COMMENTARY

The Smart Classroom Grows Ever Smarter amid Technological Advances

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"All children start their school careers with sparkling imaginations, fertile minds, and a willingness to take risks with what they think."
–Ken Robinson

THE CLASSROOM is the most vital component of any educational setting, providing the venue for teaching and learning. Amid the rapid development of information technology, the evolution of its functioning is also being expedited.

The notion of the smart planet was advanced in IBM's "*A smarter planet: The next leadership agenda*" in 2008, which laid out a vision that our planet would become smaller, flatter, more open, and more importantly, smarter as we infuse intelligence into the systems and processes that provide goods and services (Palmisano, 2008). As predicted, the physical and digital infrastructures of our planet have converged, and technology has been continuously embedded into the vast majority of objects we use, giving rise to concepts such as the smart city, smart healthcare, smart transportation, and smart energy grid, among others. As a result of the increase in digital awareness and application in the education world, the smart classroom emerged.

In their discussion of the role of education for a smarter planet, Rudd et al. (2009) summarized the benefits of the smart classroom as being able to provide a learning environment that improves student achievement by increasing their access to resources and tools for collaboration; a student data environment that supplies real-time information, insights, and strategies to teachers and faculty; open source applications, content, and standards to enhance cost-effectiveness and interoperability; devices that deliver high functionality while reducing acquisition, support, and operational costs by centralizing services; and cloud-based services and infrastructures that create a dynamic, green, and flexible desktop as well as IT environments that are built on world-class technologies. With advantages like these, the smart classroom outperforms the traditional classroom by removing the barriers of time and space in student learning, increasing teacher-student and inter-student in-class interactions, making teaching more efficient, and facilitating multi-dimensional student evaluation (Gao & Peng, 2023).

The development of the smart classroom in China has been ongoing in recent decades. It can be traced back to 2000, when the multimedia classroom featured by the application of "computer plus projector" was introduced to schools at all levels. The "Three Links and Two Platforms Program" (namely, the school link to broadband-based network, class link to excellent teaching content, individual link to the online learning space; the national public educational resource and educational administration platforms), launched by the Ministry of Education in 2012, catalyzed a new wave of smart classroom construction in China. Since then, digital learning resources and technologies, such as mobile devices, smart whiteboards, and all sorts of educational app, have been widely applied to classroom teaching, generating various smart classroom models including the interactive whiteboard classroom, 1:1 laptop classroom, and mobile tablet classroom (Wang & Li, 2019). 2015's "Internet plus" initiative marked the establishment of the digital transformation as a national strategy in China. The digital transformation in education gives new impetus to the building of smarter learning environments that facilitate more in-depth integration of instruction and intelligent technologies (Xie, 2016). The new-generation smart classroom is distinguished by its application of cutting-edge technologies, such as cloud computing, big data, and artificial intelligence, and deployment of mobile intelligent terminals, allowing enhanced teaching and learning experience.

Smart *classroom research shows a growing* trend in recent years. The *Construction and Application of Smart Classrooms in China*: *A Literature Review Based on 93 Studies* in this issue examines the status quo of the construction and application of the smart classroom in China by reviewing the published research findings and pinpointed issues arising in the said processes, as well as proposing targeted suggestions (Ren, 2024). It is hoped that this article can spark more discussions on the development of smart learning environments in the context of digital transformation of education.

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