Security and privacy in online teaching during the COVID-19 pandemic: experiences and concerns of academics in Saudi higher education

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Abstract

Purpose – This study investigated the attitudes and concerns of Saudi higher educational institution (HEI) academics about privacy and security in online teaching during the COVID-19 pandemic.

Design/methodology/approach – Online Questionnaire questionnaire was designed to explore Saudi HEI academic's attitudes and concerns about privacy and security issues in online teaching. The questionnaire asked about attitudes and concerns held before the pandemic and since the pandemic. The questionnaire included four sections. At the beginning of the questionnaire, participants were asked what the phrase "online privacy and security" meant to them, to gain an initial understanding of what it meant to academics. A definition for what we intended for the survey was then provided: "that a person's data, including their identity, is not accessible to anyone other than themselves and others whom they have authorised and that their computing devices work properly and are free from unauthorised interference" (based on my reading of a range of sources, e.g. Schatz *et al.*, 2017; Steinberg, 2019; NCS; Windley, 2005). This was to ensure that participants did understand what I was asking about in subsequent sections.

Findings – This study investigated the attitudes and concerns of Saudi HEI academics about privacy and security in online teaching during the COVID-19 pandemic. The findings provide several key insights: Key aspects of online privacy and security for Saudi HEI academics: Saudi HEI academic's notion of online privacy and security is about the protection of personal data, preventing unauthorized access to data and ensuring the confidentiality and integrity of data. This underscores the significance of robust measures to safeguard sensitive information in online teaching, but also the need to make academics aware of the other aspects of online privacy and security. Potential to improve policies and training about online privacy and security in Saudi HEIs: Although many participants were aware of the online privacy and security policies of their HEI, only a small percentage had received training in this area. Thus, there is a need to improve the development and dissemination of policies and to provide academics with appropriate training in this area and encourage them to take available training. Use of videoconferencing and chat technologies and cultural sensitivities: The study highlighted moderate levels of concern among Saudi HEI academics regarding the use of videoconferencing and online chat technologies, and their concerns about cultural factors around the use of these technologies. This emphasizes the need for online teaching and the growing use of technologies in such teaching to respect cultural norms and preferences, highlighting the importance of fostering a culturally sensitive approach to

technology deployment and use. Surprising low webcam use: An unexpected finding is the low use of webcams by both academics and students during online teaching sessions, prompting a need for a deeper understanding of the dynamics surrounding webcam engagement in such sessions. This calls for a reevaluation of the effectiveness of webcam use in the teaching process and underscores the importance of exploring methods for enhancing engagement and interaction in online teaching. In summary, this paper investigated the attitudes and concerns about privacy and security in the online teaching of Saudi HEI academics during the coronavirus pandemic. The study reveals areas where further research and policy development can enhance the online teaching experience. As the education landscape continues to evolve, institutions must remain proactive in addressing the concerns of their academics while fostering a culturally sensitive approach to technology deployment.

Research limitations/implications – One limitation of this study is the relatively small qualitative data sample, despite the adequate size of the sample including 36 academics from various Saudi Arabian HEIs for quantitative analysis. It was necessary to make the most of the open-ended questions optional – participants did not have to answer about concerns if they did not want to, as we did not want to make the questionnaire too long and onerous to complete. Consequently, the number of academics responding to the open-ended questions was limited, emphasizing the need for additional data and alternative research methods to further these issues. The study was focused on investigating the concerns of HEI Saudi academics, recognizing that the attitudes and concerns of academics in other countries may differ. Furthermore, the research also includes an exploration of the changes in academic attitudes and concerns before and since the COVID-19 pandemic, which will be the subject of further data analysis.

Originality/value – This research delves into Saudi HEI academics' perceptions and concerns regarding privacy and security in online education during the COVID-19 Pandemic. Notably, it highlights the moderate priority placed on online privacy and security, the unexpectedly low usage of webcams and the potential for enhancing policies and training. The study emphasizes the necessity for comprehensive measures to protect sensitive data and the importance of tailored policies for educators. It also underscores the need for a more nuanced understanding of webcam usage dynamics, offering valuable insights for institutions aiming to improve online education and address educators' concerns amidst evolving educational landscapes.

