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Research and Paradigms
Научни изследвания и парадигми

DETERMINANTS AFFECTING ACADEMIC STAFF SATISFACTION WITH ONLINE LEARNING IN HIGHER MEDICAL EDUCATION

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Abstract. This study aimed to identify factors affecting academic staff satisfaction with online learning during the COVID-19 pandemic. An online survey was conducted among 249 faculty members from two medical universities in Bulgaria. The EFA identified four groups of factors that influence academic staff satisfaction with e-learning: student-related positives, student-related negatives, teacher-related negatives, and teacher-related prior experience and expectations. The results outline some barriers in teaching, such as disruption of the balance between personal and professional life and the work and rest rhythm, weakening of the relationship between teachers and students, difficulties in learning practical skills, and technical and organizational problems.

Keywords: e-learning; faculty satisfaction; students; medical education

1. Introduction

E-learning has become a major agent of change in higher medical education as a result of the COVID-19 pandemic. Remote learning as an emergency measure has brought challenges and opportunities for many medical schools worldwide, affecting faculty, students, and administrative and support staff. E-learning, due to its ubiquity (accessibility anywhere and at any time), ease of use, and interactive nature, is a valuable practical tool of the learning process (Gaur et al. 2020, Almaiah, Al-Khasawneh & Althunibat 2020, CERI 2005). For students, the positives of e-learning are flexible study schedules, easier interaction with colleagues and teachers during the scheduled hours and overtime. At the same time, multimedia construction contributes to making the learning process more active and engaging.

For educators, the pandemic has provided opportunities to acquire additional skills for online pedagogy, develop digital learning materials, and alternative

methods of assessing students (Al-alak & Alnawas 2011). On the other hand, different perceptions of the use of new technologies, lack of skills to work with software applications, design of distance courses, as well as the adoption of new social roles for student motivation turn out to be serious barriers to academic staff in the use of e-learning. Significant challenges in providing online learning are also a lack of reliable network infrastructure and compatible e-learning platforms and a lack of competent IT staff providing technical support and security in the event of cyber attacks (Gaur et al. 2020).

Many factors determine the success of an online learning program, some student-driven, others faculty-driven.

Faculty satisfaction is one of the five pillars of quality, together with student satisfaction, learning effectiveness, access, institutional commitment and cost-effectiveness, offering a means of implementing and continuously improving the quality of blended learning (Mahmud & Ismail 2020). Academic staff satisfaction is defined as the perception that teaching in the online environment is "effective and professionally beneficial". It is a complex issue with many elements, which subjective nature makes it demanding to analyze and hard to manage. Components of faculty satisfaction need to be investigated as online education becomes more prevalent (Bolliger & Wasilik 2009). Knowing the teacher-related factors affecting e-learning in medical education can help improve organizational conditions and prevent learning deficiencies to make the educational environment better.

This study aimed to identify factors affecting academic staff satisfaction with online learning during the COVID-19 pandemic.

2. Methods and participants

An online survey delivered through Google Forms was conducted among faculty members from two medical universities in Bulgaria in the period from September through October 2020. The study used non-probability sampling methods including convenience and snowball sampling.

The questionnaire was developed especially for this survey and consisted of 26 items related to the advantages and disadvantages of e-learning, work–life balance of the academic staff, attitudes and willingness to teach in an online environment. We applied descriptive statistical methods and exploratory factor analysis. We accepted a level of significance P=0.05. The statistical processing was done with IBM SPSS v.23.

3. Results

We received 249 filled online forms. Female participants prevail – 174 (69.9%), 32.5% have teaching experience over 20 years. Most of the respondents work in faculties of medicine – 45.35% and 40.62% work in theoretical departments.

The socio-demographic characteristics of the sample are presented in Table 1.

