Saudi Arabian Family Medicine Postgraduate Trainees' Satisfaction with I-Heed as an E-Learning Platform

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Abstract:

Background: Many studies have measured satisfaction level with different E-learning platforms but there is limited information about E-learning for family medicine trainee doctors in Saudi Arabia.

Objective: To assess the satisfaction levels of family medicine residents at King Saud Medical City (KSMC) and King Fahad Medical City (KFMC) with the I-heed system, an E-learning platform designed for family medicine, over a period of 24 months starting from January 25, 2021.

Methods: This cross-sectional descriptive study used an electronic questionnaire which was distributed to all trainee residents enrolled in family medicine residency training programs at KSMC and KFMC who were using the I-heed learning platform as a designed E-learning platform.

Results:

A total of 57% of residents at KSMC and 43% at KFMC responded to the survey. Among all respondents: 39% of respondents were moderately pleased with the quality of learning content, and the same percent 39% found the E-learning content moderately informative. 31% respondents viewed E-learning as a helpful learning method, while 32% planned to incorporate it into their future education. 38% of participants were moderately trustful of online learning topics, and 33% expressed satisfaction with the I-heed system. However, 34% respondents reported low satisfaction with the system's activities, and 28% indicated low satisfaction with I-heed as a tool for improving knowledge. Regarding system confidence; 31% respondents were confident using the I-heed system. Satisfaction by Education Levels among resident's satisfaction level showed that R2 residents with 44% were highly satisfied followed by R3: 30%; R1 residents, 17.3%; R4: 9% (P=0.028). Regarding E-learning effectiveness, high

satisfaction was reported by 47% at R2, 27% at R3, 21% at R1, and 6% at R4. Eventually, Satisfaction with the I-heed system was high for 51% at R2, 28% at R3, 15% at R1 and 7% at R4.

Conclusion: This sample of Family Medicine residents were highly satisfied with E-learning, satisfaction level being higher among females than males, however, other factors should be further investigated.

Keywords: Electronic learning, satisfaction, I-heed, postgraduate training, family medicine.

Abbreviations:

E-learning:	electronic learning
KFMC	King Fahad Medical City
KSMC	King Saud Medical City
KSA	Kingdom of Saudi Arabia
NPIT	National Plan for Information Technology
NCEDL	National Centre for E-Learning & Distance Learning
MOHE	Ministry of Higher Education

Introduction:

E-learning, or electronic learning, has become an effective educational tool in various undergraduate and postgraduate programs across different fields. The World Health Organization (WHO) defines E-learning as "an approach to teaching and learning that incorporates all or part of the educational model and relies on electronic media and devices to enhance access to training, communication, and interaction. This approach also supports the adoption of innovative methods for understanding and advancing learning."[1.] In just a few years, E-learning has become a standard in most medical schools.[2] The value of the E-learning experience continues to be debated, with key issues including cost, infrastructure challenges (particularly the lack of internet access in developing and remote areas), security concerns (such as computer viruses and hackers), and the ongoing disruptions that threaten the stability of the E-learning environment. Despite these obstacles, E-learning offers numerous valuable and innovative methods for healthcare education, [3] and its adoption has progressively grown among healthcare professionals globally.[4] E-learning has been a transformative component of the healthcare system for more than a decade, with its advantages well-established, including improved access to education, enhanced effectiveness, cost efficiency, greater flexibility for learners, and increased interactivity.[5] Research on E-learning, including meta-analysis, has demonstrated its potential to enhance various professional skills, including mindset, understanding, abilities, and actions.[6,7]

E-learning offers a practical solution for medical educators dealing with numerous challenges, such as encouraging self-directed, flexible, and collaborative learning.[8] The implementation of lockdowns and social distancing measures during the COVID-19 pandemic was essential to curb the spread of the virus, leading to a complete disruption of global activities and an increased reliance on information technologies. [9]

In Saudi Arabia, E-learning initiatives began in 2002 in response to the growing need to empower citizens through innovative educational methods while minimizing financial waste. To address this, the Kingdom of Saudi Arabia (KSA) implemented approved programs, training methods, and the production of educational materials [10]. As part of this effort, the National Plan for Information Technology (NPIT) was developed, leading to the establishment of the National Centre for E-Learning and Distance Learning (NCEDL) in Riyadh.

