Medical Science

Medical specialty students' perceptions, experiences, and barriers regarding online learning: A cross-sectional study during the covid-19 pandemic

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DISCOVERY
SCIENTIFIC SOCIETY

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ABSTRACT

Objective: To investigate medical specialty students' perceptions, experiences, and barriers regarding online learning as a new direction for education after the novel coronavirus (COVID-19) pandemic in Egypt. *Methods:* This cross-sectional survey distributed a three-domain questionnaire focusing on perceptions, experiences, and barriers to physiotherapy students of the Egyptian Chinese University at the end of the second semester 2020/2021. *Results:* The study involved 413 students, with a mean age of 21.9 ± 1.4 years. The majority (90.1%) had access to a computer, and nearly all had internet access. The mean total scores for student perception and experience were 35.9 ± 9.2 and 45.6 ± 12.5, ranging from 20 to 50 and 26 to 65, respectively. Students' perception and experience scores were affected by several factors, including sex, computer experience, and training for online courses. Students' most significant barrier was network problems (77.2%), followed by a lack of required skills (67.8%), costs (65.6%), lack of technical support (65.4%), and lack of motivation (62.7%). *Conclusion:* This research analyzed real-life experiences and identified how students' new experiences during the pandemic could be enhanced. Sex, computer availability, and training independently impacted students' online learning perception and experience scores. Network problems were the most significant barrier for students.Online learning experiences present challenges and opportunities during the pandemic. Instruction, encouragement, and better internet networks are ways to enhance online learning.

Keywords: Barriers, COVID-19, Online Learning, Perception.

1. INTRODUCTION

The novel coronavirus (COVID-19) pandemic has affected global medical education. Education institutions have had to adopt technological learning by moving from conventional education to online teaching methods (Ahmed et al., 2020). According to the most recent studies from the United Nations Educational, Science and Cultural Organization (UNESCO), more than 120 countries have closed their schools and suspended on-campus physical education classes on the advice and mandate of health authorities, acknowledging the vital role of social separation and programmed lockdowns in limiting the spread of the disease. More than 60% of students at all levels of education have been affected by these closures globally (UNESCO, 2020).

Virtual learning is a novel way of instructing students remotely. The popularity of online learning has exploded globally in recent years. In developing countries, online learning is underutilized due to underdeveloped infrastructure, lack of sufficient technology, and lack of network planning (Cheok et al., 2017; Aljaraideh & Al Bataineh, 2019). Most universities began the transition from conventional on-campus classes to online courses on March 15, 2020. Such substantial changes may have a significant effect on students and faculty members (Sahu, 2020).

High costs and limited technological resources have been critical obstacles to online education in universities (Rodriguez et al., 2008). Furthermore, lack of internet connectivity, networking improvements, software updates, and training skills are all obstacles to online education (Fish & Gill, 2009; Hartmann et al., 2017). While the rapid transition to online distance learning was necessary and vital to ensure learning continuity during the COVID-19 pandemic, it posed several challenges for students and their families (Daniel, 2020; Ferrel & Ryan, 2020). Among the critical challenges faced were the effects on students' mental health, learners' lack of motivation, difficulty adjusting to online distance learning methods, technological and bandwidth problems, and content development of distance online learning materials, especially practical and laboratory-based courses (Sahu, 2020). Additional issues included the economic effects on families as well as the immediate and high demand for training and information technology support (Qandil & Abdel-Halim, 2020).

In Egypt, few studies have focused on university students' perceptions of distance education and their experiences during the exceptional pandemic circumstances (El-Zayat & Fell, 2000; Headar et al., 2013; Megeid, 2014; Hussien et al., 2020). Therefore, it was essential to focus on exploring university students' perceptions of receiving education online, their experiences, and the obstacles they faced in such difficult circumstances.

2. METHODOLOGY

Research design
The study utilized a descriptive cross-sectional survey design.

Setting
This study was conducted at the Faculty of Physiotherapy, Egyptian Chinese University.

Sample
A convenience sample was chosen of 414 students from levels two, three, and four. The survey excluded level one because these students have no prior experience with online learning.

Sample size estimation
According to a previous study by Mostafa et al., (2017), 38% of students have a positive perception toward online learning. Therefore, a minimum sample size of 356 participants was needed to achieve a 95% confidence level and a margin of error of 5%. Fifteen percent was added to the overall sample size to account for potential losses, resulting in a total sample size of 410 participants out of 540 students as a target population. The sample size was estimated using NQuery statistical package, version 7.0, Los Angeles, CA.