Table 1. Socio-demographic characteristics of the respondents

Characteristic	N	%
Gender		
Male	75	30.10
Female	174	69.85
Teaching experience		
0 – 5 years	64	25.71
6 – 10 years	42	16.86
11 – 15 years	40	16.15
16 – 20 years	22	8.84
> 20 years	81	32.51
Faculties		
Faculty of Medicine	113	45.35
Faculty of Dental Medicine	15	6.01
Faculty of Pharmacy	44	14.72
Faculty of Public Health	27	10.84
Department of Languages and Specialized Training	10	4.03
Medical College	40	16.15
Departments		
Theoretical	101	40.62
Pre - Clinical	47	25.71
Clinical	57	33.67
Positions		
Teacher	56	25.53
Assistant	74	29.71
Chief Assistant	49	19.70
Associate Professor	46	18.55
Professor	24	9.62

The Kaiser-Meyer-Olkin Measure of Sampling Adequacy test (KMO) and the Bartlett's test of sphericity showed that the data were adequate for factor analysis (KMO=0.930, Bartlett's Test of Sphericity, P<0.0001).

The EFA identified four groups of factors that influence the academic staff's satisfaction with e-learning. The model in EFA extracted four factors of the scale with 26 items which explained 56.33% of the overall variance, distributed as follows: Factor 1 – 27.24%, Factor 2 – 12.13%, Factor 3 – 9.73%, and Factor 4 – 7.23% (Table 2). The rotated component matrix is given in Table 3.

Table 2. EFA extracted components

Component	Initial Eigenvalues			Extraction sum of squared loadings			Rotation sum of squared loadings		
	Total	% of variance	Cumulative %	Total	% of variance	Cumulative %	Total	% of variance	Cumulative %
1	10.213	39.281	39.281	10.213	39.281	39.281	7.082	27.239	27.239
2	1.913	7.358	46.639	1.913	7.358	46.639	3.155	12.135	39.374
3	1.333	5.126	51.765	1.333	5.126	51.765	2.530	9.731	49.105
4	1.188	4.569	56.334	1.188	4.569	56.334	1.880	7.229	56.334

Table 3. Rotated component matrix

Variable	Factor loadings			
	Factor1 Student-related positives	Factor 2 Student-related negatives	Factor 3 Teacher-related difficulties	Factor 4 Teacher-related prior experience and expectations
10. E-learning is an attractive teaching method that stimulates more active students' participation in the learning process.	0.721			
7. E-learning motivates students to learn willingly.	0.691			
13. Students show more activity during their studies compared to face-to-face teaching.	0.691			
5. E-learning provides better formative assessment of students during exercises.	0.673			
8. E-learning is more effective in constructing new knowledge by students.	0.642			
16. The feedback is faster, compared to the face-to-face form of training.	0.637			
12. Students' interest is sustained long enough during e-learning.	0.633			

4. E-learning provides better control of student attendance during the semester.	0.621
15. Real-time communication in a digital environment between teachers and students is improved, compared to the face-to-face form of training.	0.615
14. At the end of the lecture/ exercise there is an opportunity to discuss with the students.	0.564
20. Distance learning is suitable in some disciplines in medical education.	0.561
9. An e-platform facilitates students‘ access to administrative services in a medical university.	0.554
6. The summative assessment during the end-of-semester exam is improved in an electronic environment.	0.535
26. In general, I am satisfied with the way e-learning is conducted.	0.533
3. E-learning materials (lectures, exercises, sample tests, etc.) are more accessible to students, compared to the same during the face-to-face form of education.	0.524
17. The assessment of students‘ knowledge is facilitated in an e-platform, compared to the face-to-face form of an exam.	0.513
25. The conducted distance learning created a shortage in the students’ practical knowledge and skills.	0.822