1. Introduction

The COVID-19 pandemic had a significant global impact on higher educational institutions (HEIs) worldwide. HEIs were forced to swiftly shift to online teaching, necessitating academics worldwide adjusting to this new teaching method with limited preparation. This transition entailed substantial alterations to teaching and learning approaches. When possible, in-person lectures, seminars, and practical activities were replaced with online equivalents. In situations where such a shift was not feasible, specific activities had to be halted. Additionally, assessments and examinations underwent modifications, transitioning to online formats or alternative online assessment methods. This sudden and unexpected transformation placed significant pressure on both academics and students. While numerous HEIs had already incorporated online technologies such as virtual learning environments (VLEs) to support teaching and learning before the pandemic, the pandemic led to a significant increase in the adoption of various digital technologies. This abrupt shift towards using a wide range of digital technologies also prompted discussions regarding the privacy and security concerns linked to these technologies in the context of education. These concerns include difficulties in overseeing student involvement and interaction in virtual sessions, as well as issues tied to the use of webcams. Investigations conducted during and since the pandemic showed that students were reluctant to turn on their webcams in online sessions, citing reasons such as shyness, anxiety, and privacy concerns.

Despite numerous studies examining HEI academics' experiences with digital technologies, a gap exists in research addressing privacy and security concerns in online teaching during the pandemic, highlighting the continued importance of these technologies even as in-person education has resumed in many HEIs. Consequently, our research

investigated these concerns among a particular population of HEI academics. We focused our attention on HEI academics in Saudi Arabia. This choice stemmed from the fact that educational approaches at the HEI level can differ significantly between countries. Furthermore, academics originating from different cultural backgrounds may have differing views regarding online privacy and security. Specifically, academics at Saudi HEIs may have specific concerns about their visibility, such as through webcams, in online teaching situations. This study builds on similar research by Almekhled and Petrie (2023b) conducted with UK academics, which we built on, and extends the comparative analysis to include the perspectives of Saudi and UK students (Almekhled and Petrie, 2023a, c).

Our specific research questions were:

RQ1. What do Saudi HEI academics understand by online privacy and security?

RQ2. Are Saudi HEI academics aware of their institution's policies about online privacy and security issues and are they provided with training about these issues?

RQ3. What are Saudi HEI academics' concerns about privacy and security issues concerning using video conferencing (particularly the use of webcams) and online chat technologies for online teaching?

RQ4. What are Saudi HEI academics' concerns about privacy and security issues in a range of specific online teaching situations?

2. Background work
2.1 Defining online privacy and security in online teaching
Many researchers fail to discuss what they specifically mean by online security and privacy when discussing these concepts in their papers. However, researchers have explored online teaching security and privacy from various perspectives, such as privacy in cooperative tasks (Patil and Kobsa, 2005), the safeguarding of learners' secure learning environments and privacy (Anwar and Greer, 2012), the protection of personal and private data exchanged by learners during virtual discussions (Booth, 2012), and the preservation of privacy on social networking sites (Salmon *et al.*, 2015). Recently, Kularski and Martin (2021) conducted a systematic review of online privacy issues for HEI students, identifying 41 relevant papers. Most focused on students' online privacy beliefs and behaviors on social network sites. However, they found a lack of research on privacy concerns in online teaching sessions and students' perceptions of information sharing in online teaching.

Greater dependence on digital technologies for online teaching has brought a new set of online privacy concerns for both students and academics. Privacy is contextual, it is difficult to define a universal privacy policy that can be implemented everywhere. Privacy concerns differ by context and might shift over time among different communities. New privacy concerns may be discovered, and some privacy agreements may need to be amended and tailored to a new set of people or a new situation (Martin, 2016).

In addition to privacy issues, security has become an important factor as online teaching methods enable students to connect, edit, exchange, and study using similar data sources. Therefore, it is important to provide data and facilities only to authorized users and protect the confidentiality, availability, and integrity of the online teaching system for such users (Aldheleai *et al.*, 2015). An online teaching system should not put the student's data at risk and should be sufficiently secure (Zhang and Nunamaker, 2003). For example, in online teaching sessions, it is important if students are being recorded without permission, who can access the recordings (particularly whether institutional staff can access them) and where recordings are stored.

For this study, we will define online security and privacy to mean "that a student's or academic's data, including their identity, are not accessible to anyone other than themselves and others whom they have authorized and that their computing devices work properly and are free from unauthorized interference" (this definition is based on a range of sources, e.g. NCSC, 2022; Schatz *et al.*, 2017; Steinberg, 2019; Windley, 2005).

2.2 Academics' and students' experiences in online teaching before and since the pandemic
Numerous studies have investigated the experiences of HEI academics with digital technologies during the pandemic, spanning various countries and contexts. However, there is a lack of studies that specifically tackle the privacy and security concerns of HEI academics concerning the increased use of digital technologies during the pandemic. Several more general studies of HEI academics' attitudes to online teaching do mention privacy or security issues. Alhubaishy and Aljuhani (2021) investigated the attitudes of HEI academics in Saudi Arabia regarding online teaching. They found that academics were concerned about online privacy, were worried about change, and lacked experience in effectively incorporating digital technologies into the teaching process. Vital-López *et al.* (2022) explored the experiences of HEI academics in Mexico during the pandemic. The majority of participants found that conducting online teaching activities from their home offices raised privacy concerns within their families. Another study in Mexico (Zamora-Antuñano *et al.*, 2021) examined the attitudes of academics from 93 different HEIs. The primary challenge faced by these academics was determining whether students were actively engaged during online sessions or not.