Prior to this, in 1996, the Ministry of Higher Education (MOHE) established the Computer and Information Centre (CIC). This center provides various information and instructional technology services to schools and educational institutions, aiming to enhance the skills of both teachers and students across primary, elementary, and high schools[11]. In terms of E-learning of higher education, the universities in KSA have equipped their lecture rooms with interactive whiteboards, data shows, E-podiums,

Polycom video conferencing solutions and multi media centers. The solutions provided include a comprehensive learning management system, virtual classrooms, collaboration tools, content authoring and capturing tools, and digital repository systems [12]. Moreover, learning management systems (LMS), such as Moodle and Blackboard, have been widely utilized for their ability to provide interactive course materials and lectures, store educational resources, streamline administrative tasks, and track learners' achievements[13].

Family medicine and primary health care form the cornerstone of any health system, ensuring high-quality, cost-effective, and accessible care. The development of skilled family doctors' hinges on robust education and training, particularly at the postgraduate level. Since the 1960s, countries like the UK, Canada, and Australia have established postgraduate programs specifically designed to train family medicine doctors[14]. The challenge lies in effectively scaling continuous learning and training for the family medicine and primary care workforce. Family doctors should possess a universal core skill set, encompassing clinical, diagnostic, and essential soft skills, while also mastering skills tailored to the specific population and geographic context they serve. Career development through postgraduate training plays a vital role in motivating healthcare professionals to enhance patient outcomes.

In the Eastern Mediterranean Region, 90% of primary health care physicians are unspecialized generalists. Since completing a formal 3–4-year postgraduate program is not feasible for many of them, family medicine physicians must enhance their skills and knowledge through a tailored training process to meet minimum standards[15].

In response to the WHO report and as part of efforts to advance the E-learning development plan in Saudi Arabia, the Medical Specialties Authority in Riyadh approved the I-heed platform in 2018 as a mandatory E-learning tool for postgraduate education. Specifically designed for family medicine postgraduate training, I-heed serves as an innovative and specialized electronic platform to enhance primary healthcare education in the Kingdom of Saudi Arabia [16].

The I-heed E-learning platform is designed to offer a robust learning environment for training health professionals on a large scale, effectively addressing geographical barriers. It features internet-based courses, including online lectures, email communication, and access to online resources, aimed at building workforce capacity[17]. The Medical Specialties Authority aims to empower professionals to play an effective role, enhance their skills for implementing change efficiently, and improve communication with patients and other sectors. Additionally, the goal is to minimize unnecessary referrals to secondary and tertiary care facilities, preventing their overburdening with cases that can often be more effectively managed within primary care settings[18; 19.]

In our study, we examine the satisfaction and effectiveness of the I-heed platform as a dedicated E-learning tool for postgraduate education among Saudi family medicine residents. Additionally, we investigate the impact of this learning approach on their clinical practice and knowledge.

Methods

In this cross-sectional descriptive study, an electronic questionnaire was distributed via the I-heed system on the target group in the different levels. The target groups are all trainee residents enrolled in Family Medicine residency training programs from R1 up to R4 at KSMC and KFMC from 25th of Jan 2021 up to 24 months. The I-heed is the only E-learning platform designed for the target group from the Authority for Medical Specialties in Saudi Arabia. In 2021, I-heed E-learning platform was conducted first in two training centers in family medicine which are: King Fahad Medical City (KFMC) and King Saud Medical City (KSMC), in order to be evaluated in satisfaction level from the participants.

In the First stage and for reliability reasons, Face Validity was conducted on small group of the participants. The questionnaire was filled out by the same respondent on two occasions at two weeks intervals. Face validity was evaluated by using a pilot-group that filled out the questionnaire and were encouraged to give comments, either written or oral, concerning the questionnaire. Face validity is the degree to which a measure appears to be related to a specific construct, in the judgment of test takers and representatives. This validation evaluates the appearance of the questionnaire in terms of feasibility, readability, consistency of style and formatting, and the clarity of the language used.

The questionnaire answers were categorized as "Yes" and "No" which indicate a favorable and unfavorable item respectively. Where favorable item means that the item is objectively structured and can be positively classified under the thematic category.

