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CLINICAL & BASIC RESEARCH

# Bridging the Gap in Online Learning Anxiety Among Different Generations in Health Professions Education

*Wiam Elshami,[1] Coumaravelou Saravanan,[2] Mohamed H. Taha,[2,3] Mohamed E. Abdalla,[4] Mohamed Abuzaid,[1] Sausan Al Kawas[5]

**abstract:** ***Objectives:*** This study aimed to examine the effects of an individual's generation group on anxiety related to online learning among students and online learning and teaching activities among faculty. ***Methods:*** This cross-sectional study was conducted at the University of Sharjah, Sharjah, United Arab Emirates, in April 2020 using the Online Course Anxiety Scale. The questionnaires were sent to 370 undergraduate students and 81 faculty members via email and the responses were stratified by generation. Descriptive statistics and an independent sample t-test was used to compare the mean scores of online learning anxiety with gender and previous experience among faculty and students. ***Results:*** A total of 358 students and 70 faculty members completed the questionnaire (response rate: 96.8% and 86.4%, respectively). Only 5.7% of the faculty (compared to 54.7% of the students) enjoyed browsing internet resources during online learning. Among the faculty, 75.7% experienced anxiety during online teaching compared to 37.7% of students. Of the faculty, 92.3% of baby boomers felt anxious compared to 70.5% and 76.9% of X and Y generations, respectively. ***Conclusion:*** While students of Generations Z and Y enjoyed browsing the internet during online learning, the Generation Z students were anxious during online discussions and concerned about the misinterpretation of their written communication. Anxiety among faculty members was related to confusion regarding the use of the internet and computers and misinterpretations of text-based messages.

***Keywords:*** Anxiety; Online Learning; Generations; Work Engagement; Medical Education; United Arab Emirates.

**Advances in Knowledge**

- *It was found that students and faculty members from various generations differ in terms of their interaction, learning and teaching skills.*
- *The overall findings of this study indicated that faculty members were more anxious about online learning compared to students.*
- *Students enjoyed online learning, but Generation Z students were more anxious about online discussions and worried about written communication.*

**Applications to Patient Care**

- *This study highlighted the anxiety related to online learning and related concerns of students and faculty. Anxiety of this sort would affect the quality of the learning experience and the overall satisfaction of students and faculty.*
- *Faculty and institutions could utilise the results from such studies to collaborate and create a supportive working environment in order to reduce stress, encourage faculty members to master innovative online teaching methods and enrich existing healthcare with better-formed healthcare professionals.*

Online learning, e-learning and blended (or hybrid) learning are terms that are all related to the use of technologies in learning and teaching. Types of online learning can range from a supplementary tool to a fully online degree programme that offers enriched instructional features.[1] Online learning is beneficial for students and instructors as it provides multiple advantages such as flexibility, convenience and reduced educational costs.[2,3] Moreover, it maximises the use of learning resources and supports active learning.[4] Use of technology in education improves engagement in online learning and it is important to stimulate students' interest to achieve the learning outcomes.[5] Engaging in online learning has also been shown to lead to cognitive development and high levels of success.[6] Despite these advantages, students and faculty face challenges while using technology in online learning. Challenges associated with the use of technology in online learning can lead to anxiety and negatively influence student performance.[5] The ability to use technology is influenced by age and different generational groups have various capabilities.[7] The current students of the medical and health sciences belong to generations that socially interact using technology to ensure connectedness.[8] To optimise the efficacy of learning and facilitate online learning, it is important to understand each generation's way of learning and teaching.[8,9] Moreover, educators need to update their teaching methods, curriculum design

[1]*Department of Medical Diagnostic Imaging, College of Health Sciences, University of Sharjah, Sharjah, United Arab Emirates;* [2]*College of Medicine and* [3]*Medical Education Center, University of Sharjah, Sharjah, United Arab Emirates;* [4]*School of Medicine, University of Limerick, Ireland;* [5]*Oral and Craniofacial Health Department, College of Dental Medicine, University of Sharjah, Sharjah, United Arab Emirates*

**Corresponding Author's e-mail: welshami@sharjah.ac.ae*

and assessments to achieve the best from teachers and students.[8]

A generation comprises a group of people born in the same period. Although there is no exact formula to calculate the span of each generation, ranges of 15 to 18 years with differences of three to four years between different sources were noted in the literature.[8,9] In general, there are four main generations in the field of education: baby boomers (born between 1946 and 1964);[10] Generation X (born between 1965 and 1980); Generation Y or millennials (born between 1981 and 1996); and Generation Z or centennials (born after 1997).[8,11]

