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Systematic Review (Pages: 351-362)

Worldwide Students' Satisfaction with Virtual Education during the COVID-19 Pandemic: A Systematic Review

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Abstract

Background: With the spread of the coronavirus pandemic, most schools and universities worldwide were forced to cancel their face-to-face activities and switch to e-learning and online education. This study aimed to investigate students' satisfaction with virtual education during the COVID-19 pandemic.

Materials and Methods: The present study is a systematic review of Persian and English articles extracted from Persian (SID, Magiran, and CIVILICA); and English databases (PubMed, Scopus, Web of Science, and EMBASE) up to November 2021 using the related Mesh keywords.

Results: The students' satisfaction with virtual education during the COVID-19 pandemic across worldwide studies ranged from 26.4% (Jordan) to 82% (Saudi Arabia). The highest satisfaction was related to students from Saudi Arabia, Poland, and South Korea, and the lowest satisfaction was related to students from Jordan, Iran, and the USA. According to respondents' answers, the main advantages of online learning were the ability to stay home, continuous access to online materials, learning at one's own pace, and comfortable surroundings. The results showed that the quality of e-learning was mainly derived from service quality with administrative, technical, and learning assistance through tutors and the library, teachers' active role in the process of online education with their responsiveness and timely feedback, and the overall system quality with the mode of delivery and IT infrastructure.

Conclusion: Satisfaction with the quality of virtual education varied in different countries from 26.4 to 82%. Online learning is essential in current times but is not an effective alternative for all college students. The blended method that combines face-to-face classes and practical sessions with online learning can be a practical suggestion.

Key Words: E-learning, Satisfaction, Students, Virtual Education, Worldwide.

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1- INTRODUCTION

In December 2019, a new coronavirus variant was identified in Wuhan, China, and quickly spread to most parts of the world. The phenomenon of the coronavirus epidemic is a major crisis in global health and has caused critical changes in human life on a large scale (1, 2). Education has been one of the most affected sectors during the pandemic (3, 4). With the onset of the COVID-19 epidemic worldwide, health protocols have emphasized social distance (5). In this regard, in many countries, to reduce the spread of the coronavirus, face-to-face education was closed in schools and universities (6), and virtual education was selected to continue education in schools, universities, and various educational centers (7).

E-learning is one of the most important applications of information and communication technology in recent decades. This type of training, which does not need physical presence (known as absenteeism), is a new method with the help of modern technologies and relies on information technology tools. In e-learning, face-to-face training is fully simulated and presented virtually in absentia. This educational method can be held simultaneously (live), and asynchronously (8, 9). Successful implementation of e-learning is largely dependent on factors such as access to e-learning equipment and technologies, training of staff, professors, and students, appropriate content, and cross-sectoral collaborations between the computer science and education types (10).

Students in higher education have been severely affected by the pandemic due to travel restrictions and social distancing, isolation measures, quarantine, closure of university campuses, and closure of borders. In line with that, their motivation is also damaged, with delaying their entrance to the university being one of the biggest harms. Virtual education has been adopted as a way of continuing education. However, it has confronted students and universities with new challenges and particular complexities. The purpose of this study was to investigate students' satisfaction with virtual education during the COVID-19 pandemic.

2- MATERIALS AND METHODS

2-1. Data sources

The Preferred Reporting Items for Systematic reviews and Meta-Analyses (PRISMA) checklist was used as a template for this review. A systemic search of electronic databases Medline (via PubMed), SCOPUS, Web of Science, EMBASE, SID, Magiran, CIVILICA, and Google Scholar search engine with Mesh keywords including: "Virtual learning, Virtual education, E-learning, Web-based learning, Online learning, Online class, Students, Worldwide, World, and Satisfaction" was conducted with no time limit up to November 2021. The search was performed independently and in duplication by two reviewers and any disagreement was solved by the supervisor.

2-2. Eligibility criteria

Participants, interventions, comparators, and outcome (PICO) was used to formulate the review objective and inclusion criteria.