A pre-pandemic study examined the viewpoints of both academics and students regarding the use of webcams in online teaching sessions. Kozar (2016) interviewed online language academics from a range of countries (Australia, Canada, Ukraine, UK, USA) and Eastern European adult students to understand their attitudes and practices regarding the use of webcams in online English language classes. The study found that both academics and students initially used webcams to establish rapport, but gradually reduced their use after two to three weeks of classes due to feelings of discomfort and fatigue.

Since the pandemic, several studies have investigated HEI students' attitudes to the use of webcams in online teaching and specifically why students do not want to have their webcams on during online teaching sessions (Almekhled and Petrie, 2023a; Bedenlier *et al.*, 2021; Castelli and Sarvary, 2021; Dixon and Syred, 2022; Gherheş *et al.*, 2021). Although conducted in different countries (Saudi Arabia, Germany, the USA, the United Kingdom, and Romania respectively), all found reluctance on the part of students to have webcams on during teaching sessions. A range of reasons was proposed to explain this, including shyness, anxiety, social norms, and not feeling the need to do so unless the instructor requests it, but all studies highlighted privacy issues as major concerns. However, studies with HEI academics highlight the difficulty of engaging with students who cannot be seen at all (Petchamé *et al.*, 2022; Yarmand *et al.*, 2021). Research has also shown that if students in online sessions cannot see one another or the instructor, they feel isolated and disengaged (Pallof and Pratt, 2007; Petchamé *et al.*, 2022).

2.3 The transition to online teaching in Saudi Arabia
The establishment of the National E-learning Center (NELC) in Saudi Arabia in 2005 marked an important milestone in the country's pursuit of governing and enhancing e-learning, ultimately aimed at improving the educational experience and implementing effective e-learning practices (Alqahtani and Rajkhan, 2020). The NELC has taken important steps in establishing guidelines and standards for Saudi universities to ensure they possess robust e-learning infrastructure. This infrastructure includes essential hardware components such

as servers, storage facilities, and networking resources. Moreover, it involves developing online teaching platforms, setting up specialized administrative units to be responsible for e-learning operations, conducting extensive training and awareness campaigns, and introducing a range of other digital learning projects (Malik *et al.*, 2018).

The NELC sets policies for technology requirements, support for students and academics, instructional design, and accessibility standards. Thorpe and Alsuwayed (2019) indicated that Saudi universities generally met the criteria of having adequate e-learning infrastructure in place. In addition, according to Alqahtani and Rajkhan (2020), quality infrastructure for IT at Saudi universities emerged as a critical factor in successfully transitioning to online learning during the pandemic of COVID-19. However, the ability to make this transition smoothly varied among universities due to differences in their readiness and maturity in using e-learning systems before the pandemic.

Several studies conducted in Saudi Arabia suggest generally positive attitudes among academics and students towards online learning. Hoq's (2020) study at the Jubail Industrial College found that most academics expressed positive views regarding online education. Similarly, Alammary *et al.* (2021) survey of 24 public Saudi universities revealed that attitudes, self-efficacy, and perceived reliability positively influence the intention to participate in online learning, with the COVID-19 pandemic further promoting its long-term adoption. Hasan *et al.* (2023) emphasized the positive associations between perceived usefulness, perceived ease of use, and self-efficacy in students' adoption of online learning. Furthermore, Alqahtani *et al.* (2021) noted that previous exposure and preparedness for e-learning impacted the overall satisfaction of Saudi students with their online learning experiences. The perception of e-learning among students varied based on factors such as gender, the academic level of the course, and the effectiveness of e-learning methodologies (Elumalai *et al.*, 2020).

The establishment of the NELC in Saudi Arabia has played a crucial role in enhancing the infrastructure and implementation of e-learning, therefore facilitating a smooth transition to online education during the COVID-19 pandemic. While positive attitudes prevail, variations in readiness among universities highlight the need for ongoing support and development in this transformative educational landscape.

3. Method
3.1 Participants
The first author asked colleagues to recruit participants. Additionally, to expand the study's reach, we used various other channels for recruitment, including internal university email lists, online forums, and social media platforms, to maximize participation and obtain a diverse sample of Saudi academics. We included two "attention check" questions in the questionnaire to check whether participants read the questions carefully and did not respond randomly (see section 3.2 below). 39 academics responded, but three were discarded because they failed attention-check questions, leaving a sample of 36 participants. More than half the participants (23, 63.88%) were teaching at public HEIs and the remainder (13, 36.1%) at private institutions. Demographic information for the sample is shown in Table 1.

