




# EDUCATION MANAGEMENT AND INFORMATION AND COMMUNICATION TECHNOLOGIES

Snežana Kirin<sup>1</sup>   
Nena A. Vasojević<sup>2</sup>   
Ivana Vučetić<sup>3</sup> 

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**Abstract:** *The education system is facing the permanent challenge to adapt to the constantly changing states in science, technology, and economy, and it plays an important role in the overall society development and socio-economic progress. In order to establish a high-quality, efficient education system, it is necessary to develop the teaching staff competences in accordance with the innovations in the education field. The quality of the teaching process largely depends on the extent to which modern teaching methods are applied, which are, in the contemporary context, based on the use of the information and communication technologies in the teaching process (ICT). Following the technology advancement and the information channels transformation, the role of the teacher has changed, and in this new context the teacher is assigned with a new role of the “teaching manager”, or the leader of the teaching process. This paper shows comparative analyses of the relations between the teaching staff ICT training and the organisation of the teaching process, when observed in traditional and online teaching settings. The research was conducted in Serbia in January and February of 2021, during the Covid-19 pandemic, and included the sample of teachers who work in primary schools (N=609).*

**Keywords:** *Teaching staff training, Information and communication technologies (ICT), Teaching management, Online learning, Traditional learning.*

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## 1. INTRODUCTION

Society development has always been affected by different factors inducing constant changes in all the spheres of society, including the education sector as well. The changes in this sector are mostly influenced by those in the fields of science, technology and economy, but the particular circumstances in the natural environment, like pandemics, for example, should also be taken into account. The prominent characteristic of the modern society is that the duration of knowledge is shorter than ever before, which, among other things, requires lifelong learning (Kirin, Jovanac, etc., 2014). In order to adjust to the contemporary societal context, empirical researches indicate the need for the continuous improvement of the education system (Kirin, Sedmak, etc., 2014), which, among others, implies the permanent training of the teaching staff in regard to the efficient implementation of the innovative teaching methods, the organisation of the teaching process, and the educational management. According to the literature, the term educational management refers to the process of planning, organisation, guidance and control of the financial, human and information resources of the educational institutions, in order to effectively achieve the education goals (Šormaz, 2017). Efficient educational management is based on the permanent specialisation and improvement of skills and expertise of the teaching staff (Šormaz, 2017). The effectiveness of the educational process and the quality of the edu-

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<sup>1</sup> Innovation Centre of the Faculty of Mechanical Engineering in Belgrade, Serbia

<sup>2</sup> Innovation Centre of the Faculty of Mechanical Engineering in Belgrade, Serbia

<sup>3</sup> Innovation Centre of the Faculty of Mechanical Engineering in Belgrade, Serbia

cational institutions performance are highly dependent on the efficient implementation of the modern teaching methods and educational management tools, which are nowadays based on the Information and Communications Technologies – ICT (Al-Ababneh & Alrhaimi, 2020). The education system is facing significant challenges due to the implementation of the new educational technologies, which have introduced new teaching models, demanding the improvement of the teaching staff competences, especially in the field of educational management. In order to achieve good management skills, it is necessary not only to expand the knowledge in theory but also to learn how to implement this knowledge in practice. The introduction of ICT in the teaching process has contributed to the major change of the teacher's function, putting an accent to the teaching process management. In this manner, the students are instigated to develop creative thinking and achieve knowledge as active participants in the learning process (Rizescu, Bucata & Herman, 2020).

Due to the Covid-19 pandemic, during certain periods the schools in Serbia were closed and the online learning model was introduced. Most of the teachers faced the application of the ICT in the teaching process for the first time, both in regard to the new didactic tools and the organisation of the teaching process. This research aimed to determine if, and to what extent, the previous training in ICT influenced the teachers' ability to adapt to the new circumstances, as well as their attitudes in regard to the introduction of the new online learning model.