2-2-1. Participants: Worldwide students.

2-2-2. Interventions*:* The included research are non-interventional studies, so we did not have comparison group.

2-2-3. Comparators: We did not have a comparison group and intervention.

2-2-4. Outcomes: Students' satisfaction with virtual education.

2-3. Included and excluded studies

Review articles, systematic reviews, case-control studies, cross-sectional studies,

qualitative studies, and descriptive and analytical studies were included in the study. Pilot, preliminary, and case report studies were not included due to the limited sample size and higher risk of bias.

2-4. Study selection

Database search was performed for the relevant studies, abstracts of the studies were screened to identify eligible studies, full-text articles were obtained and assessed, and a final list of selected studies was made. This process was performed independently and in duplication by two reviewers and any disagreement was resolved by a third reviewer. References were organized and managed using EndNote software (version X8).

2-5. Data collection process

A form was developed and followed for each study. The data collected by the two reviewers were combined and compared for accuracy, and a third reviewer solved any discrepancies.

2-6. Risk of bias

The risk of bias was assessed based on the Cochrane Risk of Bias criteria (11) by two reviewers independently and in duplication, and any discrepancies were resolved by a third reviewer.

2-7. Synthesis of results

Due to the difference in the included studies, study designs, lack of control groups in some studies, small sample size, and type of intervention used, and duration of treatment and follow-up, meta-analysis was not conducted.

3- RESULTS

Several studies measured student satisfaction in traditional and online environments. Opinions on what constitutes student satisfaction vary across the countries.

3-1. Iran

A review study aimed to determine the views of educational users on e-learning during the COVID-19 pandemic until December 2020 showed that the users' level of satisfaction in education is not high, and they still prefer face-to-face education. Findings also showed that most of the relevant studies emphasized the use of e-learning methods as much as possible and considered it as a suitable method for education in the current situation (12).

The results of a study on 364 students aimed to examine the status of virtual education in Alborz University of Medical Sciences in 2019-2020 showed that students find virtual education in course introduction, educational content, interaction and feedback, assessment, and evaluation relatively desirable. The Faculty of Pharmacy and master's students showed the highest level of satisfaction with the virtual education program among the faculties based on the areas under study ($p < 0.05$) (13).

A qualitative-analytical study conducted on 550 students of Jahrom University of Medical Sciences, aimed to assess their perceptions and requests of different dimensions of virtual education showed among the benefits expressed by students, 99 cases regarding general satisfaction with easy access to content were identified. In the study of the disadvantages expressed by students, 91 cases were mentioned, which were often related to problems due to lack of technological infrastructure and high volume of content or lack of study time (14).

The results of a cross-sectional study on 250 students of the Self-Governing Campus of Babol University of Medical Sciences in 2020-21 showed that their level of satisfaction was moderate. Regarding the preferred teaching method, students in all fields chose the face-to-face teaching method (15).

A descriptive cross-sectional study was conducted on 209 dental students of Ahvaz Jundishapur University of Medical Sciences aimed to evaluate the quality of virtual education curriculum components and student satisfaction during the COVID-19 pandemic. The results showed that the quality of virtual education curriculum components and the level of satisfaction of dental students were at a relatively good level (16).

The results of a study on 100 students of Semnan Branch of Azad University aimed to assess students' satisfaction with the quality of virtual education during the COVID-19 pandemic showed that 42% of students were moderately satisfied with the quality of virtual education, 24% were highly satisfied, and 21% relatively unsatisfied. It can be said that students' satisfaction with the quality of education is moderate (17).

A cross-sectional study assessed the satisfaction of nursing students of AJA University of Medical Sciences with the quality of the course and virtual education during the COVID-19 pandemic. The results showed that 66.2% of students found the quality of the course satisfactory. The satisfaction of 56.3% of students with virtual education was moderate. Among the demographic variables, only students' semester was a predictor of satisfaction with the course ($p < 0.05$) (18).

