

EXPLORING PERCEIVED COMPETENCE AND RELATEDNESS IN AVATAR-BASED LEARNING: INSIGHTS FROM A VIRTUAL WORLD PLATFORM FOR HIGHER EDUCATION

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Abstract

Avatars in virtual worlds provide a dynamic and versatile means for individuals to socialize, learn, collaborate, and play. Instructional designers and educators in both the corporate sector and higher education are increasingly adopting ready-made platforms to craft engaging and enjoyable learning experiences. However, the readiness of learners to navigate avatars for interactive activities in virtual environments is seldom examined. In October 2024, a pilot study involving 46 business students in Hong Kong was conducted to explore this aspect. This paper explores the impact of perceived competence, perceived relatedness, and user satisfaction in a virtual world designed for learning and collaboration. Key dimensions, including a user-friendly interface, communication tools, and scalability, were also evaluated. The results revealed a range of opinions and varying levels of acceptance and engagement with the platform. These findings offer practical insights into the design elements crucial for optimizing avatar-based interactions in virtual world settings. In particular, avatar-based flipped learning activities can be developed to complement traditional lectures, thereby fostering active learning in higher education.

Keywords: Avatar-based learning, flipped learning, higher education, perceived competence, virtual world.

1 INTRODUCTION

In a world of digitalization and personalization, avatars are commonly used digital characters that represent users in virtual environments like video games, online forums, and social media. These avatars can range from simple icons to detailed 3D models, which users customize to reflect their appearance and interact with others while maintaining a personal identity. In the business sector, avatars are used on e-commerce sites, by virtual marketers [1], and in customer service chatbots to provide a more interactive experience throughout the customer journey.

In corporate training, instructional designers can leverage avatars to enrich the learning experience for trainees. For instance, incorporating avatars during a virtual orientation day can encourage shy participants to engage and ask questions without embarrassment, as they can maintain anonymity in the digital space. With the rise of ready-made digital platforms, avatars in virtual worlds offer a dynamic and versatile way for individuals to not only socialize and play but also to learn and collaborate in an enjoyable way, thereby supporting organizational training and development objectives.

However, as instructional designers, we cannot assume that everyone is well-versed in using avatars in a virtual learning environment. While previous literature offers many insights into developing pedagogical models for virtual worlds to achieve various learning objectives [2], the readiness of learners to navigate avatars is seldom examined. Before implementing any training or learning activities involving avatars, it is crucial to consider learners' readiness for this learning modality, as it directly impacts the effectiveness of the program. Are trainees comfortable and capable of using an avatar-based learning platform? Do they value interactions with other avatars during the learning process? How satisfied are they with the experience, particularly in terms of it being an enjoyable activity that aligns with their learning goals? This paper presents a pilot study involving postgraduate students to explore learners' perceived competence, their sense of relatedness, and their user satisfaction within a virtual world platform. Additionally, this study aims to validate the statement items for two dimensions—perceived competence and perceived relatedness—in avatar-based learning.

2 METHODOLOGY

This study was conducted in October 2024 at a public university in Hong Kong. The participants were 46 postgraduate students from a business school, aged between 26 and 40. The university provided the students with access to a ready-made virtual world platform abbreviated as Virtual World. A learning activity was designed for students to create their personalized avatars and complete a challenge in the virtual world within a set time limit during class. Students were encouraged to navigate freely and interact with others. Upon completion, participants were asked to fill out a self-administered survey. The survey included 30 statements aimed at assessing dimensions such as perceived competence, perceived relatedness, and overall satisfaction. A 5-point Likert scale was used, ranging from 1, "Strongly disagree," to 5, "Strongly agree."

Regarding the measurement items, there are nine statement items under the dimension of perceived competence [3] [4], three items under perceived relatedness, and four items to measure students' overall satisfaction with the learning activity.

For data analysis, SPSS version 29 was used. Descriptive statistics were employed to provide information on the statement items and the demographic profile of the respondents. Since the study also aimed to validate the statement items related to the variables of perceived competence and perceived relatedness, exploratory factor analysis and reliability tests were conducted.

3 RESULTS

A total of 46 completed surveys were collected, resulting in a 100% valid response rate. Among the respondents, 82.6% were female and 17.4% were male. 74% of the respondents are aged between 23 and 29, while 26% are aged between 30 and 40. All of them were studying in their first semester of a business master's degree program.

3.1 Perceived Competence

There are nine items under the dimension of perceived competence, with mean values ranging from 3.17 to 3.48. The item with the lowest mean value (3.17) is "I felt very confident using the Virtual World." These results suggest that it is important to offer a pre-training workshop to build participants' confidence in using it before implementing any learning activities on the platform. The individual items are presented in the table below:

Table 1. Mean Value of Perceived Competence.

<i>Items</i>	<i>Mean</i>	<i>Std. Deviation</i>
I found the Virtual World was easy to use.	3.37	1.123
I found that the various functions in the Virtual World were well integrated.	3.33	1.034
I would imagine that most people would learn to use the Virtual World very quickly.	3.33	1.034
I felt very confident using the Virtual World.	3.17	1.102
I am smart enough to use the Virtual World effectively.	3.39	.954
I am confident in my ability to use the Virtual World effectively.	3.48	1.005
I am quite skilled at maneuvering my avatar in the Virtual World.	3.30	1.008
After spending some time in the Virtual World, I felt quite competent.	3.24	.822
I am satisfied with the basic skills I have utilized in the Virtual World.	3.35	.948

The nine items underwent factor analysis using the principal components method with varimax rotation. The Kaiser-Meyer-Olkin (KMO) measure was calculated at 0.819, and Bartlett's Test of Sphericity yielded a value of 414.384 with a significance level of less than 0.001. These results suggest that the data matrix possessed adequate correlations for conducting factor analysis [5]. The factor loadings ranged from 0.722 to 0.868, and the Cronbach's Alpha was recorded at 0.926.

