

# The concrete application of mixed teaching method in computer teaching reform

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**Abstract:** *The rapid evolution of information technology has precipitated profound transformations in computer education. Embracing a pedagogical paradigm that amalgamates the virtues of traditional face-to-face instruction with the versatility of online learning, the blended teaching methodology emerges as a potent tool for catalyzing reform in computer education. This discourse delves into the specific application framework of blended teaching within the realm of computer education reform, delineating three pivotal junctures: pre-class preparation, in-classroom pedagogy, and post-class consolidation and extension. Through meticulous crafting of instructional blueprints, dissemination of preparatory materials, utilization of diverse pedagogical approaches, assignment of homework and supplementary materials, as well as facilitation of online mentoring, the blended teaching modality efficaciously enhances students' autonomy, engagement, and academic performance. Furthermore, it augments the pedagogical arsenal and resource pool, fosters robust teacher-student interactions, and fosters the cultivation of students' ingenuity and practical acumen. Nonetheless, the implementation of blended teaching presents discernible challenges for both educators and learners alike. In navigating this instructional landscape, educators must augment their proficiency in information technology and pedagogical prowess, while learners must cultivate self-directed learning aptitude and information fluency. In conclusion, this paper advocates for the continued exploration and implementation of innovative practices in computer education, underscoring the transformative potential of sustained scholarly inquiry and pragmatic experimentation.*

**Keywords:** *Mixed teaching method, Computer teaching reform, Application*

## 1. Introduction

In the contemporary landscape of the information society, computer education stands as a cornerstone of modern social and educational systems. As science and technology rapidly progress and societal demands for skilled professionals evolve, the traditional modes of computer instruction find themselves inadequately equipped to meet the multifaceted challenges of our era. This necessitates a comprehensive reformulation of computer education to align with the dynamic exigencies and promising opportunities of the new epoch <sup>[1-2]</sup>.

At the forefront of this educational renaissance lies the blended teaching methodology, a burgeoning pedagogical paradigm that seamlessly integrates the time-honored traditions of face-to-face instruction with the boundless possibilities of online learning. Blended teaching, also known as hybrid teaching, combines the virtues of traditional classroom interactions with the flexibility and resources offered by digital platforms. This amalgamation of teaching approaches has the potential to revolutionize the educational landscape by enhancing student engagement, promoting autonomy, and fostering a culture of continuous learning and innovation <sup>[3-5]</sup>.

The purpose of this document is to delve into the specific application framework of blended teaching within the realm of computer education reform. By exploring the optimal utilization of blended teaching modalities, pedagogical strategies, and evaluation methodologies, we aim to refine teaching efficacy and catalyze innovation and advancement within the domain of computer education. This exploration is crucial in light of the relentless march of information technology and the evolving educational paradigms, where the hybrid teaching method is poised to assume an increasingly pivotal role in driving computer education reform forward.

Blended teaching refers to the strategic integration of traditional face-to-face instruction with online

learning components, creating a dynamic learning environment that combines the best of both worlds [6-7]. This innovative approach not only preserves the pivotal role of educators as facilitators of knowledge but also empowers students to assume active agency in their educational journeys. Through the judicious utilization of a diverse array of online resources, educators can cultivate rich and multifaceted learning environments that captivate students' interests and engender a sense of ownership over their learning pursuits. Simultaneously, learners are afforded the autonomy to customize their learning experiences to suit their individual needs and proclivities, thereby fostering a culture of personalized education [8].

In the subsequent sections of this document, we will delve into the advantages and challenges inherent in the application of blended teaching in computer education reform. By addressing the gaps in existing literature and providing actionable insights, we aim to contribute to the ongoing dialogue on innovative teaching practices in computer education. This exploration underscores the transformative potential of sustained scholarly inquiry and pragmatic experimentation in shaping the future of computer education in the digital age.

## 2. Related work

In the realm of blended teaching and computer education reform, numerous studies and research have contributed valuable insights into the efficacy, challenges, and best practices associated with integrating technology into educational settings [9-11]. By drawing upon existing literature and research findings, educators and policymakers can gain a deeper understanding of the potential impact of blended teaching on student learning outcomes and instructional practices.

