Received 20 December 2023
Revised 24 May 2024
5 August 2024
Accepted 12 August 2024

Perceptions of students on artificial intelligence-generated content avatar utilization in learning management system

Saw Fen Tan
School of Education, Humanities and Social Sciences, Wawasan Open University, Penang, Malaysia

Abstract

Purpose – This study aims to explore students' perceptions of the use of an artificial intelligence-generated content avatar (AIGC avatar) within a learning management system (LMS).

Design/methodology/approach – This qualitative research involved seven postgraduate students. Data were collected through individual, in-depth interviews. The videos of the AIGC avatar, created using Leonardo, ChatGPT and Heygen, were uploaded to the LMS to communicate with students for the purposes of a welcome note, assignment guide, assignment feedback, tutorial reminders and preparation as well as to provide encouragement and study tips. Students were interviewed at the end of the semester.

Findings – The findings of this study indicated that the majority of participating students held positive perceptions regarding the use of the AIGC avatar in the LMS. They reported that it enhanced their perceived instructor's social presence and motivation to learn. The assignment guide and feedback were particularly valued by the participants. While some students noted the AIGC avatar's lack of naturalness, others appreciated the clear and professional speech it delivered.

Research limitations/implications – The study was confined to seven students from a single course at one institution, which may limit the generalizability of the findings. Future research could involve a larger and more diverse group of participants.

Practical implications – The findings may offer education providers an alternative solution for engaging students in an LMS.

Originality/value – This study highlights the potential of AIGC avatars to replace text-based communication in LMS and enhance students' perceived instructor social presence.

Keywords Artificial intelligence-generated content avatar (AIGC avatar),
Learning management system (LMS), Students' perceptions

Paper type Research paper

Introduction

Open and distance education is booming, with an ever-increasing number of students enrolling in open and distance learning program each year (Muljana and Luo, 2019). Seaman *et al.* (2018) reported that the growth between 2012 and 2016 was 17.2%. However, the institutions offering open and distance learning programs continue to face challenges with

This is a substantially extended and enhanced version of the paper "Revolutionising Learning Management System with AIGC Avatar: An Insights from Students' Perspectives" published in the proceedings of the 36th Annual Conference of the Asian Association of Open Universities, held in İstanbul, Turkey, on 28–30 September 2023.

Asian Association of Open Universities Journal
Vol. 19 No. 2, 2024
pp. 170-185
Emerald Publishing Limited
e-ISSN: 2414-6994
p-ISSN: 1858-3431
DOI 10.1108/AAOUJ-12-2023-0142

low retention and completion rates as well as high dropout rates (Muljana and Luo, 2019; Radovan, 2019; Xavier and Meneses, 2020). Many reasons contribute to student dropout. One of the reasons is the geographical distance between learners, their coursemates and instructors, which often leads to feelings of loneliness and isolation (Burns, 2013). These sentiments demotivate learners, causing them to feel discouraged and ultimately drop out of their studies.

The learning management system (LMS) plays a crucial role as the primary communication platform in open and distance learning. It serves as a comprehensive tool for distributing educational materials, assessment tasks, announcements, facilitating discussions and enabling communication among students and instructors. Being the central portal in open and distance learning, it serves as the key link connecting students with their peers and instructors. Nevertheless, communication within the LMS is primarily text-based. Text-based communication lacks nonverbal cues such as facial expressions, body language and tone of voice. The absence of these nonverbal cues hinders the establishment of rapport and trust between instructors and learners. Cobb (2009) reported that several researchers have found social presence in text-based online communication to be perceived as low. This creates feelings of disconnection or transactional distance between learners and instructors (Byrd, 2016; Estes, 2016), which in turn contributes to student dropout.

As a response, some researchers have introduced multimodal communication in online learning to enhance social presence and engagement, for instance, Flipgrid, LMS video-response discussion boards and VoiceThread (Carr, 2020; Casan-Nunez, 2021; Chen and Bogachenko, 2022). Carr (2020) reported that participants preferred alternative communication modes over traditional text-based communication. Similarly, Casan-Nunez (2021) found that participants in his study responded positively to the use of Flipgrid in their online classroom. Despite the positive response to multimodal communication, the study conducted by Lowenthal and Moore (2020), where Flipgrid was used as a video-based discussion tool in online learning, revealed that some students were uncomfortable showing their faces in the video. The reasons for this discomfort included self-confidence issues, the pressure to look presentable and concerns about privacy. To alleviate the anxiety some students feel about being on camera, Lowenthal and Moore (2020) proposed several flexible and creative approaches for participating in Flipgrid discussions. These suggestions included allowing students to point the camera at something else in the room, such as a book, while they speak; using a still shot (a static image) or an avatar (a digital representation of themselves) instead of their own face and permitting students to upload videos they have created on other platforms. The findings of Lowenthal and Moore (2020) have informed the current study by highlighting the challenges students face with video participation. In our study, similar issues of shyness and lack of confidence might also affect certain online instructors' ability to communicate through video. By incorporating the insights from Lowenthal and Moore (2020), the current study proposes a creative solution by using artificial intelligence-generated content avatar (AIGC avatar) to replace real human videos for communicating with students in LMSs.

Open and distance learning have shattered the limitations of educational opportunities. Students can enroll in programs from any corner of the globe without being restricted by their geographical location. As a result, instructors may find themselves interacting with students from diverse regions, each with their own unique dialects and slangs that significantly influence their English proficiency. This diversity may pose challenges to effective video communication. Thus, this study proposes using the AIGC avatar as a means of communication in the LMS. Since students are the primary beneficiaries of the teaching and learning process, this study aims to explore students' perceptions regarding the use of

the AIGC avatar in the LMS. By understanding their perceptions, we can determine whether the AIGC avatar has the potential to replace real human video in the LMS in enhancing the teaching and learning process.