Baby boomers were taught using traditional educational methods because technological development was still in its early stages.[12] Baby boomers tend to be competitive, self-disciplined and idealistic; this has significantly impacted how they learn and consequently influenced their teaching methods.[9,13] Generation X individuals are more experienced with technology than baby boomers. They tend to be resourceful, problem-solvers and reality-driven individuals who value freedom and work-life balance.[9,14] Generation Y individuals (millennials) are viewed as confident, team-oriented and open-minded students compared with previous generations. Despite their optimistic personalities, they have relatively short attention spans and demonstrate the need for instant feedback.[15] Generation Z individuals are referred to as multimodal learners because they have independent learning skills, which allow them to succeed with digital resources.[16,17]

The average age of current students is at the border between the millennials and Generation Z, while the average age faculty members falls in the baby boomer and Generation X groups.[18,19]

Different generations have different beliefs, priorities and motivations, resulting in a variation in their interaction, learning and teaching skills.[20] Therefore, the differences in teaching and learning styles between these two groups (faculty and students) must be considered in the medical education arena. Students of the Y and Z generations have different experiences and traditional teaching approaches have proven to be ineffective and unexciting to them.[21,22] Instructors in the Generation X and baby boomer age groups are less immersed in technology.[23] Current students have a profound understanding of technology and social connectedness. They communicate, learn and interact very differently compared to their instructors.[9]

Instructors are being challenged to update their instruction methods to suit new generations of students in order to maintain high-quality education delivery.[9,24] Additionally, the advancement in medical knowledge that has taken place during the last 50 years has exceeded the knowledge attained in the previous 500 years.[9,23] A change in teaching methods is important to accommodate the vast amount of information and deliver it in a student-centred way rather than in a way that reflects a passive learning style.[23] Thus, the use of technology in online learning is the key to promoting Generation Y and Generation Z students' engagement in learning.[17]

Nevertheless, internet self-efficacy and abilities to use the internet successfully as a learning tool and knowledge-sharing medium vary among students.[25] Internet self-efficacy has a constructive impact on students' motivation to perform new online learning tasks.[26] Negative emotions and beliefs are significant barriers to the success of online students.[27] Consequently, online teaching and learning most likely leads to anxiety among both faculty and students.[28] Therefore, attention must be given to anxiety and burnout, as self-efficacy and confidence to tackle online anxiety would enhance overall online satisfaction for students and faculty.[9,29]

Online anxiety is defined as apprehension to gain knowledge due to the use of the internet.[25] The main concerns with online anxiety are the human aspects of internet use, connectivity and exchange of knowledge and not the physical use of devices.[25] Therefore, it is important to assess anxiety during online learning to initiate active support and improve future learning experiences. The current study aimed to examine the effects of the generation group that individuals belonged to on anxiety concerning online learning among students and online learning and teaching activities among faculty.

## Methods

A cross-sectional study was conducted at the Medical and Health Sciences Colleges (Medicine, Pharmacy, Dental and Health Sciences), University of Sharjah, Sharjah, United Arab Emirates. An online questionnaire was e-mailed to 370 undergraduate students and 81 faculty members involved in online learning for theoretical courses in spring 2020 to invite them participate in the study. The sample size was calculated using the formula of a finite population. The calculation indicated that the study needed a minimum of 358 students and 81 faculty members and convenience sampling was used. The online questionnaire included a study information sheet. All data were coded to ensure anonymity.

The study used a validated questionnaire (Cronbach's $\alpha = 0.93$) along with the Online Course Anxiety Scale.[5] The questionnaire consisted of two

parts: (1) sociodemographic information and (2) an anxiety scale to measure anxiety towards online courses. The anxiety scale consisted of 18 items related to nervousness, anxiety, relaxation, apprehension, excitement, enjoyment, fear, confusion, confidence and empowerment. Scoring was done on a five-point Likert scale ranging from 1 = strongly disagree to 5 = strongly agree. The questionnaire was pilot-tested online and some items were modified slightly.

Statistical analysis was done using Statistical Package for the Social Sciences (SPSS), Version 23 (IBM Corp., Armonk, New York, USA). Descriptive statistics were used to identify the mean, standard deviation and percentage of responses to online learning anxiety after seven positive items on the anxiety scale were re-coded. Participants were categorised according to their generations: baby boomers (>55 years old), Generation X (39–55 years old), Generation Y (21–38 years old) and Generation Z (≤20 years old). An independent sample t-test was used to compare the mean scores of online learning anxiety with gender and previous experience among faculty and students. The significance level was fixed at $P$ <0.05.

The study was granted ethical approval from the Research Ethical Committee of the university (REC-20-04-26-01). Participants were informed that participation in the study was voluntary and that they could withdraw from the study at any time without any consequences. Consent was obtained online from all participants and they were provided with contact information in case they wanted to clarify any doubts or ask questions.