Tools
In addition to a sociodemographic data sheet, a questionnaire constructed of three sections was used.
Section I: The Students' Perceptions Questionnaire, adapted from (Sánchez & Hueros, 2010), consists of ten items scored on a 5-point scale (strongly disagree = 1 point, disagree = 2 points, neither agree nor disagree = 3 points, agree = 4 points, strongly agree = 5 points). This section's highest rating is 50, with a minimum score of 10.

Section II: The students' experience tool was adapted from (Goyal &Tambe, 2015), consisting of 13 objects. A 5-point Likert scale was also used. The overall maximum score is 65, with a minimum score of 13.

Section III: This component includes nine questions about technological and personal barriers that students faced.

A pilot study of 30 students was conducted to determine the questionnaire's clarity, time usage, and response rate, and it was then adjusted accordingly. A group of five expert National Cancer Institute staff reviewed the validity of the tool and ensured that their material was correct. Cronbach's tools were used to determine the instrument's reliability, and the alpha test was applied to check the instrument's internal accuracy. Sections I, II, and III had an accuracy of 0.953, 0.966, and 0.933, respectively.

Data collection

From 5th March to 15th March 2021, students were asked to complete an online self-administered questionnaire. Participants were sent individualized emails that included a link to the questionnaire to facilitate the distribution process and increase the efficiency of data collection. All students in levels two, three, and four who could participate were included in the survey.

Ethical consideration

The National Cancer Institute's Institutional Review Board approved the research proposal (approval number: 2103-502-003). The data were collected anonymously after a detailed description of the study, in which the volunteer participants were informed about the objective and benefits of the research. Written consent was obtained from participants. The confidentiality of the information gathered from the participants was ensured. The researchers adhered to all ethical considerations for scientific research of the Declaration of Helsinki (World Medical Association, 2018).

Statistical analysis

The results were analyzed using SPSS version 26 (IBM Corp, 2019). Numbers and percentages were used to represent qualitative data. The mean and standard deviation (SD) or median (range) of numerical variables were used as applicable. The Kolmogorov–Smirnov single-sample test was used to determine the data's normality. Students' perception and experience scores were not normally distributed. The Mann–Whitney U test was used to compare pairs of groups, and the Kruskal–Wallis test was used to compare more than two groups. Continuous data were correlated using Spearman's correlation. The significant variables in the univariate analysis were subjected to linear regression and considered significant if the probability (p-value) was equal to or less than 0.05.

3. RESULTS

The study involved 413 medical specialty students, with an average age of 21.9 ± 1.4 years. Of them, 343 students (83.1%) were in level two, most students (90.1%) had a computer, and almost all students had access to the internet. Approximately three quarters of participants had taken more than six courses through online learning (Table 1).

Table 1 Sociodemographic characteristic of participants (N = 413)

Sociodemographic data	Categories	n	%
Age (mean ± SD)		21.9 ± 1.4 years	
Age group (years)	≤20	140	33.9
	>20	273	66.1
Sex	Male	108	26.2
	Female	305	73.8
Education level	Two	343	83.1
	Three and four	70	16.9
Computer availability	No	41	9.9
	Yes	372	90.1
Internet connection	No	6	1.5
	Yes	407	98.5
Online learning courses	2–3	36	8.7
	4–6	76	18.4

	>6	301	72.9
Training for online courses	No	191	46.2
	Yes	222	53.8

Values are presented as mean ± SD or frequency and percentage (%).

In Table 2, the students' mean perception score was 35.9 ± 9.2, ranging from 20 to 50. Overall, 54% agreed or strongly agreed that they enjoyed online learning, while 26.6% disagreed. A total of 198 (48%) agreed that online learning helped them to learn more efficiently, and 140 (33.8%) disagreed. Nearly half of the students agreed that online learning helped them to improve their academic results and made their learning more effective (46.2% and 47%, respectively). Only 10.7% of students disagreed that online learning was convenient, and the majority agreed that online learning provided easy access to class material and keeping track of the latest developments in the course (78% each) (Table 2).

