

Research on the Application Strategy of Ubiquitous Learning Mode in Physical Education Teaching

Zhaoxi Li*

Department of Public Foundation Teaching, Yunnan Open University, Kunming, China
**Corresponding author*

Abstract: *The ubiquitous learning mode is a learning method based on modern technological means, which allows students to learn at any time and place. This study aims to explore the application strategies of ubiquitous learning mode in physical education teaching and analyze its impact on student learning outcomes. The research results indicate that by creating a diversified learning environment, promoting personalized and differentiated learning, enhancing interactivity and participation, and implementing real-time feedback and evaluation strategies, the ubiquitous learning mode can effectively improve students' learning experience and outcomes. This study has important guiding significance for promoting innovation and development in physical education teaching.*

Keywords: *ubiquitous learning mode, physical education teaching, diversified learning environment, personalized learning*

1. Introduction

With the rapid development of information technology and continuous innovation of educational concepts, traditional educational models are gradually shifting towards a more flexible and personalized direction. Especially Ubiquitous Learning, as an emerging learning mode, its core lies in the ability to learn anytime, anywhere, and through any device, which presents new challenges and opportunities for the education field [1]. Physical education teaching, as an important component of cultivating students' physical fitness and spiritual outlook, also faces the problem of how to integrate modern educational technology to improve teaching quality and effectiveness.

Currently, there are common problems in physical education teaching, such as single course content, traditional teaching methods, and low student participation, which limit the comprehensive development of students' physical abilities. The introduction of ubiquitous learning mode provides new ideas for innovative physical education teaching by providing diverse learning resources, personalized learning paths, and real-time feedback evaluation. The use of ubiquitous learning models can effectively promote students' active learning, enhance the interactivity and fun of learning, and thus improve the quality and effectiveness of physical education teaching.

This study aims to explore the application strategies of ubiquitous learning mode in physical education teaching. Through literature review, case analysis and other methods, the basic characteristics of ubiquitous learning mode and its specific application in physical education teaching are analyzed. The research will focus on how to build a diversified learning environment, design personalized learning paths, enhance interactivity and participation, and implement real-time feedback and evaluation strategies, aiming to provide practical guidance for physical education educators to promote the innovative development of physical education teaching.

With the increasing demand of society for the comprehensive development of students' physical and mental health, introducing ubiquitous learning mode into physical education teaching can not only enrich teaching methods and content, but more importantly, stimulate students' interest in learning, cultivate their self-learning ability and teamwork spirit, and thus achieve the comprehensive improvement of physical education teaching goals. Therefore, the significance of this study lies not only in theoretical exploration, but also in providing feasible application strategies for physical education teaching practice, and assisting in the reform and innovation of physical education teaching.

2. Literature review

2.1 Fundamentals of ubiquitous learning theory

The term Ubiquitous Learning originates from the concept of "Ubiquitous Computing", which means that computing power is ubiquitous. Ubiquitous learning inherits this concept, emphasizing that learning can be conducted anytime, anywhere, and through any device. Its theoretical foundation mainly comes from constructivist learning theory, emphasizing that learning is an active process of constructing knowledge, and the importance of environment, tools, and social interaction for learners to construct knowledge [2].

As an emerging educational mode, ubiquitous learning has the core advantage of providing learners with a full-time and all-round learning environment. The uniqueness of this model is reflected in several key features: context awareness, personalization, seamless connection and social interaction. These features together build a flexible, effective, and highly personalized learning experience, greatly promoting innovation in learning methods and environments. Context awareness is a major feature of ubiquitous learning, which refers to the learning system's ability to provide corresponding learning resources and support based on contextual information such as the learner's environment, time, and state. For example, when learning a foreign language, the system can recommend relevant local culture and language learning materials based on the learner's geographical location, making the learning content more closely related to real life, enhancing the practicality and fun of learning. Personalization is another significant feature of ubiquitous learning, which customizes personalized learning paths and content for each learner by analyzing their learning history, preferences, abilities, and other information. This personalization is not only reflected in the selection of learning content, but also includes adjustments to learning methods and speed, as well as targeted feedback and evaluation, ensuring that each learner can learn in the most suitable way for themselves. Seamless connection reflects the characteristic of ubiquitous learning that breaks through time and space limitations. With the support of mobile devices, cloud computing and other technologies, learners can access the learning platform anytime and anywhere, continue the previous learning process, and achieve seamless connection of learning activities. This seamless connection ensures coherence and flexibility in learning, enabling learners to more effectively utilize their fragmented time for learning. Social interaction emphasizes the importance of interpersonal communication and collaboration in the learning process. Ubiquitous learning promotes communication and cooperation among learners by providing tools such as online discussion groups and virtual collaborative spaces, enhancing the social nature of learning. This kind of interaction not only helps to deepen and consolidate knowledge, but also cultivates learners' communication skills and teamwork spirit.