3.2 Perceived Relatedness

There are three items under the dimension of perceived relatedness, with mean values ranging from 3.30 to 3.57. This indicates a positive sense of connection and closeness to others. The results indicate that more meaningful tasks should be designed if the purpose of the learning activities is to build a sense of relatedness. This can involve starting with ice-breakers, then moving on to team-building activities, and finally progressing to project or team-based collaboration. Additionally, written comments in a discussion forum for an asynchronous class can be replaced by interactive discussions through avatars. Using both written and spoken language in this format may be more engaging and well-received by participants.

Table 2. Mean Value of Perceived Relatedness.

<i>Items</i>	<i>Mean</i>	<i>Std. Deviation</i>
I felt a sense of connection with others during the activity.	3.46	1.026
I enjoyed interacting with others during the activity.	3.57	.935
I felt a sense of closeness to others while doing the activity.	3.30	1.113

The three items were factor analyzed using the principal components method with varimax rotation. The Kaiser-Meyer-Olkin (KMO) measure was 0.760 and the Bartlett's Test of Sphericity was 108.128 with a significance level of less than 0.001. This indicated that the data matrix had sufficient correlations for factor analysis [5]. The factor loadings were high, ranging from 0.924 to 0.948, and the Cronbach's Alpha was recorded at 0.926.

3.3 Overall Satisfaction

Regarding overall satisfaction, the mean values for whether the learning activity was pleasurable, fun, and made them feel good ranged from 3.54 to 3.85.

Table 3. Mean Value of Overall Satisfaction.

<i>Items</i>	<i>Mean</i>	<i>Std. Deviation</i>
This learning activity was pleasurable to me.	3.54	.887
This learning activity was fun.	3.61	.930
This learning activity made me feel good.	3.70	.840
Overall, I am satisfied with this learning activity.	3.85	.918

3.4 Comments of the Ready-made Platform

Feedback about the ready-made platform itself was gathered from respondents through an open-ended question in the survey, focusing on its user-friendly interface, communication tools, and scalability. The results indicated a range of opinions and varying levels of acceptance and engagement with the platform, influenced by participants' prior experience with avatars and their age.

First, while some respondents found the platform easy to use, others considered it user-unfriendly, with limited functionality and complexity. Some participants expressed negative comments due to Wi-Fi network issues and encountered bugs. On the other hand, students who experienced a smooth connection felt that the platform provided a simulated environment where they could meet with friends virtually and interact as they would in a real situation. Some respondents mentioned that they did not know how to control the avatar. One respondent noted that she fell into the water without any warning, indicating that some students were not familiar with maneuvering the avatar. On the contrary, those who found the experience enjoyable expressed a desire to incorporate virtual world and avatar-based learning into their classes.

Regarding the virtual learning platform for communication purposes, some respondents viewed the platform positively, describing it as "interesting and useful." Many appreciated the avatars and the personalization options, considering them "cute," "funny," "good looking," "lovely" and "interesting images." However, some felt that the animation was not visually appealing and lacked variety in options.

In terms of using avatars to communicate, some respondents mentioned that they liked the ability to interact with others and felt encouraged to ask questions openly. However, some respondents were not familiar with how to interact with others, and some experienced no interaction during the process. While some appreciated the "open space" and "beautiful scenery" in the designated virtual world environment, others felt that the "world is too small."

Finally, utilizing this ready-made platform to offer students an interactive virtual activity functioned as a pilot test. Including the course instructor and project assistants, there were a total of 50 participants on the platform. Some participants encountered network or software bugs, which provided valuable insights into the platform's capacity to support a large number of users engaging in virtual activities concurrently. This experience highlights the need for further evaluation of the platform's technical support infrastructure and the development of strategies to scale it effectively for a larger audience. Future investigations will focus on optimizing system performance and ensuring robust support mechanisms to enhance user experience during high-demand scenarios.

4 CONCLUSIONS

This study serves as a pilot test for incorporating avatars into learning activities. The primary aim is not to determine whether the activities or system are effective in achieving specific learning goals, but rather to explore participants' readiness to engage in virtual learning environments. Often, trainers in corporate settings or course instructors in higher education place less emphasis on ensuring learners are fully prepared before the learning process begins. In a digital world where technology is integrated at varying levels, learners may struggle to keep up with the content if they are unfamiliar with the technology or if incorrect assumptions are made about their readiness to learn.

The results indicate that participants' skills and comfort levels in controlling avatars vary, potentially due to their prior experiences. Those familiar with avatars through gaming might find the platform less engaging, while those without such experience may have diverse reactions. Factors such as openness to new technology versus a preference for traditional learning methods could explain these differences. Additionally, some participants enjoyed the interaction and felt a sense of connection and closeness with others, which may reflect individual personality traits, such as being extroverted or introverted.

Avatar-based learning has the potential to increase engagement with the learning material and promote active learning in higher education. Importantly, this study highlights that different learners have varying preferences for learning tools. It is the responsibility of instructional designers to assess learners' readiness to use specific tools and to build their confidence in using them. This involves not only developing skills and knowledge but also fostering a positive attitude. Once the groundwork is laid, contemporary learning modalities, such as using avatars for pre-class activities or role-playing in problem-based scenarios following in-depth class discussions, can motivate and engage students, thereby supporting higher-order thinking skills for flipped learning outcomes.

Finally, the validity of perceived competency and perceived relatedness was confirmed through factor analysis and reliability testing. Specifically, in the context of perceived competency, corporate trainers and researchers can use these findings to assess learners' readiness before implementing avatar-based learning.

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