Table 2 Perception of students toward online learning

Perception questions	N	Strongly disagree		Disagree		Neither agree nor disagree		Agree		Strongly Agree	
		n	%	n	%	n	%	n	%	n	%
Online learning helps me to learn more efficiently	413	0	0	140	33.8	75	18.2	106	25.7	92	22.3
Online learning helps me to improve my academic performance	413	0	0	146	35.4	76	18.4	95	23	96	23.2
Online learning makes my learning more effective	413	0	0	162	39.2	57	13.8	101	24.5	93	22.5
Learning online is fun	413	0	0	139	33.7	60	14.5	110	26.6	104	25.2
Easy access to class material	413	0	0	48	11.6	43	10.4	171	41.4	151	36.6
Online learning gives me control over my learning	413	0	0	106	25.7	67	16.2	133	32.2	107	25.9
Self-assessment be easily completed	413	0	0	145	35.1	68	16.5	100	24.2	100	24.2
Convenience	413	0	0	44	10.7	50	12.1	191	46.2	128	31
Keeping track of the latest developments in the course	413	0	0	34	8.2	57	13.8	202	48.9	120	29.1
Overall, I am satisfied with online learning	413	0	0	110	26.6	80	19.4	118	28.6	105	25.4
Mean ± SD of student's perception scores	35.9 ± 9.2										
Median (range) of student's perception scores	36 (20–50)										

N = sample; n = frequency; SD = standard deviation; % = percent.

The overall experience score was 45.6 ± 12.5, ranging from 26 to 65. Around half of the students (218; 52.8%) agreed that online learning was an effective educational tool. A total of 249 (60.3%) students agreed that online learning helped them to better communicate with the professor, while 112 (27.1%) disagreed, and 52 (12.6%) neither agreed nor disagreed. Of all students, 253 (61.3%) agreed that online learning helped them to get prompt feedback from the professor. Overall, 202 (48.9%) of students agreed that online learning had helped them connect and interact with their classmates, while 145 (35.1%) disagreed, and 66 (16%) neither agreed nor disagreed. More than half of the students (56%) believed that online learning could replace conventional learning (Table 3).

Table 3 Students' experiences of online learning

Experience questions	N	Strongly disagree		Disagree		Neither agree nor disagree		Agree		Strongly Agree	
		n	%	n	%	n	%	n	%	n	%
Online learning helped me to better communicate with the professors	413	0	0	112	27.1	52	12.6	124	30	125	30.3
Online learning helped me to ask more questions	413	0	0	115	27.8	60	14.5	120	29.1	118	28.6
Online learning helped me to get prompt feedback from the professors	413	0	0	91	22	69	16.7	140	33.9	113	27.4
Using the calendar helped in planning the course activities	413	0	0	111	26.9	59	14.3	139	33.6	104	25.2
Online learning helped me to communicate and collaborate with my classmates	413	0	0	145	35.1	66	16	121	29.3	81	19.6
Online learning gives me more chances to show my skills and abilities in my area of study	413	0	0	124	30	82	19.9	121	29.3	86	20.8
Online learning makes it more convenient to do my course activities	413	0	0	114	27.6	73	17.7	132	32	94	22.7
Online learning increases my motivation to learn	413	0	0	134	32.4	68	16.5	123	29.8	88	21.3
Online learning challenges me to give my best	413	0	0	123	29.8	77	18.6	123	29.8	90	21.8
Online learning is useful to keep me updated with the latest developments in the course	413	0	0	118	28.6	89	21.5	109	26.4	97	23.5
Online learning made it possible for me to refer to my notes from earlier semesters	414	0	0	124	30	64	15.5	133	32.2	92	22.3
Online learning can substitute for traditional learning	413	0	0	117	28.3	65	15.7	111	26.9	120	29.1
Based on all the above features, I feel that online learning is an effective educational tool	413	0	0	117	28.3	78	18.9	115	27.8	103	25.0
Mean ± SD	45.6 ± 12.5										
Median (range)	46 (26–65)										

N = sample; n = frequency; SD = standard deviation; % = percent.

The most significant technical and personal barriers that students faced in online learning were network problems (77.2%), followed by lack of required expertise and skills (67.8%), expenses (65.6%), lack of technical support (65.4%), and lack of motivation (62.7%). Approximately half of the students (46.2%) reported a lack of appropriate preparation as a barrier, while around one fifth (21.8%) reported no barriers (Table 4).

Table 4 Technical and personal barriers to online learning (N = 413)

Barriers*	n	%
Network issue	319	77.2
I don't have the necessary skills	280	67.8
Cost	271	65.6
Lack of technical support	270	65.4
I don't enjoy using technology	270	65.4
No motivation	259	62.7
Extra work	239	57.9
Lack of adequate training	191	46.2
No barrier	90	21.8

N = frequency; % = percent.

* Each student may have more than one barrier.