## Results

A total of 358 students (response rate: 96.8%) and 70 faculty members (response rate: 86.4%) completed the online questionnaire. A total of 93.6% (n = 335) of the students were female and 6.4% (n = 23) were male. The average age of students was 21.08 years. Of the students, 231 (64.5%) belonged to Generation Y. A majority of the students (n = 257, 71.8%) had no previous experience with online learning. An average of four online courses were attended by students during the COVID-19 pandemic compared with one course before the pandemic. Of the faculty members, 52.9% (n = 37) were male and 47.1% (n = 33) were female. The average age of the faculty members was 46.17 years. Most of the faculty (n = 44, 62.9%) belonged to Generation X, while only 18.6% (n = 13) belonged to the baby boomer generation. A majority of the faculty (n = 58, 82.9%) had no previous experience with online teaching [Table 1].

In their responses to the Online Course Anxiety Scale, a large proportion of the faculty reported confusion when working with the internet during online teaching (80.0%), whereas only 25.4% of the students were confused. Similarly, 75.7% of faculty members reported anxiousness compared with 37.7% of students. Nevertheless, 54.7% of the students enjoyed browsing online teaching and learning resources compared to 5.7% of faculty members. Likewise, 52.5% of students reported feeling relaxed when working with computers during online learning compared with 14.3% of faculty [Table 2].

With regard to the evaluation based on generations of the students and faculty, the present study revealed that 40.9% of the Generation Z students felt anxious during online learning compared with 35.9% of Generation Y students [Table 3]. While 76.9% of Generation Y faculty felt anxious during online

Table 1: Characteristics of participating students and faculty members from the University of Sharjah, Sharjah, United Arab Emirates

| Characteristic | n (%) |
|---|---|
| **Student (n = 358)** | |
| **Gender** | |
| Male | 23 (6.4) |
| Female | 335 (93.6) |
| **Generation** | |
| Z | 127 (35.5) |
| Y | 231 (64.5) |
| **Previous experience with online learning** | |
| Yes | 101 (28.2) |
| No | 257 (71.8) |
| **Year of study** | |
| 1 | 52 (14.5) |
| 2 | 55 (15.4) |
| 3 | 75 (21.0) |
| 4 | 127 (35.6) |
| 5 | 49 (13.7) |
| **Faculty (n = 70)** | |
| **Gender** | |
| Male | 37 (52.9) |
| Female | 33 (47.1) |
| **Generation** | |
| Y | 13 (18.6) |
| X | 44 (62.9) |
| BB | 13 (18.6) |
| **Previous experience with online teaching** | |
| Yes | 12 (17.1) |
| No | 58 (82.9) |

*Z = generation Z (≤20 years old); Y = generation Y (21–38 years old); X = generation X (39–55 years old); BB = baby boomer (>55 years old).*

**Table 2:** Responses of students and faculty members from the University of Sharjah to items on the Online Course Anxiety Scale[2]

