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Web Conferencing: The Technical and Social Challenges

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Abstract

Society, people, and institutions have reaped the benefits of technologies that allow online meetings and collaboration in real-time - often known as web conferencing technologies. Most of the benefits of these technologies were observed during the COVID-19 pandemic, where efforts to prevent the spread of the virus introduced mass social distancing. In higher education, web conferencing benefits a growing number of students across the world. It enables synchronous online learning, where learning takes place in real time, with communication technologies that permit live audio, video, and text transmission. Extant research suggests that the interplay of technical and social challenges within synchronous online learning, before the COVID-19 pandemic and beyond, has not been comprehensively investigated. Additionally, there is a need for thorough studies on the effects of prolonged virtual interactions on individuals, teams, and organizations, stemming from the features of web conferencing technologies. This paper reports ongoing research aimed at exploring the technical and social challenges that affect the success of web conferencing in synchronous online learning. The research investigates the experiences of students and teachers who use these technologies for learning and teaching, and the challenges they face. The work uses theories of technology acceptance and the psychology of user behaviours. The research aims to advance knowledge and offer valuable information to educators and learners. It seeks to enhance the effectiveness of teaching and learning processes using web conferencing technologies, ensuring that they successfully achieve their intended outcomes. The results of this study, in the long-term, will also inform the development of better and improved interventions, practices and strategies for web conferencing, that can be applied in educational and even commercial contexts. The paper also discusses an exploratory study that was conducted to explore the effects of webcam usage on learner engagement in training and tutorial sessions among higher education students. The exploratory study showed that the webcam, even though rarely used in most sessions, had an impact on learner engagement, and can be explored further. Additionally, the technical and social aspects in these online sessions are complex and need more examination.

Keywords

Web conferencing, synchronous, online learning, teaching, learning.

Research Objectives

The objectives of the study discussed in this paper are to investigate the technical and social challenges of web conferencing in Higher Education and explore causalities and relationships between them. The study will explore how these challenges play out differently for students and instructors across different contexts and geographies in a post-COVID world. COVID-19 served as a catalyst for increased usage and innovation in web conferencing technologies, which makes it a pivotal moment in this study.

This study aims to answer the following research questions:

1. What are the current technical and social challenges of web conferencing faced by students and instructors?
2. What is the relationship between technical and social challenges experienced by students and instructors in online synchronous learning after the COVID-19 pandemic?
3. What role do cultural and geographic backgrounds play in influencing the challenges faced during web conferencing for online learning?

Underpinning Theory

Gregor (2002) defines underpinning theories as theories that help us understand social contexts in information systems research, helping to explain how and why things happen. For this study, the Unified Theory of Acceptance and Use of Technologies (UTAUT; Venkatesh et al., 2003) is used as the underpinning theory, for the reasons given below. It considers four constructs directly influencing behavioural intentions and usage of technology: social influence, performance expectancy, effort expectancy, and facilitating conditions.

The UTAUT is being used for the following reasons:

- **Comprehensiveness:** The UTAUT model offers a comprehensive framework that integrates several key factors influencing technology acceptance. These can help realise and understand the role of surroundings, culture and environment in the challenges users face and perceive in web conferencing.
- **Validated and widely used:** The UTAUT model has been extensively validated and widely used in online learning (Batucan et al., 2022; Bellaaj et al., 2015; Halili & Sulaiman, 2018; Prasad et al., 2018). Its robustness and reliability makes it an appropriate choice for studying technology acceptance in online learning, as it has proven effectiveness in explaining user behaviour and intention to use technology.
- **Adaptability to online learning:** The UTAUT model can be adapted to specific contexts, such as online learning, by incorporating relevant variables and factors specific to the domain. This will allow customisation of the model, where necessary, to address the unique challenges and dynamics of web conferencing as used in the higher education context.
- **Predictive power:** The UTAUT model provides a strong foundation for predicting user behaviour and intention to use technology. Using this model in the research will help generate valuable insights into the factors that drive acceptance and adoption in online learning, helping to understand the challenges, and thereby informing the design and implementation of effective online learning systems and interventions.
- **Comparability with previous studies:** With examples, and widespread use of this model in previous studies (Batucan et al., 2022; Halili & Sulaiman, 2018; Prasad et al., 2018), utilizing it in this research will allow for possible comparability with the existing studies. This facilitates the integration and synthesis of findings from different studies, contributing to the advancement of knowledge in the field.

Research Design

Based on the research objectives, a mix of research methods are needed to help address the research questions. The study will draw participants from across the world. It will involve surveying students and educators who use web conferencing, observing sessions and interviewing participants.

The study will not focus on specific web conferencing applications or tools, but rather will abstract the various features and overall affordances provided by these tools. This is due to the nature and advancement of web conferencing technologies, and the frequent updates that these technologies receive over the years. For example, Zoom software in 2020 is different from Zoom in 2023, and the same is true for Microsoft Teams, among others. Video channels, text channels and other common features of these systems will be considered in the study as abstracted features. This will ensure that changes in the interface of web conferencing tools in focus will not hinder the study.

