



TEACHERS' AND SPECIAL EDUCATORS' ATTITUDES TOWARD THE USE OF COMPUTERS IN EDUCATION – BASIC REVIEW CONCEPTS

STAVOVI NASTAVNIKA I DEFEKTOLOGA PREMA UPOTREBI KOMPJUTERA U EDUKACIJI – BAZIČNI REVIJALNI KONCEPTI

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ABSTRACT

Distance learning has characterized the previous school years, both in Serbia and worldwide, due to the COVID-19 pandemic. The transition from traditional forms of teaching to online learning happened quickly and unexpectedly, leaving many educators unprepared for this form of teaching. Some teachers encountered difficulties using various online platforms for conducting classes, due to a lack of platforms, insufficient time to shift from traditional to electronic teaching, and a lack of skills in using information technology and computers. Given this, the goal of this research is to determine the attitudes of teachers and special educators towards the use of computers and modern technology in teaching. The reason for comparing these three groups of respondents lies in the fact that there are few studies in our region that examine the attitudes of both teachers and special educators. The sample consisted of 248 respondents, of which 86 were primary school teachers (34.67%), 53 were subject teachers (21.33%), and 109 were special educators (44%). A modified version of the Teachers' Attitudes Toward Computers Questionnaire was used. The results show that the majority of respondents have positive attitudes towards computers and their use in teaching. Primary school teachers and subject teachers working in regular schools show more positive attitudes towards the use of computers compared to special educators. We believe that the positive attitudes of teachers and special educators contribute to the integration of computers into the teaching process, both now when teaching is conducted in a hybrid format, and in the present when students return to traditional classrooms.

Keywords: education, attitudes, computers, special educators, coronavirus

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SAŽETAK

Nastava na daljinu obeležila je prethodne školske godine, kako u Srbiji tako i širom sveta, usled pandemije korona virusa (Covid-19). Prelazak sa klasičnih oblika nastave na učenje preko interneta se dogodio brzo, neplanirano i mnogi prosvetni radnici nisu bili pripremljeni za ovaj vid nastave. Deo nastavnika imao je teškoće prilikom upotrebe različitih onlajn platformi za izvođenje nastave, kako zbog nedostatka platformi i vremena da se nastava preorijentiše sa klasične na elektronsku, tako i zbog nedostatka veština upotrebe informacionih tehnologija i računara. Imajući u vidu navedeno, cilj ovog istraživanja je da se utvrde stavovi nastavnika i defektologa prema upotrebi računara i savremene tehnologije u nastavi.. Uzorak je činilo 248 od toga je 86 nastavnika razredne nastave (34,67%), 53 nastavnika predmetne nastave (21,33%) i 109 defektologa (44%). Upotrebljena je modifikovana Skala za procenu stavova nastavnika prema računarima (*Teachers' Attitudes Toward Computers Questionere*). Rezultati pokazuju da većina ispitanika ima pozitivne stavove prema računarima i njihovoj upotrebi u radu. Nastavnici razredne nastave i nastavnici predmetne nastave koji rade u redovnim školama ispoljavaju pozitivnije stavove prema upotrebi računara u odnosu na defektologe. Smatramo da pozitivni stavovi nastavnika i defektologa doprinose integraciji računara u nastavni proces, kako sada dok se nastava održava kombinovano, tako i u budućnosti kada se učenici budu vratili u školske klupe.

Ključne reči: nastava, stavovi, kompjuteri, defektolozi, korona virus.

INTRODUCTION

Modern technology plays a significant role in people's lives today. The desire to gain knowledge about the use of modern technology in the process of educating students is closely related to the attitudes of teaching staff toward the use of computers in teaching. The attitudes of primary and subject teachers influence their relationship with technology and the acquisition of knowledge about its use. Their attitudes directly impact their competence in using computers and other devices, and therefore, the ability to effectively integrate technology into the teaching process, the ability to teach students the use of various technologies, the frequency of technology use in teaching, and the students' attitudes towards computers and modern technology (Gilakjani & Leong, 2012). The availability of the internet and access to different forms of technology allows educators to explore new and creative teaching methods, facilitates the search for necessary teaching resources, encourages cooperative learning, diversifies the ways of presenting and adapting teaching material, and so on (Heflin, Shewmaker & Nguyen, 2017).

