https://doi.org/10.53656/ped2024-4.02

Research Insights
Изследователски проникновения

ONLINE TEACHING AND COVID-19 ERA: POSITIVE EXPERIENCE REGARDING HEALTH-EDUCATION AND PSYCHOLOGICAL COMPETENCIES OF EDUCATION STUDENTS IN THE CONTEXT OF GLOBAL BURDEN

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Abstract. The aim of this study was to estimate the level of knowledge, health-education and psychological competencies of education students regarding COVID-19 circumstances and to determine whether they can be improved if the teaching and facilitated discussions were delivered in a virtual way, employing online learning platform Microsoft Teams. The sample was composed of 43 participants, who were thought crucial topics essential for improving their knowledge and competences related to the most common infectious diseases (chain of infection, the concepts of epidemics/pandemics, prevention) and mental health (resilience, readiness to face various challenges). Wilcoxon's rank test revealed a statistically significant difference in all three subsets – knowledge segment, health-education competencies and psychological competencies. The magnitude of the impact was 0.6, 0.57 and 0.45 respectively, which is considered to be of great influence. The results demonstrated that online teaching during the pandemic was successful in the context of the acquired knowledge and competences**.**

Keywords: online teaching; education students; health-educational/psychological competencies

Introduction

Globalization, in a sense of closer integration of the world economy, trade, culture, travel, education etc. enabled via global interconnectedness, emerged as a substantial determinant of disease transmission (Shrestha et al. 2020). Since modern globalization has capacity to allow unprecedented worldwide dissemination of infections at an astonishing speed (Mas-Coma et al. 2020), last three years have been overwhelming regarding global health. In short period of time and with very

little warning, COVID-19 pandemic has taken over almost all aspects of life and managed to dismantle them. The World Health Organization, has been warning that majority of global health issues are related to the domain of infectious diseases (WHO 2019), and the main treats to be addressed nowadays are certainly persistent pandemic and multy-country outbreaks of different infectious diseases[1].

The pandemic revealed that many people are or, very rapidly, might become vulnerable regardless of the socioeconomic groups they come from, with physical and mental struggle being central to their crisis[2]. Since these sudden disruptions could reshape lives of both, children and grownups, leading to the impairment of mental and physical health, it is necessary for future teachers to gain essential health-education and psychological competencies. These skills are highly desirable to overcome major challenges in pandemic and post-pandemic world at the personal and professional levels.

Numerous studies identified necessity to strengthening global health education and to improve educational programs regarding transdisciplinary approach to public health (Karduck et al. 2020; De Zeeuw 2020; Togami 2018). Special emphases should be placed on aetiology of infectious disease, pathogens that cause them, transmission routes, prevention strategies and other epidemiologic principles (Togami 1918, Petrovic et al. 2021). Considering prevention crucial for the combat against infectious diseases (Bloom & Cadarette 2019), it appears that initial education should incorporate basic knowledge about the most common infectious diseases and correlating prevention measures (Petrovic et al. 2021).

Proper psychological competencies of future teachers are especially important in unexpected and unpredictable circumstances, such is pandemic. The competencies of teachers from the psycho-educational domain include knowledge, skills, abilities and personal characteristics that provide them ability to successfully respond to professional challenges that carry sudden and unfamiliar epidemic threats. Thus, teachers are expected to be able to successfully implement the teaching process in the conditions imposed by pandemic circumstances and social restrictions (Carrillo & Flores 2020; Kidd & Murray 2020), to adequately cope with potential health threats, new working conditions and potential stressors arising from the aforementioned, as well as to be ready to prevent the occurrence of dysfunctional psychological responses in children, which are reflected primarily in the sphere of negative emotions and maladaptive behavior, and to preserve the mental health of students in these extremely complex and unpredictable circumstances.

In the psychology of education and mental health context, it is necessary to adapt working methods and materials to changed circumstances, e.g. the transition to online teaching (Allen et al. 2020), while at the same time it is necessary to take care of the successful adaptation of the child, both to the overall situation, and especially to these changes in the teaching process itself. This could be quite difficult even for more experienced teachers, and it is necessary to train them in this direction during

their studies (Carrillo & Flores 2020; Maile Cutri et al. 2020). Teachers must be stable personalities themselves, resistant to various internal and external challenges, because they are important model and support for students (Bandura 1977; Klapproth et al. 2020), both in standard, as well as in new and unexpected circumstances. Also the pupils' response will depend on their reaction, i.e. whether they will develop certain maladaptive reaction patterns (Spinelli et al. 2020), in the form of negative emotions (fear, anxiety, panic) and dysfunctional behavior (withdrawal, aggressiveness, etc.). Since psychological burden caused by the pandemic may have long-term effects on students' mental health (Villani et al. 2021), it is also essential to develop durable psychological competencies for themselves, enabling them to adjust and diminish possible distresses in future life situations.

Education acts as a driving force for progressive and changing society. Therefore, it is expected that all structures involved in the educational process, across all levels of education, have the capability to respond rapidly to any emerging problems, including different global issues. Watermeyer et al. (2021) advocated that pandemic could cause multidimensional and traumatic damage across universities. Therefore, Tam and El-Azar (2020) promoted that "resilience must be built into our educational systems."

