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# Why People Use Metaverse Education for Learning:
## An Extended Perspective of Task-Technology Fit

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## ABSTRACT

Metaverse education is one of the most promising applications of the web and information technology and one of the newest applications of the metaverse. Considering that the metaverse is a virtual and real internet application and social structure created by integrating cutting-edge technologies, whether technology can be adapted to the task is one of the critical factors for the sustainable development of the platform. This study adopted the task-technology fit theory (TTF) to investigate the use of metaverse education. The results showed that both personalized learning and incarnational interactivity significantly affect TTF and actual use, and TTF significantly affects user satisfaction and continues to affect final performances. This study enriches the empirical research on metaverse education and provides a new entry point for subsequent research.

## KEYWORDS

Metaverse Education, Personalized Learning, Gamified Learning, Task-Technology Fit, Performance Impact

## INTRODUCTION

Hwang and Chien (2022) propose that virtual reality (VR), augmented reality (AR), mixed reality (MR), and artificial intelligence (AI) offer significant potential for improving education. These technologies provide learners with unique opportunities for training and immersion that may not be possible in the physical world. Among these technologies, the metaverse stands out as a particularly promising platform for achieving training objectives that are otherwise unattainable. Consequently, it is expected that the use of metaverse-based education will significantly increase over the next decade, leading to greater research and practical applications in the field.

In fact, with the spread of 5G and the development of information technology in the past few years, coupled with the need for epidemic prevention, many countries and regions have already tried

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to promote metaverse education. As the use of metaverse learning has increased, related research has begun to increase. For example, in recent years, the advancement of 5G technology and information technology, combined with the necessity for epidemic prevention, has prompted numerous countries and regions to explore the possibilities of metaverse education. As the adoption of metaverse learning continues to rise, so does the research related to it. For instance, Kye et al. (2021) has categorized four types of metaverse, elucidated their potential and limitations in educational settings, and showcased the primary technical features and educational implications of the metaverse through practical case studies. In their 2022 study, Hwang and Chien explored potential applications and research issues of the metaverse in educational settings, focusing on the role of AI in metaverse education. Suh and Ahn (2022) conducted a survey of 336 elementary school students in Korea using an extended technology acceptance model (TAM). Their findings suggested that metaverse education can benefit most students, but it requires teaching methods that offer more fun and immersion. Similarly, Almarzouqi et al. (2022) developed a research model that combined a TAM with personal usage characteristics. Their survey of 1858 university students in the United Arab Emirates who used metaverse applications for medical education showed that user satisfaction significantly influenced metaverse learning intention, as revealed by the structural equation modeling-machine learning approach.

There are also studies (Go et al., 2021; Hwang & Chien, 2022; Wang & Xiang, 2021) that highlight the significance of technological factors, such as technological advancement, in the development of the metaverse. The metaverse is a new type of virtual and real Internet application and social form that arises from the integration of various new technologies, enabling each user to create content and modify the world. It is clear that the development and improvement of the metaverse require the seamless integration of different technologies for technical support. In order to ensure that a wide range of users participate, it is essential to have four types of technology: communication, rendering, interaction, and teamwork technology (Davis et al., 2009). Therefore, it is important to pay attention to and study whether the technical features align with the task requirements to meet the users' needs.

It is worth noting that there is currently no study that utilizes task-technology fit (TTF) to validate the use of metaverse education by people. While TTF is initially important for organizations rather than end users, researchers have highlighted the potential impact of TTF at the individual level (Yu & Yu, 2010). Research on online user behavior indicates that site features or quality dimensions have a positive influence on user task completion and behavioral intentions. A study on the factors influencing individual use of online learning systems revealed that the stronger the fit between the individual, the task, and the technology, the more willing the user is to continue using it, thereby leading to a greater impact on performance (Yu & Yu, 2010). Understanding the relationship between user tasks and technology is crucial as it significantly affects technology use and subsequent outcomes, such as altering user perceptions, increasing utilization, and improving team performance (Aljukhadar et al., 2014).

Hence, we chose to employ TTF in a personalized user setting to pinpoint the technological elements that support users in utilizing metaverse education. We also aim to highlight the significance of these elements in forecasting task accomplishment, as well as to clarify the influence of task and technological characteristics on user perception and performance. To this end, the next section of the paper introduces the metaverse education background and foundational theories of the framework, followed by the conceptual model and articulation of hypotheses in the Research Model and Questionnaire section. The Data Analyses and Results section will discuss the empirical method and analysis of the results, and the Discussion and Implications section will provide the insights and implications of the results from both academic and practical perspectives.