Research (Gilakjani & Leong, 2012) that studied the attitudes of subject teachers of English towards the use of technology in working with students showed that the mere presence of computers in the classroom does not guarantee their use by teachers, and that it is necessary to organize additional training for teachers on possible ways to use them in teaching. The importance of additional training is also highlighted in research (Ismail, 2003), which showed that teachers who had additional training on the use of computers in teaching had the most positive attitudes towards their use in the classroom, and consequently, used computers most frequently in working with students.

The use of computers and modern technology goes hand in hand with the modern education system, and as such, it requires abandoning traditional teaching methods, which are still prevalent in many schools (Pricahyo et al., 2018). Research has shown that experience with technology positively correlates with teachers' attitudes. More experience is associated with more positive attitudes towards technology and greater readiness to use various forms of technology in teaching (Buabeng-Andoh, 2012; Teo, 2008, 2009). The perception of the usefulness and ease of use of different types of technology affects teachers' attitudes (Teo, Milutinović & Zhou, 2016). Knowledge and experience with modern technology and minimal technophobia reduce anxiety when using different devices, leading to more frequent use of technology (Larbi-Apau & Moseley, 2012).

Two more recent studies conducted in our region also point to the positive attitudes of future special educators towards computers and information technology and their use in the teaching process. One of these studies, conducted on a sample of 204 undergraduate students from various study programs and modules at the Faculty of Special Education and Rehabilitation, showed that the majority of respondents believe that the use of modern technologies positively influences the successful mastering of teaching material (54.4%) and academic success in general (55.9%). However, less than half (41.6%) believe that the knowledge and competencies in the use of technology acquired at university will significantly contribute to success in their future profession (Maćešić-Petrović, Kovačević, Žigić, Pantović & Zdravković, 2018).

A study on the attitudes of 57 students at the Faculty of Special Education and Rehabilitation, studying Special Education and Rehabilitation for persons with developmental disabilities, points to the positive attitudes of future special educators towards the use of computer technology in working with children with developmental disabilities and a high level of competence in handling simple computer software. Of the total sample, 98.2% believe they will use interactive software in working with students with developmental disabilities, while 84.2% believe they are competent to create simple software solutions (Pantović, Zdravković, Kovačević, Žigić & Maćešić-Petrović, 2018). At the beginning of 2020, the coronavirus (COVID-19) pandemic shifted teaching from traditional classrooms to the online world (UNESCO, 2020). Students from around the world joined the online education system. The transition from traditional forms of teaching to online learning happened quickly and unexpectedly, leaving many educators unprepared.

Some teachers faced difficulties using different online platforms for teaching, due to both a lack of platforms and insufficient time to transition from traditional to electronic teaching, and a lack of skills in using information technology and computers. Like teachers in the regular education system, special educators also had to adapt to the new situation and conduct online classes for students with developmental difficulties. This form of teaching brought new challenges but also new opportunities. Most future special educators have positive attitudes towards the use of technology and computers in teaching (Pantović et al., 2018), but there are not many studies in our region that indicate the attitudes of subject and primary school teachers. Given that the global pandemic situation has led to a shift from the traditional method of teaching students to an online teaching system, it is important to examine the differences in attitudes among these three groups, as they are responsible for the education of primary school-age children in our country.

