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ATTITUDES OF MEDICAL STUDENTS ABOUT E-LEARNING

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Abstract:

Background*: E-education is becoming increasingly important at the third level of education, but it has not been successfully implemented everywhere. The success of the introduction of e-education at the faculties is significantly influenced by the readiness for this type of education, as well as the attitude of the students towards it. The intention of this research is to study the attitude of medical students towards e-education.*

Methods*: Quantitative research was conducted in February 2021 on a deliberate sample of 100 students of higher medical vocational schools in Serbia. The Crombach alpha coefficient was 0.966. Data were processed in SPSS. Frequency analysis, t-test for independent variables, one-way analysis of variance, correlation, factor and regression analysis were used.*

Results: *The advantages of e-education were mostly assessed by students who participated in three subjects in the e-classroom ($p = 0.000$). Attitudes towards e-education are related to students' computer literacy ($p < 0.05$). Three factors can explain 64.72% of the variability of the total factors of students' attitudes towards e-education: the use of e-classroom, satisfaction with teamwork and the way of learning.*

Conclusion: *Respondents are not in favor of e-learning, although several factors have been identified that positively influence their attitudes towards e-learning. The results would be more significant, if the research were extended to a larger sample of respondents.*

Keywords: *e-education, medical education, students, teaching process, e-classroom*

INTRODUCTION

E-learning began its development in the 1980s. In the last fifteen years, it has developed and expanded in the developed world, especially in the United States, Australia and New Zealand.

The term e-learning in a broader sense is understood as education partially supported by technology, and within which it means integrated education (Berger et all. 2010).

This paper discusses e-learning in a broader sense, ie the process in which knowledge transfer continues in classrooms, and information and communication technologies are used as a complementary component of the learning process.

The OECD publication (CERI OECD, 2005) noted that e-learning is becoming increasingly important in tertiary education and that a new educational paradigm is being adopted at universities around the world. However, this type of learning is not applied everywhere successfully. As early as 2009 (Barolli, Sevrani, 2009), Baroli and Sevarni realized that readiness for e-learning is a key aspect that influences the introduction of e-learning. E-learning readiness includes 7 components: business readiness, appropriate technological infrastructure, content readiness, educational institution readiness (ability to organize, analyze, design, develop, implement and evaluate the selected curriculum, organizational and cultural readiness, and relationship according to such education within the institution), readiness of human resources, financial readiness. The introduction of e-learning is also influenced by the attitude of teachers and students of higher education, who, God forbid, reject this form of education. The problem with the introduction of e-learning can arise if the new systems are not in line with the personal characteristics of students (digital literacy, learning style, etc.), if motivation is low, knowledge of e-technology is low, if computer access is inadequate. (Graff, Davies, McNorton, 2014; Kundi, Nawaz, Khan, 2010; Lugonjić, 2019;)

The key results of previous research on the relationship between students and teachers of higher education towards e-learning show different trends. Dosari (Dosari, 2011) noticed a positive attitude of students and teachers of higher education towards e-learning, as well as Bregar, Zagmejster and Radovan (2020). However, Kundi et al (2020) found that e-learning users are rarely satisfied with its functionality, and therefore higher education institutions are constantly faced with dissatisfaction from users of the new approach to learning. The American report on new information technologies in higher education (NMC, 2018) shows that the computer literacy of

students entering higher education is not improving, and that the space of higher education does not use the opportunities offered by various online tools. They state that faculties and their staff often face difficulties in integrating these tools into the educational process. Similarly, Wilkinson and colleagues (Wilkinson, While, Roberts, 2009) find that higher education teachers do not reach the potential of ICT. Ficzko (2010) states that the introduction of e-learning should take into account the principle of "Less is more", which means the gradual introduction of e-learning first in one or fewer subjects. He also notes that in medical education it makes sense to use combined e-learning, which is a combination of classical lectures and e-learning. Combined education gives good results in group work in which students cooperate with each other and learn from each other (Nora, Snyder, 2008). The majority of students (77.78%) are more satisfied with the combined way of education than with the traditional one. This form of education also brings better learning outcomes (Tsai, Shen, Lin, 2015) E-learning, therefore successfully complements the didactic methods of the traditional educational process, and in the future it will be necessary to develop critical thinking and actively involve students in the educational process. Research among undergraduate students found that for students, the main benefits of online learning are related to independent study commitment planning (66.9%), user network environment (51.2%), and communication (20.9%) (Ditzel, Wheeler, 2017). Participation in a group of previously known members and the development of mutual trust between them is also a factor of job satisfaction in the e-environment. A meta-analysis of the relationship between e-learning and student success Mothibi (2015) showed that e-learning has a positive impact on student success. Kintu, Zhu and Kugambe (2017) came up with results that show that there is a high intrinsic motive for achievement in students using a blended learning method.