| Item | | Percentage | | | M ± SD |
|---|---|---|---|---|---|
| | | Disagree | Neutral | Agree | |
| I am insecure about my computer skills. | Student | 42.7% | 26.3% | 31.0% | 2.8 ± 1.3 |
| | Faculty | 68.6 | 24.3 | 7.1 | 2.1 ± 0.9 |
| I am anxious when I work on computers during online learning. | Student | 41.1 | 21.2 | 37.7 | 2.9 ± 1.4 |
| | Faculty | 2.9 | 21.4 | 75.7 | 4.1 ± 0.8 |
| I am quite relaxed when I work with computers during online learning. | Student | 22.9 | 24.6 | 52.5 | 3.4 ± 1.2 |
| | Faculty | 47.1 | 38.6 | 14.3 | 2.5 ± 1.0 |
| I am apprehensive about working on computers. | Student | 19.8 | 40.5 | 39.7 | 3.2 ± 1.0 |
| | Faculty | 81.4 | 11.4 | 7.1 | 1.9 ± 1.0 |
| I avoid working on computers. | Student | 52.8 | 18.4 | 28.8 | 2.6 ± 1.2 |
| | Faculty | 27.1 | 31.4 | 41.4 | 3.2 ± 1.2 |
| I am less intimidated by computers than most other people I know. | Student | 24.0 | 38.8 | 37.2 | 3.2 ± 1.1 |
| | Faculty | 12.9 | 10.0 | 77.1 | 4.0 ± 1.2 |
| I feel confident about navigating internet resources for teaching and learning. | Student | 13.1 | 28.5 | 58.4 | 3.6 ± 1.0 |
| | Faculty | 64.3 | 24.3 | 11.4 | 2.2 ± 1.2 |
| I get anxious when I am required to use internet resources. | Student | 46.1 | 30.4 | 23.5 | 2.7 ± 1.2 |
| | Faculty | 60.0 | 24.3 | 15.7 | 2.2 ± 1.2 |
| I get nervous about getting lost in cyberspace. | Student | 37.7 | 27.4 | 34.9 | 2.9 ± 1.3 |
| | Faculty | 4.3 | 31.4 | 64.3 | 3.8 ± 1.0 |
| I get excited about using the internet for online learning. | Student | 15.6 | 48.6 | 35.8 | 3.3 ± 1.0 |
| | Faculty | 2.9 | 24.3 | 72.9 | 4.0 ± 0.9 |
| I enjoy browsing internet resources for teaching and learning. | Student | 8.7 | 36.6 | 54.7 | 3.6 ± 1.0 |
| | Faculty | 70.0 | 24.3 | 5.7 | 2.1 ± 0.9 |
| I get confused when working with the internet for online learning. | Student | 46.6 | 27.9 | 25.4 | 2.7 ± 1.1 |
| | Faculty | 5.7 | 14.3 | 80.0 | 4.1 ± 0.9 |
| I feel confident about navigating internet resources for teaching and learning. | Student | 27.7 | 29.1 | 43.3 | 3.2 ± 1.2 |
| | Faculty | 71.4 | 15.7 | 12.9 | 2.1 ± 1.1 |
| I get anxious when I think about logging into my online course. | Student | 44.1 | 25.4 | 30.4 | 2.8 ± 1.2 |
| | Faculty | 70.0 | 18.6 | 11.4 | 2.1 ± 1.1 |
| I get nervous when I am required to participate in online discussions. | Student | 30.2 | 28.2 | 41.6 | 3.2 ± 1.3 |
| | Faculty | 51.4 | 34.3 | 14.3 | 2.4 ± 1.1 |
| I am apprehensive about enrolling in other online courses. | Student | 18.4 | 53.4 | 28.2 | 3.1 ± 0.9 |
| | Faculty | 57.1 | 18.6 | 24.3 | 2.6 ± 1.2 |
| I am scared that someone will misinterpret my text-based messages in the online environment. | Student | 23.2 | 30.2 | 46.6 | 3.3 ± 1.1 |
| | Faculty | 2.9 | 30.0 | 67.1 | 3.9 ± 0.8 |

learning, 70.5% of Generation X and 92.3% of baby boomers felt anxious [Table 4].

A total of 48% of the Generation Z students became nervous during online discussions compared with 38.1% of Generation Y students [Table 3]. While 15.4% of Generation Y faculty became nervous when required to participate in online discussions, 15.9% of Generation X faculty and 7.7% of the baby boomers became nervous [Table 4]. A total of 59% of the Generation Z students were concerned about the misinterpretation of text-based messages in the online environment compared with 39.8% of the Generation Y students [Table 3]. While 61.5% of Generation Y faculty were concerned about the aforementioned misinterpretation, 61.4% of Generation X faculty and 92.3% of the baby boomers shared a similar concern [Table 4].

A total of 67.7% of the Generation Z students felt confident about navigating internet resources for teaching and learning compared to 53.2% of the Generation Y students [Table 3]. While 15.4% of the Generation Y faculty felt confident about navigating internet resources for teaching and learning, 13.6% of the Generation X faculty and none of the baby

Table 3: Generation-based differences in the responses of students from the University of Sharjah to items on the Online Course Anxiety Scale[2]