Given the above, the goal of this research is to determine the differences in attitudes between teachers and special educators towards the use of computers and modern technology in teaching

MATERIAL AND METHODS

Sample of participant

The research was conducted in elementary schools in the Republic of Serbia and the sample was convenient and included special educators, primary school teachers, and subject teachers. A total of 248 respondents participated in the study, of which 86 were primary school teachers (34.67%), 53 were subject teachers (21.33%), and 109 were special educators (44%). The respondents were employed in regular elementary schools (60.9%) and schools for students with developmental disabilities (39.1%). The sample included respondents of both genders (21.77% male and 77.23% female), aged 20 to over 55 years.

Method of conducting research

The research was conducted by sending an email to schools across the Republic of Serbia, requesting that the school's staff, including teachers and special educators, forward a link to an online questionnaire for data collection.

Measuring instruments

For this research, a modified version of the "Teachers' Attitudes Toward Computers Questionnaire" (Christensen & Knezek, 2009) was used, along with a socio-demographic questionnaire to gather information about the respondents. The instrument consists of 51 items divided into nine subscales that cover the following areas: Interest (e.g., "I think the use of computers at work would be stimulating and fun."); Comfort (e.g., "When I use a computer, I feel tense and uncomfortable."); Accommodation (e.g., "I don't see the purpose of using computers in my profession."); Interaction (e.g., "I believe students are more motivated when I use computers and the internet in teaching."); for the purposes of this research, the term "email" in some items was replaced by "internet" to reflect a broader context); Concern (e.g., "People have become too dependent on computers."); Usefulness (e.g., "The use of computers increases productivity."); Perception (this subscale consists of seven adjective pairs, and the respondent must choose a position between two opposite adjectives, such as uncomfortable/comfortable, regarding how they feel when the adjectives relate to their perception of computers); Engagement (e.g., "I enjoy talking about modern technology."); Significance (e.g., "The use of computers can help a student develop writing skills."). All items, except for the Perception subscale, are presented in the form of statements, i.e., attitudes and feelings about computers and their use. Each statement is rated on a five-point Likert scale, where ratings from 1 to 5 express the level of agreement with the statement (1 = strongly disagree, 2 = disagree, 3 = not sure, 4 = agree, 5 = strongly agree), with higher scores indicating a more positive attitude. Negatively formulated items are recoded during data processing. In addition to these nine subscales, the instrument includes a

section related to self-assessment of proficiency in modern technology use in teaching, which is examined through six application phases. The respondents are expected to determine which phase they are at based on the description of the application phase. The phases of application range from awareness of the existence of technology to understanding, application, and creativity in technology use were examined.

Data processing methods

It has been used numerical and percentage display of obtained results same as mean, standard deviation, Chronbah coefficient of consistency, Scheffé Post-hoc Test. Cronbach's alpha is a convenient test used to estimate the reliability, or internal consistency, of a composite score. Cronbach's alpha gives us a simple way to measure whether or not a score is reliable. It is used under the assumption that you have multiple items measuring the same underlying construct. A post-hoc test is done to which group differ from each other. Therefore, such tests are also called multiple comparison tests.

RESULTS AND DISCUSSION

The examination of differences in attitudes between primary school teachers, subject teachers, and special educators initially showed that attitudes differ based on profession (Table 1). From the data presented in Table 1, it is evident that, in terms of attitudes towards computer use, there are no significant differences between primary school teachers and subject teachers. However, on most subscales (interest, comfortaccommodation, engagement, and significance), special educators have significantly less positive attitudes compared to primary school and subject teachers. On the interaction subscale, special educators have less positive attitudes compared to primary school teachers, but not compared to subject teachers. On the perception subscale, special educators show less positive attitudes compared to subject teachers but not compared to primary school teachers. No significant differences were found between the three groups of respondents on the concern and usefulness subscales.