Artificial intelligence-generated content (AIGC) in education

AIGC involves the utilization of artificial intelligence (AI) to aid or automate the content creation process. By analyzing the keywords or requirements input by the user, AI systems generate relevant content to meet specific criteria or preferences. As mentioned by Wu *et al.* (2023), there are three modes of content creation, namely professional-generated content (PGC), user-generated content (UGC) and AIGC. In the PGC mode, content is generated by professional teams with expertise in their respective fields. This mode often produces high-quality content, but the production process can be time-consuming and challenging to meet the demand for top-tier content. Meanwhile, in the UGC mode, users create content using authoring tools. The use of tools reduces the threshold and costs of generation. However, the quality of the content created may vary depending on the users' competencies, which could lead to inconsistencies in content quality. In the AIGC mode, content is produced with the assistance or complete automation of AI technologies. It employs machine learning algorithms, natural language processing (NLP) and other AI techniques to analyze large datasets for content generation. AIGC can be categorized into text, image, audio and video.

Since the advent of generative AI, researchers have begun to investigate the effectiveness of AI-generated materials as a potential substitute for traditional human-created content, which requires significant investment in time, labor and equipment to produce quality products. Wu *et al.* (2023) observed that the use of AIGC enhances efficiency and scalability. Content can be generated in a shorter time. Besides, AIGC can perform language localization by translating content into languages commonly spoken in specific regions. Leong *et al.* (2023) utilized AI-generated voices for explainer videos at a university in Malaysia. The study investigated students' responses to AI-generated voices. The 31 participants were exposed to a set of explainer videos using different voice-overs, including human voices, speaker notes apps and AI-generated voices. Based on their responses collected through a questionnaire, the students preferred the more human-like voice-overs and showed no substantial negative perceptions of the AI-generated voices that closely resembled human voices.

Other than AI-generated voice, studies were also conducted to explore the potential of video featuring AI-generated avatars. Leiker *et al.* (2023) compared the impact of learning videos featuring an AI-generated virtual instructor with those featuring a human instructor on students' content acquisition and learning experience. This study involved 83 adult learners who were divided into experimental and control groups. The findings showed that learners in both conditions showed significant improvements in their learning, and there were no significant differences in gains between the two conditions ($p = 0.80$). Besides, no differences were observed in the learners' perceptions of the AI-generated virtual instructor and human instructor videos.

A similar study was conducted by Vallis *et al.* (2023), who explored students' perceptions of teaching and learning with an AI-generated avatar. They found that students perceived little difference between AI-generated avatars and human presenters for certain types of lectures, especially those focused on delivering knowledge rather than personal experiences. They found AI-generated avatars suitable for the topic of ethical issues in business. The participants appraised the AI-generated videos for their clarity, helpful pauses and easy-to-follow pronunciation, which were particularly beneficial for international students. Additionally, they expressed a desire for the ability to customize AI-generated avatars by changing their accents, language, gender, age and appearance.

Both Leiker *et al.* (2023) and Vallis *et al.* (2023) reported that their participants expressed positive perceptions of AI-generated avatars. While the use of AIGC avatar in education is a relatively new and evolving field, research on students' perceptions remains limited. Although AI has demonstrated potential in replicating certain human attributes, more comprehensive studies are needed to fully understand the implications and effectiveness of AIGC avatars in educational settings.

Computers are Social Actors (CASA) paradigm

The Computers are Social Actors (CASA) paradigm is derived from the Media Equation (Reeves and Nass, 1996). It explains how humans perceived and socially interact with media technologies (Nass *et al.*, 1994). When humans interact with media technologies, they respond as if they are interacting with another human. In other words, humans apply social script when interacting with technology and treat it similarly to how they would treat another human being. Since the early 1990s, this framework has been used by researchers to understand users' interactions with desktop computers (Nass *et al.*, 1997), web-based agents (Liew and Tan, 2018) and video game avatars (Kim and Timmerman, 2018). In recent years, advancements in AI have expanded its application to include human–robot interaction (Spence *et al.*, 2014) and human–chatbot interaction (Edwards *et al.*, 2019).

Kim and Timmerman (2018) found that individuals consider and react to feedback from a video game avatar as if it were from a human. Similarly, Edwards *et al.* (2019) discovered that after interacting with a robot, people have more positive perceptions of robot interactions than they initially perceived. These findings suggest that although people may initially have different expectations for human versus robot interactions, they may come to perceive humans and robots similarly once they engage in actual interactions. Therefore, this study proposes using an AIGC avatar to replace real human interactions for communication with students in the LMS. Students may perceive the avatar as another human supporting them in their learning journey. If the study's findings indicate this potential, AIGC avatars could be widely adopted in LMS communication, significantly reducing the time and resources required for creating videos with real humans.

Instructor social presence

Instructor social presence is a construct based on the Community of Inquiry framework advocated by Garrison *et al.* (2000). According to this framework, social, cognitive and teaching presences are essential components of the educational experience. Social presence is defined as "the ability of participants in the community of inquiry to project their personal characteristics into the community, thereby presenting themselves to others as 'real people'" (p. 89). Garrison and Anderson (2003) elaborated that social presence involves "creating a climate that supports and encourages probing questions, scepticism and the contribution of more explanatory ideas" (p. 50). Teaching presence refers to "the design, facilitation, and direction of cognitive and social processes for the purpose of realising personally meaningful and educationally worthwhile outcomes" (Anderson *et al.*, 2001, p. 8). Teaching presence includes managing instruction, building understanding and providing direct instruction.