All participants have access to I-heed learning platform module in their training program starting from R1 up to end of R4, after R4 no access allowed. The anticipated numbers of participants were 107 from KFMC and 119 from KSMC**.**

The questionnaire was designed to address the following domains:

no	Questions	Type of answers
1	Demographic data including gender, program level of the resident and residency center	Personnel Data
2	E-learning satisfaction level including the quality of E-learning content, whether the learning was informative, whether the learning method was helpful, and whether the resident planned to use online learning in his education and trusted that online learning would be helpful.	Yes or No
3	Effectiveness of E-learning which including the trust that online learning will help educational competence, whether Iheed can help the resident's learning performance, facilitate learning and facilitate interaction between trainer and trainee	Yes or No
4	Satisfaction with the I-heed system, its activities, whether the resident was confident with the system and felt satisfied that this learning method would improve their knowledge.	Yes or No

For all domains, scales were from 0 to 10 where 0 represents not satisfied and 10 was extremely satisfied.

E-learning satisfaction was gauged from responses to five questions, each scored out of 10. Each participant's score was out of 50 for the first domain and 40 for the second and third domains. The sample size was calculated using EpiTools, with estimated proportion of 0.3, precision of 0.05 and confidence level of 95%.

Statistical analysis

Data were analyzed using JMP/SAS version 12. Descriptive statistics are reported here as mean and standard deviation (SD) or median and interquartile range (IQR) for continuous variables where appropriate. Categorical variables are reported as frequency (percentage). Other inferential statistical analyses were performed as required.

Descriptive (such as demographic) data such as demographic are reported as frequency and percentage.

Satisfaction score was calculated for each domain. For domain 1, the sum was categorized as low (sum score 0 to 8), moderate (9 to 16) or high (17 to 25).

The domain 2 and 3 sum scores were categorized as low (0 to 6), moderate (7 to 12) or high (13 to 20).

Ethical considerations

The research was approved by the Institutional Review Board (IRB) committee (reference H1RI-14-Jan21-01) on January 25, 2021. A statement of consent was given to participants prior to completing the questionnaire. This study did not have any risk of harm to the participant, and the data were confidential.

Results

This study aimed to measure the satisfaction level of dealing with E- learning generally, effectiveness of I-heed as E-learning platform, and overall satisfaction of I-heed as E-learning platform as used through family medicine. Total of residents responded to questionnaire percent in each training centers was 57% from KSMC and 43% from KFMC; in detail of 58% of male and 56% of female from KSMC and 42% male, 44% female from KFMC, respectively.

Moreover, in demographic data, respondents at education level R2 provided the highest response rates 62% while KSMC residents 39% KFMC residents, followed by R1 in 59% at KSMC and 41% at KFMC. Level R4 residents were least responsive 63% responses from KFMC and 38% from KSMC (See table 1). The less participation among groups because of Clinical Demands and increased Patient Care Responsibilities: As R4 residents are typically in the final stage of their residency, they often face a heavier clinical workload with more responsibilities, such as managing complex cases, leading teams, and preparing

for independent practice and family medicine final board exam (oral and written). This can reduce the time they have available for additional E-learning activities.

Table1: shows the demographic data of the residents involved in the questionnaire from KSMC and KFMC.

Demographic data		
Variable	**KSMC**	**KFMC**
	57%	43%
Level: N, (%)		
R1	59%	41%
R2	62%	39%
R3	52%	48%
R4	38%	63%
Gender: N, (%)		
Male	58%	42%
Female	56%	44%

First of all, General E-learning satisfaction level was measured as shown in table 2. E-learning satisfaction level indicating the residents' overall experience of the quality of learning content, and whether it is informative, a helpful method, and if the respondent feels it would be helpful to use online learning in future and trusts that online learning topics.

As a result of the questionnaire among the participants; 39% were pleased with the quality of the learning content with scores at a moderate level of 7-9 out of 10. A further 39% considered the e-learning contents informative, also with moderate scores. 31% believed that e-learning is a helpful learning method, 32% planned to use online learning to aid their education in future, and 38% indicated a moderate level of trust that online learning topics is helpful.

E-learning satisfaction level: Regarding residents' overall experience					
Satisfaction level	**0**	**1-3**	**4-5**	**7-9**	**10**
I am pleased with the quality of the learning contents	3%	15%	30%	39%	13%
I consider the e-learning contents are informative	2%	13%	32%	39%	15%
I believe e-learning is a helpful learning method	5%	15%	28%	31%	22%
I plan to use online learning to help my education from now on	9%	16%	24%	32%	20%
I trust that online learning topics are helpful	4%	16%	23%	38%	19%

Table 2: shows distribution of satisfaction rate through the participants in different level of satisfaction (0 is lowest level of satisfaction whereas 10 is the highest)

In terms of effectiveness level of I-heed as an E-learning platform; 33% respondents indicated a moderate level of educational competence of online learning, while 30% responded represented low level at 4-5. On other hand, 35% believed that I-heed can help facilitate their learning and 31% provided low scores on belief that I-heed can facilitate the interaction between the trainer and trainee (see table 3).