24. Distance learning is not enough to acquire practical skills, especially in humanities education.	0.817		
23. Distance learning lowers the quality of higher education.	0.545		
22. Distance learning predisposes students to a passive and relatively less responsible role.	0.520		
21. Distance learning weakens the connection between students and faculty.	0.512		
19. Working at home and learning in an e-environment involves more working time, compared to the usual duties in the office /increases the workload/.		0.792	
18. Working at home and learning in an e-environment disrupts the rhythm of work and rest, due to the mixing of work and personal commitments.		0.721	
11. Using an e-platform is associated with more difficulties during teaching.		0.717	
1. I had prior training and experience in teaching in an electronic environment.			0.829
2. I had positive expectations about shifting to working with an electronic platform.			0.509

The first identified factor comprises most of the analyzed variables that are associated with positive outcomes for students in e-learning and was named *student-related positives* (Survey items 3, 4, 5, 6, 7, 8, 9, 10, 12, 13, 14, 15, 16, 17, 20 and 26 in Table 2). The first and main component reflects the academic staff's perceptions of e-learning as an attractive learning method, as well as the interactive possibilities of e-learning for learning new knowledge, good motivation of students in e-learning, better control in ongoing and final assessment of students' knowledge, better communication with students and easier access of students to administrative services. They form the main component of satisfaction and, therefore, can be considered

essential for assessing the overall teachers' satisfaction with e-learning. All loadings for the adequate factor are over 0.5; for most of the items, they are over or close to 0.7. The variables with the highest factor loadings are the most significant. These are the statements related to e-learning as an attractive teaching method (with a loading of 0.721) and the ones related to the good motivation of students in e-learning and better student activity compared to face-to-face training (with a loading of 0.691).

The second factor was named *student-related negatives* because the items within it described academic staff's perceptions of negative outcomes for students (Survey items 21, 22, 23, 24, and 25 in Table 2). The second factor consists of five variables with loadings between 0.822 and 0.512. It is worth noting that the values of the factor loadings in this group are significantly high, which confirms the high significance of the analyzed variables.

Three variables form the third factor and it was named *teacher-related negatives*. The factor structure captures adverse consequences according to the academic staff when teaching in an electronic environment – disruption of the rhythm of work and rest in working conditions and a home environment, and increased workload. (Survey items 11, 18, and 19 in Table 2). All variables are with high factor loadings – over 0.7.

The fourth factor includes two variables and was named *teacher-related prior experience and expectations* because the items related to teachers' prior experience with e-platforms (with loading 0.829) and their expectations of e-learning with loading 0.509 (Survey items 1 and 2 in Table 2). This factor explains 7.23% of the variance after the Varimax rotation.

4. Discussion

The conducted EFA revealed that the influence of the academic's staff satisfaction with e-learning can be decomposed into four groups of factors: (1) student-related positives, (2) student-related negatives, (3) teacher-related negatives, and (4) teacher-related prior experience and expectations.

4.1. Factor 1. Student-related positives

The first and main factor covers the academic staff's perceptions associated with positive outcomes for students in e-learning. These perceptions form the main component of satisfaction and therefore can be considered essential for assessing the overall satisfaction of teachers with e-learning. Student-related issues most valued by respondents include e-learning as an attractive learning method, the interactive possibilities of e-learning for constructing new knowledge, and better motivation of students in e-learning. Most faculty believed that their students were more actively involved in the e-learning and the communication between teachers and students in a digital environment is better than in the face-to-face form of education. Additionally, according to the academic staff, e-learning provides better control over formative and summative assessment of students' achievements as

well as easier access of the students to e-learning materials (lectures, exercises, tests, etc.) and administrative services.

Student-related factors are among the most frequently cited reasons instructors are motivated to teach online. The motivating factor is that instructors perceive the online environment as an opportunity for students to engage in highly interactive communication with the instructor and their peers (Gaur et al. 2020, Almaiah, Al-Khasawneh, & Althunibat 2020), CERI 2005, Mahmud & Ismail 2020, Bolliger & Wasilik 2009, Laddunuri & Kampasati 2022). A recent multi-institutional study by Blundell, Castaneda & Lee 2020 on factors affecting faculty satisfaction with online teaching and learning found that the instructor-learner interaction factor was the strongest predictor of perceived faculty satisfaction and reflected successful teaching and learning. Previous research by Bolliger & Wasilik 2009 on factors influencing instructor satisfaction in online courses found that higher levels of interaction (e.g., instructors' perceptions of interactions with their students) influenced instructors' decisions to adopt and expand their online course offerings. These are some of the issues related to teacher satisfaction mentioned by the Sloan Consortium (Mahmud & Ismail 2020), specifically that teacher satisfaction is positively affected when teachers believe they can promote positive student outcomes.