2.2 Current situation and challenges of physical education teaching

In the field of education, ubiquitous learning has been widely applied in various fields such as language learning, mathematics education, and science education. By utilizing intelligent devices and network resources, educators can provide students with rich learning materials and real-time feedback, greatly enhancing the interactivity and personalization of learning. For example, in language learning, vocabulary learning through mobile applications can recommend corresponding learning content based on the learner's progress and interests, achieving personalized learning. In addition, ubiquitous learning also supports students to learn in real social and cultural backgrounds, improving the practicality and applicability of learning.

The main challenges faced by current physical education teaching include the singularity of course content, limited teaching resources, and low student participation. Many schools still rely on traditional teaching methods for physical education, lacking sufficient innovation and interactivity, which leads to low interest and participation of students in physical education classes. In addition, due to the uneven distribution of resources, some schools have insufficient sports facilities and equipment, which limits the diversity and effectiveness of physical education teaching. The challenges faced by physical education teaching not only affect students' interest and enthusiasm for sports activities, but also constrain the improvement of physical education teaching effectiveness and the development of students' physical health.

The singularity of course content is a common problem in physical education teaching. Most physical education courses in schools still revolve around traditional events such as athletics, basketball, volleyball, etc., lacking novelty and creativity. This single curriculum design is difficult to meet the

diverse interests and needs of students, resulting in low participation and enthusiasm of students in the classroom. The limited availability of teaching resources further exacerbates the challenges of physical education teaching. On the one hand, teachers are often limited by resources in their teaching methods and means, making it difficult to adopt more diverse and interactive teaching strategies. On the other hand, the lack of sports facilities and equipment in schools, especially in areas with limited resources, seriously affects the quality of teaching and student experience. Low student participation is a direct manifestation of poor physical education teaching effectiveness. Due to the monotony of course content and the limitations of teaching resources, students often feel that physical education courses are boring and lack the motivation to actively participate. In addition, traditional teaching methods are difficult to meet the needs of students for personalized and interactive experiences, further reducing their participation and learning motivation. The uneven distribution of resources makes the problems faced by physical education teaching more complex. In some areas with lower levels of economic development or uneven distribution of educational resources, school sports facilities and equipment are even more scarce, and teacher professional training is relatively lacking. These factors work together to limit the diversity and innovation of physical education teaching, affecting students' interest and participation in sports activities.

2.3 Research on the application of ubiquitous learning in physical education teaching

In recent years, with the development of technology, ubiquitous learning models have been introduced into physical education teaching [3]. Related studies have shown that the use of technologies such as smart wearable devices and mobile applications can effectively enhance students' learning motivation and engagement. For example, by recording student exercise data through a smartwatch, teachers can provide personalized training suggestions based on the data, and students can also monitor their exercise status and progress in real-time, thereby increasing their motivation for learning. In addition, the immersive sports learning environment created using virtual reality (VR) technology can simulate real sports activity scenes, providing students with a more vivid and authentic learning experience. Through these application strategies, the ubiquitous learning model can not only improve the quality and effectiveness of physical education teaching, but also promote the comprehensive development of students' physical and mental health.

3. Research methods

This study aims to explore the application and effectiveness of ubiquitous learning in physical education teaching. A comprehensive research design was adopted, combined with experimental design and case study methods, in order to obtain a deeper and more comprehensive understanding and insights.