Globalization has altered the way academic communities live and has been transforming universities towards institutions that exhibit market-like activities who operate within the global market-place (Walker 2009). However, one of the best achievements of globalization was certainly online access to education. When the pandemic was accelerating and changing our reality, online was frequently applied approach to teaching, and had to be rapidly adopted by universities, all over the world, as a new pedagogical practice (Bozkurt & Sharma 2020; Lederman 2020). Online teaching emerged as an "emergency measure" since academics quickly altered and adapted their practice, performing online transition in their work (Lee et al. 2022). Before pandemic, e-learning or distance learning were usually used to acquire some types of non-formal education, but after all COVID-19 experience, we can expect more of online education if the unfavorable circumstances persist (Mishra 2020).

As future teachers, students have to be trained to implement meaningful strategies in order to resolve different disruptions and mitigate potential damage they might come across while working with children. The main aim of the research was to examine the contribution of online teaching on development and improvement of knowledge and competencies in the field of health-education and psychology and in relation to current global health and educational issues. Furthermore, it also revealed the capacity of online teaching to overcome the initial difference in knowledge and skills of education students regarding their previous secondary school education.

Methods

Instrument and procedure

A research instrument was designed as a survey questionnaire that contained three subsets intended to examine the levels of knowledge (K) (3 questions) and attitudes (15 statements that represent certain competencies used for self-assessment according to the Likert-type scale) (Appendix). Bandura's (1977) self-efficacy theory is used as an explanatory model to construct the attitude scale. Self-efficacy is based on the self-assessment of a person's competencies and personal beliefs that he or she has the appropriate capacities for the realization of set tasks and goals. According to Bandura's theory, self-confidence in own potential contributes to a more positive outcome of activities and achieving goals more efficiently (Bandura 1977).

The Likert-type scale was created to measure the self-assessment of health-education (HE) and psychological (P) competencies. The expression of these competencies is assessed by the respondents on a 5-scale (the continuum ranges from 1 – *I think I do not have a developed given characteristic* to 5 – *I think I have a developed given characteristics to a large extent*). The questionnaire was completed in a paper form anonymously and used as an initial test and subsequently, after completion of a semester online course, as a retest.

The metric characteristics of the instrument proved to be satisfactory. The reliability of the self-assessment of health-education (HE) and psychological (P) competencies subscale was determined and showed that Cronbach's alpha coefficient ranges from 0.75 (for P) to 0.8 (for HE). In addition, the hypothesized two-factor structure of the instrument was confirmed. Factor analysis showed that 15 items representing attitudes are grouped into 2 factors: health-education (HE) competencies, which contains 7 items (items number: 1, 2, 3, 4, 5, 6, 7, with factor loadings in interval 0.6 – 0.9) and psychological (P) competencies, which contains 8 items (items number: 8, 9, 10, 11, 12, 13, 14, 15, with factor loadings in interval 0.6 – 0,8). Both factors have a characteristic root greater than 1 and together explain close to 70% of the variance.

Interactive lectures were delivered through online learning platform Microsoft Teams and were focused on thorough understanding of health-education and psychological topics. The emphasis was on the infection/immunity and themes such as: characteristics of the actual infectious diseases, pathogens involved in their pathogenesis, Vogralik's chain of infection, the concepts of epidemics/pandemics, the prevention of the most common infectious diseases and special highlights on the current pandemic situation. The mental health topics involved development of psychological competencies, including the strengthening of resilience towards emergency and extraordinary situations, establishment and expansion of willingness to face various challenges caused by pandemic and other threats, competencies of prevention of negative affective responses and disfunctional patterns of behaviour in pupils, the readiness for modification and adjustment of educational methods and

materials to new demands and proper skills of adequate comunication with pupils' parents in difficult circumstances. Online classes were delivered once a week for two hours during one semester. Students were encouraged to participate during lessons, and many of them were interested and actively involved. Majority of students presented in pairs one chosen topic and were awarded pre-exam ECTS points. However, since it was voluntary, some of them were only passive listeners.

The data were analysed using SPSS statistical software; Wilcoxon's rank test, Student's t-test were used to compare the data and a p value < 0.05 was considered statistically significant. Descriptive method was used to analyse, compare and interpret the obtained data.

Research sample

The cohort was composed of 43 participants, 6 males (14%) and 37 females (86%). All of them were freshmen education students thought crucial topics essential for impoving their knowledge and competences related to the certain infection/ immunity and mental health topics. Regarding previous education, 16 (37.2%) participants completed grammar school, 4 (9.3%) medical secondary school and 23 (53.5%) some other secondary schools.

Results

Total scores on the test/retest

The average score on the test was 55.07 with a standard error (SE) of 1.799, the variance of 139.162 and standard deviation (SD) of 11.799 (Table 1). The minimum number of points was 28 while the maximum was 81. The measure of asymmetry was negative -0.366, ie. shifted towards higher values. The kurtosis measure was positive 0.157, which means that there were more values within the mean of distribution.

On the other hand, the average number of points on the retest was 67.512 with a SE of 1.320, the variance of 74.97 and SD of 8.657 (Table 2). The minimum score was 48 while the maximum was 79. The measure of asymmetry was negative -0.585, ie. shifted towards higher values. The kurtosis measure was negative -0.685, which means that there were more values towards the tails of the distribution curve.