The sample was slightly skewed toward women (22, 61.3%). Nearly half the participants (16, 44.4%) had a PhD degree, half (50.0%) had a master's degree and only two (5.6%) had a bachelor's degree. Nearly half of the participants have 6–10 years of teaching experience in HEIs. Just over half the participants (19, 52.8%) taught computer science and engineering departments. Some participants taught administrative and financial students (7, 19.4%) and arts or humanities subjects (6, 16.7%) Only two participants (5.6%) taught medical or health sciences and two (5.6%) social sciences (e.g. psychology, sociology). The sample did include participants teaching a wide range of subjects, although the balance was more towards computer science.

Age	
Range	28–57
Mean	36.0
Standard deviation	5.31
Gender	
Men	14 (38.9%)
Women	22 (61.3%)
Highest level of education	
Bachelor	2 (5.6%)
Masters	18 (50%)
PhD	16 (44.4%)
Years of teaching experience	
Less than a year	2(5.6%)
1–5 years	14 (38.9%)
6–10 years	16 (44.4%)
11–15 years	2 (5.6%)
More than 15 years	2 (5.6%)
The subject area of teaching	
Arts/Humanities	6 (16.7%)
Administrative and Financial sciences	7 (19.4%)
Computer Science and Engineering	19 (52.8)
Medical Sciences and Health Science	2 (5.6%)
Social sciences (e.g. psychology, sociology)	2 (5.6%)
Source(s): Authors' own creation/work	

Table 1.
Demographics of
participants

3.2 Questionnaire

A questionnaire was designed to explore Saudi HEI academic's attitudes and concerns about privacy and security issues in online teaching. The questionnaire asked about attitudes and concerns held before the pandemic and since the pandemic. The questionnaire included four sections. At the beginning of the questionnaire, participants were asked what the phrase "online privacy and security" meant to them, to gain an initial understanding of what it meant to participants. A definition for what we intended for the survey was then provided: "that a person's data, including their identity, is not accessible to anyone other than themselves and others whom they have authorized and that their computing devices work properly and are free from unauthorized interference" (see section 2.1). This was to ensure that participants did understand what we were asking about in subsequent sections.

The questionnaire used a mixture of rating scales and open-ended questions.

The four sections of the questionnaire were:

The participant's institution: asked where the participant teaches, the kind of department they work in, and how long they have been teaching in higher education in total. It also asked about the methods of teaching at their institution before and since the pandemic.

Privacy and security concerns about videoconferencing and chat technologies in teaching: participants' experiences and concerns of online security and privacy specifically about video conferencing and chat technologies in their teaching. Questions also addressed attitudes and practices around the use of webcams during teaching and other institutional work.

Privacy and security concerns about a range of specific online teaching situations: asked about concerns about security and privacy issues relevant to a range of specific online teaching situations. A set of situations was developed from the literature and by brainstorming with several HEI academics about their experiences since the pandemic.

Demographics: asked basic questions about participants' such as age and gender.

The full text of the questionnaire can be obtained from the authors.

The questionnaire included two attention-check questions at different locations in the survey to check whether participants read the questions carefully and did not respond randomly (Curran and Hauser, 2019). The online questionnaire was deployed using the Qualtrics survey software in December 2021. A pilot study with five HEI academics from different Saudi Universities assessed the clarity of the questions and the time required to complete the questionnaire. Some small adjustments were made as a result of the pilot. The survey received ethical approval from the Physical Sciences Ethics Committee of the University of York Ethics Committee. The questionnaire was developed in English and then translated into Arabic with back translation to check accuracy. Participants had the option of completing either the English or Arabic version of the questionnaire by selecting their preferred language at the beginning of the questionnaire.

3.3 Data preparation

The questionnaire gathered both quantitative data from multiple-choice and Likert scale responses, and qualitative data from open-ended questions. Due to the skewed distribution of the Likert items towards the lower end of the scale, non-parametric statistics were used, employing medians and semi-interquartile ranges (SIQRs) instead of means and standard deviations. The Wilcoxon One Sample Signed Ranks Test was utilized to assess deviations from the midpoint of the Likert scale. Given the large sample size (more than 30 observations), the Z statistic for the normal distribution approximation was employed instead of the Wilcoxon T (Siegel and Castellan, 1988).