3.1 Research design

The study adopted a mixed method research design, which includes quantitative experimental design and qualitative case studies. Through experimental design, we aim to evaluate the impact of ubiquitous learning strategies on student physical education learning outcomes, and quantitatively analyze changes in learning outcomes through a comparison between pre - and post experiments. At the same time, case study methods will be used to explore in depth the implementation process of ubiquitous learning in physical education teaching, the experiences of teachers and students, as well as possible challenges and solutions, in order to provide richer qualitative data support.

3.2 Research object and sample selection

In this study, careful planning was carried out for the selection of research subjects and samples to ensure the broad applicability and depth of the research results. The focus of research on physical education teaching activities in middle school is because students are in a period of rapid physical and psychological development. Physical education teaching is of great significance in promoting students' physical and mental health, cultivating teamwork spirit, and social communication skills.

This study selected two high schools, urban and rural, with the aim of exploring the adaptability and effectiveness of ubiquitous learning strategies in different geographical environments. Urban schools usually have better educational resources, while rural schools may have insufficient resource allocation. By comparing the teaching effectiveness in these two contexts, the universal applicability of ubiquitous

learning strategies can be more comprehensively evaluated. In addition, the selection of samples should also consider the availability of physical education teaching resources. Physical education teaching resources include sports facilities, equipment, and teacher professional abilities. The richness of resources directly affects the quality and diversity of physical education teaching. The study aims to reveal the potential impact of resource allocation on the effectiveness of ubiquitous learning by examining schools with different levels of resources.

The openness of teachers and students towards adopting new teaching methods is another factor to consider in research, which is crucial for the successful implementation of ubiquitous learning strategies. The innovative consciousness of teachers in teaching philosophy and methods, as well as the acceptance and participation enthusiasm of students, will directly affect the effectiveness of teaching reform. Choosing teachers and students with an open attitude and willingness to try new teaching methods as research subjects can help more accurately evaluate the actual effectiveness of ubiquitous learning.

Each school selects two classes, one as the experimental group and the other as the control group. This setting aims to demonstrate the effectiveness of ubiquitous learning strategies more clearly through comparative analysis. The experimental group will use ubiquitous learning strategies for physical education teaching, while the control group will continue to use traditional teaching methods. Through this comparison, it is possible to more intuitively observe the impact of ubiquitous learning on the effectiveness of student physical education learning. The participation of about 200 students not only ensures the adequacy of research data, but also makes the research results more representative and universal. Through such carefully designed research objects and sample selection, this study aims to provide scientific and effective evaluation and insights for the application of ubiquitous learning in physical education teaching.

3.3 Data collection methods

Multiple tools and procedures will be used for data collection to ensure the validity and reliability of the data. Quantitative data is mainly obtained through questionnaire surveys and the collection of academic performance. The questionnaire design will cover aspects such as student satisfaction, participation, and self-evaluation of the ubiquitous learning experience. The collection of qualitative data mainly relies on semi-structured interviews and observation records. The interviewees include teachers and students who participate in teaching, with a focus on the implementation process of ubiquitous learning strategies and classroom interaction.

3.4 Data analysis methods

Quantitative data will be processed and analyzed through statistical software, mainly using descriptive statistical analysis, paired t-tests, or ANOVA analysis to evaluate the differences and significance of learning outcomes before and after the experiment. Qualitative data analysis adopts content analysis method, which deeply analyzes the experiences and feelings of teachers and students, as well as the specific problems and effective practices in the implementation of ubiquitous learning through steps such as coding, classification, and thematic analysis. In addition, the study will also use the triangulation method to enhance the reliability and validity of the research results through cross analysis of quantitative and qualitative data.

Through the application of the above research methods, this study aims to comprehensively evaluate the effectiveness of ubiquitous learning in physical education teaching, and provide theoretical and empirical support for future teaching practices.

4. Application strategies of ubiquitous learning mode in physical education teaching

The ubiquitous learning mode integrates information technology and educational concepts, providing students with the possibility of learning anytime, anywhere. In physical education teaching, the application of this mode can greatly enrich teaching methods, improve student learning efficiency and participation.

