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Exploring Issues in Teaching Using Video Conferencing Platforms: A design thinking approach

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Abstract

The experience gained by educators from utilizing video conferencing platforms during the COVID-19 pandemic has extended its usage in 21st-century education. This study aims to explore the issues faced by educators when using video conferencing for teaching. The first two stages of the design thinking approach-the empathic stage and the define stage-were employed in the study. The respondents for this study were teachers and university lecturers with experience in video conferencing. Data were gathered through interviews and focus group discussions. The study identified 42 issues, categorised into 13 themes related to the use of video conferencing in teaching.

Keywords: Design thinking; teaching; video conferencing

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1.0 Introduction

Video conferencing has been widely used during the Covid-19 pandemic. The adoption of video conferencing in education has become a common practice following the pandemic. The experience gained by educators has expanded their choices for delivering 21st-century education in various contexts for educational programs (Camilleri & Camilleri, 2022b). Gladović et al. (2020) assert that video conferencing is an efficient and economical method for delivering learning and training.

There are many video conferencing applications available that can be used for online teaching and learning. The number of video conferencing applications has also been growing in recent years, with an increasing number of users. These applications are either available with a free version or require payment. The most commonly used video conferencing platforms include Microsoft Teams,

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Google Meet, Zoom, and Cisco Webex (Cóndor-Herrera et al., 2022). Other available video conferencing platforms include Skype, GoToMeeting, ezTalks Meetings, StarLeaf, 8x8, RingCentral, Lifesize, etc. Some platforms offer a basic plan free of charge, but the free version usually has limitations on the number of participants and duration of meetings. Paid premium versions offer all features available in the video conferencing applications.

The features of video conferencing applications include file and screen sharing, recording, chat, breakout rooms for group discussions and collaboration, personal meeting space, whiteboard, third-party add-in features, auto-generated closed captions for transcription, and streaming to social media (Bhardawaj, Bhardwaj, & Chaudhary, 2023).

According to Gladović et al. (2020, p.47), video conferencing is defined as real-time interaction with synchronous two-way audio and two-way compressed video through the Internet, using digital tools from any location. The synchronous technologies in video conferencing enable interaction between course instructors and students (Camilleri & Camilleri, 2022) in real time (Camilleri & Camilleri, 2021). It represents a new way of teaching with technological advancements that stimulate teaching strategies (Gladović et al., 2020) and pedagogical support (Al-Samarraie, 2019), consistent with the technology. Literature shows that students perceive a positive attitude toward their learning using video conferencing (Gladović et al., 2020; Camilleri & Camilleri, 2022b) and consider it a useful tool for learning (Camilleri & Camilleri (b), 2022).

Video conferencing allows flexibility in learning locations, as learners can connect from anywhere (Gladović et al., 2020; Wea & DuaKuki, 2021). Students can learn at their convenience time via recorded virtual lectures and learning materials (Wea & DuaKuki, 2021)). Educators can monitor students' progress, facilitate them in real-time platforms, and provide feedback to students (Al-Samarraie, 2019; Camilleri & Camilleri, 2022(a).

Some video conferencing platforms have a virtual whiteboard complementing with some learning applications (Kansal et al., 2021), which eases educators to write in virtual classes. Sandhu et al. (2023) shared that video conferencing reduces travel time and hence saves the cost of travel, thereby reducing pollution.

The literature has identified several issues in using video conferencing for teaching. Camilleri and Camilleri (2019) highlighted that prolonged focus on the smart device screen during video conferencing can lead to physical problems such as bad posture. Additionally, distraction by other digital content in virtual environments, such as social media and websites, is a significant issue in video conferencing (Camilleri & Camilleri, 2022b). Al-Samarraie (2019) revealed technical issues of video conferencing, such as Internet connection stability and machine incompatibility with video conferencing tools. He also mentioned instructor issues, where training is required to conduct classes using video conferencing platforms, and educators need to constantly modify their teaching techniques to align with this new method. Sarangi et al. (2022) pointed out that long hours of using video conferencing can cause fatigue.