Table 2. Attitudes toward the use of computers among primary school teachers, subject teachers, and special educators

Attitude Primary School Teacher AS (SD)	Subject Teachers AS (SD)	Special Educators AS (SD)	F	df	p	Scheffé Post-hoc Test
Interest						
4,23 (0,59)a	4,16 (0,61)a	3,91 (0,71)b	7,90	2; 245	0,000* *	a > b
Comfort						
4,37 (0,55)a	4,30 (0,65)a	4,04 (0,71)b	7,06	2; 245	0,001* *	a > b
Accommodation						
4,49 (0,43)a	4,42 (0,58)a	4,19 (0,63)b	7,47	2; 245	0,001* *	a > b
Interaction						
4,24 (0,59)a	4,06 (0,76)a,b	3,99 (0,69)b	3,51	2; 245	0,031* *	a > b
Concern	8					
3,08 (0,62)	3,02 (0,64)	3,20 (0,78)	1,36	2; 245	0,257	/
Usefulness						
4,31 (0,61)	4,18 (0,66)	4,10 (0,67)	2,49	2; 245	0,085	/
Perception						
3,61 (0,62)a,b	3,74 (0,74)	3,43 (0,79)b	3,17	2; 245	0,043* *	a > b
Engagement						
4,28 (0,43)a	4,18 (0,56)a	4,02 (0,58)b	4,82	2; 245	0,009**	a > b
Significance						
4,44 (0,55)a	4,34 (0,61)a	4,11 (0,70)b	10,45	2; 245	0,000**	a > b

According to the data presented in Table 2, it is noticeable that more than half of primary and subject teachers, as well as special educators, possess computer skills at the level of confidence in use, the ability to adapt, or demonstrate creativity in their use. Compared to primary and subject teachers, a higher percentage of special educators categorize themselves in the first two stages: awareness of the existence of technology (7.3%) and mastery of technology use (9.2%). However, these differences were not statistically significant.

Table 3. Phase of mastering technology

Phase of mastering technology use	N (%)	Subject teacher	Teacher spec. educat.
Awareness of the existence of technology	/	1	
	/	(1,9%)	(7,3%)
(learning) mastering of using technology	7	1	
	(8,1%)	(1,9%)	(9,2%)
Understanding and application	8	11	
	(9,3%)	(20%)	(17,4%)
Selfconfidence in using technology	11		22
	(12,8%)		(20,3%)
Adaptation in other circumstances	26		25
	(30,2%)		(22,9%)
Creativity in the use of technology	34		25
	(39,5%)		(22,9%)

The examination of attitudes toward acquiring knowledge about the use of computers for educational purposes initially showed that the majority of primary and subject teachers, as well as special educators, have a positive attitude toward computers. They are interested in working with computers, believe that it is important to have computer skills, and that computers can facilitate learning and contribute to the educational process.

This finding is consistent with the results of other studies (Mačešić-Petrović et al., 2018; Pantović et al., 2018; Teo, 2008) which also indicate generally positive attitudes of teachers and special educators toward computers and their use in the educational process.

Also, in a meta-analysis (Dupagne & Krendl, 1992, as cited in Eickelmann & Vennemann, 2017) conducted to study teachers' attitudes toward the use of technology in teaching, it was found that the majority of teachers have positive attitudes toward their use, while there are some teachers who are hesitant about using them. In contrast to the previously mentioned studies, an Algerian study (Boucheffa & Baghoussi, 2017) found that teachers do not have positive attitudes toward the use of computers in teaching and that if they are not obligated to use them, they will not incorporate them into their daily work with students.

The majority of primary and subject teachers, as well as special educators (over 80%), are at one of the higher levels regarding their mastery of computer technology, which involves a sense of confidence in using technology, adaptation to new circumstances, or creativity in working with computers.

In a similar European study, the authors (Eickelmann & Vennemann, 2017) categorized subject teachers into five groups based on their attitudes toward the use of computers in teaching. The study included 4,670 subject teachers from Norway, Germany, and the Czech Republic. In terms of positive attitudes toward the application of computers, the respondents

were divided into five categories: those who are enthusiastic about using computers (26.4%), those who are partially enthusiastic (21.4%), teachers who are information-focused (20.4%), teachers who are partially of the opinion that technology is unnecessary in teaching (19.1%), and those who believe that the use of technology and its integration into teaching is unnecessary (13.2%).

