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Research on the Construction Strategy of Sports Smart Learning Space

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Abstract

The most direct impact brought by intelligent education enabled by intelligent technology is the transformation of learning space. Therefore, to promote sports intelligent education effectively, constructing a sports intelligent learning space is crucial as it serves as a carrier for this educational paradigm and enables scientific and efficient use. This study aims to clarify the relationship between learning spaces and environments, establish strategies for constructing smart sports learning spaces, and identify their applications under new technological environments to facilitate high-quality development in sports teaching reform. The research highlights that building smart sport-learning spaces should be based on their functions while aligning with smart-learning connotations, considering characteristics unique to sport-based education, prioritizing learners' needs by clearly defining how technology will be applied within these settings while establishing principles, functions, and features accordingly. Based on this framework, five directions can guide the application strategies of smart sports learning spaces: connecting virtual and physical spaces; blending online/offline modes; integrating formal/informal approaches; linking school/social environments; transforming evaluation methods."

Keywords

smart Learning space
Sports wisdom learning space
Construction strategy

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1. Introduction

Education informatization is a crucial strategy for the advancement of education in China, as evidenced by the issuance of various policy documents such as Education Informatization 2.0, Artificial Intelligence Education Planning Strategy, 2035 Education Vision Plan and 14th Five-Year Education Development Plan. The most significant impact of smart education on teaching and learning lies in the transformation of learning spaces. Therefore, to effectively promote smart sports education at a practical level, constructing intelligent sports learning spaces serves as both the vehicle for realizing this educational paradigm shift and key to its scientific and efficient. Despite the absence of research topics being found through searches using keywords such as "smart sports learning space," "smart sports teaching space," or "sports learning environment" on CNKI or Web of Science databases, it does not necessarily indicate that

research on these subjects is nonexistent; rather, there are issues with cross-use of concepts between learning environments and semantic confusion within related fields like educational technology. However, over ten literature sources were identified through searches using keywords like "sports smart teaching environment" or "smart sports classroom." These studies mainly focus on practical significance and theoretical research regarding construction design[1,2] of intelligent sports learning environments/spaces; development[3] and application[4] of innovative technologies within these settings; challenges encountered during implementation; countermeasures taken to address them; and pedagogical approaches based upon environmental factors.

2. Related concepts

2.1. Learning space

The study of learning space is a research topic that has gradually developed with the deepening of people's understanding of education informatization and the new modes presented in the process of education development. Whether it is digital or physical learning space, it is the most important educational infrastructure[5] in the 21st century. In traditional teaching, the space of teaching and learning is relatively fixed, and few researchers do special research on the learning space from the perspective of the function and effect of promoting the occurrence of knowledge, but usually carry out related design research from the physical space pattern combining spatial design[6] science, pedagogy and psychology.

With the development of modern information technology, learning space can break through the limitations of physical places in the past and extend to the entire living space of students, so that the efficiency of informal learning can be improved. Learning takes place all over the campus, not just in the classroom. Learning space is the medium of educational change and can serve as a supporting condition for the shift from teaching paradigm to learning paradigm.

2.2. Analysis: Learning space and learning environment

For a long time, the connotation of the two concepts of learning space and learning environment and the function of the learning process are often mixed, and the boundary of the connotation of learning space and learning environment is fuzzy. Some scholars regard space as a specific environment, some will interpret the connotation of space by environment in research, and some will use space and environment alternately. Some studies take "learning space" as a specific concept without a specific definition, or take learning space as a part of the learning environment, and summarize the constituent elements of learning experience in smart learning environment into the experience brought by three kinds of stimuli, such as information technology, learning space and teaching method. After studying the existing literature, it is found that such examples are numerous, and it is a common phenomenon not only in sports discipline, but also in the whole field of educational technology research.

Scholars have a common understanding of the function of learning space, and generally compare learning space to a "container", which plays the role of carrying the learning process, and can provide support and services in the space relying on this "container". The similarities between the two lie in that both exist outside the learner and play a supporting role in learning as an external supporting condition for learning. Therefore, learning space and learning environment are neither big nor small, nor the relationship between inclusion and inclusion, both of which belong to different functions of a process under certain circumstances.

Chinese scholar Shen Shusheng summarized the learning space as "residence" and "transfer" from the function. "Residence" refers to the location and place where learning takes place. It is an important external support condition for learning and a basic place for organizing and implementing learning activities and behaviors. It can be a classroom for face-to-face learning activities, a network space for online interaction, or even a written space for digital resources.

2.3. Intelligent learning space

Academic circles tend to agree on the definition of the connotation of smart learning space, and generally believe that it can provide support and service for the learning process. Smart learning space is a learning space enabled by intelligent technology to integrate various characteristics of e-learning environment, help teachers

directly monitor the learning environment, understand the conditions of learners, provide real-time adaptive help for learners, and promote independent learning of learners. At the same time, smart technologies are not simply embedded applications, but create a learning ecosystem that enables teachers, parents and others to actively participate in the learning process [7] of learners. The smart learning space also provides real-time and continuous evidence of knowledge change, and seamlessly transfers learning activities from one learning environment to another.