Table 5 shows the difference in the overall perception and experience scores of students based on sociodemographic factors. Men scored significantly higher in both perception and experience of online learning compared to women (p < 0.004 and p < 0.003, respectively). Students who had received training in online learning scored significantly higher in both perception and experience compared to those who did not (p < 0.001). Students who had access to computers scored significantly higher in both perception and experience of online learning compared to those who did not (p < 0.001). Furthermore, students who had internet connections scored significantly higher in both perception and experience compared to those who did not (p < 0.031, and < 0.007 respectively). No significant difference was found in students' perception or experience scores based on other variables (age group, number of courses taken, or education level) (Table 5).

Table 5 Differences in students' perception and experience scores by sociodemographics

Characteristic		Students' perception score	P-value	Students' experience score	P-value
Median (range) of scores		36 (20.0–50.0)		46 (26.0–65.0)	
Age group (years)	≤20	35.0(20.0–50.0)		43.0 (26.0–65.0)	
	>20	37.0 (20.0–50.0)	0.137	47.0 (26.0–65.0)	0.13
Sex	Female	35.0 (20.0–50.0)		44.0 (26.0–65.0)	
	Male	38.5 (28.0–50.0)	0.004**	49.5 (26.0–65.0)	0.003**
Received training	No	30.0 (20.0–50.0)		38.0 (26.0–65.0)	
	Yes	40.0 (20.0–50.0)	<0.001**	52.0 (26.0–65.0)	<0.001**
Computer availability	No	29.0 (20.0–48.0)		36.0 (26.0–59.0)	
	Yes	36.0 (20.0–50.0)	<0.001**	46.0 (26.0–65.0)	<0.001**
Internet connection	No	28.0 (22.0–35.0)		30.5 (26.0–41.0)	
	Yes	36.0 (20.0–50.0)	0.031*	46.0 (26.0–65.0)	0.007**
Number of courses	2–3	32.5 (22.0–50.0)		46.0 (26.0–65.0)	
	4–6	35.0 (20.0–50.0)		43.0 (26.0–65.0)	
	>6	36.0 (20.0–50.0)	0.088	46.0 (26.0–65.0)	0.466
Education level	Two	36.0 (20.0–50.0)		46.0 (26.0–65.0)	
	Three and four	34.5 (20.0–50.0)	0.143	42.5 (26.0–65.0)	0.108

*Significant difference at <0.05; **Significant at <0.01;Values are presented as median (range).

In the multivariate regression analysis, the independent factorsthat influenced students' perception and experience scores were sex, computer availability, and training (p < 0.05) (Table 6).

Table 6 Multivariate regression analysis for factors affecting students' perception and experience scores

Variables	Students' perception score				Student's experience score			
	B	95% confidence interval for B	t	P-value	B	95% confidence interval for B	t	P-value
(Constant)	22	15.4–29.4	6	<0.001**	24	14.8–33.7	5	<0.001**
Sex	2	0.3–3.9	2	0.031*	2.8	0.4–5.2	2	0.03*
Computer availability	4.6	1.9–7.4	3	0.001**	6.4	2.7–10.0	3	0.001**
Training	7.3	5.7–8.9	9	<0.001**	9.8	7.6–11.9	9	<0.001**

*Significant at <0.05; **Significant at <0.01.

A statistically significant strong positive correlation was detected between students' perception toward online learning and their experience (r = 0.924, p < 0.001) (Figure 1).
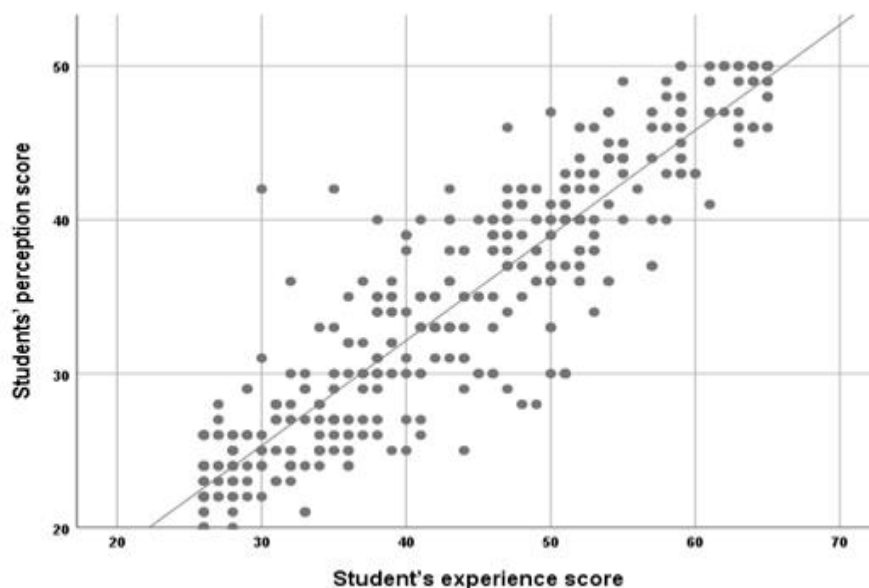