## 2. TEACHERS' COMPETENCES

As well as in other fields, industry for example, managing the class also requires certain skills and expertise. The term *classroom-management* refers to every activity that takes place in the classroom with the main goal to provide the environment for effective learning practice, including teaching activities and teacher's engagement (Arsenijević, Andevski & Banić, 2018). Efficient classroom management includes teachers' competences for teaching, instructions giving and the organisation of the teaching process, meaning that the role of the teacher includes three different functions: a teacher, an instructor and a manager (Kulić & Despotović, 2004). The *instructor function* implies teachers' competences in regard to students' preparedness, the implementation of various teaching techniques and didactic tools in the teaching process, and connection of the new knowledge to the broader learning context and its application in practice. The *organisation function* implies teachers' problem-focusing skills, and competences in regard to the teaching material preparation and the selection of teaching forms and methods, as well as the time and space management (Ljujić, 2011b; according to Kulić and Despotović, 2004). Following the advancement of technology, the implementation of ICT in the teaching process and the development of the new teaching models, the teachers' competences have been changed. This change includes the development of the new teachers' competences concepts, or the modification and improvement of the existing ones, as it is the case with the competences for classroom management.

For Ljujić, the classroom management competences are equally relevant for both traditional and online teaching models, and they imply teaching activities design and schedule, time management and the teaching process coordination, teaching goals definition and realisation, decision making etc. (2011b). When it comes to the online educational model, some authors propose the specific teachers' competences categorisation, including 31 teaching competences divided into 4 groups: 1) general competences, 2) distributive competences, 3) presentational competences, and 4) managerial competences (Aragon & Johnson, 2002 in Ljujic, 2011b). According to these au-

thors, the teachers' management competences include the appropriate teaching technology selection, as well as the design, development, implementation, support and evaluation of the teaching technology in the online educational model (Ljuić, 2011b). This approach highlights the importance of the basic managerial skills in regard to managing the implementation of technology in the teaching process of the online educational models. In order to implement the new teaching methods successfully, it is necessary to take into account both technological and pedagogical aspects of the process, meaning that teacher, as a manager, has to be in charge of the new teaching materials, as well as the organisation of the teaching process (Šain, 2017). The goal of educational management is to ensure the effective and high-quality training and education of individuals by optimizing the educational process itself, in regard to both personnel and technologies, among others. Some empirical studies showed that curricular support, as well as teacher updating, are of great importance for the successful education management practice. In this sense, the constant preparation of seminars and trainings enable the teachers to be up-to-date with the contemporary educational practices (Gorozabel-Quiñonez, Alcívar-Cedeño, etc., 2020). To ensure the effectiveness of the education management, it is necessary to create an effective organisational and methodological model of training, retraining, improving knowledge and experience of the educational institutions' personnel, in order to develop teachers' knowledge and skills and create work environment that supports teaching and learning (Al-Ababneh & Alrhaimi, 2020).

### 3. RESEARCH METHODOLOGY AND DATA SOURCES

The goal of this empirical research was to determine the effectiveness of the ICT training previously attended by teachers (before the pandemic and the transition to the online teaching model), in regard to the teachers' attitudes towards the online teaching model. The following hypotheses are specified:

**H1:** The choice of the online teaching model depends on the teachers' competences required for that teaching model.

**H2:** The teachers who have previously attended ICT training have more positive attitude towards the online teaching model compared to the teachers who have not.

**H3:** The teachers' competences for online teaching self-assessment do not depend on gender.

The specialised questionnaire was designed, consisting of 12 closed-ended questions regarding socio-economic factors, and 16 closed-ended questions regarding teachers' experiences and attitudes about the organisation of the teaching process in both traditional and online teaching models. All the regions of the Republic of Serbia were covered by the research, which qualifies this research sample as appropriate in regard to the aim of the research. The research sample included 609 subject teachers, of which 75.5% are female. This is in accordance with the current state of the gender structure in the teaching profession in Serbia. The respondents teach different subjects (47% of them in the field of natural sciences and mathematics), and the highest percentage of them works in a school situated in the narrow city centre (35%). With the respondents' work experience span from 1 to 30 years, the sample of maximum diversity was provided (Patton, 2001). In regard to the previous ICT training, 52.1% of the respondents claimed they had previously attended some form of the training course, as presented in Table 1.

### 4. RESEARCH RESULTS

The research results showed that the highest percentage of teachers (81%) prefer the traditional learning model, as presented in Table 1.