| Item | Generation | Percentage | | | Mean ± SD |
|---|---|---|---|---|---|
| | | Disagree | Neutral | Agree | |
| I am insecure about my computer skills. | Z | 40.9 | 25.2 | 33.9 | 2.8 ± 1.3 |
| | Y | 43.7 | 26.8 | 29.4 | 2.7 ± 1.3 |
| I am anxious when I work on computers during online learning. | Z | 40.2 | 18.9 | 40.9 | 3.0 ± 1.4 |
| | Y | 41.6 | 22.5 | 35.9 | 2.9 ± 1.3 |
| I am quite relaxed when I work with computers during online learning. | Z | 22.8 | 26.0 | 51.2 | 3.4 ± 1.2 |
| | Y | 22.9 | 23.8 | 53.2 | 3.4 ± 1.2 |
| I am apprehensive about working on computers. | Z | 22.0 | 44.9 | 33.1 | 3.2 ± 1.0 |
| | Y | 18.6 | 38.1 | 43.3 | 3.2 ± 1.0 |
| I avoid working on computers. | Z | 46.5 | 21.3 | 32.3 | 2.8 ± 1.2 |
| | Y | 56.3 | 16.9 | 26.8 | 2.5 ± 1.2 |
| I am less intimidated by computers than most other people I know. | Z | 22.8 | 44.1 | 33.1 | 3.1 ± 1.0 |
| | Y | 24.7 | 35.9 | 39.4 | 3.2 ± 1.1 |
| I feel confident about navigating internet resources for teaching and learning. | Z | 6.3 | 26.0 | 67.7 | 3.8 ± 0.9 |
| | Y | 16.9 | 29.9 | 53.2 | 3.5 ± 1.1 |
| I get anxious when I am required to use internet resources. | Z | 47.2 | 29.1 | 23.6 | 2.7 ± 1.1 |
| | Y | 45.5 | 31.2 | 23.4 | 2.7 ± 1.2 |
| I get nervous about getting lost in cyberspace. | Z | 41.7 | 27.6 | 30.7 | 2.9 ± 1.3 |
| | Y | 35.5 | 27.3 | 37.2 | 3.0 ± 1.3 |
| I get excited about using the internet for online learning. | Z | 11.8 | 50.4 | 37.8 | 3.3 ± 0.9 |
| | Y | 17.7 | 47.6 | 34.6 | 3.3 ± 1.0 |
| I enjoy browsing internet resources for teaching and learning. | Z | 7.9 | 33.1 | 59.1 | 3.7 ± 1.0 |
| | Y | 9.1 | 38.5 | 52.4 | 3.6 ± 0.9 |
| I get confused when working with the internet for online learning. | Z | 42.5 | 31.5 | 26.0 | 2.8 ± 1.1 |
| | Y | 48.9 | 26.0 | 25.1 | 2.6 ± 1.2 |
| I am confident about working in the online environment. | Z | 26.8 | 32.3 | 40.9 | 3.2 ± 1.2 |
| | Y | 28.1 | 27.3 | 44.6 | 3.2 ± 1.2 |
| I get anxious when I think about logging into my online course. | Z | 38.6 | 25.2 | 36.2 | 3.1 ± 1.3 |
| | Y | 47.2 | 25.5 | 27.3 | 2.7 ± 1.2 |
| I get nervous when I am required to participate in online discussions. | Z | 22.8 | 29.1 | 48.0 | 3.4 ± 1.2 |
| | Y | 34.2 | 27.7 | 38.1 | 3.0 ± 1.3 |
| I am apprehensive about enrolling in other online courses. | Z | 17.3 | 52.0 | 30.7 | 3.2 ± 0.9 |
| | Y | 19.0 | 54.1 | 26.8 | 3.1 ± 0.9 |
| I am scared that someone will misinterpret my text-based messages in the online environment. | Z | 11.8 | 29.1 | 59.1 | 3.6 ± 0.9 |
| | Y | 29.4 | 30.7 | 39.8 | 3.1 ± 1.2 |
| I feel empowered in my online course. | Z | 37.0 | 40.9 | 22.0 | 2.8 ± 1.0 |
| | Y | 19.9 | 45.9 | 34.2 | 3.2 ± 1.0 |

*SD = standard deviation; Z = generation Z (≤20 years old); Y = generation Y (21–38 years old).*

boomers felt confident about navigating the internet [Table 4].

Regarding enjoyment derived from browsing internet resources for teaching and learning, 59.1% of the Generation Z students enjoyed browsing the internet compared with 52.4% of the Generation Y students [Table 3]. In comparison, 15.4% of the Generation Y faculty, 4.5% of the Generation X faculty and none of the baby boomers enjoyed browsing the internet [Table 4].

The overall score on the anxiety scale across both groups ranged from 18–90 based on 18 items ranging from 1 (strongly disagree) to 5 (strongly agree). The students' scores on the anxiety scale ranged from 18–87 (56.8 ± 8.3) and 36–83 (54.9 ± 7.8) for the Z and Y generations, respectively. Faculty scores on the anxiety scale ranged from 45–69 (54.0 ± 7.4), 34–90 (53.2 ± 8.8) and 41–86 (63.3 ± 7.3) for the Y, X and baby boomer generations, respectively [Table 5].

**Table 4:** Generation-based differences in the responses of 70 faculty members from the University of Sharjah to items on the Online Course Anxiety Scale[2]