One seminal work in this field is the study by Fan (2023) [12], which introduced the Community of Inquiry (CoI) framework for online learning. This framework emphasizes the importance of social, cognitive, and teaching presences in creating a meaningful and effective online learning environment. By applying the CoI framework to blended teaching contexts, educators can design instructional strategies that promote active engagement, collaboration, and critical thinking among students.

Additionally, the research conducted by Xie (2023) [13] offers valuable insights into the effectiveness of blended learning models in higher education. Picciano's study highlights the benefits of combining face-to-face instruction with online components to enhance student engagement, flexibility, and learning outcomes. Educators can leverage these findings to design blended teaching approaches that cater to diverse learning styles and preferences, ultimately improving the overall educational experience for students.

Furthermore, the work of Zhou (2023) [14] on the "Handbook of Blended Learning" provides a comprehensive overview of blended learning theories, models, and best practices. This seminal text offers practical guidance on designing, implementing, and evaluating blended learning initiatives in various educational contexts. Educators can draw upon the insights shared in this handbook to inform their pedagogical approaches and optimize the integration of technology in blended teaching environments.

Moreover, recent studies by Almusaed et al. (2023) [15] and Korhonen et al. (2023) [16] have explored the impact of blended learning on student achievement, engagement, and satisfaction. These studies underscore the potential of blended teaching to enhance student learning outcomes, promote self-directed learning, and foster collaborative interactions among students. By incorporating the findings from these studies into their instructional practices, educators can tailor their blended teaching approaches to meet the diverse needs and preferences of learners in the digital age.

In addition to the foundational works mentioned earlier, several recent studies have delved into the application of blended teaching methods in the context of computer education reform, shedding light on emerging trends, challenges, and opportunities in this evolving field.

A study by Kanetaki (2022) [17] explored the impact of blended learning on student engagement and academic performance in computer science courses. The findings revealed that the integration of online components in traditional classroom settings led to increased student participation, motivation, and learning outcomes. This research underscores the potential of blended teaching to enhance student engagement and achievement in computer education.

Furthermore, the work of Yu & Yao (2023) [18] examined the role of blended learning in promoting collaborative learning and knowledge sharing among computer science students. The study highlighted

the importance of fostering a supportive online learning community to facilitate peer interaction, knowledge exchange, and collaborative problem-solving. By leveraging the social aspects of blended teaching, educators can create dynamic learning environments that promote teamwork, communication, and critical thinking skills.

Moreover, a study by Shihab (2023) [19] investigated the design and implementation of blended learning environments in computer science education. The researchers emphasized the importance of aligning instructional strategies with learning objectives, leveraging technology to enhance student engagement, and providing ongoing support for both educators and learners in blended teaching settings. This research offers practical insights into designing effective blended learning experiences that cater to the unique needs of computer science students.

In conclusion, by integrating insights from seminal works and current research in the field of blended teaching and computer education reform, educators can enhance their pedagogical practices, optimize student learning experiences, and drive continuous improvement in educational outcomes. By leveraging the collective wisdom of existing literature, educators can navigate the complexities of blended teaching with confidence and creativity, ultimately shaping a more innovative and effective educational landscape for the future.

### 3. Materials and methods

#### 3.1 The application strategy of mixed teaching method in computer teaching reform

The so-called Blended Learning method is a teaching method that combines traditional face-to-face teaching and remote network teaching. By combining the advantages of two completely different learning methods, the purpose of improving students' learning efficiency and deep learning can be achieved. Specifically, the mixed teaching method usually displays part of the teaching content through an online platform, allowing students to watch teaching films, do after-class exercises, and even take online exams<sup>[20-22]</sup>. In this way, the length of traditional face-to-face lectures will be reduced accordingly, and students will be able to arrange their own study time and place more flexibly. In addition, the mixed teaching method is also very friendly to teachers' time arrangement. Teachers can adjust the actual teaching arrangement according to the needs of curriculum progress, make full use of network technology to help students learn new knowledge, complete after-class exercises, consolidate and accumulate knowledge, and discuss topics with teachers of other teaching and research groups.

In the computer teaching reform, the mixed teaching method provides new ideas and directions for teaching reform with its unique advantages. We will elaborate the application strategy of hybrid teaching method in computer teaching reform from five aspects as shown in Figure 1, so as to provide valuable reference for subsequent teaching practice.