Statistical difference test vs. retest

In order to determine the statistical difference between the results on the test and retest, and since the score on the retest did not satisfy the normal distribution (Table 1a), the comparison was made using Wilcoxon's rank test (Table 1b). Wilcoxon's rank test revealed a statistically significant difference, $p=0.000<0.001$ (Fig. 1), with a magnitude of the impact of 0.6, which was considered to be of great influence (Cohen 1988, pp. 284 – 287).

Table 1a. Tests of Normality

	Kolmogorov-Smirnov[a]			Shapiro-Wilk		
	Statistic	df	Sig.	Statistic	df	Sig.
Test	.109	43	.200*	.978	43	.553
Retest	.126	43	.082	.935	43	.017

*. This is a lower bound of the true significance.

a. Lilliefors Significance Correction

Table 1b. Test Statistics[a]

	Total Retest / Total Test
Z	-5.522[b]
Asymp. Sig. (2-tailed)	.000

a. Wilcoxon Signed Ranks Test

b. Based on negative ranks.

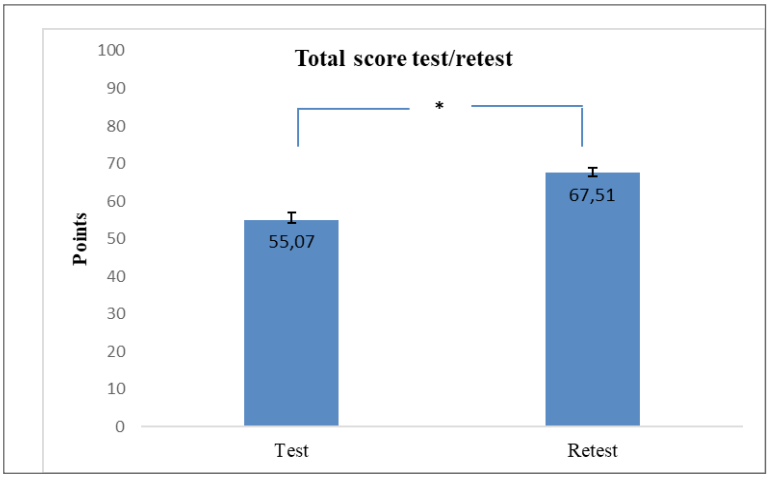

Figure 1. Total scores obtained on the test and retest. Data are presented as the mean +/- SEM and the differences were considered significant at $p < 0.05$

Scores obtained on subsets of the test/retest

The average number of points on the knowledge test was 5 with a SE of 0.208, the variance of 1.857 and SD of 1.363. The minimum score was 3, while the maximum was 8. The measure of asymmetry was positive 0.118, ie. shifted towards lower values. The kurtosis measure was negative -0.885, which means that there were more values towards the tails of the distribution curve. On the health-education competencies test the average number of points was 20.91, SE was 0.966, the variance 40.086 and SD 6.331. The minimum score was 8, while the maximum was 35. The measure of asymmetry was negative -0.415, ie. shifted towards higher values. The kurtosis measure was positive 0.019, which means that there were more values within the mean of distribution. The average number of points on the psychological competencies test was 29.16 with a SE of 0.988, the variance of 41.997 and SD of 6.48. The minimum score was 16, while the maximum was 40. The measure of asymmetry was negative -0.176, ie. shifted towards higher values. The kurtosis measure was negative -0.544, which means that there were more values towards the tails of the distribution curve (Table 3).

On the other hand, the average number of points on the knowledge retest was 7.28 with a SE of 0.142, the variance of 0.873 and SD of 0.934. The minimum score was 5, while the maximum was 9. The measure of asymmetry was negative -0.5, ie. shifted towards higher values. The kurtosis measure was negative -0.182, which means that there were more values towards the tails of the distribution curve. On the health-education competencies retest the average number of points was 27.28, SE was 0.557, the variance 13.349 and SD 3.654.

The minimum score was 18, while the maximum was 33. The measure of asymmetry was negative -0.689, ie. shifted towards higher values. The kurtosis measure was negative -0.137, meaning that there were more values towards the tails of the distribution curve. The average number of points on the psychological competencies retest was 32.95 with a SE of 0.868, the variance of 32.426 and SD of 5.694. The minimum score was 20, while the maximum was 40. The measure of asymmetry was negative -0.668, ie. shifted towards higher values. The kurtosis measure was negative -0.72, indicating that there were more values towards the tails of the distribution curve (Table 4).

Statistical difference subsets test vs. subsets retest

In order to determine the statistical difference between the results on the test subsets and retest subsets, and since the score did not satisfy the normal distribution (Table 2a), the comparison was made using Wilcoxon‘s rank test. Wilcoxon‘s rank test revealed a statistically significant difference in all three subsets, $p<0.001$ (Table 2b). Within the knowledge segment, the median increased from 5 to 7, in the health-education competencies from 22 to 28 and in the psychological competencies from 29 to 34 (Fig. 2). The magnitude of the impact was 0.6, 0.57 and 0.45 respectively, which was considered to be of great influence.