A review study investigated the effect of virtual education on students learning motivation. The results showed that providing online education infrastructure and equipment, metacognition skills, self-management, and self-regulation can increase students' motivation. On the other hand, factors such as academic apathy, academic inefficiency, and academic fatigue, negative self-talk, and lack of access to information resources and the Internet reduce the motivation of students to learn via virtual education during the pandemic (19).

In a cross-sectional study conducted on 90 medical students of Bushehr, aimed to investigate their opinions about the quality of virtual education courses held during the COVID-19 pandemic, results showed that 84.5% of students approved of virtual education courses and 57.7% of students expressed satisfaction with the quality of virtual education (20).

In a study on 900 undergraduate nursing students of Islamic Azad University, Tehran Branch aimed to evaluate the quality of online teaching courses during the COVID-19 pandemic, the results showed that students had above-average satisfaction with the quality of online teaching. Satisfaction was higher in women, third-year students, and students who had the experience of attending face-to-face classes (9).

In a cross-sectional study on students of Qazvin University of Medical Sciences aimed to determine the factors affecting their satisfaction with e-learning during the COVID-19 pandemic, results showed that 59% of students had low satisfaction. There was a significant relationship between satisfaction with e-learning and variables of gender and history of attending online classes before the pandemic. The results revealed that the mean scores of teaching and learning, feedback and evaluation, flexibility and appropriateness, and workload among students with high satisfaction were higher than students with lower satisfaction (21).

A cross-sectional study on students of Birjand University of Medical Sciences aimed to evaluate the relationship between different factors of satisfaction amongst students during the COVID-19 pandemic showed that the majority of participants (41.7%) had a medium level of satisfaction. There was a significant relationship between computer skills,

semester, and gender with overall satisfaction (22).

3-2. Jordan

In a study on 386 students from all majors at the University of Jordan aimed to identify their satisfaction with online teaching during the COVID-19 pandemic, the results showed that more than half of the students participating in this study (229, 59.3%) were unsatisfied (completely or partially) with online teaching. Only 102 (26.4%) students expressed their willingness for online learning (23).

3-3. Thailand

A study was conducted on 185 higher education students in Thailand that investigated the impact of e-learning quality on student satisfaction and their continued usage during the pandemic. The results showed that e-learning quality had a significant impact on student satisfaction and continued usage of e-learning platforms (24).

3-4. Nepal

A web-based cross-sectional study in Nepal aimed to assess satisfaction towards online learning and its predictors among students at Chitwan Medical College, results showed that 53.5% of the students were satisfied with the online learning, while 29.7% had neutral views. Also, female gender, WiFi as the Internet modality for learning, and learners score were the significant predictors of students' satisfaction ($p<0.05$) (25).

3-5. Poland

In a study on 804 medical students in Poland aimed to assess their perception of online learning during the COVID-19 pandemic, results showed that they considered e-learning less effective than face-to-face learning in terms of increasing skills ($p<0.001$), and social competence ($p<0.001$). Students assessed that they were less active during online classes than traditional classes ($p<0.001$). E-learning was rated as enjoyable by 73% of respondents (26).

3-6. Indonesia

In a study on 357 Indonesian students aimed to investigate satisfaction with online learning during the COVID-19 pandemic, results showed that students were satisfied with the online learning. Each indicator of online learning satisfaction had a significant relationship with academic achievement (27).

In a study aimed to determine students' level of satisfaction with e-learning media for vocational learning during the COVID-19 pandemic, results showed that the students were satisfied with the e-learning courses in vocational learning (28).

3-7. Sri Lanka

A quantitative study was conducted on 1,376 undergraduates in humanities and social sciences at three state-owned universities in Sri Lanka. The determinants of student satisfaction with online learning during the COVID-19 pandemic were studied. The results showed that students' satisfaction with online learning can be determined by three key variables: Perceived Challenges of E-learning (PCE), Perceived Learner Motivation (PLM), and Interaction (INT). The results revealed that all three independent variables had a significant impact on student satisfaction (29).