The issues of using video conferencing tools shared by Mukan et al. (2020) include technical problems, time-consuming preparation of teaching materials, difficulty in converting materials from hard copy to interactive formats, adjustment of assessment techniques, class management challenges, and lack of confidence leading to loss of control in lesson procedures. Bhardawaj et al. (2023) listed 12 issues related to video conferencing applications (p.5). These issues encompass internet connectivity problems, physical strain on eyes and body, mental health issues such as exhaustion, mood swings, depression, etc., sleep deprivation, challenging working hours, increased risk of obesity due to sedentary work, susceptibility to chronic health conditions, loss of cognitive ability, impaired socializing skills and lower self-esteem, weakened emotional judgment, screen addiction, and lack of interactive one-on-one sessions.

Since video conferencing is an emerging delivery method in the 21st century, more studies need to be conducted to identify issues related to using video conferencing for teaching. The research on video conferencing is still limited, and ongoing improvements are needed for these platforms. Therefore, this study aims to scrutinize the issues of using video conferencing for teaching among educators. From these issues, the ideation step in the design thinking approach will be carried out, aiming to improve the current limitations in video conferencing tools.

2.0 Design Thinking Approach

Design thinking is a user-centred approach that aims at innovative problem-solving (Gibbons, 2016; Mueller-Roterberg, 2018). The literature identifies six phases of the design thinking process with iteration loops. Gibbons (2016), in 'Design Thinking 101,' proposes the design thinking framework with an overall flow of understanding, exploring, and materializing. The flow is completed with six phases of the design thinking process, namely empathize, define, ideate, prototype, test, and implement (Fig. 1). The design thinking processes by Gibbons (2016) are summarised in Table 1.

Table 1. The design thinking processes

Phases of Gibbons (2016) design thinking model	Explanation of the phases
Empathize	Developing an understanding of the challenge, problem, need, or requirement (problem understanding). (Mueller-Roterberg, 2018, p.5).
	Detail research and on-site observations need to be carried out on the customer's need or problem (Mueller-Roterberg, 2018, p.5).
Define	Condense to a single prototypical user whose problem or need is to be summarized in a clearly defined question (Mueller-Roterberg, 2018, p.5).
Ideate	Brainstorm a range of crazy, creative ideas that address the unmet user needs identified in the Define phase. Sketch out various ideas, and then have participants share their ideas with one another. Encourage mixing, remixing, and building on others' ideas. (Gibbons, 2016, p.3).

Prototype	"The goal of this phase is to understand which components of ideas work and which do not. During this stage, one begins to assess the impact versus feasibility of ideas by gathering feedback on prototypes. (Gibbons, 2016, p.3).
Test	The goal of this phase is to understand which components of ideas work and which do not. During this phase, one evaluates the impact versus feasibility of ideas by collecting feedback on prototypes (Gibbons, 2016, p.4).
Implement	Put the vision into effect. Ensure that the solution is materialized and touches the lives of end users (Gibbons, 2016, p.4).

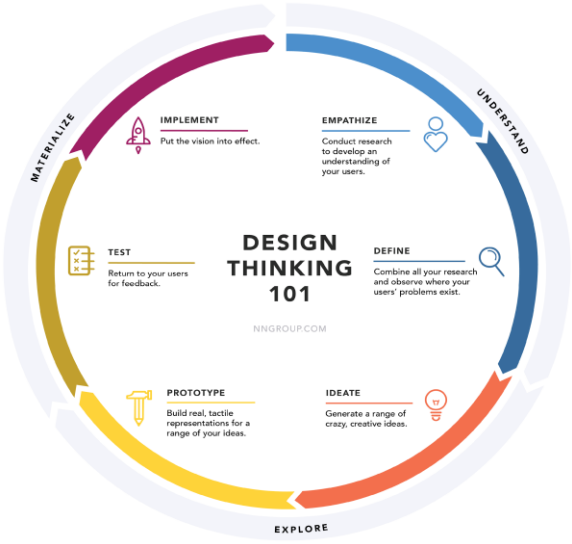

Fig. 1: Design Thinking 101 (Gibbons, 2016, p. 1)

Design thinking is a suitable process for this study, as the challenge of video conferencing in teaching requires a thorough understanding before innovating a suitable model for video conferencing tools. Therefore, video conferencing issues can be addressed through the first two steps of Gibbons' (2016) model.