Table 2a. Tests of Normality

	Kolmogorov-Smirnov[a]			Shapiro-Wilk		
	Statistic	df	**Sig.**	Statistic	df	Sig.
Test K	.164	43	**.005**	.926	43	.008
Test HE	.157	43	**.009**	.954	43	.087
Test P	.072	43	**.200***	.968	43	.271
Retest K	.222	43	**.000**	.902	43	.001
Retest HE	.144	43	**.025**	.946	43	.041
Retest P	.192	43	**.000**	.909	43	.002

*. This is a lower bound of the true significance.

a. Lilliefors Significance Correction

Table 2b. Test Statistics[a]

	Retest K/Test K	Retest HE/ Test HE	Retest P/ Test P
Z	**-5.554[b]**	**-5.294[b]**	**-4.187[b]**
Asymp. Sig. (2-tailed)	**.000**	**.000**	**.000**

a. Wilcoxon Signed Ranks Test

b. Based on negative ranks.

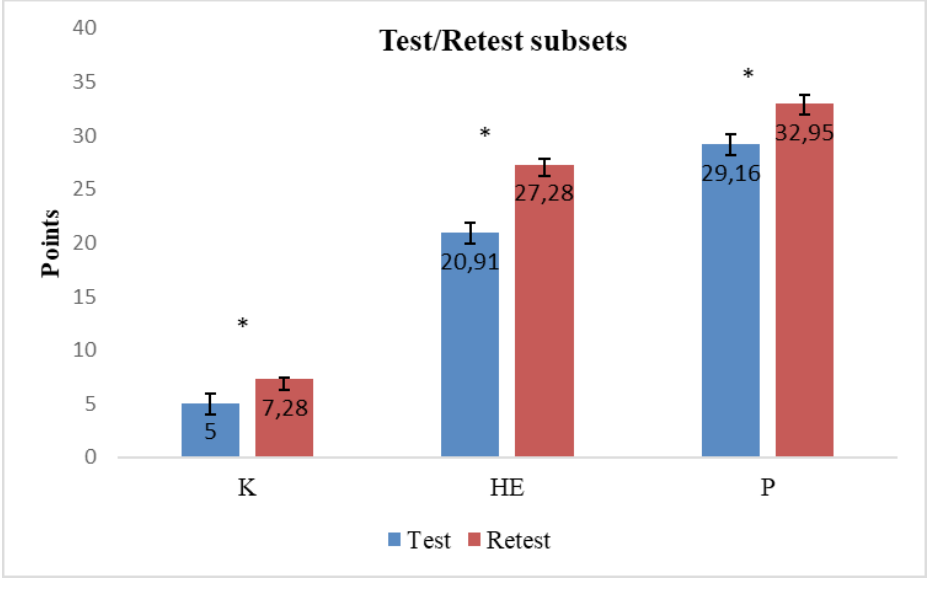

Figure 2. Total scores obtained on the test and retest subsets (knowledge – K, health-education – HE and psychological – P competences). Data are presented as the mean +/- SEM and the differences were considered significant at $p < 0.05$

Total scores obtained on the test/retest and scores on their subsets regarding previous secondary school education

First group – medical and grammar schools' students

The analysis of the test obtained from the *first group* of students, those who previously attended medical or grammar schools, revealed that the average number of points was 56.95 while on the retest it was 66.75.

Data analysis of the test subsets of the same group of students demonstrated that the average number of points on the knowledge part was 5.15, on the health-education competencies was 22.10 and on the psychological competencies 29.70. Furthermore, data obtained on the retest subsets revealed higher average numbers of points in all three parts; so in knowledge part it was 7.35, the health-education competencies 27.20 and in psychological competencies 32.20.

Second group – other schools' students

The analysis of the results obtained from the *second group* of students, those who previously attended all other secondary schools (except medical and grammar), revealed that the average number of points was 53.43 while on the retest it was 68.17.

Data analysis of the test subsets of the same group of students demonstrated that the average number of points on the knowledge part was 4.87, on the health-education competencies was 19.87 and on the psychological competencies 28.70. Furthermore, data obtained on the retest subsets revealed higher average numbers of points in all three parts; so in knowledge part it was 7.22, the health-education competencies 27.35 and in psychological competencies 32.61.

Statistical differences regarding previous education

For the *first group* of students (medical and grammar schools), the normality test confirmed the normal distribution of the total number of points on the test and retest (Table 3a), so the t-test of paired samples was used for comparison.

Table 3a. Tests of Normality –1st group

	Kolmogorov-Smirnov[a]			Shapiro-Wilk		
	Statistic	df	**Sig.**	Statistic	df	Sig.
Test	.125	20	**.200***	.945	20	.296
Retest	.120	20	**.200***	.936	20	.203

*. This is a lower bound of the true significance.

a. Lilliefors Significance Correction

Paired t-test disclosed a statistically significant difference between the total score on test (56.95) and retest (66.75), p=0.000<0.0005 (Tables 3b/c). The average increase was 9.8 (Fig. 3). The magnitude of the impact was 0.62, which was considered to be of great influence (Cohen 1988, pp. 284 – 287).