3-8. Philippines

A cross-sectional study on 529 university students in the Philippines aimed to determine the significant relationship between course satisfaction and student engagement in online learning during the COVID-19 pandemic showed that students were highly satisfied with online learning (30).

3-9. Vietnam

A study on 3,000 undergraduate students of a university in Vietnam investigated learners' satisfaction with online learning. The results showed that learners' interaction with content, peers, and instructors was associated with student satisfaction. The study also indicated that although students valued the chance to learn online during the pandemic, they viewed that interaction as limited and believed that instructors should improve their online teaching skills (31).

3-10. USA

A case study on 114 nursing students in the USA explored the effect of rapidly transitioning from in-person to remote instruction during the COVID-19 pandemic, results showed that no statistically significant difference existed between the in-person Cohort 1 (who received traditional in-person education, mean deviation = 4.53, n = 57), and the emergency remote Cohort 2 (who was transitioned to emergency remote instruction, mean deviation = 4.70, n = 53), U = 58.50, z = -2.26, p< 0.24, r = 0.04 (32).

In a study on 2,828 students of Mt. San Antonio College's (Mt. SAC) investigating their online learning experiences and challenges during the COVID-19 pandemic, the results showed that only 17.0% of students were able to keep a regular schedule. A slight majority of students expressed difficulties with online learning; 53.7% had trouble focusing or paying attention to remote instruction or activities, and another 53.5% indicated that they had a personal preference for face-to-face learning. In total, 56.8% of respondents said that they had issues completing their course assignments in a timely matter (33).

3-11. Malaysia

A study on 65 undergraduate students in Malaysia investigating their satisfaction with online learning during the COVID-19 pandemic showed that undergraduate students were satisfied with online learning in terms of learners' dimension (M = 3.31), technology characteristics (M= 3.66), and instructor characteristics (M= 3.70). The study revealed that the students had positive perceptions towards online learning and accepted it as the new learning system (34).

3-12. Afghanistan

In a study on 340 students in Afghanistan aimed to investigate their satisfaction with online learning during the COVID-19 pandemic, results showed that the majority of students of the Education Faculty at Kandahar University had problems with online learning compared to traditional classrooms. It can be said that students learn better in the traditional way, as they are not satisfied with online learning (35).

3-13. United Arab Emirates

A study on 539 students in the UAE investigated their satisfaction with and attitudes towards e-learning and virtual classes during the COVID-19 pandemic. The results showed that the students' satisfaction with and attitudes towards e-learning and virtual classes were high and positive during the pandemic (36).

3-14. India and South Korea

A study on 100 undergraduate students in South Korea and India examined the determinants of students' perceived learning outcomes and their influence on their satisfaction. The results showed that the factors of interaction in the classroom, student motivation, course structure, instructor knowledge, and facilitation positively influence perceived learning outcomes and student satisfaction (37).

3-15. France and South Korea

In a cross-cultural perspective study on 510 undergraduate students in two business schools in France and one University in Incheon, South Korea during

the first wave of COVID-19, Korean students expressed higher satisfaction with online teaching compared to French students. Female students also reported higher satisfaction scores (38).

3-16. South Korea

A study was conducted on 213 college students in South Korea to examine the factors affecting online learning satisfaction and areas of improvement as indicated by students to ensure efficient practices in future online studio classes. The results showed the high usefulness of both the lecture videos and teacher's demonstrations. Students' satisfaction with the online fashion design studio class was significantly affected by teaching and social presence, stability of the online learning system, perceived usefulness of teacher demonstration, and affective response toward COVID-19. Also, students' satisfaction with an online garment construction studio class was significantly affected by teaching and social presence, stability of the online learning system, and perceived usefulness of teacher demonstration (39).