3.0 Methodology

The study utilised the design thinking approach to identify issues related to teaching using video conferencing platforms among educators. School teachers and higher learning institution lecturers with experience in using video conferencing for teaching were involved in the study. In-depth interviews and focus group discussions were employed to collect data. The study specifically focused on the first two stages of the design thinking model (Gibbons, 2016).

The first stage involves 'understanding the problem.' Here, the aim is to develop an understanding of the issues surrounding the use of video conferencing tools. This stage includes making decisions about the study participants and formulating questions to scrutinize the identified issues. The target group for the study comprises university lecturers who use video conferencing as a teaching delivery platform. To gain a deeper understanding of the problem, data were collected from lecturers within the Sarawak region with over three years of experience using video conferencing as a teaching tool, ensuring they were immersed in the context of video conferencing tools for teaching. The respondents were selected based on their experience with using video conferencing for teaching and their willingness to participate, as indicated by their response to the invitation email sent to all related educators. Observations, in-depth interviews, and focus group discussions were conducted to collect the data. There were 26 lecturers and 16 teachers involved in the study. The second stage involves 'defining the problem.' In this stage, the issues of using video conferencing in teaching were translated from the first stage and categorized into themes.

Interview sessions and focus group discussions were recorded, and the data were transcribed into text. Thematic analysis was applied to analyse the qualitative data. The data were closely examined to identify common themes that emerged.

4.0 Findings and Discussions

The data were gathered through interviews and focus group discussions from 42 participants. The study identified 43 issues, categorizing 13 themes related to use video conferencing in teaching. The first theme was Information and communication technology (ICT) Literacy, encompassing five issues: lack of skills to use video conferencing software, inability to handle video conferencing hardware, insufficient self-learning skills for ICT-related software and equipment, lack of training for using ICT-related equipment in video conferencing, and difficulty handling multiple applications simultaneously in a video conferencing classroom.

The second theme was Management, with three issues namely no standard guidelines for conducting video conferencing classes, lack of systematic instructions on how to conduct video conferencing, and unrealistic expectations from management regarding video conferencing classes. Four issues were grouped under the Assessment theme, covering issues such as a lack of skills to monitor students' progress in a fully online course, absence of standard guidelines for conducting assessments using video conferencing platforms, inadequate skills to set assessment questions for video conferencing, and plagiarism issues during assessments.

The fourth theme, Stakeholders Support, included issues such as a lack of parental support, insufficient support on video conferencing tools for economically disadvantaged students, community culture preferences for face-to-face learning, and a lack of industrial initiative/support in video conferencing for teaching.

The fifth theme, Teaching Facility, comprised four issues namely lack facilities for online learning delivery (ODL), insufficient or outdated teaching tools to support video conferencing, difficulty keeping up with the latest versions of technologies and software, and low-end laptops or smart devices not meeting the minimum requirements to install related software for video conferencing.

Under the Online Teaching Content theme, namely theme number six, comprises two issues: a lack of skills in producing online teaching materials such as videos and digital notes. The Learning Environment theme which is theme number seven encompassed two issues: an unconducive learning environment (noise pollution from surroundings) and no suitable place for teaching at home.