Thematic analysis was conducted separately for each open-ended question, employing an inductive thematic analysis approach (Braun and Clarke, 2006) without any predetermined assumptions about the emerging themes. The analysis process involved repeated readings of all responses, initial theme development, and subsequent refinement through iterative examination, considering the relatively limited scale of the thematic analyses conducted.

4. Results

Before addressing the research questions, we present results on participants' experience of online teaching and how that changed due to the pandemic.

Participants were asked what their teaching method was before the pandemic and how it changed due to the pandemic (see Table 2). Before the pandemic, about half the participants were teaching totally face-to-face, with the remainder teaching in a blended mode. In response to the pandemic, teaching for almost all participants (35, 97.0%) moved totally online with only one participant (2.8%) reporting moved partly online. Thus, for all participants, the pandemic resulted in a radical teaching method.

4.1 Saudi HEI academics understanding of online privacy and security (RQ1)

At the beginning of the survey, participants provided their understanding of online privacy and security in their own words. 14 participants answered and a thematic analysis was

Teaching mode	Number of participants responding (percentage)
Totally online	0 (0.0%)
Blended (i.e. a mixture)	17 (47.2%)
Totally face-to-face	19 (52.8%)
Source(s): Authors' own creation/work	

Table 2.
Teaching method
before the pandemic

conducted on these answers (see Table 3). Three themes emerged with *protecting personal information* mentioned by half the participants; *preventing unauthorized access to data*; and *ensuring the confidentiality and integrity of data*. It is interesting that all these themes relate to data, both personal and teaching-related and not the privacy or security of the location or appearance of the person.

4.2 Saudi HEI academics' awareness of their institution's policies regarding online privacy and security issues and whether they are provided with training about these issues (RQ2)

In relation to whether participants knew of their institution's policies about privacy and security issues for online teaching, more than half (23/36, 63.9%) knew of such policies and less than one-third (10/36, 27.8%) said they thought the institution did not have any policies. Only three of the participants (8.3%) did not know any such policies.

Nearly a quarter of the participants (7/36, 19.4%) provided information about the policies of their institution, FS3 mentioned that their institution has safeguards in place to secure the identities of webinar participants. FS6 stated that passwords must be changed every six months, indicating that the institution stresses the significance of routine password updates. FS9 mentioned the use of two-factor authentication methods. Thus some participants were aware of a range of privacy and security measures.

In relation to whether the institution provides training about these issues, just over half the participants (19/36, 52.8%) reported that training was provided and a quarter (9/36, 25.0%) reported that the institution did not provide any training (9/36, 25.0%). A further quarter (8/36, 22.2%) did not know whether the institution provided any training. Less than a quarter of participants (7, 19.9%) reported have received any training. Three (8.3%) respondents provided details about the training, but only one participant (FS1) provided any detail (a training programme focusing on information security).

4.3 Saudi HEI academics' concerns about privacy and security issues with video conferencing and online chat technologies for online teaching (RQ3)

Participants provided the ratings of levels of concern about privacy and security issues about the use of videoconferencing and online chat technologies for different teaching and other institutional work (see Table 4). In all cases, median ratings did not significantly different from the midpoint of the rating scale, showing moderate levels of concern about these issues.

In a follow-up open-ended question, only 4 (11.1%) participants expressed specific concerns regarding the privacy and security of these technologies. FS1 expressed concern over the unauthorized capture of their photographs or audio recordings and the potential risk of obtaining personal information. FS3 expressed concern that female students might be

Theme (number of participants, %)	Example quotes
Protecting personal information (7/14, 50.0%)	Preserving my basic information such as my name and mobile number, ensuring my right to preserve my image and voice (FS1)
Preventing unauthorized access to data (4/14, 28.6%)	My personal data are secured (FS13)
	The inability of others to see the contents of my device (FS4)
Ensuring the confidentiality and integrity of data (3/14, 21.4%)	Maintaining information about teaching materials, exams, and more (FS5)
	Ensure the confidentiality and authenticity of data transmission and do not use it without permission (FS9)
	The most important standard to ensure data integrity (FS14)
Source(s): Authors' own creation/work	

Table 3.
Participants' understanding of online security and privacy ($N = 14$)

captured on camera when they did not realize male students or academics were present. This highlights specifically Saudi cultural norms about personal visibility. FS4 expressed concern about the potential misuse of videoconferencing and online chat technologies without specific examples or details regarding the nature of the misuse.

Participants rated how often they were turned on their webcam during different types of online teaching sessions (See Table 5). For all types of teaching sessions, participants gave very low ratings (all significantly lower than the midpoint of the rating scale), indicating that they never or very infrequently turn on their webcam during teaching sessions.