E-learning effectiveness: Regarding residents' overall experience					
Effectiveness satisfaction level	**0**	**1-3**	**4-5**	**7-9**	**10**

I trust that online learning can help educational competence	5%	13%	32%	33%	18%
I think I-heed can help my learning performance	3%	25%	30%	28%	14%
I believe I-heed can help facilitate learning.	2%	20%	35%	26%	18%
I believe I-heed can facilitate the interaction between the trainer and trainee	8%	24%	31%	23%	13%

Table3: shows the percent of E-learning effectiveness through the participants in different level of satisfy (0 is lowest level of satisfaction whereas 10 is the highest).

Regarding the overall satisfaction of Family medicine residents about I-heed platform system as a learning method to improve their knowledge; 33% respondents were satisfied, while 34% indicated a low level of satisfaction with I-heed activities as shown in table 4. Moreover, 31% were confident about the I-heed system whereas 28% indicated a low level of confident.

I-heed platform system satisfaction: Regarding residents' overall experience					
Using I-heed platform satisfaction level through residents	**0**	**1-3**	**4-5**	**7-9**	**10**
I feel satisfied about I-heed system	5%	21%	33%	27%	14%
I feel satisfied about I-heed activities	6%	24%	34%	25%	11%
I am confident with I-heed system	6%	21%	31%	25%	17%
I feel satisfied about I-heed as a learning method to improve my knowledge	8%	26%	28%	22%	16%

Table 4: shows I-heed system satisfaction level regarding residents' overall their experience (0 is lowest level of satisfaction whereas 10 is the highest)

Collectively to the same context regarding the overall satisfaction; 61% respondents represented a high score of 10 for E-learning satisfaction and 56% showed high satisfaction for E-learning effectiveness, while 49% with moderate scores (table 5).

Overall satisfaction level with E-learning			
Overall satisfaction level	Low (N%)	Moderate(N%)	High (N%)
E-learning satisfaction level: Regarding your overall experience	5%	35%	61%
E-learning effectiveness: Regarding your overall experience,	3%	41%	56%
E-learning system satisfaction: Regarding your overall experience,	5%	49%	46%

Table 5: Overall satisfaction level with E-learning across three domains

In terms of distribution of satisfaction results through the participants high overall satisfaction was indicated R2 residents as 44%, followed by R3 residents by 30% and R1 residents by 17.3%; and finally, the least result with R4 as 9%. P value was significant (0.028).

In the same arrangements of result about E-learning effectiveness; R2 residents indicated high satisfaction by as 47%; followed by R3 residents in 27% and R1 residents by 21% and least results with R4 as 6%.

Moreover, the highest satisfaction with the E-learning system was reported by R2 at 51%, followed by R3 at 28%, R1 at 15%, and the lowest satisfaction was observed with R4 at 7% (see Table 6).

Relationship Between E-learning Satisfaction and Resident Engagement Levels						
Measurement domains	level	R1	R2	R3	R4	P-value
E-learning satisfaction level: Regarding your overall experience	High	17%	44%	30%	9%	0.028*
	Moderate	30%	57%	13%	0	
	Low	17%	50%	17%	17%	
E-learning effectiveness: Regarding your overall experience	High	21%	47%	27%	6%	0.0201
	Moderate	26%	54%	15%	6%	
	Low	0	50%	25%	25%	
E-learning system satisfaction: Regarding your overall experience	High	15%	51%	28%	7%	0.1015
	Moderate	28%	50%	19%	3%	
	Low	29%	15%	29%	29%	

Table 6: shows the relationship Between E-learning Satisfaction and Resident Engagement Levels

In Table 7, gender was found to be associated with E-learning satisfaction levels, showing variation across groups. Specifically, 40% of males and 60% of females reported a high level of satisfaction with E-learning. Regarding E-learning effectiveness, 47% of males and 53% of females expressed high satisfaction. Similarly, 41% of males and 59% of females indicated high satisfaction with the overall E-learning system.

There are several factors why women may respond to questionnaires more frequently than men. These differences are influenced by psychological, social, and behavioral aspects: Women are often socialized to be more expressive and communicative, which may make them more likely to participate in surveys or questionnaires requiring detailed responses. Moreover, women may be more diligent in completing tasks requiring cooperation or compliance, including surveys.