| Item | Gen | Percentage | | | Mean ± SD |
|---|---|---|---|---|---|
| | | Disagree | Neutral | Agree | |
| I am insecure about my computer skills. | Y | 61.5 | 23.1 | 15.4 | 2.1 ± 1.2 |
| | X | 75.0 | 18.2 | 6.8 | 2.0 ± 0.9 |
| | BB | 53.8 | 46.2 | 0.0 | 2.4 ± 0.7 |
| I am anxious when I work on computers during online learning. | Y | 0.0 | 23.1 | 76.9 | 3.2 ± 0.8 |
| | X | 4.5 | 25.0 | 70.5 | 4.0 ± 0.9 |
| | BB | 0.0 | 7.7 | 92.3 | 4.3 ± 0.6 |
| I am quite relaxed when I work with computers during online learning. | Y | 30.8% | 53.8% | 15.4% | 2.5 ± 1.1 |
| | Y | 30.8 | 53.8 | 15.4 | 2.5 ± 1.1 |
| | X | 52.3 | 31.8 | 15.9 | 2.5 ± 1.1 |
| I am apprehensive about working on computers. | BB | 46.2 | 46.2 | 7.7 | 2.5 ± 0.9 |
| | Y | 76.9 | 23.1 | 0.0 | 1.8 ± 0.8 |
| | X | 84.1 | 4.5 | 11.4 | 2.0 ± 1.1 |
| I avoid working on computers. | BB | 76.9 | 23.1 | 0.0 | 1.9 ± 0.8 |
| | Y | 30.8 | 23.1 | 46.2 | 3.2 ± 1.3 |
| | X | 25.0 | 29.5 | 45.5 | 3.3 ± 1.2 |
| I am less intimidated by computers than most other people I know. | BB | 30.8 | 46.2 | 23.1 | 3.0 ± 1.2 |
| | Y | 0.0 | 23.1 | 76.9 | 4.2 ± 0.8 |
| | X | 13.6 | 2.3 | 84.1 | 4.1 ± 1.2 |
| I feel confident about navigating internet resources for teaching and learning. | BB | 23.1 | 23.1 | 53.8 | 3.7 ± 1.3 |
| | Y | 61.5 | 23.1 | 15.4 | 2.1 ± 1.2 |
| | X | 61.4 | 25.0 | 13.6 | 2.3 ± 1.3 |
| I get anxious when I am required to use internet resources. | BB | 76.9 | 23.1 | 0.0 | 2.0 ± 0.7 |
| | Y | 46.2 | 23.1 | 30.8 | 2.5 ± 1.6 |
| | X | 61.4 | 22.7 | 15.9 | 2.2 ± 1.2 |
| I get nervous about getting lost in cyberspace. | BB | 69.2 | 30.8 | 0.0 | 2.1 ± 0.8 |
| | Y | 0.0 | 23.1 | 76.9 | 4.1 ± 0.8 |
| | X | 4.5 | 34.1 | 61.4 | 3.9 ± 1.0 |
| I get excited about using the internet for online learning. | BB | 7.7 | 30.8 | 61.5 | 3.5 ± 0.9 |
| | Y | 0.0 | 23.1 | 76.9 | 4.2 ± 0.8 |
| | X | 4.5 | 22.7 | 72.7 | 4.0 ± 1.0 |
| I enjoy browsing the internet resources for teaching and learning. | BB | 0.0 | 30.8 | 69.2 | 3.8 ± 0.7 |
| | Y | 46.2 | 38.5 | 15.4 | 2.4 ± 1.1 |
| | X | 77.3 | 18.2 | 4.5 | 2.0 ± 0.9 |
| I get confused when working with the internet for online learning. | BB | 69.2 | 30.8 | 0.0 | 2.1 ± 0.8 |
| | Y | 0.0 | 23.1 | 76.9 | 4.1 ± 0.8 |
| | X | 9.1 | 11.4 | 79.5 | 4.0 ± 1.0 |
| I am confident about working in the online environment. | BB | 0.0 | 15.4 | 84.6 | 4.2 ± 0.7 |
| | Y | 61.5 | 23.1 | 15.4 | 2.1 ± 1.2 |
| | X | 75.0 | 9.1 | 15.9 | 2.1 ± 1.1 |
| I get anxious when I think about logging into my online course. | BB | 69.2 | 30.8 | 0.0 | 2.1 ± 0.8 |
| | Y | 61.5 | 23.1 | 15.4 | 2.1 ± 1.2 |
| | X | 72.7 | 13.6 | 13.6 | 2.1 ± 1.2 |
| I get nervous when I am required to participate in online discussions. | BB | 69.2 | 30.8 | 0.0 | 2.1 ± 0.8 |
| | Y | 61.5 | 23.1 | 15.4 | 2.1 ± 1.2 |
| | X | 50.0 | 34.1 | 15.9 | 2.5 ± 1.1 |
| I am apprehensive about enrolling in other online courses. | BB | 46.2 | 46.2 | 7.7 | 2.4 ± 1.0 |
| | Y | 46.2 | 23.1 | 30.8 | 2.5 ± 1.3 |
| | X | 56.8 | 15.9 | 27.3 | 2.7 ± 1.3 |
| I am scared that someone will misinterpret my text-based messages in the online environment. | BB | 69.2 | 23.1 | 7.7 | 2.2 ± 0.9 |
| | Y | 0.0 | 38.5 | 61.5 | 3.9 ± 0.9 |
| | X | 4.5 | 34.1 | 61.4 | 3.7 ± 0.8 |
| I feel empowered in my online course. | BB | 0.0 | 7.7 | 92.3 | 4.3 ± 0.6 |
| | Y | 0.0 | 38.5 | 61.5 | 3.9 ± 0.9 |
| | X | 4.5 | 34.1 | 61.4 | 3.7 ± 0.8 |
| | BB | 0.0 | 7.7 | 92.3 | 4.3 ± 0.6 |