Designed to provide learners with self-directed learning, self-motivation and personalized service, smart learning Spaces should focus on learners and content rather than devices[46], providing information through accessible technical resources to provide a complex learning experience. With the support of smart learning space, teachers can be liberated from tedious and repetitive teaching labor, and instead put into the diversified design of learning content and personalized guidance, so as to monitor the learning process of individual learners in a more fine-grained manner. In addition, learners can have the opportunity to choose and shape their own learning mix, providing support for immediate reflection and review of learners' learning progress. At the same time, the smart learning space can adapt to the choices of learners of various styles, and help students establish the correlation between the curriculum goal system and the realistic problem system, improve the mental structure of learners, and promote the generation [9]of wisdom of learners.

The construction of smart learning space should be guided by advanced educational ideas and theories, supported by appropriate information technology, tools, resources and activities, acquire, analyze and mine the perceived learning situation data, generate personalized learning tasks and activities, guide and help learners to make correct decisions, and effectively promote the development of intelligent ability and the emergence[8] of intelligent actions. Embodies the basic idea [8] of service learning. The aid of intelligent technology can make the teaching method adapt to the needs of learners. When constructing and designing smart learning space, the consistent principle of learning environment design should be considered to meet the needs of smart learning environment. Smart learning space is the learning space under smart learning environment, and smart learning environment is the stimulus to promote the effective occurrence of learning in smart learning space.

The learning space empowered by intelligent technology has three characteristics[41]: intelligent efficiency expression, value-oriented physical and mental state, and emotional resonance and unmasking of the conscious world. At the same time, he also proposed that the empowerment of intelligent technology has formed a distributed spatial system composed of multiple spatial elements. Through the mutual influence of learners, the material properties of the learning space show new characteristics of connectivity and integration, flexibility and openness, and enlightenment and wisdom on the basis of intelligent technology support.

To sum up, the connotation of intelligent learning space can be summarized as intelligent learning space supporting and serving the learning process, giving full play to the functions of the learning space to meet the cognitive, social and emotional needs of individuals and groups in learning. In order to obtain better ability improvement in the learning process, intelligent technology is set up to provide intelligent empowerment, so as to promote the cultivation of ability. At the same time, it helps learners apply individual and group wisdom to construct a new learning field of the trinity of knowledge.

3. Strategies for the construction of sports smart learning space

3.1. Based on the function of learning space

The function of learning space in the learning process is the basis of the construction of sports smart learning space. Learning space has the functions of "residence" and "transfer" in terms of function. "Residence" refers to the location where learning takes place. It can also be a network virtual platform such as online MOOC resources. The increase of learning space brings diversification of learning space, enhancement of functions and expansion of learning process. "Transfer" has the function of learning pathway and learning exhibition area. Pathway refers to the enhancement of learning objects, or some means and tools to help them understand the essence

behind the phenomenon. For example, intelligent technical analysis device is set up in the sports field, and learners can see the details of their own skill learning and compare it with standard movements. So that learners can accelerate the mastery of scientific and standardized technical movements.

3.2. Conform to the connotation of intelligent learning

The core value of sports smart learning space compared with traditional sports learning space is that sports smart learning can reflect all the demands of today's education for talent training, and this value is reflected in the connotation of following smart learning. The learning activities carried by smart learning space should be smart learning activities, and smart learning is to better serve learning, take learners as the center, apply the latest intelligent technologies such as the Internet of Things, big data, artificial intelligence technology, etc., to bring more personalized, accurate, objectified, convenient and social support to the learning process, and have the perception ability of subject and object. Intelligent technology, as the basis for the construction of learning environment, enables learning to take place in an environment full of intelligent technology and stimulates the occurrence of wisdom, and promotes the interaction and negotiation between learners. At the same time, the pursuit of the "people-oriented" concept, to cultivate people's wisdom as the process is also the ultimate goal, in order to promote the cultivation of advanced ability. With the support of intelligent learning, learners can not only gain wisdom, but also learn to correctly apply wisdom to deal with real problems in the real context[9].

Scholars' definition of the connotation of intelligent learning can be summarized into three dimensions: intelligent technology environment (technical perspective), wisdom cultivation(ability perspective), and how to apply wisdom (process perspective). Based on the consensus of the academic circle on the connotation of intelligent learning, this study should construct the intelligent characteristics of sports intelligent learning space from three dimensions, namely, intelligent perception, pointing to the assistance and research and development of intelligent technology; Intelligent development, pointing to the creation of learning environment; And the application of wisdom, which points to the resources produced by wisdom and their utilization[10].