METHODS

The goal of the research was to present the experiences of nursing and health care students in higher professional studies in Serbia with e-education, as well as to investigate the advantages of e-education and students' attitude towards it.

The paper presents 3 hypotheses: H1 Students who performed their obligations in the e-classroom have a more positive attitude towards e-education than students who performed part of the obligations in the e-classroom, and part via e-mail; H2 Students with a very high level of information literacy have a more positive attitude towards e-education than those with a lower level of information literacy; H3 Stu-

dents' attitude towards e-education and the advantages of e-education are positively correlated.

Descriptive and non - experiential causal methods using a structured questionnaire were used in the paper.

The questionnaire was designed based on a review of original scientific articles and the CINAHL and PrQuest International Database. It consists of demographic data (year of study, compulsory e-classroom attendance, e-classroom experience, learning style, support for group / individual work) and three sets of content using the Likert scale of 5 points, namely: students' attitude towards e-education, expectations and benefits of e-learning.

Data were collected in February 2021 using an online questionnaire that students received via email. Participation in the survey was voluntary and anonymous. The data were analyzed in the statistical computer program SPSS, version 20.0. Statistical methods of t-test for estimation of arithmetic mean, t-test for independent variables, one-way analysis of variance, correlation, factor and regression analysis were used. Thus, a statistically significant relationship between independent and dependent variables was shown. Independent variables included demographic data, e-learning benefits, and dependent variables included respondents' attitudes toward e-learning. Demographic data is analyzed by frequency analysis. Statistical significance was checked at the level of 5% risk ($p = 0.05$).

Description of the sample

We used a quota sample. The research included students who participated in the e-classroom during the 2019/20 school year. Respondents were divided into two groups:

Table 1. Research sample

Groups	No /% of returned questionnaire	Participation in one course	Participation in two courses	Participation in three courses
Students with obligations in e-classroom	67/94,3	27/29,3	45/48,9	20 /21,7
Students with obligations in e-classroom and email	25/27,8			

RESULTS

Below are data on the way respondents learn, their computer literacy and attitude towards group work. 72.8% of respondents support group work, while only a quarter support individual work. 55.4% of them say they do not study regularly. 42.4% of surveyed students rated their computer literacy as high or very high (19.6%). Only 1.1% of respondents were beginners in computer use. The data show that the majority of surveyed students (75%) had experience with only one subject in which they used e-learning when completing the survey. (Table 1)

Students' attitudes towards the obligatory presence in the e-classroom

The T-test for independent variables conducted a statistical analysis of students' attitudes towards mandatory attendance in the e-classroom. The results are shown in Table 2.

Table 2: Mandatory presence in the e-classroom

Statement	Mandatory presence X/s	Non-mandatory presence X/s	*p*
I am satisfied with the material in the e-classroom.	2,34/0,94	2,40/1,47	0,000
E-learning offers me more flexibility than classical learning.	1,92/0,95	1,92/1,18	0,189
Using an e-classroom improves the success of my learning.	2,37/1,09	2,32/1,24	0,296
I want to participate in some more courses in the e-classroom.	2,07/1,00	2,20/1,11	0,438
I am satisfied with the way of learning in the e-classroom.	2,05/1,08	2,12/1,12	0,530
Using the e-classroom contributed a lot to my learning.	2,02/1,08	1,96/1,01	0,611
E-learning presents me with the same challenge as classic learning.	2,22/1,08	1,92/1,15	0,807
Working in an e-classroom helps me develop critical thinking	2,10/1,24	2,00/1,25	0,899
The e-classroom offers an attractive learning environment.	2,01/1,10	2,00/1,00	0,963

X-average; s-standard deviation; *p*- statistical significance at 0.05 and less

We found statistically significant differences in student satisfaction with e-classroom materials with regard to compulsory attendance (p = 0.000). The average value

was higher for students for whom attendance in the e-classroom was not mandatory (= 2.40, s = 1.47) than for those for whom it was mandatory (= 2.34, s = 0.94). For other claims, we did not find statistically significant differences between the groups. However, we found that students did not like e-learning, as all responses were closer to a negative than a positive attitude towards e-learning (the value was around 2.00). By one-way analysis of variance, we found that the advantages of e-learning are most assessed by students who participated in the e-classroom in three subjects, and the lowest by students who met in the e-classroom in only one subject. Hypothesis 1 can be confirmed. The largest statistically significant difference was estimated in the claim that e-learning enables the adjustment of the way students work (F = 16.75, p = 0,000).