4.2. Factor 2. Students-related negatives

This factor includes academic staff's perceptions of negative student outcomes from e-learning: e-training creates a shortage in practical knowledge, e-training is not enough to acquire practical skills in humanitarian education, weakening the relationship between student and teacher and lowering the quality of education in the e-environment. The values of the factor loadings in this group are significantly high, which gives the second place in the importance of the analyzed components. Not surprisingly, issues related to students' lack of practical knowledge and skills in e-learning, and also the loss of face-to-face student-teacher interaction negatively affect faculty satisfaction. Especially in humanitarian education, in areas such as medicine, dentistry, and health care the study process is bilateral, strongly influenced by the authority and the personal qualities of the teacher. This process requires a direct relationship between the learner and the teacher, who impresses the students with professional experience and imparts knowledge. Direct social communication "face to face", necessary in vocational education, is the missing link in distance training, which, despite the possibilities of the virtual learning environments, can hardly be compensated (Seymour-Walsh, Weber & Bell 2020, Sahi, Mishra & Singh 2020). It is well-researched that live contact with patients cannot be replaced by online learning as "clinical experience and human interaction are extremely important for the practice of medicine" and online learning cannot completely replace in-person live sessions (Khalil, et al. 2020).

The interruption of the educational process and its shift to distance training in

the COVID-19 pandemic is among the most discussed challenges of higher medical education. The effect of the pandemic will lead to an irreversible transformation of medical education and is likely to have long-lasting consequences on student learning (Machado et al. 2020, Longhurst et al. 2020).

Gaur et al. 2020 study the influence of the COVID-19 crisis on medical education and summarise the major challenges and opportunities on preclinical medical education. The authors argue that the lack of hands-on training in the preclinical years may have serious implications on the training of the current cohort of preclinical students, and they may struggle later in the clinical years. Besides, online learning will minimize the chances of building a better mentoring relationship between faculty and students. Similar studies have also shown that academic areas such as medicine and science, which depend on laboratory skills and practical experience, require excellent quality educational resources to provide adequate training (Al-Balas et al. 2020, O'Doherty et al. 2018, Sindiani et al. 2020).

4.3. Factor 3. Teacher-related negatives

The third important factor for teachers' satisfaction with e-learning is related to some of the adverse consequences of working in an e-environment for the teachers themselves: increased workload when adapting to new technologies, as well as disruption of the rhythm of work and rest when working at home. The sudden transition from classroom to teaching at home affected both students' and faculty performance. Adaptation to home teaching proves to be challenging. The most frequently expressed concern is the time investment associated with developing new resources and activities to replace lectures and hands-on sessions (Longhurst et al. 2020; Liang, Ooi, & Wang 2020; Niebuhret al. 2014).

Medical educators appear to be under time pressure in the management of teaching, developing and implementing online learning programs for medical students, and maintaining work-life balance. In this context, the lack of time to devote to design, development and application of online learning tools can be seen as a significant barrier. A study by Skye, Wimsatt, & Master-Hunter 2011 indicates scheduling time to work on the module as a significant challenge in developing online learning modules. O'Doherty et al. 2018 and Niebuhr et al. 2014 highlight time as a barrier for faculty engaged in using electronic tools. Faculty who want to develop e-learning materials face pedagogical challenges of transforming instruction for the online environment, especially as many have never experienced online learning themselves. They face the technical challenges of learning new software and the time challenges of not always being able to attend training to learn these new skills. To overcome the pressure of the time factor, a possible solution for universities is to develop a formal mechanism for recognition of the teachers for their efforts in developing and implementing online learning.