Table 3b. Paired Samples Statistics – 1st group

		Mean	N	Std. Deviation	Std. Error Mean
Pair 1	Test	**56.95**	20	8.90579	1.99140
	Retest	**66.75**	20	7.77225	1.73793

Table 3c. Paired Samples Test – 1st group

		Paired Differences					t	df	Sig. (2-tailed)
		Mean	Std. Deviation	Std. Error Mean	95% Confidence Interval of the Difference				
					Lower	Upper			
Pair 1	Test Retest	-9.800	7.938	1.775	-13.515	-6.085	-5.521	19	**.000**

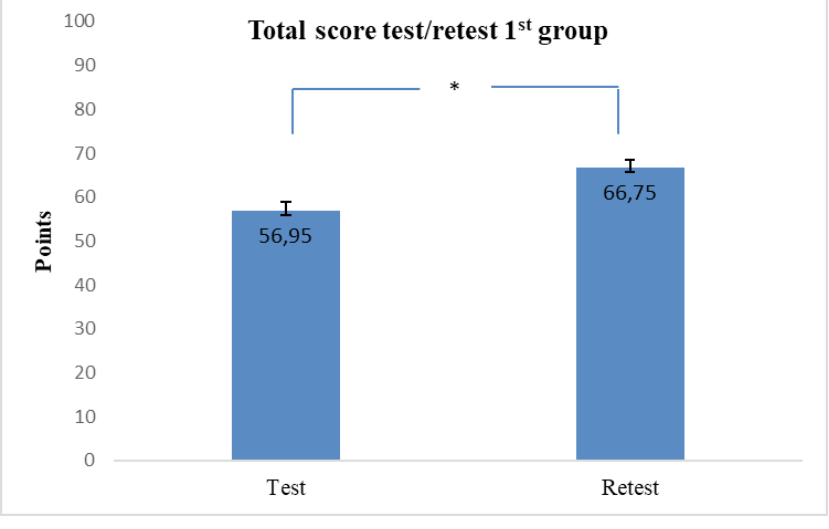

Figure 3. Total scores obtained on the test and retest by the students who obtained secondary education from medical and grammar schools. Data are presented as the mean +/- SEM and the differences were considered significant at $p < 0.05$

The results on the test and retest subsets did not satisfy the normal distribution (Table 4a), and, therefore, in order to determine the statistical difference between them, the comparison was made using Wilcoxon's rank test (Table 4b), which revealed a statistically significant difference in all three subsets, $p=0.000<0.05$ (Fig. 4).

Table 4a. Tests of Normality – subsets 1st group

	Kolmogorov-Smirnov[a]			Shapiro-Wilk		
	Statistic	df	Sig.	Statistic	df	Sig.
Test K	.236	20	.005	.893	20	.031
Test HE	**.143**	**20**	**.200***	.945	20	.302
Test P	**.119**	**20**	**.200***	.941	20	.247
Retest K	.305	20	.000	.797	20	.001
Retest HE	**.142**	**20**	**.200***	.954	20	.440
Retest P	.163	20	.170	.923	20	.115

*. This is a lower bound of the true significance.

a. Lilliefors Significance Correction

Within the knowledge segment, the median increased from 5.50 to 7, in the health-education competencies from 23.50 to 28 and in the psychological competencies from 29 to 32.50. The magnitude of the impact was 0.58, 0.57 and 0.35 respectively, which was considered to be of great influence for K and HE segments and moderate influence for the P subset.

Table 4b. Test Statistics[a] – subsets 1st group

	Retest K/Test K	Retest HE/Test HE	Retest P/Test P
Z	-3.644[b]	-3.404[b]	-2.180[b]
Asymp. Sig. (2-tailed)	**.000**	**.001**	**.029**

a. Wilcoxon Signed Ranks Test

b. Based on negative ranks.

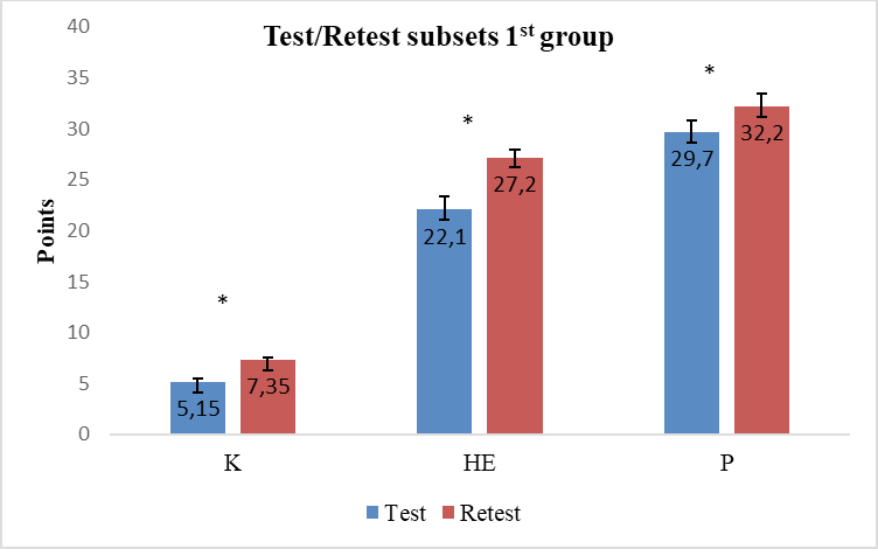

Figure 4. Total scores obtained on the test and retest subsets (knowledge – K, health-education – HE and psychological – P competences) by the students who obtained secondary education from medical and grammar schools. Data are presented as the mean +/- SEM and the differences were considered significant at $p < 0.05$

For the students of the *second group* (other schools), the normality test did not confirm the normal distribution of the total number of points on the retest, so the Wilcoxon's rank test was used for comparison (Tables 5 a/b) and revealed a statistically significant difference between the median score on test (54) and retest (70), $p=0.000<0.05$ (Fig. 5). The magnitude of the impact was 0.61 which was considered to be of great influence.