The construct of instructor social presence is the intersection of social presence and teaching presence. It refers to the way an instructor "positions him/herself socially and pedagogically in an online community" (Richardson *et al.*, 2015, p. 259). It represents the social presence of the instructor. Instructor social presence can be created in online learning by giving welcome and orientation announcements, providing timely and detailed feedback and maintaining regular communication with students (Gunawardena and Zittle, 1997; Ho *et al.*, 2022; Jaggars *et al.*, 2013; Nasir, 2020; Richardson and Lowenthal, 2017). When students

feel connected to their instructors, they are more likely to actively engage in idea-sharing, collaborative work and meaningful discussions within the online learning environment, ultimately enhancing their performance. The use of asynchronous videos by Borup *et al.* (2011, 2012, 2014) was found to foster closeness and increase instructor social presence as these videos conveyed verbal and non-verbal immediacy cues.

As discussed in the previous section, the CASA paradigm posits that humans interact with technology as they would with other humans (Reeves and Nass, 1996). In this study, instructor social presence refers to how the AIGC avatar positions itself socially and pedagogically within the LMS to support students. Unlike other studies that focus on human instructors (e.g. Richardson and Lowenthal, 2017), this study explores the instructor's social presence created by the AIGC avatar. It investigates how the AIGC avatar can emulate the social and pedagogical roles of a human instructor, fostering a sense of connection, engagement and support among students in the online learning environment.

This study examines instructor social presence because many studies have reported that it is crucial for creating a positive learning experience in online learning (e.g. Park and Kim, 2020). However, text, which is widely used for communication in LMS, was found to exhibit low social presence (Cobb, 2009). Given the importance of instructor social presence in enhancing the online learning experience, this study explores the potential of the AIGC avatar to establish instructor social presence in the LMSs.

Throughout the semester, the avatar provides a welcome note, assignment guide, assignment feedback, encouragement, study tips and tutorial reminders and preparation. Students perceive a human-like presence in the virtual environment as they interact with the AIGC avatar. By engaging with the AIGC avatar, students' perceptions of instructor social presence are expected to be enhanced, leading to a better online learning experience.

Research methodology

Using a qualitative approach, this study aims to explore the students' perception of the use of AIGC avatar for communication purposes within the LMS. Videos of the AIGC avatar were used to replace text-based communication in the LMS.

Participants

This study involved seven postgraduate students enrolled in the Master of Education course "Professional Development in Education" at an open and distance learning institution. Seven of them were selected using random sampling from the students of the course. The demographic information of these seven participating students is presented in Table 1. As displayed in Table 1, Carmen was the only student in her first semester, while the other six participants were at various stages in their academic journey. They consisted of four females and three males, ranging in age from 31 to 45.

Procedure

The creation of the AIGC avatar videos involved the utilization of three AI tools, namely Leonardo, ChatGPT and Heygen. The image of the avatar was crafted using Leonardo (as shown in Figure 1), followed by the generation of the script by ChatGPT. Important points were integrated into the ChatGPT, which was then instructed to rephrase the script in a friendly and motivating tone. Lastly, the script from ChatGPT and the image from Leonardo were combined within Heygen to transform the text and image into video format.

The AIGC avatar was used for communication purposes in the LMS for a single semester within a postgraduate course. All the students of the course were given access to the videos. As shown in Table 2, the duration of the semester was 14 weeks, including 11 weeks of

teaching and learning, one week for self-study and two weeks for examinations. Over the span of the 11 teaching and learning weeks, students were required to complete two assignments, while three online tutorials were also offered, although attendance to these

Student	Gender	Academic term	Age
Linda	Female	4th	45
Kenny	Male	4th	31
Eugene	Male	2nd	37
Melissa	Female	2nd	49
Alex	Male	5th	40
Carmen	Female	1st	39
Jasmine	Female	3rd	40

Source(s): Table by author

Table 1. Demographic information of participants

Source(s): Figure by author

Figure 1. Image of AIGC avatar created using Leonardo

Week	Academic activity	Content delivered
1	Tutorial 1	Welcome notes Assignment guide
2		Encouragement and study tips
3		
4		Tutorial reminder and preparation
5	Submission of Assignment 1 Tutorial 2	Assignment guide
6		Encouragement and study tips
7	Release of Assignment 1 marks	Feedback for Assignment 1 Tutorial reminder and preparation
8	Tutorial 3 Submission of Assignment 2	Encouragement and study tips
9		
10	Release of Assignment 2 marks	Feedback for Assignment 2
11		Encouragement

Source(s): Table by author

Table 2. Timeline of AIGC avatar content delivery across the semester

tutorials was not compulsory. The AIGC avatar videos were posted in the LMS from week 1 to week 11 to convey the following messages:

(1) Welcoming note

A welcome note was presented at the beginning of the semester. The AIGC avatar introduced herself as the course instructor and tutor. Then, an overview of the course and the assessment criteria were provided. Students were encouraged to regularly access the LMS for resources and updates, participate in online tutorials and actively communicate with instructors, tutors and peers.

(2) Assignment guide

The assignment guide was provided about one month before the submission deadline. It aimed to assist students in completing their assignments. It detailed the necessary components for each question, along with the corresponding mark allocation. Each component was clearly defined, with a description of its purpose within the context of the assignment, to ensure that students understood the relevance and necessity of every section.

(3) Assignment feedback

Assignment feedback was provided after the release of the marks to the students. It highlighted the common mistakes made in their assignments and offered advice on how to improve performance in future assessments.

(4) Tutorial reminder and preparation

While attendance at tutorials was not mandatory, students were reminded and encouraged to attend the tutorial one week in advance. Furthermore, the AIGC avatar emphasized the essential content that students should review prior to attending the tutorial, ensuring that students were well-prepared for a productive and insightful learning experience during the tutorials.

(5) Encouragement and study tips

Students received consistent encouragement and study tips to foster regular study habits. They were advised to practice effective time management by setting aside dedicated periods for study and ensuring a balanced approach to their coursework and other commitments. Besides, students were prompted to engage in active communication with their peers, creating a collaborative learning environment. They were also reassured that seeking assistance from tutors and instructors was not only welcomed but encouraged, should they require further clarification or support in their learning journey.