4.1 Creating a diversified learning environment

Creating a conducive environment for physical education learning through technological means

expanding traditional physical education classrooms to virtual spaces, allowing students to participate in physical education learning through video, online interactive platforms, and other means. For example, teachers can use virtual reality (VR) technology to create simulated sports scenes, allowing students to learn skills such as basketball shooting and soccer kicking in a virtual environment. In addition, mobile learning applications can provide customized fitness plans, exercise skills tutorials, and other content, allowing students to choose learning content based on their interests and needs, thereby improving their learning motivation.

4.2 Promoting personalized and differentiated learning

The methods and strategies for designing personalized learning paths include using intelligent teaching systems to collect student learning data, analyzing their learning characteristics and needs, and customizing personalized learning plans for each student. For example, based on the physical fitness level, mastery of sports skills, and interests of students, teachers can recommend training programs and learning materials of different difficulty levels. In addition, by setting personalized learning goals and feedback mechanisms, students can be motivated to learn independently according to their own pace, meeting the learning needs of different students.

4.3 Enhance interactivity and engagement

By using ubiquitous learning mode to enhance student interaction and engagement, online collaboration tools and social media platforms can be used to promote communication and interaction between students and between teachers and students. For example, by establishing an online learning community, students can share their sports experiences and learning experiences, comment and like each other, and create a positive learning atmosphere. Meanwhile, using real-time live streaming or video conferencing tools, teachers can organize online physical education courses, achieve face-to-face interactive teaching between teachers and students, and improve student participation and learning interest.

4.4 Implement real-time feedback and evaluation

The use of technological means for real-time monitoring, feedback, and evaluation of the learning process means collecting student exercise data, such as step count, heart rate, exercise time, etc., through intelligent wearable devices, mobile applications, and other tools, so that teachers can monitor students' learning status and exercise performance in real time. Based on these data, teachers can provide immediate guidance and feedback to help students adjust their learning strategies and exercise methods in a timely manner. In addition, using data analysis techniques can provide a more objective and accurate evaluation of student learning outcomes, supporting personalized learning for students.

5. Conclusion

This study aims to explore the application strategies and effects of ubiquitous learning mode in physical education teaching, through in-depth analysis of strategies such as creating diversified learning environments, promoting personalized and differentiated learning, enhancing interactivity and participation, and implementing real-time feedback and evaluation. The ubiquitous learning mode can effectively expand the space and methods of physical education teaching, create a diversified learning environment through the use of technological means, and provide students with a more flexible and rich learning experience. This mode breaks through the limitations of traditional physical education classrooms, allowing students to access and learn sports knowledge and skills at any time and place, greatly improving the accessibility and convenience of learning. The ubiquitous learning mode plays an important role in meeting the personalized and differentiated learning needs of students. By designing personalized learning paths, combining intelligent teaching systems and data analysis techniques, we can provide tailored learning content and methods for each student, better adapting to the learning characteristics and needs of different students, and improving learning efficiency and effectiveness. This mode effectively stimulates students' interest and motivation in learning by enhancing interactivity and participation. By utilizing online collaboration tools and social media platforms, effective communication and interaction between students and between teachers and students have been promoted, establishing a positive learning community and providing students with a more active and participatory learning environment. Finally, implementing real-time feedback and evaluation is an

important feature of ubiquitous learning mode. It provides real-time monitoring and feedback of the learning process through technical means, providing teachers and students with real-time learning support and guidance, helping to adjust learning strategies and improve learning methods in a timely manner, thereby improving the quality of learning outcomes.

References

- [1] Jiang G X, Gu Z, Ma J Z. *Research on the Ubiquitous Learning Style of Preparatory Students under the Environment of Internet+Education [J]. Journal of Jilin Provincial Institute of Education, 2021,37 (8): 132-135.*
- [2] Wang Y Q, Yan A P, Wang T. *Study on the application of ubiquity learning model in physical education teaching [J]. Liaoning Sport Science and Technology, 2022,44(5): 116-119.*
- [3] Jin W, Li Y, Liu Y G. *A study of a new ubiquitous sports learning mode under the background of "Internet+Education" [J]. Journal of Physical Education, 2019,26 (1): 120-124.*