Table 5a. Tests of Normality – 2nd group

	Kolmogorov-Smirnov[a]			Shapiro-Wilk		
	Statistic	df	Sig.	Statistic	df	Sig.
Test	**.141**	**23**	**.200***	.966	23	.605
Retest	.165	23	.104	.898	23	.023

*. This is a lower bound of the true significance.

a. Lilliefors Significance Correction

Table 5b. Test Statistics[a]– 2nd group

	Retest/Test
Z	-4.109[b]
Asymp. Sig. (2-tailed)	**.000**

a. Wilcoxon Signed Ranks Test

b. Based on negative ranks.

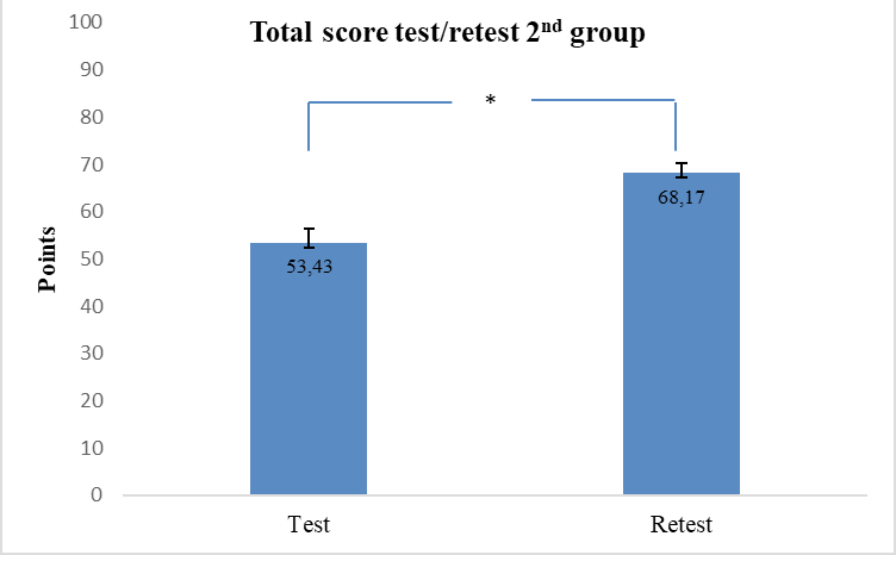

Figure 5. Total scores obtained on the test and retest by the students who obtained secondary education from other schools. Data are presented as the mean +/- SEM and the differences were considered significant at $p < 0.05$

The results on the test and retest subsets did not satisfy the normal distribution (Table 6a), and, therefore, determination of the statistical difference between them was achieved using Wilcoxon's rank test (Table 6b), which revealed a statistically significant difference in all three subsets, $p=0.000<0.05$. Within the knowledge segment, the median increased from 5 to 7, in the health-education competencies from 21 to 28 and in the psychological competencies from 29 to 36 (Fig. 6). The magnitude of the impact was 0.63, 0.59 and 0.51 respectively, which was considered to be of great influence.

Table 6a. Tests of Normality – subsets 2nd group

	Kolmogorov-Smirnov[a]			Shapiro-Wilk		
	Statistic	df	Sig.	Statistic	df	Sig.
Test K	.169	23	.088	.929	23	.103
Test HE	.174	23	.071	.948	23	.260
Test P	**.105**	**23**	**.200***	.946	23	.241
Retest K	.218	23	.006	.861	23	.004
Retest HE	.204	23	.014	.929	23	.103
Retest P	.221	23	.005	.869	23	.006

*. This is a lower bound of the true significance.

a. Lilliefors Significance Correction

Table 6b. Test Statistics[a]- subsets 2nd group

	Retest K/Test K	Retest HE/Test HE	Retest P/Test P
Z	-4.240[b]	-4.005[b]	-3.457[b]
Asymp. Sig. (2-tailed)	**.000**	**.000**	**.001**

a. Wilcoxon Signed Ranks Test

b. Based on negative ranks.