Family Obligations were categorized under the eighth theme, with issues including disturbances from family members and overloaded home duties for students. The ninth theme, the Lecturer Competency theme, grouped three issues: lack of experience teaching using video conferencing, lack of online pedagogical skills, and a lack of skills to engage students. Four issues related to the Personal Related Issues theme were identified as theme number ten. The issues were heavy workload, poor engagement in teaching due to distractions from social media and home duties during video conferencing, loneliness (lack of human contact in video conferencing classes), and a lack of personal time.

The eleventh theme was Technical, with five identified issues: poor Internet connection, slow Internet speed at university/home, applications crashing during video conferencing classes, microphone/speaker connection problems, and an unstable learning management system. The Financial theme numbered as theme number twelve included five issues: limited data subscription due to financial constraints, increased utility bills (e.g., electricity), insufficient budget to acquire hardware and software, limited subscription to video conferencing platforms by the university, and a limited grant to subscribe to online learning platforms. The last theme identified was Health, with eye tiredness due to long hours on computers or smart devices being the issue reflected by respondents.

Some issues found in the study were consistent with findings from the literature. Technical issues, common in online learning, were identified in the study. Literature reported video conference technical issues such as Internet connection instability, consistent with the poor Internet connection and slow internet speed at home or university in this study. He also reported machine incompatibility of video conferencing tools, reflected in this study as application clashes during video conferencing classes and an unstable Learning Management System (Al-Samarraie, 2019; Bhardawaj et al., 2023; Mukan et al., 2020). On the other hand, internet connectivity problems were also reported as an issue. The study added one more technical issue, which is microphone or speaker connection problems.

Poor engagement in teaching due to distraction from social media, grouped under the personal-related issue theme, is consistent with findings from Camilleri and Camilleri (2022b), where they mentioned distractions by other digital content in virtual environments, such as social media and websites. Health issues were another finding in the study consistent with Camilleri and Camilleri (2022) and Bhardawaj et al. (2023). The study found eye tiredness due to long hours on computers or video conferencing devices, whereas Camilleri and Camilleri (2022b) shared bad postures due to the long focus on the smart device screen during video conferencing. Bhardawaj et al. (2023, p.5) listed physical issues such as eyes and body, mental issue, and the risk of obesity.

Lack of experience in teaching using video conferencing and lack of online pedagogical skills, categorized under lecturer competency themes, aligned with instructor issues reported by Al-Samarraie (2019). He shared that training is required to conduct classes using video conferencing platforms. He also revealed that educators need to constantly modify their teaching techniques to align with the new way of teaching. Mukan et al. (2020) shared their issues as difficulty in converting existing materials to interactive materials, which were consistent with the online teaching content issues identified in the study. Their finding on the technique of assessment adjustment was related to the assessment issues identified in the study, but the scenarios of the issues are slightly different. They also pointed out class management as their video conferencing issue. The study also found an additional issue related to lecturer competency, which is a lack of skills to engage students in video conferencing classes. The study's findings which focus on user-centered approach as revealed by Mueller-Roterberg, (2018) as design thinking processes can serve as the basis for ideating innovative solutions to issues with video conferencing platforms. For example, artificial intelligence solutions that pick up the speaker's voice and ignore surrounding noise would reduce issues in unconducive learning environments.

5.0 Conclusion

The study identified 13 themes encompassing 42 issues related to the use of video conferencing tools for teaching. These themes include ICT literacy, Management, Assessment, Stakeholder Support, Teaching Facility, Online Teaching Content, Learning Environment, Family Obligations, Lecturer Competency, and Personal Related Issues. The issues identified in the study are from a developing country and might differ from those in advanced countries. Future developments in video conferencing tools may consider the issues identified in this study to enhance the current versions, ensuring these tools become more effective for teaching, particularly in developing countries.

6.0 Co-Author Contribution

The authors affirmed that there is no conflict of interest in this article. All Authors carried out the fieldwork, prepared the literature review and overlooked the writeup of the whole article.

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Paper Contribution to Related Field of Study

The complexities and diversities of video conferencing in teaching identified for future ideation of portable video conferencing toolkits associated with pedagogical best practices.

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