3-17. India

A study was conducted on 435 undergraduate and graduate management students (national and international) in Indian Universities to examine the relationship between learning content and the e-learning quality and determine the impact of e-learning quality on learners' satisfaction under the perceived threat of COVID-19. The results showed that both the learning content and the website content provided in the online study environment are important factors in e-learning quality and have a positive effect on e-learning quality and student satisfaction (40).

In an online survey of 307 agriculture students in India focusing on their perception and preference towards online learning, results showed that the majority of the respondents (70%) were ready to opt for online classes to manage the curriculum during the pandemic. Most students preferred to use smartphones for online learning. The students stated that the flexibility and convenience of online classes make them an attractive option (41).

A study was conducted on 544 university students (business management and hotel management) in India to identify the factors affecting students' satisfaction and performance regarding online classes during the COVID–19 pandemic. The results showed that four independent factors of quality of instructor, course design, prompt feedback, and students' expectation affect students' satisfaction and, consequently, students' performance (42).

In a cross-sectional study on 1068 undergraduate medical and nursing students in India aimed to assess their satisfaction with virtual classes after disruption of classroom teaching by the COVID 19 pandemic, results showed that the overall satisfaction level of students was low (37.76%), and the majority were dissatisfied (42%). Some students also complained of stress and health-related problems because of the unplanned transition to virtual teaching (43).

3-18. Saudi Arabia

In a study on medical students in Saudi Arabia aimed to measure their preferences and effectiveness of e-learning during the COVID-19 pandemic, results showed that half of the students were satisfied with the availability of assistance (28.5 and 25% were highly satisfied and satisfied, respectively), and resources (25.8 and 28.5% were highly satisfied and satisfied, respectively) in online classes. Approximately half of the students (46.3%) were neither satisfied nor dissatisfied with the help provided through class materials. Satisfaction was highest

for the availability of e-resources (3.55 ± 1.2), and assistance (3.53 ± 1.3), and lowest for the balance between practical and theoretical knowledge (2.51 ± 1). The average satisfaction score was the highest for assignment submission (3.47 ± 1.33), and the lowest for balancing practical and theoretical experience (2.07 ± 1.03) (44).

In a study on 116 science students in Saudi Arabia aimed to investigate their satisfaction with using e-learning and virtual classes during the COVID-19 pandemic, results showed that the satisfactionwith using e-learning and virtual classes by science students was medium in general but with varying degrees from one item to another (45).

The results of a Saudi study in 2020 aimed to evaluate the satisfaction of 162 undergraduate medical students with the teaching quality of case-based discussion (CBD) sessions via web video conferencing (WVC) showed that 82% of students were highly satisfied with the teaching quality of WVC CBD sessions (46).

A case study of 538 college students in Saudi Arabia was conducted to investigate their satisfaction with English as a foreign language (EFL) taught via E-learning during the COVID-19 pandemic. The results showed that e-learners from departments of Islamic Studies, Foods and Nutrition Sciences, Medicine, Physics, Business Administration, Mathematics, Computer Science, Biology, Accounting, Arabic Language, Information System, and Chemistry were highly satisfied with the e-learning process using Blackboard LMS during the COVID-19 pandemic. EFL learners were less satisfied with the e-learning process than students from other departments during the COVID-19 pandemic (47).

In a study on 283 postsecondary students aimed to evaluate their satisfaction with online learning platforms and learning experiences during the COVID-19 pandemic in Saudi Arabia, results showed that the students were satisfied with the university staff and faculty members who agreed on the use of specific online platforms, grading system, assessment options, training workshops, and online technical support. Students were also satisfied with the facilities provided by the university (48).

In a study on 870 medical and dental students in Saudi Arabia aimed to identify effective factors on their satisfaction and continued inclination towards e-learning, results showed that students had a moderate level of satisfaction with e-learning, and half of the participants preferred blended learning (49).