**Table 1.** The teaching model preferences

	Frequency	Percent	Valid Percent	Cumulative Percent
Traditional teaching is better	493	81,0	81,0	81,0
Online teaching is better	40	6,6	6,6	87,5
There is no difference	76	12,5	12,5	100,0
Total	609	100,0	100,0	

Following the preposition that the choice of the preferred teaching model depends on the teachers' competences, the self-assessment of the online teaching competences was observed, as presented in Figure 1. The results showed that the biggest percentage of teachers, 47%, rated their competence level as *medium*, while 50% of teachers rated their competence level as *high* or *very high*. Pearson Correlation ( $r$ ) between the teaching model and teachers' competences self-assessment was proven weak (0.271), as presented in Table 2. This means that the self-assessed competences for online teaching and the preference for that teaching model are not significantly related.

**Table 2.** Correlation between the online competences and the preferred teaching model

		Competences for online teaching	Preferred teaching model
Competences for online teaching	$r$	1	.271**
Preferred teaching model	$r$	.271**	1
	$N$	609	609

Correlation is significant at the 0.01 level (2-tailed).

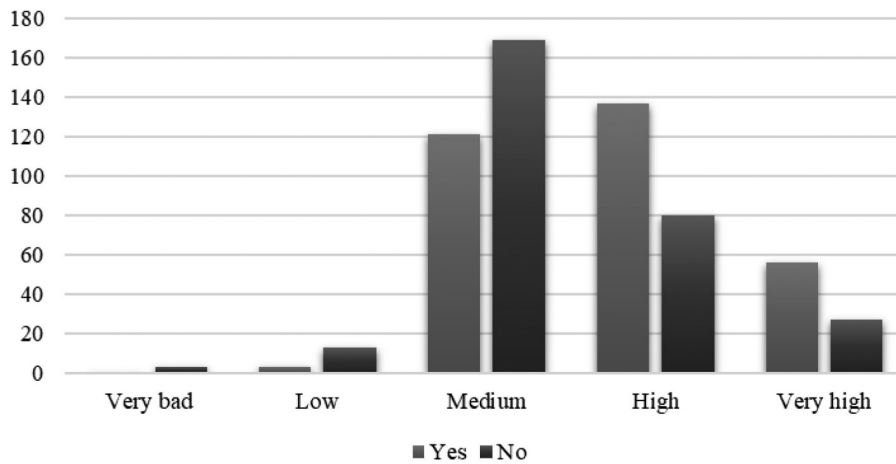
According to the research results, the first hypothesis, that the choice of the preferred teaching model depends on the teachers' competences, is not fully confirmed. The shortcomings of this conclusion related to the objectivity of self-assessment, should also be taken into consideration.

In order to verify the second hypothesis, the teachers' competences in relation to the previously attended ICT training were examined, as presented in Table 3 and Figure 1. It was stated that the number of teachers who had previously attended ICT training was almost equable to those who had not (317 and 292 respectively).

**Table 3.** Competence for online teaching in relation to previously attended ICT training

		Previously attended ICT training		Total
		Yes	No	
Competence for online	Very bad	0	3	3
	Low	3	13	16
	Medium	121	169	290
	High	137	80	217
	Very high	56	27	83
Total		317	292	609

The research results showed that a significantly higher percentage of teachers who had previously attended ICT training courses rated their competences as *high* or *very high*. In the group of teachers who had not previously attended ICT training courses considerable number of respondents rated their competences as *medium*. This calls into question the objectivity of self-assessment when it comes to rating one's preparedness to perform work assignments in new conditions, and the second hypothesis could only be partially accepted.



**Figure 1.** Competence for online teaching in relation to the previously attended ICT training

In order to determine if the previous ICT training influenced the increase of the competences for teaching and classroom management, only the group of teachers who had previously attended ICT training was observed, in relation to the preferred teaching model, as presented in Table 4. The highest percentage of respondents, 76.5%, still chose the traditional teaching model as preferred, while 23.5% of respondents stated that the online teaching model was better, or that there was no difference. Among the respondents who had not previously attended ICT training only 14.5% thought that the online teaching model was better, or that there was no difference, as presented in Table 5.