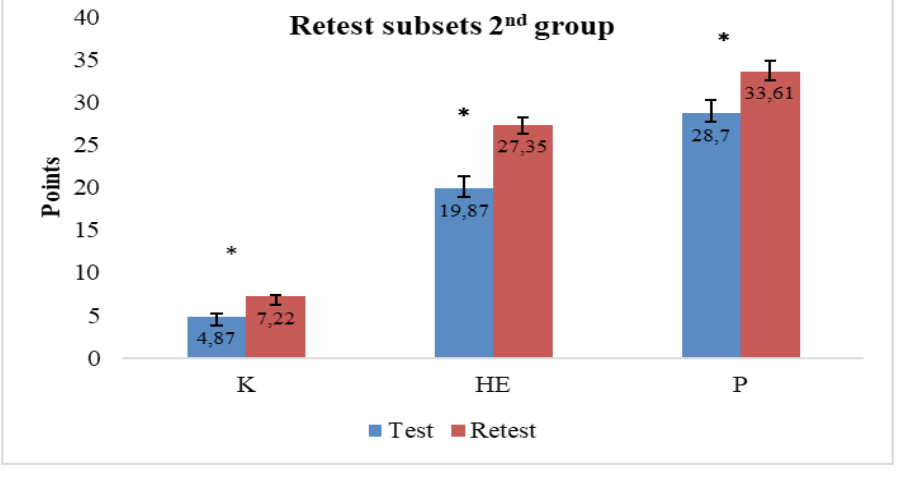

Figure 6. Total scores obtained on the test and retest subsets (knowledge – K, health-education – HE and psychological – P competences) by the students who

obtained secondary education from other schools. Data are presented as the mean +/- SEM and the differences were considered significant at $p < 0.05$

Discussion

The aim of the future teachers' education is to create and improve students' knowledge and skills enabling them to provide support to children in their everyday work. Accordingly, this study has demonstrated that adequate and coherent information, delivered through facilitated and well-constructed online teaching, contributed to a significant improvement of the education students' knowledge and both sets of skills. In the future, it is expected for many of these competencies to be translated to any insecure and unknown situations that may possibly arise either in their daily activities or under specific circumstances.

Some studies revealed that disadvantages of online education were mostly due to technical issues, lack of adequate knowledge or experience (Coman et al. 2020; Rapanta et al. 2020), inaccessibility to online facilities and physical and mental discomforts (Selvaraj et al. 2021). Some of them reported that in online settings it was harder to evaluate and conduct practical classes (Saha et al. 2022). Unexpected transition to online education was particularly challenging for some students as they reported lack of learning motivation and digital competences (Blizak et al. 2020; Bozkurt & Sharma 2020). On the other hand, Lee et al. (2021) confirmed that students have been more resilient than it's often anticipated. Moreover, most pros and cons for online education depended on willingness, rediness and personal attitudes of someone to adopt technology and recognize added value (Irene van der Spolen 2020), what also was identified even before pandemic (Amhag et al. 2019).

A recent study demonstrated that teachers perceived online method as effective during the pandemic and even preferred mixed teaching (face-to-face and online) in the post-pandemic time (Saha et al. 2022). A study by Martinho (2021) carried out among university lecturers, emphasised positive attitude towards online lecturing, usefulness of technological experience, positive aspects for faculty career and the strategy of higher education institutions. Most importantly, the same study demonstrated positive impact of online education on students' learning, what is in line with our results. Also, from the future teachers' perspective, online teaching was a positive experience that will help them in further education and careers (Sepulveda-Escobar & Astrid Morrison 2020). Many studies revealed that students' academic achievements, through online education during pandemic, depended on their experience, i.e. was in a positive correlation with student's satisfaction with the quality of instructions, communication, course design etc. (Omar et al. 2021; Gopal 2021; Kasyadi et al. 2020).

Therefore, although there are certain limitations of the application of online teaching in different conditions (Bozkurt & Sharma 2020, Selvaraj 2021), our study con-

firms its effectiveness when it comes to the development of health-educational and psychological competencies of future teachers in pandemic circumstances. The importance of this research is reflected in the fact that the obtained results are coherent to the findings of previous studies that showed efficacy and the existence of different advantages of online teaching (Gopal 2021; Martinho 2021), but in a specific educational area, which relates to the development of health-educational and psychological competences of future teachers in the new and complex educational context.

When it comes to psychological competencies, this research showed that appropriate online education can influence the individual potential of future teachers, in terms of encouraging their own resilience, readiness to face new professional challenges and stressors arising from the pandemic environment, ability to adapt the way of working to the changed educational context, and willingness to provide appropriate support to pupils with the aim of protecting their mental health and appropriate cooperation with parents. All these psycho-educational competencies are of the key importance for the successful conduct of the teaching process in pandemic circumstances, as shown in earlier studies (Allen et al. 2020; Klapproth et al. 2020; Spineli et al. 2020). Namely, in addition to the transformation of the way of educational work and content, the role of teachers in preserving the mental health of students in such changed circumstances takes on special significance. Especially important is that this research showed that the competences of future teachers in this psycho-educational domain can be successfully developed through online teaching, which during the pandemic period was dominant, at all levels of education (Carrillo & Flores 2020; Maile Cutri et al. 2020).

Comparing the analysed results obtained from two groups of students, it was disclosed that the 1st group scored a significantly higher number of points on the test when compared to the 2nd group. However, on the retest was completely the opposite, since the 2nd group dramatically improved their results. When each subsets of the test were analysed, it was revealed that students that attended medical or grammar schools had advantage in knowledge and health-education competences, while the significant difference was not observed for psychological competences, when compared to the students that attended other secondary schools. However, on the retest, all the differences were diminished, whereas the 2nd group of students performed considerably better on the retest in the psychology competence subset when compared to the colleagues in the 1st group.

It is particularly interesting that the psychological competences of all included groups of future teachers were successfully improved, both among those who previously completed medical and grammar school, as well as among those who completed other secondary schools. Moreover, progress was more noticeable among those who graduated another high school, which suggests that these students were particularly motivated to progress, possibly because they come from schools with less psychological content.