4.4. Factor 4. Teacher-related prior experience and expectations

The fourth factor structure for teachers' satisfaction with e-learning includes

two variables that are related to teachers' previous experience with e-learning and their expectations. The teachers' attitude, prior information and communication technology experience, and technology acceptance readiness, have a significant effect on the adoption of an e-learning system. It is hypothesized that a positive belief or attitude will encourage individual technology adoption, while a negative attitude or belief may deter it. Since e-learning is mainly based on the use of technology to deliver content via the Internet, it is likely considered radical and challenging for teachers, and therefore teachers may resist accepting the use of such a system.

Results from the current study indicate that educators who are biased/skeptical about distance learning opportunities and have no prior experience in working in an electronic environment have a lower satisfaction score with e-learning. Many empirical studies support the finding that lack of skills, especially technical skills and negative attitudes towards new technologies, are some of the barriers educators face in developing and implementing online learning (Al-alak, & Alnawas 2011; Bolliger & Wasilik 2009; O'Doherty et al. 2018).

Bolliger & Wasilik 2009 indicated that when educators experience technological difficulties or do not have access to appropriate technology and tools, their satisfaction is likely to decrease. A study by Al-alak & Alnawas 2011 about the acceptance and adoption of e-learning by academic staff reveals computer skills as the second strongest indicator of behavioral intention, and this could explain why computer anxiety was significant and has a negative effect on the intention to adopt an e-learning system.

A multi-institutional study of factors influencing faculty satisfaction with online teaching and learning by Blundell, Castaneda & Lee 2020 shows that the technology factor influences faculty satisfaction but to a lesser extent than the instructor-student satisfaction factor. According to the authors, this indicates that instructors may experience some issues with the learning management platforms provided by their institutions and that these issues could impact their overall perceived satisfaction in fully online courses.

Another study by Zalat et al. 2021 reported some differences between teachers in the use of e-learning, their motivation and satisfaction, based on age and gender factors. Among factors predicting the acceptance of e-learning, age under 40 years, teaching experience less than 10 years, and male gender are the most important indicators. This could be explained by the reality that younger staff is already using technologies more often than their older colleagues, which would increase abilities, willingness, and acceptance to use e-learning technology.

The limitations of this research come from the sampling methods. It is conducted in two medical schools in the country and cannot be considered representative of all medical academic staff in Bulgaria. However, it is the only one in the country conducted in pandemic conditions among the academic staff of medical universities,

which reveals the factors related to the motivation and satisfaction of faculty for teaching in an online environment. The study outlines where efforts should be directed to improve the quality of education.

4. Conclusion

The successful usage of an e-learning system relies on understanding the adoption factors as well as the main challenges that e-learning faces today. In this regard, the study contributes to valuable research related to evaluation and measuring faculty satisfaction from the instructor's perspective. The conducted EFA allowed us to indicate four groups of factors: student-related positives, student-related negatives, teacher-related negatives, and teacher-related prior experience and expectations. Not surprisingly, positive student-related issues were the most important variables influencing online faculty satisfaction, which is consistent with the priorities of student-centered graduate medical education. The results outline some barriers to teaching as disruption of the balance between personal and professional time and the work and rest rhythm; weakening of the relationship between teachers and students; difficulties in learning practical skills; and technical and organizational problems. The opportunities to overcome these challenges and difficulties are associated with the interactivity of the learning material; using e-platforms and other applications; improved access to educational materials; more opportunities for discussion; better control and easier assessment of students' knowledge. Lack of skills, especially technical skills, and negative attitudes towards new technologies have a negative effect on the intention to adopt e-learning systems and on faculty satisfaction. Institutions should make systematic efforts to provide lecturers with training on how to use e-learning systems effectively.

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