Association between E-learning satisfaction level and gender				
Measurement domains	level	Male	Female	P-value
E-learning satisfaction level: Regarding your overall experience	High	40%	60%	0.009
	Moderate	41%	50%	
	Low	66%	33%	
E-learning effectiveness: Regarding your overall experience	High	47%	53%	0.431
	Moderate	37%	63%	
	Low	25%	75%	
E-learning system satisfaction: Regarding your overall experience	High	41%	59%	0.725
	Moderate	44%	56%	
	Low	29%	71%	

Table 7: Demonstrates the relationship between gender and satisfaction levels in E-learning.

Discussion:

In Qassim, Saudi Arabia, trainees' satisfaction with the family medicine program has varied across different domains, ranging from 43% to over 80%.[20] Another study conducted in Saudi Arabia reported that family medicine residents scored 86.73 out of 160 for overall satisfaction with their training.[21] Despite this, there has been a notable lack of studies specifically assessing family medicine residents' satisfaction with E-learning, which prompted the present research.

This study evaluated participants' satisfaction across three domains: overall experience, E-learning effectiveness, and the E-learning system. Among these, the highest satisfaction rate was observed in the overall experience of E-learning, followed by E-learning effectiveness, with the E-learning system receiving the lowest satisfaction, where fewer than 50% of respondents expressed contentment. Despite this, the majority of participants indicated moderate to high satisfaction levels, suggesting overall positive perceptions of E-learning among family medicine residents.

Educational level significantly influenced satisfaction in the domains of overall experience and E-learning effectiveness, with second-year residents reporting relatively higher satisfaction levels though this may be influenced by the larger proportion of residents in this category within the sample. Gender also played a role, as female residents reported higher satisfaction with their

overall E-learning experience compared to males. This finding contrasts with prior research, where male medical students reported higher satisfaction levels than females.[22] More involvement of women contributions to questionnaires may influenced by psychological, social, and behavioral aspects. Women are often socialized to be more expressive and communicative, which can make them more inclined to participate in surveys requiring detailed responses. Additionally, women may exhibit greater diligence in completing tasks that involve cooperation or compliance, such as filling out questionnaires.

Most studies examining satisfaction with E-learning were conducted during the COVID-19 pandemic due to the rapid adoption of online learning during this period. For example, a study in Ireland reported low satisfaction with E-learning (43%), with communication and flexibility receiving the highest satisfaction scores, while technical problems negatively impacted satisfaction. [23] Similarly, a study in Pakistan on undergraduate students highlighted significant system deficiencies, leading to dissatisfaction with E-learning. [24] In contrast, research in Indonesia found students were satisfied with E-learning during the COVID-19 pandemic. [25] A study from Iran revealed low satisfaction levels, with 59% of students expressing undesirable satisfaction, and gender being a significant factor, aligning with the findings of this study. [26] Another Iranian study found moderate satisfaction with virtual education among medical students, with significant associations between satisfaction and gender, computer skills, and semester level. [27]

Conclusion:

High satisfaction with E-learning was found among family residents, and females and those in level two of residency tended to report relatively high satisfaction. However, further research should investigate factors that affect the level of satisfaction and improve residents' experience with electronic learning.

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References:

1. World Health Organization (WHO). E-learning for undergraduate health professional education. A systematic review informing a radical transformation of health workforce development. 2015.
2-Ward JPT, Gordon J, Field MJ, Lehman HPB. Communication and information technology in medical education. The Lancet. 2001; 357: 792-796
3- Regmi, Krishna, and Linda Jones. "A systematic review of the factors–enablers and barriers–affecting e-learning in health sciences education." BMC medical education 20 (2020): 1-18.
4.Vaona A, Banzi R, Kwag KH, et al. E-learning for health professionals. Cochrane Database Syst Rev. 2018;1(1):CD011736 doi: 10.1002/14651858.CD011736.pub2
5. Sinclair P, Kable A, Levett-Jones T. The effectiveness of internet-based e-learning on clinician behavior and patient outcomes: a systematic review protocol. JBI Database System Rev Implement Rep. 2015;13(1):52-64. doi:10.11124/jbisrir-2015-1919
6. Cook DA, Levinson AJ, Garside S, et al. Internet-based learning in the health professions: a meta-analysis. JAMA 2008; 300:1181–96.
7.Means B, Toyama Y, Murphy R, et al. A meta-analysis and review of online learning studies. Washington, DC: US Department of Education, Centre for Technology in Learning, 2010. https:// www2. ed.gov/rschstat/eval/tech/evidence-based-practices/finalreport. pdf
8.Lewis KO, Cidon MJ, Seto TL, Chen H, Mahan JD. Leveraging e-learning in medical education. Curr Probl Pediatr Adolesc Health Care. 2014;44(6):150-163. doi: 10.1016/j.cppeds. 2014.01.004
9.Soni VD. Global Impact of E-learning during COVID 19 Available from: https://papers.ssrn.com/sol3/papers.cfm?abstract_id=3630073. Accessed November 6th 2020.
10. Al-Asmari, A.M. and Rabb Khan, M.S., 2014. E-learning in Saudi Arabia: Past, present and future. Near and Middle Eastern Journal of Research in Education, 2014(1), p.2.
11. Oyaid AA, Education policy in Saudi Arabia and its relation to secondary school teachers. ICT Use, Perceptions, and Views of the Future of ICT in Education. Ph.D. Thesis University of Exeter, UK, 2009.
12. Al-Draiby O. E-learning and Its Effectiveness in Saudi Arabia. Faculty of Computer and Information Technology. AU, Jeddah. 13-1-2010. 2010
13. Ruiz JG, Mintzer MJ, Leipzig RM. The impact of E-learning in medical education. Acad Med.2006;81(3):207-12.

14. Kidd M. The contribution of family medicine to improving health systems: a guidebook from the world organization of family doctors. Second Edition. ed. Radcliffe Publishing Ltd. London: 2013
15. World Health Organization - Regional Office for the Eastern Mediterranean. Report on the regional consultation on strengthening service provision through the family practice approach. Cairo, Egypt: World Health Organization, Regional Office for the Eastern Mediterranean; 2014.
16. Hays RB, Morgan S. Australian and overseas models of general practice training. Med J
Aust. 2011;194(11): S63-4.
17. Stoner SA, Mikko AT, Carpenter KM. Web-based training for primary care providers on screening, brief intervention, and referral to treatment (SBIRT) for alcohol, tobacco, and other drugs. J Subst AbuseTreat. 2014;47(5):362-70. doi: 10.1016/j.jsat.2014.06.009.
18. Gillies JC, Mercer SW, Lyon A, Scott M, Watt GC. Distilling the essence of general practice: a learning journey in progress. Br J Gen Pract. 2009;59(562): e167-76. doi: 10.3399/bjgp09X420626.
19. World health Organization (WHO), Closing the gap in a generation: health equity through action on the social determinants of health. Geneva; 2008.
20. Rabbani U, Al-Gabbany SA, Jahan S, Kalevaru CS, Sulaiman AA. Satisfaction of trainees with family medicine training program: A cross sectional study from Qassim, Saudi Arabia. J Ayub Med Coll Abbottabad 2020; 17;32(3):372-7.
21. Al Helal AH, Al Turki Y. Family medicine residents' educational environment and satisfaction of training program in Riyadh. J Family Med Prim Care. 2019;8(4):1330.
22. Venkatesh S, Rao YK, Nagaraja H, Woolley T, Alele FO, Malau-Aduli BS. Factors influencing medical students' experiences and satisfaction with blended integrated E-learning. Med Princ Pract. 2020;29(4):396-402.
23. Elshami W, Taha MH, Abuzaid M, Saravanan C, Al Kawas S, Abdalla ME. Satisfaction with online learning in the new normal: perspective of students and faculty at medical and health sciences colleges. Medical Education Online. 2021;26(1):1920090.
24. Ansar F, Ali W, Khattak A, Naveed H, Zeb S. Undergraduate students' perception and satisfaction regarding online learning system amidst COVID-19 Pandemic in Pakistan. J Ayub Med Coll Abbottabad. 2020;32(Suppl 1):644-50.
25. Prasetya TA, Harjanto CT, Setiyawan A. Analysis of student satisfaction of e-learning using the end-user computing satisfaction method during the Covid-19 pandemic. JPhys 2020; 1700(1):012012).
26. Yekefallah L, Namdar P, Panahi R, Dehghankar L. Factors related to students' satisfaction with holding e-learning during the Covid-19 pandemic based on the dimensions of e-learning. Heliyon. 2021;7(7): e07628.
27. Osmani F. Analysis of students' satisfaction with virtual education in medical science university during the pandemic outbreak of COVID-19. International Journal of Assessment Tools in Education. 2021;8(1):1-8.