Students have to be trained and practice-based educated since the COVID-19 pandemic has made the public more aware of global health (Brisolara 2020). A study carried out on the university campus disclosed that students who were trained in public health, expanded knowledge on infectious disease prevention that help them to implement healthy behaviours mitigating COVID-19 (Dewa 2022). So, this education is essential for future teachers since they play an important role in developing teaching models that will support health education and the establishment of holistic well-being in children.

Conclusion

The results demonstrated that online teaching during the pandemic was successful in the context of the acquired knowledge and competences**.** It has been shown that online activities were suitable for the educational process, which had to be rapidly adapted at the University level during the global crisis. Namely, faculties that educate future teachers and educators, are even more responsible in finding ways to enable proper education of the students during the emerging situation, specially concerning the importance of their future profession.

There is a long and contradictory interplay between globalization and pandemics in human history, representing the two sides of the same coin phenomenon (Yoshimi, 2020). In terms of mobility, globalization was an crucial mechanism in COVID-19 pandemic trans-border spread. Given that the pandemic appeared in the world just suddenly, leaving no time for educational systems to prepare for the new circumstances in a timely manner, teachers were expected to quickly adapt to the new requirements, using previous knowledge, personal resources, but also adopting new knowledge and skills very fast dynamics. For this reason, educational systems around the world must be quite open and flexible, and able to provide appropriate knowledge and skills to teachers for the implementation of educational work. This has to be not only in standard and expected situations, but also in those that require special ways of working. and adapting to different unexpected circumstances.

Appendix

Assessment and self-assessment of health-educational and psychological competencies in the context of potential epidemic risks

Index number: _____
Year of study: _____
Gender: _____
Average grade during the study (circle the interval): 6 – 7 7 – 8 8 – 9 9 – 10
Completed high school (circle): medical school grammar school other

Read each question carefully and give the answer you think is correct.

1. Please define the terms:
Epidemic _____
_____
Pandemic _____
_____

2. Causes of infectious diseases can be:_____
_____
_____
_____

3. Please link the infectious disease to the pathogen that causes it (enter the appropriate numbers in the blanks).

	COVID-19	1.	Influenza virus
		2.	Tapeworm
	Measles	3.	Poliovirus
		4.	Rhinoviruses
	Influenza	5.	Coronaviruses
		6.	Morbillivirus
	Infantile paralysis (Poliomyelitis)	7.	Sars-CoV 2
		8.	HIV
	Cold	9.	Mycobacterium tuberculosis

Please read each statement carefully and, by circling the appropriate number next to it, indicate the degree to which you assess that the given competence is expressed in your case, where the numbers have the following meanings:

1 – *I think that I do not have a developed characteristic at all*

2 – *I think I have developed a given characteristic to a small extent*

3 – *I consider that I have developed a given characteristic of approximately intermediate level*

4 – *I consider that I have developed a given characteristic to a significant extent*

5 – *I think I have developed a given characteristic to a great extent*

1. I have adequate health and educational competencies for work with children in conditions of potential epidemic risks. 1 2 3 4 5

2. I am familiar with the ways of how respiratory infectious diseases are spread. 1 2 3 4 5

3. I am familiar with the ways of how intestinal infectious diseases are spread. 1 2 3 4 5

4. I have the appropriate knowledge of prevention measures against respiratory infectious diseases. 1 2 3 4 5

5. I have the appropriate knowledge of prevention measures against intestinal infectious diseases. 1 2 3 4 5

6. I think I have acquired the necessary knowledge about infectious diseases (causes, ways of spreading, prevention) during my primary school and secondary school education. 1 2 3 4 5

7. I think I need an additional education on current issues related to infectious diseases necessary to work with children in conditions of increased epidemic risks. 1 2 3 4 5

8. I have appropriate psychological competencies for working with children in conditions of increased epidemic risks. 1 2 3 4 5

9. I think I would adapt appropriately to the changed methods of educational work, caused by extraordinary epidemic circumstances. 1 2 3 4 5

10. I have the appropriate psychological knowledge, which allows me to understand the role and importance of appropriate psychological support for children in conditions of increased epidemic risks. 1 2 3 4 5

11. I have developed appropriate psychological skills to provide adequate psycho-educational assistance to children facing an epidemic threat. 1 2 3 4 5

12. I have developed competencies that allow me to prevent negative emotional responses in children (increased worry, fears, grief), caused by a potential epidemic threat. 1 2 3 4 5

13. I have developed competencies that allow me to teach children prevent the appearance of negative patterns of behaviour (retreat, avoidance, aggressive reactions), caused by potential epidemic threat. 1 2 3 4 5

14. I have the appropriate competencies that are a prerequisite for appropriate cooperation with the parents of the children in conditions of increased epidemic risks. 1 2 3 4 5

15. At the psychological level, I can successfully overcome personal challenges and increased stress in conditions of sudden epidemic risks. 1 2 3 4 5

Acknowledgement

This work was supported by the Provincial Secretariat for Higher Education and Scientific Research of Autonomous Province of Vojvodina, Republic of Serbia [Grant number 142-451-2554/2021].

NOTES

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