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Design and Research on Online-Merged-Offline(OMO) Blended Learning Scenarios in Primary and Secondary Schools

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Abstract:
The 'online-plus-offline' blended learning model represents a significant innovation in classroom teaching in the new era, and is of great importance for advancing educational modernisation and building a nation of educational excellence. To promote the development of educational informatisation, enhance the quality of primary and secondary education, and meet the individual needs of different regions and schools, the Ministry of Education has set out requirements for the implementation of the 'Double Reduction' policy. The state strongly supports the development of basic education and has widely promoted internet-based online teaching and learning activities across primary and secondary schools nationwide. Currently, blended learning scenarios have become a key format for primary and secondary schools to conduct online teaching and learning activities, offering broad prospects for application. Judging from the integrated pre-class, in-class and post-class services currently provided by major platforms for primary and secondary school students, traditional classroom teaching and online platform-based teaching have not yet been fully integrated. This paper first introduces the concept and characteristics of OMO blended teaching scenarios in primary and secondary schools, analyses the current status and existing issues in the application of OMO teaching scenarios, and then presents a design for blended teaching scenarios supported by digital twins, whilst offering recommendations for the design and development of OMO blended teaching scenarios.

Keywords:
K12; online education; OMO scenario design; blended learning

1.Introduction

Since the Ministry of Education's 2016 'Opinions on Deepening Educational Reform and Comprehensively Improving the Quality of Compulsory Education' proposed 'exploring new forms of application based on online learning spaces', primary and secondary schools have been actively implementing blended learning approaches. Through the seamless integration of online teaching and offline support, teachers can utilise mobile devices to provide high-quality educational services to pupils; pupils, in turn, can access learning resources and educational advisory services online, whilst also being able to plan their own learning and assess their own progress. The current significant push for online teaching has accelerated its development, whilst the trend towards the digitisation of offline teaching scenarios has become increasingly pronounced, with the

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emergence of large-scale online teaching, online collaborative learning and virtual seminars. However, online teaching has amplified the sense of alienation arising from physical separation, resulting in insufficient learner interaction and a lack of immersion and engagement. At the same time, traditional classroom teaching has long suffered from a lack of emotional engagement, low levels of knowledge acquisition, poor teacher-student interaction, and insufficient interdisciplinary collaboration, making it difficult to cultivate students' self-awareness and independent learning habits.

This paper aims to explore the integration of online and offline classroom teaching scenarios, the construction and design of OMO (Online-Merged-Offline) blended learning environments, and to outline the challenges facing blended learning and potential pathways for its advancement.

2.Analysis of the Integration of Blended Learning

OMO refers to a student-centred, service-oriented digital learning environment. It is a new teaching model based on the 'digitalisation of people' enabled by internet technology. The OMO teaching model emerged from the education sector's exploration of both online and offline approaches. After passing through various developmental stages—including 'O2O + OMO', 'OMO + O2O' and 'O2O + OLAP'—a new form of 'online-offline teaching integration' emerged in 2014, combining offline and online teaching methods.

Whilst the blended learning model addresses the fragmentation of teaching contexts, it also presents significant challenges for teachers. The separation of online and offline teaching methods can lead to a disconnect in learning environments, activities and teaching events, making it difficult for learners to engage in practical, real-world exercises during classroom sessions, for classroom discussions to be verified through immediate experimentation, and for collaborative learning to take place effectively. Although online teaching can effectively meet teachers' requirements for information content, it also causes students considerable distress and even psychological pressure. The blended learning model involves the effective integration of online and offline courses, combining online and offline teaching methods. This model breaks away from traditional 'face-to-face' communication, enabling both teachers and students to gain experience, grow and improve.

In face-to-face teaching settings, both teachers and students are central to the learning process, and interaction between them is indispensable. Teachers can manage and supervise students through methods such as setting assignments on online platforms, whilst students can provide feedback on the content assigned by teachers via these platforms. However, online learning platforms may not necessarily be effective in face-to-face teaching scenarios, which are centred on teacher-student interaction; teachers must consider whether students have sufficient time and energy for face-to-face communication. Furthermore, in face-to-face teaching scenarios, it is not always possible to monitor students' learning progress in real time or immediately; a certain amount of time is required to circulate around the classroom, check on students and promptly assess how the lesson is progressing.

The integration of online and offline education has yielded positive results in practice, but there are still some issues that require improvement and refinement: 1) Online teaching platforms do not facilitate real-time interaction between teachers and students, making it difficult to integrate them with offline teaching scenarios; 2) Teachers need to continuously address and resolve issues within online learning platforms; 3) Teachers

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should make full use of the functional modules available on online platforms to manage classroom teaching.