Students' attitudes towards e-education in relation to computer literacy:

In the sample, two fifths (42.4%) of students rated their computer literacy as high, a good third (37%) as medium, a fifth as very high, and only 1.1% as low. One-way analysis of variance revealed statistically significant differences according to the level of computer literacy.

Table 3. Attitudes of students in relation to the level of computer literacy

Statement	Level	X/s	F	p
Volim da radim za računarom u malim grupama.	1 low 2 medium 3 high 4 very high	1,00/0 3,32/0,97 4,12/0,86 4,50/0,98	10,816	0,000
Communication with the professor in the e-classroom is flexible.	1 2 3 4	4,00/0 3,17/1,16 2,84/1,36 1,83/1,20	4,829	0,004
Using an e-classroom has increased the flexibility of my studying.	1 2 3 4	1,00/0 3,14/1,20 2,64/1,18 2,00/1,41	4,039	0,010
Communication with students in the e-classroom is flexible.	1 2 3 4	2,00/0 3,17/1,11 2,94/1,39 2,11/1,36	2,910	0,039

With e-learning I learn the same as with classical learning.	1 2 3 4	1,00/0 2,41/0,98 2,15/1,15 1,61/0,84	2,714	0,050

X-average; s-standard deviation; p- statistical significance at 0.05 and less

One-way analysis of variance showed statistically significant differences between groups (p <0.05). Extremely computer literate students show the greatest reluctance to e-classroom, because they estimate that the flexibility of their studies using e-classroom is not increased, that e-classroom does not learn as much as classical learning and that communication between students and teachers is not flexible. The claim that communication in the e-classroom with a higher education teacher is flexible was rated the highest by students with lower and middle level of computer literacy, and the lowest by students with a very high level. Students with the highest level of computer literacy were rated the highest average value to like working in small groups. From the analysis, we see that with greater self-esteem, dissatisfaction with computer literacy with e-learning is growing. So we can see just the opposite trend. Hypothesis 2 is rejected.

Advantages of e-education and students' attitudes towards it

Using the Pearson correlation coefficient, we found statistically significant associations between dependent and independent variables. The statement „Communication with students in the e-classroom is flexible" is statistically significantly positively related to the advantage of e-learning, namely: good information about the subject (r = 0.738, p = 0.000), flexibility over time higher education teachers in the e-classroom is flexible „is statistically significantly positively related to the advantage of e-learning, namely that" e-learning enables the way of work to be adapted to students „(r = 0.723, p = 0.000)," e-learning encourages teamwork between course participants „(r = 0.714, p = 0.000) The statement "Using e-classroom increased study flexibility" is statistically significantly positively related to statements that "e-learning has no advantages" (r = 0.787, p = 0.000), "good subject information (R = 0.744, p = 0.000), "quick feedback" (r = 0.723, p = 0.000). -learning has no advantages „(r = 0.755, p = 0.000) and" e-learning encourages teamwork between participants in the subject "(r = 0.721, p = 0.000). The statement „Using e-classroom improved opportunities for solving problems within the subject in which the e-classroom is applied" is statistically significantly positively related to the advantage of e-learning, ie student orientation (r = 0.757, p = 0.000) and E-learning encourages teamwork between course participants (r = 0.743, p = 0.000). The statement „Using an e-classroom can improve

my learning performance" is statistically significantly positively related to the advantage of e-learning, namely „e-learning encourages team cooperation among course participants" (r = 0.779, p = 0.000). The statement „E-classroom offers an attractive learning environment" is statistically positively related to the advantage of e-learning, namely „e-learning encourages team cooperation among subject participants" (r = 0.730, p = 0.000). We also found a statistically significant positive correlation between the statement „In e-learning I learn as much as I would in the classical way of learning" with the advantage of e-learning, namely „e-learning encourages teamwork between participants in the subject" (r = 0.761, p = 0.000). The statement „I want to participate in another subject in an online learning environment" is statistically significantly positively related to the advantage of e-learning, ie „flexibility in space".