3.3. Learning features around sports

The characteristics of physical education learning are the fundamental and value that make the subject of physical education independent from the forest of educational scientific research. Physical education subjects take motor skills as the object of cognition, body practice as the main form of activity, and embodied cognition process through muscle activity. Therefore, the core position of physical activity as the main form of learning cannot be shaken. It is necessary to build sports intelligent learning space around the body movement, which is the embodiment of the independence of sports learning research under the concept of smart education. Therefore, the learning process should grasp the rules of each stage of sports skill learning, and make the sports intelligent learning space serve and support the efficient learning of sports skills as the carrier of sports skill learning.

3.4. Take learning needs as the center

One of the characteristics of smart learning space is the application of intelligent technology to better serve the learning process of learners. In the construction of sports smart learning space, we should not put on a flashy coat for sports learning to cater to technology, resulting in the occurrence of technicalism and putting the cart before the horse in the construction of sports smart learning space. Malcolm Brown believes that learners should be encouraged to participate in the design of learning space, in order to build a smart learning space that can support active learning, interaction and social participation. Therefore, the curriculum objectives and learning needs should be the core, and the construction of sports smart learning space should be based on how learners can better master sports skills and obtain all-round ability improvement in the process of sports learning. The research and development and application of intelligent technology should be carried out through the real needs of educational practice.

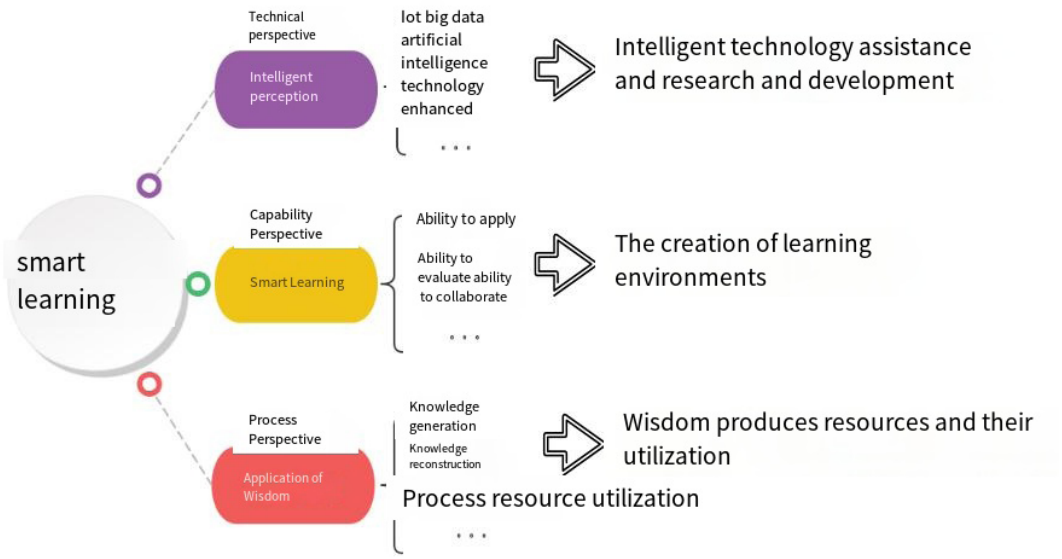

Figure 1. Smart learning

Table 1. Construction principles, characteristics and functions of sports smart learning space

Principles	Element Embodiment
A center	Learner-centered
Two around	Practice around the body and learn rules around motor skills
Three dimensions	Wisdom perception (technology perspective), wisdom development (ability perspective), wisdom application (process perspective)
Five forms	Physical and virtual Spaces are connected; Intelligent technology to assist skill learning; Online learning and offline learning mixed; Combining formal learning with informal learning; And the connection between the school and the society
Five characteristics	Perceptivity, ubiquity, connectivity, resource richness, multi-dimensional negotiation and interaction
Nine functions	Data analysis and decision, mobile learning, cooperative learning, adaptive learning, differential learning, intelligent assistance, social context connection, process monitoring, ubiquitous guidance

3.5. Principles, features and functions of overall construction

In order to better guide the learning practice, it is clear that the construction principles, characteristics and functions of the sports smart learning space are the premise of giving full play to the sports smart learning space to serve sports learning and conform to the rules of sports learning. The construction of sports smart learning space should follow one center, two surrounds, three dimensions, five forms, five features and nine functions (**Table 1**).

4. Suggestions and vision

The purpose of this study is to provide the construction strategies of sports intelligent learning space, and provide a construction idea for sports education researchers. In the specific process of physical education teaching practice, an educational research design process integrating the whole process of construction and testing in practice should be established. Through the problems and needs arising from real situations in teaching, In collaboration with industrial institutions, management departments and students, the iterative design and development will be carried out to create a "general and effective" framework for sports smart learning space and form a universal model.

Disclosure statement

The author declares no conflict of interest.

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