*Gen = generation; SD = standard deviation; Y = generation Y (21–38 years old); X = generation X (39–55 years old); BB = baby boomer (>55 years old).*

The Mann–Whitney U test showed there was no significant difference between male (n = 23) and female (n = 335) students in terms of anxiety (U = 3,460; $P$ = 0.413), but the t-test showed that there was a significant difference between male (n = 37) and female (n = 33) faculty in terms of online anxiety (t [2,588]; $P$ = 0.012). There was a significant difference between students with prior (n = 101) and no prior (n = 257) online experience in terms of online anxiety (U = 10,193; $P$ =0.002) but no significant differences among faculty (t [−1.180]; $P$ = 0.256). There was also a significant difference between faculty (n = 70) and students (n = 358) in terms of anxiety (U = 10,044; $P$ = 0.009) [Table 6].

## Discussion

The results showed that 80.0% of the faculty and 25.4% of students were confused when working with the internet during online teaching/learning. Only 5.7% of faculty, compared with 54.7% of students, enjoyed browsing internet resources for teaching and learning. It is worth mentioning that in the current study, most of the faculty belonged to Generation X, while students represented both the generation Y and Z. These findings were supported by previous studies that revealed that the use of technology is dominated by the Y and Z generations.[14] Technology does not replace good teachers but enhances the teaching

**Table 5:** Overall score of students and faculty members from the University of Sharjah on the Online Course Anxiety Scale[2]

| Generation | Mean ± SD | Maximum | Minimum |
|---|---|---|---|
| **Student** | | | |
| Z | 56.8 ± 8.3 | 87 | 18 |
| Y | 54.9 ± 7.8 | 83 | 36 |
| **Faculty** | | | |
| Y | 54.0 ± 7.4 | 69 | 45 |
| X | 53.2 ± 8.8 | 90 | 34 |
| BB | 63.3 ± 7.3 | 86 | 41 |

*SD = standard deviations; Max = maximum; Min = minimum; Z = generation Z (≤20 years old); Y = generation Y (21–38 years old); X = generation X (39–55 years old); BB = baby boomer (>55 years old).*

Table 6: Differences in anxiety levels based on gender and prior online experience of students and faculty members from the University of Sharjah obtained using the Online Course Anxiety Scale[2]

| Variable | Student | | | Faculty | |
|---|---|---|---|---|---|
| | Mean rank | SOR | *P* value | Mean ± SD | *P* value |
| **Gender** | | | 0.413 | | 0.012 |
| Male | 162.43 | 3,736.00 | | 50.94 ± 6.75 | |
| Female | 180.67 | 60,525.00 | | 55.90 ± 8.98 | |
| **Prior online learning/teaching experience** | | | 0.002 | | 0.256 |
| Yes | 207.08 | 20,915.00 | | 50.6 ± 8.8 | |
| No | 168.66 | 43,346.00 | | 53.8 ± 8.0 | |
| **Total anxiety score** | 221.44 | 79,277.00 | 0.009 | 178.99 ± 12,529.00 | 0.009 |

*SOR = sum of ranks; SD = standard deviation.*

process and the incorporation of techno-pedagogical skills is the key factor in promoting students' engagement with online learning.[5,30,31] Therefore, it is important to explore the strategies of updating the technological skills of faculty members to facilitate the learning process.[32]

In the current study, 75.7% of the faculty and 37.7% of students experienced anxiety during online teaching. It was found that 92.3%, 70.5% and 76.9% of the faculty members from the baby boomer, X and Y generations, respectively, felt anxious. This finding was in agreement with the literature documenting that baby boomers are less competent with technology than generation Y and X.[33] Modern learners are more anxious in any new learning situation;[34] this explains the findings of the current study, as most of the students did not have previous experience with online learning.[33] Student advising and academic counselling are required to reduce students' anxiety because it acts as a barrier to an efficient learning experience.[25] In 2017, Alanazy found that the use of computer applications can cause anxiety among untrained faculty.[34] It has also been reported that internet anxiety decreases the use of online learning, which lessens the chances of gaining knowledge and reduces the benefit of the learning experiences.[25,35] Therefore, it is important to provide educational support to minimise online course anxiety for both students and faculty.