3-19. Other countries

The results of an empirical analysis of an online survey from 10,092 higher education students from ten countries (Turkey, Chile, India, Ecuador, Italy, Mexico, Poland, Portugal, Romania, and Slovenia) across four continents during the first wave of the pandemic showed that the quality of e-learning mainly depended on service quality with administrative, technical, and learning assistance from tutors and the library, the teachers' active role in online education with their responsiveness and timely feedback, and the overall system quality with the mode of delivery and IT infrastructure. Moreover, the impact of e-learning quality on student performance was strongly mediated by student satisfaction with e-learning (50).

4- DISCUSSION

The purpose of this review study was to investigate students' satisfaction with virtual education during the COVID-19 pandemic. The results indicated that satisfaction with virtual education varies from 26.4% in Jordan to 82% in Saudi

Arabia. The results also showed that despite the benefits and advantages of e-learning, the existence of numerous obstacles and limitations associated with this type of education makes effective and useful education challenging. The majority of the reviewed studies acknowledged the shortcomings of e-learning and its inability to meet the needs of learners as fully as in-person and in-class education. Therefore, face-to-face education along with virtual education was the method of choice in many studies. Although the COVID-19 pandemic imposed many problems on all aspects of society, including public health, it led to the flourishing of some capabilities, including the pervasiveness and advancement of e-learning around the world.

One study classified the advantages and disadvantages of e-learning in social networks as:

1. Educational (advantages: preventing academic backwardness and creating opportunities for creativity);

2. Social (advantages: freedom of action of learners and more parental supervision; disadvantages: elimination of group activities and laziness and distraction of learners);

3. Cultural (advantages: introduction of virtual education-to-education and creating new experiences; disadvantages: elimination of teacher charisma, and the fatigue and tiredness of some parents);

4. Economic (advantages: reducing commutation costs and saving travel time; disadvantages: additional scheduling and the cost of the necessary hardware); and

5. Technical (advantage: promoting learners' media literacy; disadvantage: lack of visual appeal of videos and lack of mastery of information technology) (51).

The necessary infrastructure for e-learning as well as the possibility of its widespread use is required for the success of this method of education. In this regard, the lack of adequate infrastructure and educational facilities has been highly challenging for education providers and recipients. With the implementation of e-learning courses, its evaluation and measuring its success are critical. Due to its complexity and the existence of indicators and factors affecting virtual education, designing and developing appropriate tools for evaluating e-learning is essential to improve the level of distance learning. On the other hand, education officials are increasingly aware of the importance of distance education and e-learning. Therefore, it is expected that with the development of the necessary infrastructure, such as the expansion of the Internet network and increasing its speed, the production of interactive learning software, and the use of experiences gained during this pandemic, the use of virtual education will soon flourish in universities and schools. Following the continued spread of the coronavirus, this type of training should continue alongside face-to-face training.

5- CONCLUSION

Satisfaction with virtual education varies from one country to another, ranging from 26.4% to 82%. The highest satisfaction belonged to the students of Saudi Arabia, Poland, and South Korea, and the lowest satisfaction belonged to the students of Jordan, Iran, and the United States. Virtual education had challenges for students, such as slow Internet speed, disconnection of the Internet during classes, lack of proper interaction between teacher and student, lack of feedback at the right time, and lack of proper evaluation of the learned material. Students wanted to address these challenges and attendance in classes to accompany virtual training. Online learning in the current situation can be a great opportunity for educational systems to upgrade and develop virtual education and use modern technologies.

Although the COVID-19 pandemic imposed many problems on all aspects of society, especially public health, it led to the flourishing of some capabilities, including the popularity and advancement of virtual education around the world.

6- AUTHORS' CONTRIBUTIONS

Study conception or design: AN and HA; Data analyzing and draft manuscript preparation: SM, HS, NK, FB, and SP; Critical revision of the paper: AN and HA; Supervision of the research: AN and HA; Final approval of the version to be published: AN, SM, HS, NK, FB, SP, and HA.

7- CONFLICT OF INTEREST: None.

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