3.The Development and Design of Blended Learning Scenarios

Teaching is, at its core, an interaction between people. Drawing on the fundamental principles of blended learning and guided by reflective practice theory and experiential learning theory, this paper designs a blended teaching scenario based on digital twin technology. This approach facilitates the creation of teaching contexts, enriches classroom interaction, innovates teaching resources, enables precise assessment, stimulates student initiative, and promotes personalised learning, as illustrated in Figure 1.

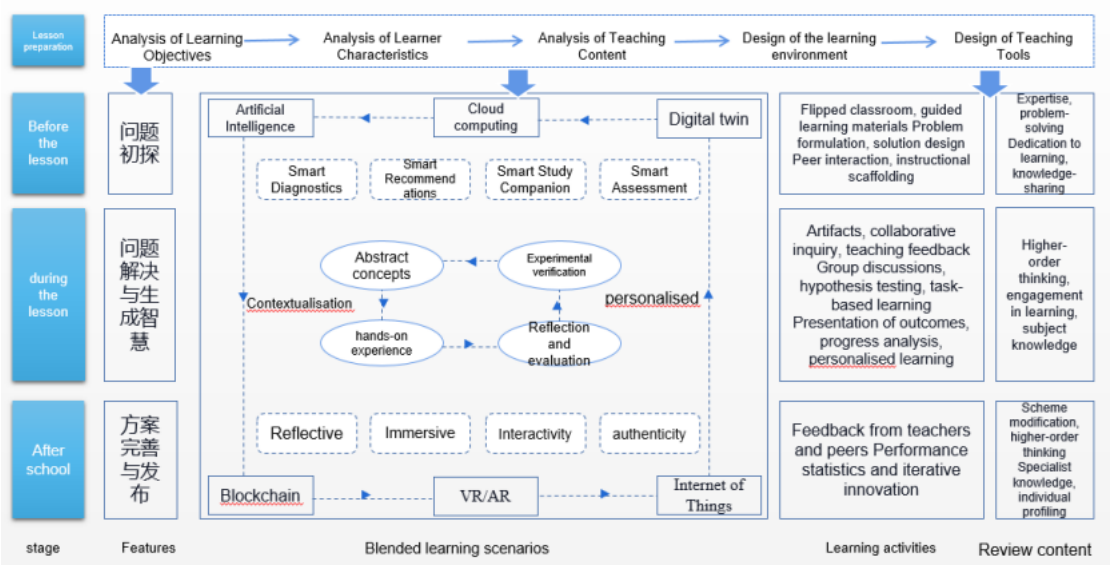


Figure 1. Design of blended learning scenarios

A blended learning environment supported by digital twins has been established across three phases—before, during and after class—to facilitate contextualised and personalised teaching. Contemporary classroom teaching places great emphasis on creating contextual scenarios, encouraging students to engage in independent and collaborative inquiry within real-world task contexts. This approach continuously deepens their understanding of knowledge, enhances their ability to transfer and apply it, and promotes meaningful knowledge construction. The quality of the learning environment directly influences students' learning outcomes. Personalised learning transforms the traditional 'knowledge-centred' educational philosophy, shifting learners from a passive to an active role; learners are not only users of relevant products and services, but also creators, updaters, service providers and reviewers.

3.1. Lesson preparation

Instructional preparation, also known as pre-instructional analysis, refers to the preliminary analysis carried out by instructional designers to enhance the effectiveness and efficiency of teaching and learning. It primarily encompasses the analysis of instructional objectives, learner characteristics, instructional content, instructional environment design, and instructional tool design.

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3.2. Lesson planning

Blended learning environments—combining online and offline elements—are crucial for pre-class learning. Guided by study guides and task lists, learners collaborate and explore within a digital twin learning space. Through a continuum of learning activities—including embodied experiences, abstract concepts, experimental verification and reflective evaluation—they engage in an in-depth exploration of both online and offline learning environments. Technologies such as digital twins, the Internet of Things, cloud computing, VR/AR, artificial intelligence and blockchain continuously monitor data; through iterative and continuous improvement, learners are able to achieve a deep understanding of the problem itself and optimise their solutions. Pre-class learning activities focus primarily on learner-led inquiry and collaborative exchange, involving flipped classrooms, guided learning materials, problem formulation, solution design, peer interaction and instructional scaffolding. Pre-class learning assessment primarily covers subject knowledge, problem decomposition, learning engagement and knowledge co-construction. Learners utilise the digital twin system to assess their mastery of specialist knowledge; the system records test results and forwards them to both teachers and learners. Problem-solving, collaborative interaction and learning engagement can be analysed using natural language processing technology to examine learners' conversational content, primarily covering analysis of the learning process, deep learning, knowledge construction, learning outcomes, as well as emotional, behavioural and cognitive engagement.