Participants will be required to have had experience with using web conferencing for teaching and/or learning. Also, the studies will be conducted in different social and geographical contexts. This will help to address the third research question, as well as investigate how the Social Influence and Facilitating Conditions in the UTAUT (Venkatesh & Davis, 2000) affect the experiences and challenges of web conferencing.

Methodology

The study will be conducted in three phases, each phase employing different methods. These phases will provide different focuses that, together, will address the research questions. Requirements of the Ethical Guidelines for Educational Research, fourth edition (2018) from the British Educational Research Association (BERA) will be followed, together with the British Psychological Society (BPS, 2021) Ethics Guidelines for Internet-mediated Research.

- **Phase 1 (Survey)**

Phase 1 will be an online survey of students and teachers/instructors in higher education, who have used web conferencing for learning/teaching before, during or after the COVID-19 pandemic. The requirement will be that

the participant has used a web conferencing platform for online classes at least three times prior to the study. This serves as a practical threshold to ensure that respondents have had sufficient exposure to synchronous online teaching and learning. The survey will consist of multiple choice, open and closed ended questions.

The survey will be open to all, and invitations will be shared via academic mailing lists, personal contacts, social media, groups, and associations. Participants may choose to respond to the survey by accepting an invitation via a link. Participants will be informed of the anonymity of the study, and will proceed to the survey after they give consent to the data being used, via a checkbox.

- **Phase 2 (Online Participant Observation)**

Phase 2 will use a netnographic approach involving observation of recorded online synchronous sessions. These observations will provide an opportunity to see first-hand some of the experiences that may have been described by participants in the survey (Peel, 2020). Kulavuz-Onal, (2015) encourages researchers to consider ethnography and observations in order to better understand online learning and teaching communities. Munoz et al. (2021) suggests that techniques such as online class observations should be employed to understand participants in online learning. It is complex to carry out such an observational study of recorded lessons, due to ethical concerns. To ensure transparency and to apply appropriate research ethics, participants will be made aware of the purpose of the observation, what the data will be used for, and the fact that the data gathered from the observation will be anonymised.

- **Phase 3 (Interviews)**

After the survey and observation, Phase 3 will comprise in-depth interviews. This will involve some students and instructors from Phase 1 (different from participants in Phase 2), who have opted to be interviewed. Participants will be selected using representative sampling (Strunk & Mwavita, 2020). Semi-structured interviews will be conducted with these selected participants to gather in-depth information on their experiences, perceptions, and attitudes towards web conferencing for synchronous learning. The interviews will include open-ended discussions for additional insights. Some of the interview questions will be based on observed phenomena and behaviours from Phase 2 of the study. Reflexive thematic analysis (Braun & Clarke, 2021) will be used.

Exploratory Study

An exploratory study was undertaken prior to the planning of the study described above to investigate the challenges with webcams and user engagement among postgraduate students who take online courses, workshops, or training sessions using Microsoft Teams. This study aimed to gain insights into how webcam video may contribute to participants' engagement and degree of participation. This was a minimal way of exploring webcams (as a technical feature) and engagement (as a social feature) and how these two may be interconnected. Participants were asked to respond to a short survey at the end of some of the sessions in which they participated. Participants were encouraged to comment on their experiences from the training they had just finished, as well as on other web conferencing experiences they had in the past.

Participants were asked if using webcams during the session was encouraged by the facilitator, and if they had used their webcams. Participants were also asked whether they felt a sense of belonging, whether they had prior knowledge of other participants in the session, about their level of interaction in the session, and how engaging they perceived the session to be. The study also gathered information on how often participants attended such online sessions, and in what ways (if at all) the webcams contributed to successful sessions online. According to Strunk & Mwavita (2020), a response rate of 15% is usually considered as relatively good by most researchers. However, in this study, a total of 9 responses was received, which was an extremely low response, given that there were a potential 80 unique participants within the time frame in focus. An exact response rate could not be calculated because students could attend multiple sessions.

The results of the exploratory study showed that almost all the respondents did not use their webcams, but nevertheless they regarded the sessions as engaging. Some respondents reported feeling a sense of belonging because other participants were familiar, other participants and facilitators engaged with their comments in the chats, or they were asked questions and encouraged to contribute. Respondents stated that webcam use was not especially mentioned by the facilitators (at the start or during the session), but 5 of them reported that the webcam had an impact on how they contributed. Some got distracted with the webcam off, others were happy to have it on and see other participants of the session nodding or interacting. One respondent felt embarrassed with the webcam on. Despite the low number of responses, this exploratory study revealed that the mix of technical and social aspects in these online sessions is complex and requires further exploration.

In my reflections on this exploratory study, I identified a form of an exclusion bias (Strunk & Mwavita, 2020) that had to do with the title of the study: “The Challenges of Web Conferencing”. The title had the capacity to deter potential participants who did not perceive any difficulties with using web conferencing. This knowledge and experience will be applied to the study in this paper to prevent such occurrences.

Conclusion

This research will explore web conferencing, and the interplay between the current technical challenges and social challenges of web conferencing in synchronous online learning and teaching. It will provide up-to-date contribution to knowledge in this subject area. The study in this paper is currently in the ethics process, and phase one is expected to start in February 2024, and the data collection period will run through to July 2024.

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