In a follow-up open-ended question, a few participants (4/36, 11.1%) provided answers about their decision-making processes in relation to webcam use. FS2 stated that they place a sticker over their camera and only use it when a visual explanation is required. FS4 noted the camera is frequently off, particularly in the women's teaching sessions. FS6 stated that their choice to turn on the webcam is based on two main factors: whether it is the first time they communicate with students and the practicality of the Internet connection. For FS7, their decision to activate the webcam depends on the nature of the meeting. When conducting research with colleagues, the webcam is typically on, whereas it is off when interacting with students. These explanations show an interesting range of reasons, some practical (Internet connection), some cultural (women students), some pedagogic (visual explanation, first interaction with students) and some related to status (students vs colleagues).

Participants rated how often their students typically turn on their webcam during different types of online teaching sessions (see Table 6). In all cases, participants gave very low ratings (all significantly below the midpoint of the scale), indicating that their students never or very infrequently turn on their webcam during online teaching sessions.

In a follow-up open-ended question, participants (7/36, 19.4%) gave their opinions on what they think on what they think about students having their webcams on or off. Some respondents felt it was unnecessary, while others wanted to interact with the camera infrequently. Others wished students would turn them on, but did not explain why. Others found it irrelevant, and others felt they were lecturing in an empty classroom. Some participants found it acceptable for students to turn on their webcams, while others found it is not acceptable for a woman.

Activity	Median (SIQR)	z	p
Using videoconferencing for teaching	4.00 (200)	−1.18	0.235
Using videoconferencing for your other institutional work	4.00 (2.50)	−1.58	0.112
Using online chat technologies for teaching	3.00 (2.50)	−1.65	0.099
Using online chat technologies for your other institutional work	3.00 (2.00)	−1.55	0.119
Source(s): Authors' own creation/work			

Table 4.
Participants' level of concern about online privacy and security with videoconferencing and chat technologies (1 = not at all concerned to 7 = very concerned)

Type of online teaching session	Median (SIQR)	z	p
Online lectures	1.00 (0.50)	−4.33	<0.001
Small group sessions/seminars	1.00 (0.50)	−4.43	<0.001
Lab sessions	1.00 (0.50)	−4.83	<0.001
One-to-one sessions with student	1.00 (0.50)	−4.83	<0.001
Administrative meetings	1.00 (1.00)	−4.01	<0.001
Research meetings	1.00 (1.00)	−3.72	<0.001
Source(s): Authors' own creation/work			

Table 5.
Participants' ratings of their typical frequency of having their webcams on in different types of online teaching sessions (scored as 1 = Never to 7 = Very frequently)

4.4 Saudi HEI academics' concerns about privacy and security issues in a range of specific online teaching situations (RQ4)

Participants rated their level of concern about online privacy and security issues in specific online teaching situations (see Table 7). Two situations, relating to unauthorized people attending or interrupting sessions had median ratings of 2.00, significantly below the midpoint of the scale, indicating a low level of concern. All the other situations had median ratings of 3.00, 4.00 or 5.00 not significantly different from the midpoint of the scale, indicating moderate levels of concern.

In a follow-up open-ended question, three participants (3/36, 8.3%) elaborated on their concerns. FS1 noted the importance of aligning actions with institutional values, even when those actions may not directly affect security or privacy. FS2 mentioned concerns regarding the unauthorized posting of information, underscoring the need for robust control mechanisms. FS3 noted that the survey itself raised their awareness of previously unconsidered fears and concerns.

5. Discussion

This study investigated the attitudes and concerns about privacy and security in the online teaching of Saudi HEI academics during the coronavirus pandemic.

Saudi HEI academics' understanding of online privacy and security (RQ1), revealed useful information about how they perceive these concepts. As noted, all three themes which emerged related to privacy and security of data. This suggests this is the most important aspect of online privacy and security for them. It is particularly interesting that participants did not emphasize privacy and security in relation to their location, their physical appearance on screen in online teaching situations or the fact that their family and personal items might be visible in the background. This was surprising given the cultural importance of personal

Table 6.
Participants' ratings of their students' typical frequency of having their webcams on during different types of online teaching sessions

Type of online teaching session	Median (SIQR)	z	p
Online lectures	1.00 (0.50)	−5.29	<0.001
Small group sessions/seminars	1.00 (0.50)	−5.28	<0.001
Lab sessions	1.00 (0.50)	−4.66	<0.001
One-to-one sessions with students	1.00 (0.50)	−4.56	<0.001
Source(s): Authors' own creation/work			

Table 7.
Participants' level of concern about online security and privacy issues in specific online teaching situations (scored as 1 = not at all concerned to 7 = very concerned)