The observed differences in attitudes between primary and subject teachers and special educators showed that primary and subject teachers, most of whom are employed in regular elementary schools (98.56%), have more positive attitudes compared to special educators. At the same time, the attitudes of primary and subject teachers do not differ from each other, indicating that the respondents from these educational profiles, who primarily work with typically developing children, represent a homogenized group. This is similar to the case in a Singapore study that examined the attitudes of 139 teachers toward the use of computers in working with students, which showed that there are no differences in attitudes among teachers regarding age, gender, intent to use computers in the future, or the perceived usefulness of computers (Teo, 2008). Similar results were obtained in Rahman's study (Rahman, 2011), which also found that teachers had similar attitudes toward the use of computers in teaching, regardless of gender or age.

The more positive attitudes of primary and subject teachers compared to special educators can be explained by the fact that the questionnaire assesses general attitudes toward the use of computers in education, and that there is an influence of personal perception. This is supported by the results of a Syrian study (Albirini, 2006), which examined the attitudes of subject teachers toward the use of information technology in teaching and concluded that personal perception and cultural circumstances shape teachers' attitudes.

The newly emerged situation in the education system caused by the pandemic has placed many schools and educators in a difficult position. Although the results of this and many other studies show that educators have a positive attitude toward the use of computers and other technologies in teaching, the reality is that many schools and teaching staff are not adequately prepared for conducting online classes (Maćešić-Petrović et al., 2018; Pantović et al., 2018; Teo, 2008).

The obstacles that many schools face are primarily reflected in the insufficient preparedness of teaching staff regarding the materials that must be presented differently, a lack of experience among educators in using online technologies, and inadequate technical readiness of both teachers and students, as well as their parents.

Positive attitudes of educators and newly acquired experience in conducting lessons via computers may lead to greater use of technology in teaching after the pandemic ends. Increased use of computer technologies in teaching may also create a need for organizing training for educators focused on the use of computers in teaching, which will further enhance the digital literacy of teachers and special educators and reduce the level of anxiety associated with using technology in the educational process.

CONCLUSION

The COVID-19 pandemic has brought new challenges for educators; however, the positive attitudes of our sample in this study indicate potential opportunities for the application of computers in the education of children with developmental difficulties, even after the improvement of the epidemiological situation and the return to a regular school environment. Considering that attitudes are an important predictor for the application of computers and modern technology in teaching, this represents a good starting point.

One of the limitations of our research at this stage is that internal factors (gender, age, years of experience, and the type of subjects taught by subject teachers) as well as external factors (additional education, school resources, availability of internet connection in the classroom, support from school administration, etc.) were not examined. These factors could indicate significant advantages and disadvantages of implementing technology in teaching. We also believe that it would be of great importance for future research to investigate whether there are differences in the attitudes of subject teachers based on the subjects they teach, assuming that computer science teachers have more positive experiences compared to teachers of other subjects.

What we consider to be a kind of potential regarding this research is that it was conducted before the onset of the COVID-19 pandemic, and thus it represents a good starting point for comparing these results with a follow-up study using the same sample and the same instrument. This would provide significant insight into how the transition to remote learning and online teaching has affected the attitudes of teachers and special educators toward the use of computers in teaching.

The pedagogical implications of this research may be directed toward forming positive attitudes among educators regarding the use of modern technology in teaching. Research has shown that teachers who have received additional training on the possibilities of applying computers in teaching consequently have more positive attitudes and more frequently incorporate computers into the teaching process. Therefore, it would be beneficial to examine teachers' attitudes toward the use of computers in teaching before and after implementing any form of such training.

It would also be of utmost importance to examine the attitudes of elementary school students regarding the use of computers by teachers in different classes. This would help identify which subjects students consider more appropriate and desirable for the use of computers, as well as determine which classes they believe would benefit from the use of computers.

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