All the students in the course had the same access to the AIGC avatar videos throughout the semester. Only seven students were involved in the semi-structured interviews conducted by the researcher.

Data collection

Interview is a fundamental technique of data collection in phenomenological studies (Smith and Fieldsend, 2009) because it allows participants to share detailed accounts of their experiences (Moustakas, 1994). Individual semi-structured interviews were conducted by the researchers with the seven participants at the end of the semester. The interview protocol was developed based on a literature review and covered the following aspects:

(1) Overall views on the use of AIGC avatars in LMS.

(2) Evaluation of AIGC avatar-based communication versus text-based communication within the LMS.

(3) Perceptions regarding the design of the AIGC avatar.

(4) Recommendations for enhancing the effectiveness and user experience of AIGC avatar.

The interview protocol was piloted with two students before the actual data collection. Written consent was sought from all the participants prior to the interviews. The interviews were conducted via Microsoft Teams. All interviews were video-recorded with permission for analysis purposes.

Data analysis

All the interviews were transcribed verbatim and imported into NVivo. The data analysis process began with a thorough reading of the transcripts multiple times to deeply engage with the data. The researcher then identified the emerging themes. Next, the researcher explored the connections among the emerging themes and grouped relevant themes together. This process was repeated for all participants. The researcher then examined patterns across all participants and established connections among them. Emergent and subordinate themes were reconfigured and relabeled as necessary.

Trustworthiness

In this study, trustworthiness was established through credibility and confirmability. Credibility was achieved via member checking (Smith and McGannon, 2018). The analyzed data were presented to the participants for review to ensure their perceptions were accurately captured. Confirmability was ensured by making certain that the interpretation of the data was not influenced by the researcher's biases. According to Tobin and Begley (2004), confirmability involves verifying that the data reflect the participants' true experiences rather than being a product of the researchers' imagination. The researcher set aside her preconceived ideas and biases to accurately capture the participants' perceptions regarding the use of AIGC avatar in the LMS.

Findings

This study aimed to explore the students' perceptions regarding the use of AIGC avatar in LMS. The findings from the analysis were divided into four sections, which included the students' perceptions regarding the use of AIGC avatar in LMS, the content delivered by the AIGC avatar, the design of the AIGC avatar and suggestions for advancement.

Students' perceptions regarding the use of AIGC avatar in LMS

The analysis of semi-structured interviews with the participating students revealed that the majority of them were excited about the use of AIGC avatar in the LMS.

> I felt really creative. Unlike the conventional method, we call it the traditional method, it's through text, slides and everything. Video tends to trigger my interest. It's quite engaging. (Eugene)

> This is my first time to have avatar in my learning management system. So it's very new to me, but I would say it's a great start to have all these videos into our LMS. (Jasmine)

> I watched the first video about the introduction. It's the avatar introducing herself. I was eager to it. It makes me want to know what's the next video about. (Alex)

Jasmine found the inclusion of AIGC avatar in the LMS interesting as it provided multimodal learning compared to text, which was unimodal communication.

> I do enjoy both text and videos. But, adding the visual and the sound create another way of learning. It's not like we only read, write and look at the text. All the materials are in text, right? It's something different to have the video. (Jasmine)

Alex and Linda had similar comments regarding the use of multimodal communication. Alex commented that "*for the text, I have to refer to it many times, compared to the video. Even I listen only one time, I still remember the details. I don't have to play the video many times. Compared to the written text, I have to check many times when I'm doing my assignment.*" He further elaborated that "*maybe because I'm a music person, or maybe I prefer the audio. I feel like listening is better than reading.*"

A similar comment was given by Linda,

> If compare the text and avatar in LMS definitely avatar will be better because I am audio type of people, I need to listen in order to learn better so avatar will … I think offer me a better understanding in terms of the assignment guide and needs and compared to text because sometimes I will not be able to comprehend that much from the text. So about that actually offer another way of learning and understanding in terms of the in the LMS learning.

While Alex and Linda commented that they can comprehend the assignment guide better through the verbal explanation from the avatar over the text, some students expressed that they still prefer text as compared to the avatar. As mentioned by Kenny, "*I like [the assignment guide in] text. I like to get the information as quick as possible so that I can start do my work. Now, when I click into it, I have to wait for the avatar to talk. Say already, I have to pause and write it down. I have played again.*"

Melissa also had a similar comment regarding the use of AIGC avatar to explain the assignment guide.

> when I was listening. I have to pause a few times, after that, listen again to make sure that I capture the information accurately before I start my assignment. I'm very particular about my marks, this portion how many points, this portion how many points. It's not very useful [to be used for assignment guide] because I have to [view] it a few times.

There was a mix of responses among the students regarding the use of the AIGC avatar for the assignment guide. Two students commented that they prefer the AIGC avatar, while the rest of the students preferred to have the assignment guide in text form.

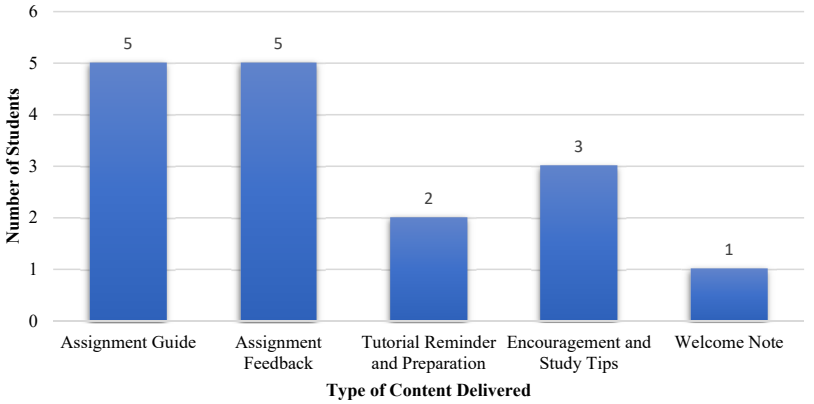
The use of the AIGC avatar was also found to create a perceived instructor social presence among the students. Alex commented that "*it feels like a real person. Feel like someone is talking to me." He elaborated that "usually the LMS, there are just text, right? With this video, when we listen, when I listen to the speech, it feels like listening to someone encouraging.*" A similar comment was given by Carmen,

> I feel more motivated. I will feel that there are some people there. When I listen to the study tips, I feel someone is supporting you by giving you some tips to help you, you feel supported and then you won't feel lonely.