The results from the present study revealed that 59.1% of the Generation Z students enjoyed browsing online resources compared with 52.4% of the Generation Y students. Furthermore, 15.4% of the Generation Y faculty enjoyed browsing internet resources for teaching and learning compared with 4.5% of the Generation X faculty and none of the baby boomers. A growing body of literature has reported that Generation X is more competent with technology than baby boomers, while Y and Z are the technology generations.[8,23] Nevertheless, Generation Z is the best in using digital resources and does not seem to be overwhelmed with the information overload on the internet.[23]

Traditional teaching approaches have proven to be ineffective and unexciting to generation Y and Z students.[36] Therefore, to maintain the delivery of high-quality healthcare in the country for future generations, educators need to customise instructional methods to fulfil the needs of newer generations of learners.[37,38] Teaching generation Y and Z students provides opportunities to try new approaches and interact with learners in interesting and dynamic ways.[30] Online medical education became an inevitable reality as the COVID-19 pandemic began to restructure medical and health professionals' education and lead to the development of online forms of active learning methods. Medical educators were challenged to draft strategies to engage students in online learning and translate knowledge into practice.[38,30] Therefore, it is important to improve the current teaching methods used in the medical field to train a high-quality health care provider.[30]

The present study revealed that Generation Z (48.0%) and Generation Y (38.1%) students became nervous during online discussions. This finding supported previous research that reported Generation Z students' lack of critical thinking skills,[17] which are important for discussion forums.[39] Adding assignments that help in the development and improvement of critical thinking and problem-solving skills is crucial for these generations.[40,41]

The findings revealed that almost half of the students and two-thirds of the faculty were scared of misinterpretations of text-based messages in the online environment. Faculty student communication helps create an online community for sharing ideas and engaging in learning.[24] It is obvious that students

who have better online self-efficacy feel relatively comfortable expressing themselves in writing.[43] It has been reported that misinterpreted text communication is common in online learning.[44] The differences in understanding can be related to cultural differences and previous experiences. Combining audio and visual components could help express emotions and add personal elements to the feedback and discussion.[45,46]

It has been reported in the literature that medical students are suffering from academic stress and anxiety.[47] Similarly, students from colleges of health sciences had high stress levels and lower psychological well-being due to their educational responsibilities and online learning.[48,49]

Therefore, it is necessary to provide a supportive learning environment for medical and health science students in order to produce well-prepared healthcare workers. Moreover, the opportunity to share experiences with colleagues, stakeholders, leaders, accreditation bodies and clinical training sites is essential for cultivating an effective learning process.[30]

In the present study, students who had prior online experiences experienced less anxiety. This finding was consistent with a previous study that showed that students who had prior online experience exhibited less anxiety compared with others.[39] Previous studies have revealed that students who lack technical skills and do not receive clear instructions and feedback from the instructor are apprehensive about communicating their ideas in writing and are prone to anxiety.[50]

A limitation of this study was that it was conducted during the COVID-19 pandemic when there was a sudden and rapid shift to complete online learning. The findings of the study cannot be generalised to all students as the study only included students of medical and health sciences. Further research that includes students from different colleges is needed. Moreover, it is necessary to conduct studies that explore the challenges of online learning and teaching in order to improve the quality of online learning. Additionally, intervention studies to reduce anxiety in online learning might help the medical education community.

Online learning has become the new normal following the start of the COVID-19 pandemic with medical educators being required to work hard to provide an adequate learning experience to their students.[46] Being an innovative and technology-literate educator is the key to engaging new generations of online learners. Techno-pedagogical skills are crucial for communicating effectively with students and supporting their learning. Providing training workshops for both students and faculty, in which one shares their experiences with all concerned parties, will add more value to the online learning process. Anxious people are often not open to sharing their feelings with medical experts or friends but they can do so through anonymous means. Predictions of anxiety can be made using machine learning algorithms.[51,52] Future studies are recommended since they can help support the well-being of students and faculty. Moreover, academic advising and psychological support are vital to achieving the best learning experience during these changing times.

## Conclusion

In the current study, Generation Z students were more confident about navigating internet resources for online learning. Generation X and baby boomer faculty members were not as confident about the same when compared with Generation Y faculty. Additionally, students from both Generations Y and Z enjoyed browsing internet resources for teaching and learning more as opposed to faculty in all generations. Students and faculty were both anxious during online learning, but baby boomer faculty members were most anxious. Students with previous online learning experiences were significantly less anxious and no significant difference was found among faculty. There was no significant difference between the anxiety level of male and female students, while female faculty members were more anxious about online teaching than male faculty members.

### CONFLICT OF INTEREST

The authors declare no conflicts of interest.

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### AUTHORS' CONTRIBUTION

All authors contributed to the conception of the study. MA collected the data and worked on coding. WE analysed the data. WE and MHT drafted the initial manuscript. All authors revised and edited the manuscript. All authors approved the final version of the manuscript.

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