Issue	Median (SIQR)	z	p
My online lectures are being recorded without my knowledge	3.00 (2.00)	−1.84	n.s
My online seminars are being recorded without my knowledge	4.00 (2.50)	−1.37	n.s
My online teaching materials (e.g. slide packs, notes, reading lists) are being re-used by others without my authorization	4.00 (2.50)	−1.14	n.s
Students not turning on their webcams during sessions	5.00 (2.00)	0.86	n.s
Unauthorized people attending sessions	2.00 (1.50)	−3.75	<0.001
Unauthorized people interrupting sessions	2.00 (1.50)	−2.86	<0.001
Students making recordings without my permission during online teaching sessions (e.g. using their phone)	4.00 (2.50)	−0.88	n.s
Accidentally sharing the wrong window that contains private information	3.00 (2.00)	−0.38	n.s
Source(s): Authors' own creation/work			

visibility for women in Saudi Arabia. This is discussed in more detail in relation to RQ3 and RQ4.

In relation to HEIs policies about online privacy and security (RQ2), only half the participants reported that their institutions provided training but only a fifth of participants had received training in this area. These results suggest that Saudi HEIs need to invest more effort into training for their academics on online privacy and security, in this age of increasing online teaching. In addition, institutions need to encourage academics to actually take the training provided and inform themselves well about online privacy and security issues, as the percentage of academics who reported having taken any training was particularly low. A separate question, which was not explored in this research, but which needs attention, is whether Saudi HEIs have clear policies in these areas. What precautions do HEIs take to ensure that only eligible students attend online teaching sessions, what policies are in place about whether academics (and students) are required to have webcams turned on during online teaching sessions, about what is recorded during these sessions (just the video or also the chat discussion), and about how informal channels such as WhatsApp and Telegram are used for communication in online teaching? There are many issues where explicit and clear privacy and security policies are needed. A starting point may be the Saudi Personal Data Protection Law (PDPL) (DataGuidance, 2023), but more specific guidance and policies are required in these areas. The PDPL, introduced in September 2021, safeguards individuals' personal data, including identification details, addresses, contact numbers, photographs, and video recordings. It applies to all personal data processing by businesses or public entities within Saudi Arabia and extends to the processing of Saudi residents' data by entities outside the country.

Saudi HEI academics reported moderate levels of concern about privacy and security issues when using videoconferencing and online chat technologies for online teaching and other institutional work (RQ3). This is an interesting contrast to the lack of mention of the privacy and security issues which the participants raised when asked what online privacy and security mean to them. This may be because which can be directly linked to the cultural and societal context in Saudi Arabia. Lewis (2019) emphasized that local culture, rooted in history, religion, and language, continues to shape human behavior despite globalization. The emphasis on Islamic traditions and values in Saudi society underscores the significance placed on familial privacy and collective well-being. The strong focus on extended family importance and the cultural value placed on safeguarding personal and familial information from potential digital threats aligns with the moderate levels of concern expressed by the participants. This emphasis on privacy and security is reflective of the cultural norms that prioritize the protection of personal data, particularly within the familial and community context. In adherence to local Islamic law, Saudi Arabia implements a gender-segregated educational environment, with separate buildings and facilities designated for male and female students (Alshalawi, 2020).

The impact of gender segregation in Saudi Arabian society, observed through the implementation of a gender-segregated educational environment, further contributes to the concerns expressed by Saudi academics regarding privacy and security issues. The restrictions on interactions between unrelated males and females, in accordance with local Islamic law, shape the educational landscape and underscore the need for stringent privacy and security measures to uphold the cultural and religious values intrinsic to the society. The adherence to gender segregation practices necessitates tailored approaches to technology implementation in educational and institutional settings, emphasizing the significance of addressing privacy, security, and cultural factors when integrating videoconferencing and online chat technologies. By recognizing the cultural and societal influences that underpin the concerns of Saudi academics, HEIs can adopt a culturally sensitive approach to technology integration, ensuring that privacy and security measures are aligned with the values and

norms inherent in the Saudi Arabian context. However, these moderate levels of concern on the part of Saudi HEI academics are different from the very low levels of concern found among UK HEI academics about online privacy and security using videoconferencing and online chat technologies (Almekhled and Petrie, 2023b). This is not surprising, given the very different cultural values in the UK.