Furthermore, the welcome note delivered by the AIGC avatar also made Carmen feel welcomed, especially when compared to another course where the welcome note was delivered in text. She said, "*the video will have a different feeling, like I am welcomed. Compare to just a formal text, I don't have the feeling."*

Content delivered by the AIGC avatar

Figure 2 shows the students' responses toward the different types of content delivered by the AIGC avatar in the LMS. Among these content types, assignment guides and feedback received the most favorable feedback from the participating students. Five out of seven of them commented that these two types of content were helpful for their study.



Source(s): Figure by author

Figure 2.
The number of students with positive perceptions toward AIGC avatar delivered content

As mentioned by Carmen, "*the most helpful one is the assignment guide. As you know, we are ODL, we have no classmate to discuss, so there's the only thing I can get before I prepare my assignment*". Similar points were given by Jasmine: "*I try to seek some clues how to start off with my assignment*". Likewise, Melissa expressed that "*I play the video [with assignment guide], I listen, get the points, then I can start do my assignment. It helps me a lot.*" Most of the participating students reported that the assignment guide delivered by the AIGC avatar assisted them in preparing their assignments.

Assignment feedback was delivered after the marks were released. Feedback was prepared based on the common mistakes in students' submitted assignments and advice on how to perform better in upcoming assignment tasks. The students found that the advice was helpful in better preparing for future assessments.

> Listening to feedback makes me . . . I mean try to improve for the next assignment and the final assessment. It is the most valuable. (Alex)

> I like the advise, like go straight to the point, try not to give superficial points, that I what I always did because of the word count limit . . . I really like that part. (Eugene)

Out of the seven participants, two of them highlighted how the tutorial reminder and preparation assisted them in their learning. As commented by Jasmine, "*the reminder of the tutorial and what the tutor is going to discuss in the coming tutorial. So, give me the picture of what I need to get prepared for the next tutorial. What topic, which area that I need to prepare myself.*" The students stated that they were able to prepare in advance for the tutorial based on the instructions delivered by the AIGC avatar.

There were also two participating students who perceived that the motivational messages were helpful to them. As expressed by Alex, "*the encouragement is quite good because . . . usually the LMS they are just text, right? Uh, with this video we list when we I listen, when I listen to speech, it's. It feels like listening to someone encouraging. It feels like a bit of human touch there.*" He felt motivated by the message he received from the AIGC avatar.

While many students found this message not useful as they were already aware of the importance of time management, Carmen, a first-term student, appreciated the message. According to her,

> I get the point from the video is everyday we allocate one hour for reading and then that is actually helps a lot. I think everyone knows, but . . . when it comes out from your mentor, you will have a

> feeling like ohh my mentor is advising me to do this, so I will have the feeling like you have the motivation to do that.

Design of the AIGC avatar

When asked about the design of the AIGC avatar, most of the participants commented that the appearance was attractive. However, they observed that the motion of the avatar was not natural.

> Tone speech is OK, but the speech and the mouth is not so coordinated. Eye blink is not so natural. (Melissa)

> The tone in terms of the speed is OK and then the appearance also very attractive. So just that it's not natural. (Linda)

Three students provided positive comments regarding the speech. Carmen commented that. "*I like the speech, very professional.*" Similarly, Alex highlighted that use of speech by AI encountered problems with instructors who have less proficiency in English speaking.

> [the speech] is very clear, let's say if someone take their own video, I think they might have a problem with the speech as a problem with the audio. Sometimes, the audio is not very clear.

Jasmine shared a similar view with Alex, and she mentioned that it would be good for international students.

> If let's say for international learning, we need to localise. We need to consider those foreign students that don't really understand well. [Some foreign lecturers'] slang are very strong. So yeah, that one the avatar will work better.

In summary, despite the AIGC avatar's appearance and motion being perceived as lacking naturalness, students found value in the AI-generated speech addressing language-related challenges. This is particularly relevant for instructors with limited English proficiency or strong accents that might hinder student comprehension.

Suggestions for advancement

The participating students were excited with the utilization of AIGC avatar in the LMS. They recommended expanding its use to deliver course content, particularly for providing summaries and highlighting key points.

> At least we don't have to go through the entire units. Lots of words. If we can have this kind of video to bring out the important points of that particular unit, and also the whole course. That would be very helpful. (Jasmine)

> The course materials are all PDF, right? What I normally read is the contents to make to get an overall guideline. Then after that go and read the details. So probably another step would be to have the avatar to give a summary of each of the unit so that it provides the students with a brief overview. (Melissa)

Besides, the students also suggested enhancing the AIGC avatar videos by incorporating textual elements to visually emphasize key points.

> The speech is presented by the avatar. Maybe some important points are presented with visual. With some infographics. (Alex)

In addition to content-related suggestions, the students also recommended making the background of the AIGC avatar videos brighter to impart a livelier atmosphere. Eugene shared his preference and stated, "*maybe the background can change too. I like brighter brighter background.*"

Discussion

The main focus of this study is to explore students' perceptions of the use of AIGC avatar in LMS. Analysis of the findings showed that most students were excited about the use of AIGC avatar. When comparing with past studies, Leiker *et al.* (2023) and Vallis *et al.* (2023) reported no significant difference between students' perceptions of AIGC avatars and real humans. However, Kim *et al.* (2021) discovered that students' perceptions regarding AI-generated avatars were influenced by the communication style and the topics being delivered. Students preferred avatars that utilized a relational style over a functional style and enjoyed watching avatars teaching social science lectures. Therefore, further study is needed to explore factors that influence students' perceptions of AIGC avatars in LMS.