**Table 4.** Previously attended ICT training and the preferred teaching model

	Traditional teaching is better	Online teaching is better	There is no difference	Total
Frequency	243	25	49	317
Percent	76,7	7,9	15,5	100,0
Cumulative Percent	76,7	84,5	100,0	

**Table 5.** Previously not attended ICT training and the preferred teaching model

	Traditional teaching is better	Online teaching is better	There is no difference	Total
Frequency	250	15	27	292
Percent	85,6	5,1	9,2	100,0
Cumulative Percent	85,6	90,8	100,0	

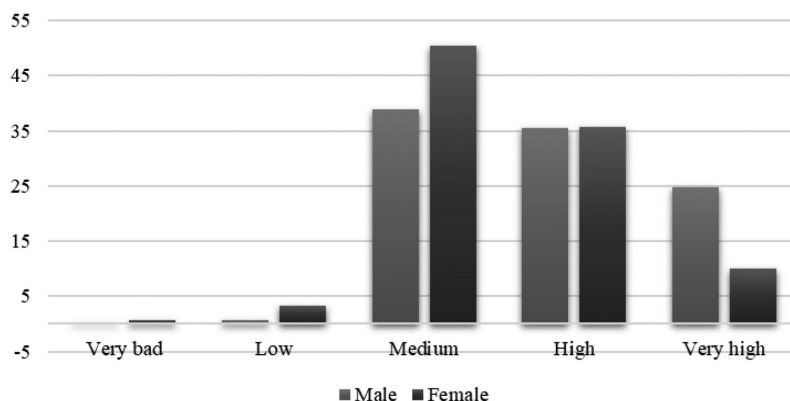
It can be concluded that the previous ICT training does have an impact on the choice of the preferred teaching model, but that this impact is not significant. The question also emerges about the quality of ICT training courses, and the possibility of a successful application of online teaching methods in practice, after the course completion.

In the next phase, the respondents’ self-assessment of the online teaching competences in relation to gender was observed. Since the sample was not equable in terms of gender, the results were given in percent, as presented in Table 6.

**Table 6.** Competence for online teaching in relation to gender (%)

	Very low	Low	Medium	High	Very high	Total
Male	0.00	0.67	38.93	35.57	24.83	100
Female	0.65	3.26	50.43	35.65	10.00	100

It was shown that a higher percentage of female teachers rated their competences for online teaching as *low* or *very low*, compared to male teachers. The *medium* rate of the competences was more represented in female examinees, the *high* rate was equally represented in both groups, while the *very high* rate prevailed in male examinees, as presented in Table 6 and Figure 2. Taking into account the subjectivity of self-assessment, the third hypothesis cannot be accepted.



**Figure 2.** Competence for online teaching in relation to gender

The research results showed that approximately 97% of the respondents who had previously attended ICT training rated their competences for online teaching as *medium*, *high* and *very high*. On the other hand, significantly higher percentage of respondents who had not previously attended ICT training rated their competences for online teaching as *medium* (57.88%), while the percent of respondents who rated their competences as *high* and *very high* was significantly lower compared to the first respondents' group, 43.21% and 17.67%, respectively. In the interpretation of these research results, the question of self-assessment objectivity should be taken into consideration.

## 5. CONCLUSION

These research results showed that the previously attended ICT training proved useful in the emergency caused by the Covid-19 pandemic, which is in consent with some previous studies (Farah, 2021). Although the lack of objectivity of the teachers' self-assessment could be considered a weakness of this research, it could be mitigated by taking into account the high-school students' feedback on this matter, who recognised the poor student-teacher communication from the technical aspect, the volume of the teaching material, and the questionable objectivity of the knowledge evaluation as the biggest disadvantages of the online teaching model (Vasojević, Kirin, Vučetić, 2021).

In order to establish an efficient, high quality education system, it is necessary for the educational management to develop in the course of innovative educational practices, especially considering the innovations in science and technology. In this manner, the educational institutions are supposed to carry out continuous teaching staff training, which would provide the development of new didactic strategies, and contribute to better functional knowledge. This underlines the purpose of teachers to produce a strategic approach in which the abilities and skills of infants and adolescents are potentiated.

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