3.3. Lesson design

In-class blended learning scenarios primarily serve to enable learners to validate and refine solutions to problems. The digital twin learning space offers features such as high realism, real-time interactivity and the integration of virtual and physical elements, thereby mitigating issues such as cognitive biases, misunderstandings and communication barriers arising from differences between pre-class and in-class learning environments. In-class learning activities are primarily conducted through face-to-face classroom teaching and online discussions, ultimately achieving the goal of developing innovative solutions to problems. In-class learning activities delve deeply into the problems encountered prior to the lesson and primarily include assignment sharing, critical reflection, collaborative inquiry, hypothesis testing, group discussions and collective presentations. Assignment sharing unfolds across three levels: individual, group and collective. The teacher guides and organises groups and the whole class to engage in collaborative inquiry. Learners and others need to utilise the blended learning environment for embodied experiences, reflective evaluation, abstract conceptualisation and experimental verification, further exploring problem-solving solutions through reflection, immersion, interaction and authenticity. In-class assessment covers higher-order thinking, learning engagement and subject-specific knowledge. Teaching practices during lessons can be identified, recorded, analysed and flagged in real time using the learning behaviour tracking system in the smart classroom. Higher-order thinking is primarily assessed based on design proposals, problem-solving, experimental verification and artefacts. Assessment of subject-specific knowledge focuses on analysing the accuracy and flexibility with which learners apply their knowledge through practical operations, logical reasoning, problem-solving and experimental verification.

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3.4. Post-lesson activities

Learners utilise blended learning environments to explore further, continuing to address unresolved issues from the lesson or devising new solutions based on the discussions held during the lesson. Post-class learning activities are primarily conducted offline, with the aim of investigating issues identified during the lesson that require further exploration. Project presentations and assessments take place within the online learning environment, with work presented in formats such as text, video and 3D models. Post-class learning activities primarily involve further investigation of existing issues through peer and teacher feedback. Post-class assessment focuses on learners' revisions to their proposals, higher-order thinking and subject-specific knowledge, and results in the creation of individual profiles.

4.Conclusions

With the ongoing advancement of educational digitalisation, OMO (online-merged-offline) blended learning has emerged as a key innovative approach in contemporary classroom teaching. Representing a transformative shift from traditional teaching methods and curriculum frameworks, this model organically integrates multiple dimensions across different stakeholders, thereby driving reform in blended classroom teaching practices. Under this approach, teachers can utilise online platforms to conduct a wide range of blended teaching activities tailored to their individual characteristics and needs, thereby enhancing classroom efficiency.

This study is based on OMO (Online-Merged-Offline) scenarios and combines the practical application of educational informatisation with the experiences and insights shared by frontline teachers to explore implementation strategies for online classrooms. Firstly, it involves integrating offline and online teaching, using online classrooms as a foundation to extend high-quality educational resources to the offline setting. This is achieved by establishing a teaching resource platform through internet technology and by constructing an integrated offline-online educational resource system and an application support system. Secondly, the offline system focuses primarily on teaching and assessment systems, whilst the online system centres on course learning platforms and live classroom streaming systems. The integration of offline and online classrooms is centred on online video, and online classes need not necessarily replace offline learning environments entirely. Thirdly, new technological frameworks are applied to OMO blended learning scenarios to construct hybrid educational environments such as smart classrooms or cloud classrooms. This facilitates online collaborative teaching methods, including personalised and blended learning, thereby enhancing the interactivity and sustainability of online education.

References

[1]SUN Yechao, LI Xuemei, YANG Yunqiang. Towards a Measurement Model of Social Presence in Massive Online Teaching of Higher Education[J]. Distance Education in China, 2022, 42(6): 36-45.
[2]YANG Yongjie, WANG Jing, YAN Ying, et al. Investigation and Analysis of Online Teaching of "Suspending Classes without Stopping Teaching and Learning" during the Epidemic Prevention and Control of COVID-19[J]. Journal of Qingdao University (Medical Sciences), 2020, 56(5): 601-604.
[3]ZHONG Zhixian. On the Design of Learning Environment[J]. E-education Research, 2005, 26(7): 35-41.

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[4]CHU Leyang, CHEN Weidong, TAN Yue, et al. Virtual and Reality Symbiosis: Digital Twin(DT) Technology and Its Prospective Application in Education: Also Discuss the Reconstruction of the Ubiquitous Intelligence Space[J]. Journal of Distance Education, 2019, 37(5): 3-12.

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