Some students expressed a preference for AIGC avatar over text-based communication due to its multimodal nature. This preference aligns with Mayer's (2001) multimedia principle, which advocates for the use of multiple channels to enhance learning. When watching videos with AIGC avatar, students engage both visually (through the avatar) and auditorily (through spoken words). This dual-channel engagement improves communication effectiveness and contributes to the students' positive perceptions of AIGC avatar. While many students appreciated the use of AIGC avatar, some expressed a preference for having the assignment guide presented in text form. This preference could be attributed to their individual learning styles, as described by the VARK model (Fleming, 2001). Auditory learners tend to benefit more from auditory explanations provided by the avatar, while reading/writing learners prefer reading the information in text form.

Students reported feeling as if someone was personally talking to and supporting them when they watched videos featuring AIGC avatar. This observation aligns with the CASA paradigm, which suggests that students do not significantly differentiate between human–human and human–robot communication. Similar findings by Kim *et al.* (2021) indicated that students often perceive machine teachers as humans when interacting with them. Additionally, students felt encouraged and supported while watching these videos, which contributed to their motivation. This finding highlights the potential of AIGC avatars to create a sense of instructor social presence in online learning environments, akin to human instructors. When students perceived this social presence, their motivation increased.

In this study, an AIGC avatar was utilized to deliver various types of messages. Students particularly valued assignment guides and feedback, aligning with the findings of Vlachopoulos and Makri (2019). Their literature review highlighted the importance of guidance and feedback on assignments as critical factors for enhancing learning in online environments. Different students had varying perceptions of the content delivered by AIGC avatars. For instance, time management and help-seeking, identified as essential for distance learners to perform well (Tan *et al.*, 2021), were particularly valued by first-year students. However, some students found these messages redundant. While some students appreciated motivational messages, others valued tutorial reminders and preparation. Many students recommended incorporating AIGC avatar into course content delivery, suggesting that the messages should be tailored to meet specific student needs. While the use of AIGC avatar has the potential to reduce instructors' workloads, intensive studies are needed to explore which areas are suitable for AIGC avatar and which still require human instructors. Achieving a balance between AIGC avatar and real instructors in online learning is essential (Vallis *et al.*, 2023).

The students also commended the clarity and professionalism of the AIGC avatar's spoken language. This positive feedback on the vocal quality aligns with the findings of Vallis *et al.* (2023), where students commented that the AI-generated voice was easy to understand and follow. In addition, the study by Leong *et al.* (2023) supports these findings. Their research showed that students did not exhibit substantial negative perceptions of the AI-generated voice. These consistent findings across multiple studies highlight the potential

of AI-generated voices in educational settings. The positive student feedback on the clarity and professionalism of these voices suggested that AIGC avatar can effectively facilitate communication and enhance the overall learning experience in LMS.

Conclusion

This study marks a significant initial step in exploring the application of AIGC avatar in the context of open and distance learning. The analysis of data based on the students' perception revealed a combination of positive and negative comments regarding this innovation. The majority of the participating students expressed positive perceptions regarding the use of AIGC avatar; they were deemed to enhance their perceived instructor's social presence and motivation in learning. Meanwhile, there were also a few participants who expressed their preference for text over the AIGC avatar. The discrepancy in response could be caused by the differences in their learning style or the features of the AIGC avatar.

The assignment guide and feedback were most valued by participants among the various messages delivered. While some of the participating students commented that the AIGC avatar was lacking in naturalness, some of them expressed appreciation for the clear and professional speech delivered by the AIGC avatar. They also highlighted its potential in addressing the English language proficiency challenges faced by certain instructors. Students expressed anticipation for broader integration of the AIGC avatar in their learning process, suggesting its use for delivering course materials.

Practical implication

The use of AIGC avatar received a positive response from students, as it created a perceived instructor social presence. This finding implies that AIGC avatar can be utilized for communication purposes in LMS to engage the students.

Videos of AIGC avatar can be used to provide assignment guides and feedback, as they received very good responses from the majority of the participating students. To accommodate different learning styles, text or diagrams can be added to videos to highlight key points. This multimodal approach ensures that learners with varying learning styles, whether they are visual, auditory or reading/writing learners, can all benefit from the videos. In addition, when designing content delivered by AIGC avatar, instructors should consider the students' backgrounds, such as their academic level and prior knowledge, to ensure the content or message delivered is appropriate and effective.

The spoken language of AIGC avatar was deemed clear and professional, making them highly suitable for communication purposes. This feature is particularly advantageous for instructors who are not proficient in English. Tools like Heygen, which can speak more than 40 languages in over 100 regional accents, further extend the versatility of AIGC avatar. This capability allows AIGC avatar to reach a wider audience from different countries, making them invaluable tools in international and multicultural educational settings.

Research implication

The findings from this study contribute to the growing knowledge pool by highlighting the potential of AIGC avatar to create a perceived instructor social presence among students in LMS. This perceived presence can enhance students' sense of connection and support, which is crucial for maintaining engagement and motivation in online learning settings.

However, further studies are needed to improve the effectiveness of AIGC avatar. Future research can explore how different features of AIGC avatar could enhance students' online learning experiences, such as communication style, content delivery, types of courses and so forth.

This study only involved seven postgraduate students from one course, which may limit the generalizability of the findings. Future research should be conducted with larger sample sizes to validate these results and explore the impact of AIGC avatar on a more diverse student population. Including students with different demographics, such as age, gender, cultural background and academic proficiency, will provide a more comprehensive understanding of the effectiveness of AIGC avatar in various educational contexts. By addressing these areas, future studies can build on the current findings and provide more detailed guidance to optimize the usage of AIGC avatar in enhancing online learning experiences.