The participants reported very low levels of webcam use both by themselves and their students, a phenomenon we had already observed anecdotally. This phenomenon can be linked to several reasons including cultural norms, personal preferences and the particular needs of teaching sessions. The common perception is that students are mostly responsible for the reluctance to turn on their webcams during online learning sessions, but our results suggest this may not be the case. These results are consistent with previous research with students in other cultures that have found reluctance on students' part to have their webcams on during online teaching sessions (Almekhled and Petrie, 2023a; Bedenlier *et al.*, 2021; Castelli and Sarvary, 2021; Dixon and Syred, 2022; Gherheş *et al.,* 2021). However, the present study indicates that academics too, are not inclined to have their webcams on. This is a surprising result, particularly in relation to academics' need for engagement with students. Participants' mention of the specific context and requirements of the teaching session, along with their consideration of Internet connectivity, reflects a pragmatic approach to webcam usage. The results suggest that there may be a lack of student engagement and concentration in online teaching sessions, as both academics and students do not have their webcams on and can engage in additional tasks or be more easily distracted from the teaching material. Further research is clearly needed on how the lack of visual interact affects both academics and students in online teaching.

Saudi HEI academics showed varying levels of concern about privacy and security issues in different online teaching situations (RQ4). While they expressed low levels of concern about unauthorized attendance or interruptions in online sessions, they expressed moderate levels of concern about issues such as students not turning on their webcams and unauthorized recording or reusing teaching materials. Understanding the contextual factors contributing to these concerns is essential for the development of tailored approaches that account for the specific challenges faced by Saudi HEI academics. Institutions can proactively formulate measures to address privacy and security concerns for the different situations effectively. Further exploration of the underlying factors driving these concerns is crucial for devising comprehensive policies that foster secure and conducive online teaching systems for academics and students alike.

The study had a number of limitations which need to be considered. One limitation is the relatively small sample, of 36 academics from various Saudi Arabian HEIs. While a sample of this size is quite adequate for quantitative analysis, for several reasons it is rather small for the qualitative analysis of the open-ended questions. It was necessary to make the most of the open-ended questions optional – participants did not have to answer about concerns if they did not want to, as we did not want to make the questionnaire too long and onerous to complete. Consequently, the number of academics responding to any particular open-ended question was limited, and participants who did respond often gave very brief answers, meaning there was not a large corpus of material for thematic analysis. This emphasizes the need for additional data and alternative research methods to further investigate these issues. For example, interviews and focus groups could each provide different insights into the issues and solutions in relation to online privacy and security concerns. Another limitation is the use of a retrospective self-report instrument, the questionnaire. Participants may have been answering in a socially acceptable way on some questions, for example they may have thought it was inappropriate to express concern about using videoconferencing or chat technologies as they are now required to use them. They may also not have wanted to express certain views about webcam use if they thought they were inappropriate. This more nuanced

kind of information may have emerged better in interviews, in which the interviewer could establish a personal rapport with the participant. Further research could also use observation of online teaching sessions and testing out different interventions to increase webcam use and investigate the effects on student engagement and academic satisfaction. Finally, the study was conducted with HEI academics in one country, Saudi Arabia, but the concerns of academics in other countries with different cultural contexts may well differ. Understanding online teaching in each cultural context is important to optimize the process, while comparing online teaching between cultures highlights interesting differences in how cultural context affects online teaching.

6. Conclusions

This study investigated the attitudes and concerns of Saudi HEI academics about privacy and security in online teaching during the COVID-19 pandemic. The findings provide several key insights:

Key aspects of online privacy and security for Saudi HEI academics: Saudi HEI academic's notion of online privacy and security is about the protection of personal data, preventing unauthorized access to data and ensuring the confidentiality and integrity of data. This underscores the significance of robust measures to safeguard sensitive information in online teaching, but also the need to make academics aware of the other aspects of online privacy and security.

Potential to improve policies and training about online privacy and security in Saudi HEIs: Although many participants were aware of the online privacy and security policies of their HEI, only a small percentage had received training in this area. Thus, there is a need to improve the development and dissemination of policies and to provide academics with appropriate training in this area and encourage them to take available training.

Use of videoconferencing and chat technologies and cultural sensitivities: The study highlighted moderate levels of concern among Saudi HEI academics regarding the use of videoconferencing and online chat technologies, and their concerns about cultural factors around the use of these technologies. This emphasizes the need for online teaching and the growing use of technologies in such teaching to respect cultural norms and preferences, highlighting the importance of fostering a culturally sensitive approach to technology deployment and use.

Surprising low webcam use: An unexpected finding is the low use of webcams by both academics and students during online teaching sessions, prompting a need for a deeper understanding of the dynamics surrounding webcam engagement in such sessions. This calls for a re-evaluation of the effectiveness of webcam use in the teaching process and underscores the importance of exploring methods for enhancing engagement and interaction in online teaching.

In summary, this paper investigated the attitudes and concerns about privacy and security in the online teaching of Saudi HEI academics during the coronavirus pandemic. The study reveals areas where further research and policy development can enhance the online teaching experience. As the education landscape continues to evolve, institutions must remain proactive in addressing the concerns of their academics while fostering a culturally sensitive approach to technology deployment.

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