljna s poučevanjem matematike po spletu, vendar bi spletne vsebine lahko uporabili kot pomoč pri rednem poučevanju.

Ključne besede: poučevanje matematike po spletu, učenje na daljavo, poučevanje matematike na razredni stopnji, razredni učitelj, covid-19