References

Anderson, T., Rourke, L., Garrison, D.R. and Archer, W. (2001), "Assessing teaching presence in a computer conferencing context", *Journal of Asynchronous Learning Networks*, Vol. 5 No. 2, pp. 1-17, doi: 10.24059/olj.v5i2.1875.

Borup, J., Graham, C.R. and Velasquez, A. (2011), "The use of asynchronous video communication to improve instructor immediacy and social presence in a blended learning environment", in Kitchenham, A. (Ed.), *Blended Learning Across Disciplines Models For Implementation, IGI Global*, Pennsylvania, pp. 38-57.

Borup, J., West, R.E. and Graham, C.R. (2012), "Improving online social presence through asynchronous video", *Internet and Higher Education*, Vol. 15 No. 3, pp. 195-203, doi: 10.1016/j.iheduc.2011.11.001.

Borup, J., West, R.E., Thomas, R. and Graham, C. (2014), "Examining the impact of video feedback on instructor social presence in blended courses", *International Review of Research in Open and Distance Learning*, Vol. 15 No. 3, pp. 1-15, doi: 10.19173/irrodl.v15i3.1821.

Burns, M. (2013), "Staying or leaving? Designing for persistence in an online educator training programme in Indonesia", *Open Learning: The Journal of Open, Distance and eLearning*, Vol. 28 No. 2, pp. 141-152, doi: 10.1080/02680513.2013.851023.

Byrd, J.C. (2016), "Understanding the online doctoral learning experience: factors that contribute to students' sense of community", *The Journal of Educators Online*, Vol. 13 No. 2, pp. 1-34, doi: 10.9743/jeo.2016.2.3.

Carr, J. (2020), "Teacher candidate perceptions on alternative asynchronous online discussion boards", *Journal of Educational Technology and Online Learning*, Vol. 3 No. 3, pp. 288-310, doi: 10.31681/jetol.752283.

Casan-Nunez, J.C. (2021), "Creating a positive learning environment in the online classroom with Flipgrid", *The EuroCALL Review*, Vol. 29 No. 2, pp. 22-32, doi: 10.4995/eurocall.2021.15347.

Chen, J. and Bogachenko, T. (2022), "Online community building in distance education: the case of social presence in the Blackboard Discussion Board versus Multimodal VoiceThread interaction", *Educational Technology and Society*, Vol. 25 No. 2, pp. 62-75.

Cobb, S.C. (2009), "Social presence and online learning: a current view from a research perspective", *The Journal of Interactive Online Learning*, Vol. 8 No. 3, 241254.

Edwards, A., Edwards, C., Westerman, D. and Spence, P.R. (2019), "Initial expectations, interactions, and beyond with social robots", *Computers in Human Behavior*, Vol. 90, pp. 308-314, doi: 10.1016/j.chb.2018.08.042.

Estes, J.S. (2016), "The pivotal role of faculty in online student engagement and retention", Kyei-Blankson, C., Blankson, L., Ntuli, J. and Agyeman, E. (Ed.s), *Handbook of Research on Strategic Management of Interaction, Presence, and Participation in Online Courses*, IGI Global, Pennsylvania, pp. 66-88.

Fleming, N. (2001), *Teaching and Learning Styles: VARK Strategies*, Neil Fleming, Christchurch.

Garrison, D.R. and Anderson, T. (2003), *E-Learning in the 21st Century*, Routledge-Falmer, Routledge, London.

Garrison, D.R., Anderson, T. and Archer, W. (2000), "Critical inquiry in a text-based environment: computer conferencing in higher education", *The Internet and Higher Education*, Vol. 2 No. 23, pp. 87-105, doi: 10.1016/s1096-7516(00)00016-6.

Gunawardena, C. and Zittle, F. (1997), "Social presence as a predictor of satisfaction within a computer-mediated conferencing environment", *American Journal of Distance Education*, Vol. 11 No. 3, pp. 8-26, doi: 10.1080/08923649709526970.

Ho, M.C., Keoy, K.H., Tan, H.L., Pang, K.Y., Ooi, P.B. and Yusof, R. (2022), "Examining social presence and online learning satisfaction among Malaysian university students during the COVID-19 pandemic", *International Journal of Education, Psychology and Counseling*, Vol. 7 No. 47, pp. 189-202, doi: 10.35631/ijepc.747018.

Jaggars, S.S., Edgecombe, N. and Stacey, G.W. (2013), "Creating an effective online instructor presence", *Report completed for the Community College Research Center, Teachers College*, Columbia University, NY, available at: http://files.eric.ed.gov/fulltext/ED542146.pdf (accessed 20 December 2023).

Kim, J. and Timmerman, C.E. (2018), "Effects of supportive feedback messages on exergame experiences", *Journal of Media Psychology*, Vol. 30 No. 1, pp. 29-40, doi: 10.1027/1864-1105/a000175.

Kim, J., Merrill, K., Xu, K. and Sellnow, D.D. (2021), "I like my relational machine teacher: an AI instructor's communication styles and social presence in online education", *International Journal of Human-Computer Interaction*, Vol. 37 No. 18, pp. 1760-1770, doi: 10.1080/10447318.2021.1908671.

Leiker, D., Gyllen, A.R., Eldesouky, I. and Cukurova, M. (2023), "Generative AI for learning: investigating the potential of learning videos with synthetic virtual instructors", in Wang, N., Rebolledo-Mendez, G., Dimitrova, V., Matsuda, N. and Santos, O.C. (Ed.s), *Artificial Intelligence in Education. Posters and Late Breaking Results, Workshops and Tutorials, Industry and Innovation Tracks, Practitioners, Doctoral Consortium and Blue Sky (AIED 2023). Communications in Computer and Information Science*, Springer, Cham, Vol. 1831, pp. 523-529, doi: 10.1007/978-3-031-36336-8_81.

