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Smart Campus and Student Learning Engagement

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ABSTRACT

This study aims to assess the implementation of smart campus and the students' learning engagement at Zhongshan College, China. A well-structured questionnaire was developed, and information was collected from 277 students and 377 teachers. The results indicate that both groups of respondents highly agree on the construction levels of the smart campus in terms of security operations, academic technology assistance, public relation services, and stakeholders' experience. Furthermore, respondents emphasized that the level of smart campus construction affects students' learning engagement. Specifically, students' personalized learning engagement is affected by the level of smart campus construction in security operations and public relations services. And the degree of students' use of smart learning resources is significantly related to the smart campus construction levels in all four dimensions. This study fills research gaps and provides valuable guidance for the development of smart campuses.

KEYWORDS

Digital Technology, Learning Engagement, Personalized Learning, Smart Campus, Smart Learning Resources

SMART CAMPUS AND STUDENT LEARNING ENGAGEMENT

With the rapid evolution of smart technologies and the advent of the Internet of Things (IoT), many campuses are now realizing the importance of these advancements in optimizing student and faculty engagement (Anagnostopoulos et al., 2021). The number of IoT connected devices is expected to skyrocket to over 75 billion by 2025. Campuses across the nation are witnessing the integration of connected devices, cameras, sensors, and smart technologies, leading to the emergence of what we now refer to as a "smart campus" (Dong et al., 2020; Sneesl et al., 2022).

A smart campus is a learning environment that allows students' learning and teachers' teaching to be fully conducted on the basis of science and technology. It consists of all-round intelligent construction, which mainly includes a smart teaching environment, smart teaching resources, smart

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teaching services, and smart campus management (Huang et al., 2012; Zhou et al., 2022). The utilization of digital technology in education opens a realm of possibilities.

China, with its vast population and rapid technological advancements, has emerged as a global leader in digital technology and innovation. In recent years, the country has exhibited remarkable enthusiasm for adopting digital solutions across various sectors including education (Song & Li, 2018). The implementation of smart campuses and the utilization of digital technology in Chinese educational institutions hold significant potential for transforming the traditional educational landscape and creating innovative learning environments. Nevertheless, implementing smart campuses and efficiently utilizing the technology in the Chinese educational context presents unique challenges (Yang & Liu, 2013). The vastness of the education system, the diversity of student populations, and the need for equitable access to technology pose significant implementation hurdles. Questions regarding infrastructure readiness, teachers' training, digital resource availability, and data security need to be addressed to ensure successful integration and maximize the potential benefits (Chagnon-Lessard et al., 2021).

Understanding the current state of smart campus implementation, along with exploring opportunities and challenges, is crucial for policymakers, educators, administrators, and researchers. The number of studies on the construction of smart campuses, however, is small, and the field of research is narrow. Some universities have rudimentary smart campus constructions, and administrators lack a deep understanding of their essence and functional value. There is a lack of scientifically valid evaluation criteria to measure the level of smart campus construction. In this study, we aim to fill these gaps by delving into the implementation of a smart campus within the context of 5G technology development, elucidating the key components involved and the effective utilization of digital technology. By conducting an empirical study at Zhongshan College and using descriptive statistics and quantitative research methods, we address the following questions.

Q1: What aspects should be considered in evaluating the level of smart campuses?
Q2: Do respondents from different groups exhibit variations in their evaluations of smart campuses?
Q3: How do various aspects of smart campuses influence the level of students' learning engagement?

LITERATURE REVIEW

Smart Campus

The concept of smart campuses is derived from that of smart earth (Min-Allah & Alrashed, 2020); there is no unified definition for a smart campus. Some scholars have contributed their own interpretations in their respective research. Bandara et al. (2016) defined smart campuses as the use of information and communication technology (ICT) within university campuses to enhance service quality and performance, reduce costs, and optimize resource consumption. Muhamad et al. (2017) suggested that the primary role of a smart campus is to utilize intelligent systems to dynamically present services based on user needs. In this article, we define a smart campus as a university that provides an intelligent teaching and learning environment, as well as applications that contribute to resource integration, teacher-student interaction with the support of the Internet, communication, and other technologies, and that ultimately promotes comprehensive development of teachers and students. By summarizing and consolidating the relevant literature, we found that research on the subject mainly focuses on the following four aspects.

Technology

The existence of smart campuses is intricately linked with technological advancements, particularly in information and communication technology. Emerging technologies such as IoT, big data, artificial intelligence, and 5G are frequently mentioned in literature related to smart campuses. The campuses