We estimated that 64.72% of the variability of common factors "student attitudes toward e-learning" can be explained by three common factors. The first factor, which we called „using the e-classroom", shows the great weight that the e-classroom is more useful than the information system for students (0.862), discussions in the e-classroom are an important part of the learning process (0.854) and student satisfaction with the learning regime in the e-classroom (0.845). The second factor, which we called "group work satisfaction," shows the great weight that students like to work with a computer in small groups (0.795) and that they like team learning or learning in a small group (0.707). The third factor, which we called the „way of learning", shows the great weight that students would suggest to their peers e-learning (0.840) and that they would like to learn in the classical way (0.826).

Tabela 4. Multivariate linear regression model for nursing students' attitudes towards e-learning

Model	**R**	**R^2**	**Corrected R^2**	**F**	**p**
Encouraging teamwork among course participants	0,834	0,695	0,692	205,17	0,000
Encouraging teamwork among course participants, e-learning has no advantages	0,877	0,769	0,763	147,23	0,000
Encouraging teamwork among course participants, e-learning has no advantages and quick feedback	0,887	0,788	0,780	108,71	0,000

R –/the correlation coefficient; R^2 –the coefficient of determination; popravljeni R^2 –the adjusted coefficient of determination; F –analysis of variance ANOVA; p –

statistically significant at 0.05 or less

By regression analysis, we analyzed the dependence of "students' attitudes towards e-learning" on the independent variables "advantages of e-learning". We combined 3 factors into a dependent variable, which we identified using factor analysis. We estimated a multivariate model of linear regression. Independent variables are included in the regression model according to the Forward selection method. Regression coefficients showed that the following combinations of e-learning advantage factors have a statistically significant positive effect on students' attitudes towards e-learning: encouraging team cooperation between participants - in the course (β = 0.834, p = 0.000); encouraging team cooperation between participants - in the course (β = 0.538, p = 0.000), e-learning has no advantages (β = 0.401, p = 0.000), encouraging team cooperation between participants - in the course (β = 0.468, p = 0.000), e-learning has no advantages (β = 0.299, p = 0.000) and fast feedback (β = 0.211, p = 0.000) Based on the assessment of the correlation coefficient, we found that the relationship between the student's attitude towards e-learning and the benefits of e -learnings positive and strong, so we can confirm hypothesis 3.

DISCUSSION

When conducting e-education, it is necessary to recognize the individuality of the student, his previous knowledge and attitudes towards e-education. The conducted research showed that the respondents (medical students) were not in favor of e-learning. In contrast to the survey conducted in Serbia, MItchell et al. (2007) found that 98.8% of their respondents, almost all, were of the opinion that the technology would be better accepted if the attitude towards it was positive. In the same year, Multimedia Victoria found that 48% of students felt that they did not have enough knowledge to use ICT while studying. In our research, students' attitudes were statistically significantly positively related to the advantages of e-education, such as: quick feedback, good information about the subject, focus on students, e-education allows the way of working to adapt to students, encourages teamwork subject matter and flexibility in relation to time and space.

Research has shown that attitudes towards the e-classroom become more positive with the increase in the number of subjects that students take in the e-classroom. The advantages of e-education were rated the highest by students who participated in the e-classroom in three subjects, and the lowest by students who attended only one subject in this way.

Regression analysis showed that the attitudes of medical students are significantly influenced by factors that benefit e-learning, such as: encouraging teamwork and quick feedback. Communication, as an important factor in e-learning satisfaction, has been confirmed by research by other authors as well (Frith & Kee, 2003; Vica, 2015 Nora, Snyder, 2009; Farooq, Javid, 2012; Lint, 2013).

It is important to note that some research has found that only one negative experience in e-learning leads to discouraging students from further using it. (Chen, et al., 2008; Lin, et al., 2011)

CONCLUSION

The research showed that nursing and nursing students at the studied higher education institutions are not for e-learning. However, there are a number of factors that affect student satisfaction with e-learning and their attitude towards it. Many of these factors are related to the way e-learning is applied, which imposes a significant responsibility on higher education institutions and higher education teachers. Knowledge of these factors is crucial in the application of e-learning. Two important documents of the European Union - Modernization of European Higher Education Systems and the European Digital Agenda - encourage the use of ICT and other new technologies in order to enrich teaching and improve learning experiences. This means that e-learning has a future, so ways need to be found to improve the attitudes of nursing and nursing students towards it.

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