Leong, W.K., Chew, Y., Zulkifli, B. and Kho, S.N. (2023), "Perception of university students towards the use of artificial intelligence-generated voice in explainer videos", *SEARCH Journal of Media and Communication Research*, pp. 77-89, Special Issue.

Liew, T.W. and Tan, S.M. (2018), "Exploring the effects of specialist versus generalist embodied virtual agents in a multi-product category online store", *Telematics and Informatics*, Vol. 35 No. 1, pp. 122-135, doi: 10.1016/j.tele.2017.10.005.

Lowenthal, P.R. and Moore, R.L. (2020), "Exploring student perceptions of Flipgrid in online courses", *Online Learning*, Vol. 24 No. 4, pp. 28-41, doi: 10.24059/olj.v24i4.2335.

Mayer, R.E. (2001), *Multimedia Learning*, Cambridge University Press, Santa Barbara.

Moustakas, C. (1994), *Phenomenological Research Methods*, Sage Publications, Los Angeles.

Muljana, P.S. and Luo, T. (2019), "Factors contributing to learner retention in online learning and recommended strategies for improvement: a systematic literature review", *Journal of Information Technology Education: Research*, Vol. 18, pp. 19-57.

Nasir, M.K.M. (2020), "The influence of social presence on student satisfaction toward online course", *Open Praxis*, Vol. 12 No. 4, pp. 485-493, doi: 10.5944/openpraxis.12.4.1141.

Nass, C., Steuer, J. and Tauber, E.R. (1994), "Computers are social actors", *Human Factors in Computing Systems*, pp. 72-78, doi: 10.1145/191666.191703.

Nass, C., Moon, Y. and Green, N. (1997), "Are machines gender neutral? Genderstereotypic responses to computers with voices", *Journal of Applied Social Psychology*, Vol. 27 No. 10, pp. 864-876, doi: 10.1111/j.1559-1816.1997.tb00275.x.

Park, C. and Kim, D. (2020), "Perception of instructor presence and its effects on learning experience in online classes", *Journal of Information Technology Education: Research,* Vol. 19, pp. 475-488, 10.28945/4611.

Radovan, M. (2019), "Should I stay, or should I go? Revisiting learner retention models in distance education", *The Turkish Online Journal of Distance Education*, Vol. 20 No. 3, pp. 29-40, doi: 10.17718/tojde.598211.

Reeves, B. and Nass, C. (1996), *The Media Equation: How People Treat Computers, Television and New Media like Real People and Places*, Cambridge University Press, New York.

Richardson, J.C. and Lowenthal, P. (2017), "Instructor social presence: learners' needs and a neglected component of the community of inquiry framework", in Whiteside, A.L., Dikkers, A.G. and Swan, K. (Eds), *Social Presence in Online Learning: Multiple Perspectives on Practice and Research*, Routledge, New York, pp. 32-44.

Richardson, J.C., Koehler, A.A, Besser, E.D., Caskurlu, S., Lim, J. and Mueller, C.M. (2015), "Conceptualizing and investigating instructor presence in online learning environments", *International Review of Research in Open and Distance Learning*, Vol. 16 No. 3, pp. 256-297, doi: 10.19173/irrodl.v16i3.2123.

Seaman, J.E., Allen, I.E. and Seaman, J. (2018), "Grade increase: tracking distance education in the united stated", available at: https://onlinelearningsurvey.com/reports/gradeincrease.pdf (accessed 20 December 2023).

Smith, J.A. and Fieldsend, M. (2009), *Interpretative Phenomenological Analysis. Theory, Method and Research*, SAGE, Los Angeles, CA.

Smith, B. and McGannon, K.R. (2018), "Developing rigor in qualitative research: problems and opportunities within sport and exercise psychology", *International Review of Sport and Exercise Psychology*, Vol. 11 No. 1, pp. 101-121, doi: 10.1080/1750984x.2017.1317357.

Spence, P.R., Westerman, D., Edwards, C. and Edwards, A. (2014), "Welcoming our robot overlords: initial expectations about interaction with a robot", *Communication Research Reports*, Vol. 31 No. 3, pp. 272-280, doi: 10.1080/08824096.2014.924337.

Tan, S.F., Eak, A.D., Ooi, L.H. and Abdullah, A.C. (2021), "Relationship between learning strategies and academic performance: a comparison between accreditation of prior experiential learning (APEL) and regular entry undergraduates", *Asian Association of Open Universities Journal*, Vol. 16 No. 2, pp. 226-238, doi: 10.1108/aaouj-08-2021-0081.

Tobin, G.A. and Begley, C.M. (2004), "Methodological rigour within a qualitative framework", *Journal of Advanced Nursing*, Vol. 48 No. 4, pp. 388-396, doi: 10.1111/j.1365-2648.2004.03207.x.

Vallis, C., Wilson, S., Gozman, D. and Buchanan, J. (2023). "Student perceptions of AI-generated avatars in teaching business ethics: we might not be impressed", *Postdigital Science and Education*, Vol. 6, pp. 537-555, doi: 10.1007/s42438-023-00407-7.

Vlachopoulos, D. and Makri, A. (2019), "Online communication and interaction in distance higher education: a framework study of good practice", *International Review of Education*, Vol. 65 No. 4, pp. 605-632, doi: 10.1007/s11159-019-09792-3.

Wu, J., Gan, W., Chen, Z., Wan, S. and Lin, H. (2023), "AI-generated content (AIGC): a survey", arXiv preprint arXiv:2304.06632.

Xavier, M. and Meneses, J. (2020), *Dropout in Online Higher Education: A Scoping Review from 2014 to 2018*, eLearn Center Universitat Oberta de Catalunya, Barcelona.

Corresponding author
Saw Fen Tan can be contacted at: sftan@wou.edu.my