Figure 1 Correlation between students' online learning perception and experience scores

4. DISCUSSION

This cross-sectional survey aimed to investigate students' perceptions, experiences, and barriers regarding online learning. The mean student perception score was 35.9 ± 9.2, with a range of 20 to 50. The mean experience score was 45.6 ± 12.5, ranging from 26 to 65. A statistically significantly strong positive correlation existed between students' perception and experience scores. Sex, computer training, and training for online courses are all factors that influence perception and experience scores. In the present study, 249 students (60.3%) agreed that online learning improved their communication with their professors. Around half of the students (48.9%) believed that online learning helped them connect and interact with their classmates. This agrees with Muthuprasad et al. (2021), who reported that approximately 60% of respondents agreed that online classes were less successful than face-to-face classes in terms of professor contact. However, more students in distance learning reported lower learning satisfaction and more challenging contact with professors or student peers, according to a study by Amir et al. (2020).

In the current study, 253 students (61.3%) agreed that online learning helped them receive timely feedback from their professors. Many studies have reported that one of the main problems of online learning was the delay in direct feedback from teachers (Petrides, 2002; Ku & Lohr, 2003; Vonderwell, 2003; Ali et al., 2004; Kim et al., 2005; Sun et al., 2008). In this research, 198 students (47.9%) agreed that online learning helped them learn more efficiently, while 140 (33.9%) disagreed. Just 44 students (10.7%) disagreed that online learning was a convenient and easy process, while 319 (77.2%) agreed. According to Mostafa et al., (2017), slightly more than half of the students reported that Moodle for online learning was simple to use (57%), while 43.9% did not find

Moodle highly convenient for course activities. The internet was the most crucial obstacle to online learning for students (77.2%), followed by lack of required expertise (67.8%), expenses (65.6%), lack of technical support (65.4%), and lack of motivation to use online learning systems (62.7%). A lack of appropriate preparation and training was cited as a barrier by nearly half of the students (46.2%), and only around one fifth of students (21.8%) reported no barriers. In a study by Goyal & Tambe (2015), nearly 50% reported that they faced no barriers at all; 25% faced problems related to network and bandwidth, 8% reported that they did not have the required technical support, and 5% reported they did not like the technology.

In the current study, men's perception and experience scores were significantly higher than women's. These findings disagree with Muilenburg & Berge (2005), who reported no significant difference in the perceived perception level between men and women, at 33.3 ± 7.3 and 32.3 ± 7.1, respectively (p = 0.201). Furthermore, female students have shown more positive perceptions of online learning compared to male students (González-Gómez et al., 2012; Amro et al., 2015). Factors associated with higher perception and experience scores for online learning included receiving training about online learning and owning a computer with access to the internet. This is mostly related to the convenience of online learning to students who have received training on such technology and have their own computer and internet connection for it, compared to others who lack such equipment and preparation.

5. CONCLUSION

This research analyzed real-life experience and identified how students' new learning experiences during the pandemic could be enhanced. Sex, device availability, and preparation were all variables with an independent impact on students' perception and experience scores. Network problems were the most significant barrier for students, followed by a lack of required skills, costs, technical support, and motivation.

Recommendations

Online learning experiences present challenges and opportunities during the pandemic. Instruction, encouragement, and better internet networks are all ways to enhance online learning. Student induction courses for distance learning form one of the most important basic points for the success of the educational process, along with the proper introduction of this technology to remove the fear of the unknown and allow students to explore new methods in the learning process, especially since online learning is considered a new and strange method in Arab societies.

Limitations

The use of cross-sectional research design, nonrandom sampling technique, limited sample size, and the inclusion of one department from one university are among the main threats and limitations of the current study.

Ethical approval

The study proposal was approved by the Institutional Review Board of the National Cancer Institute (ethical approval number: 2103-502-003).

Authors' contributions

SAA managed the correspondence for the study, conceived and designed the study, and performed the statistical analyses. DNE collected the data, drafted the paper, and reviewed the manuscript. MAS performed final editing and submission of the manuscript for publishing. All authors provided input to the manuscript and approved the final version.

Conflict of interest

The authors have no conflict of interest to declare.

Data and materials availability

All data associated with this study are present in the paper.

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