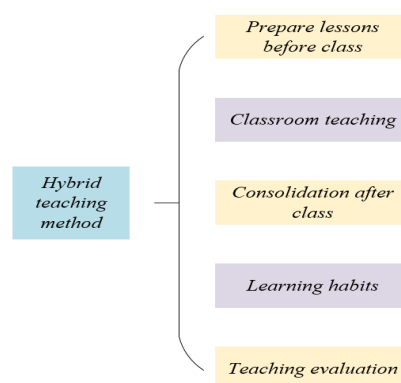


Figure 1: Application Angle of Mixed Teaching Method

##### 3.1.1 Optimize the preparation before class and lay the foundation for learning

Preparation preceding class sessions constitutes a pivotal component of the blended teaching methodology, serving to stimulate students' interest and proactive engagement in the learning process. Foremost, educators are tasked with the meticulous development of a comprehensive teaching plan, elucidating explicit instructional objectives and content parameters, thereby ensuring the systematic

organization and cognitive coherence of the pedagogical endeavor. Subsequently, leveraging the affordances of online platforms, instructors are encouraged to proactively disseminate preparatory materials and pertinent pedagogical resources well in advance of scheduled sessions<sup>[23]</sup>. This proactive approach is instrumental in cultivating efficacious study habits among students, fostering early immersion in course content and facilitating the construction of rudimentary cognitive frameworks. Furthermore, educators are enjoined to prescribe preparatory assignments, prompting students to engage substantively with preview materials within specified temporal constraints. This multifaceted approach not only serves to catalyze students' intrinsic motivation and agency within the learning milieu but also lays a robust foundation for subsequent instructional activities within the hybrid teaching paradigm.

### ***3.1.2 Innovative classroom teaching methods to enhance the teaching effect***

Classroom teaching is the core link of mixed teaching method, which requires teachers to integrate more information technology means and online learning resources on the basis of traditional face-to-face teaching, so as to achieve the purpose of integration<sup>[24]</sup>. At this point, teachers can use a variety of teaching methods, such as lectures, discussions, case studies, etc., to stimulate students' interest and initiative in learning. Secondly, teachers need to pay more attention to the interaction and communication with students, encourage students to boldly raise questions and "strange" views, and promote a lively and relaxed classroom atmosphere. Finally, teachers can also use the online platform to show the feedback of students' learning situation and knowledge acceptance in real time, so as to adjust teaching strategies in time to ensure the expected results of teaching.

### ***3.1.3 Strengthen the consolidation and expansion after class, and enhance the depth and breadth of learning***

Post-class consolidation and extension constitute pivotal supplements to the blended teaching approach, affording students opportunities to deepen and broaden their knowledge base<sup>[25]</sup>. Initially, educators ought to disseminate homework assignments and review materials to aid students in consolidating acquired knowledge, fostering deeper comprehension and enhanced retention of key concepts. Subsequently, instructors are encouraged to incentivize students to leverage online platforms for self-directed and expansive learning endeavors, facilitating the exploration of additional learning resources and information to augment learning outcomes. Concurrently, educators may institute supplementary tasks or collaborative projects, necessitating group participation, to cultivate students' collaborative skills and innovative acumen. This multifaceted approach not only reinforces learning outcomes but also nurtures students' capacity for autonomous inquiry and creative problem-solving.

### ***3.1.4 Build an online learning community and cultivate study habits***

The online learning community stands as a pivotal component within the blended teaching methodology, furnishing students with a platform for collaborative learning, communication, and knowledge sharing. Educators can establish learning communities or forums via online platforms, encouraging students to contribute their learning experiences, pose inquiries, offer solutions, and exchange learning resources and insights. Such initiatives serve to galvanize students' learning motivation and foster a sense of belonging within the academic community. Moreover, the cultivation of an interactive online learning environment facilitates the dissemination and dissemination of knowledge, enriching the collective learning experience and enhancing overall learning outcomes. Through active participation in online learning communities, students not only consolidate their understanding of course content but also hone their communication skills and collaborative aptitude, thereby augmenting their educational journey.

### ***3.1.5 Establish an effective teaching evaluation system to ensure the quality of teaching***

Teaching evaluation serves as the cornerstone for assessing the efficacy of the blended teaching approach, enabling educators to gain insights into students' learning progress, adapt teaching strategies accordingly, and uphold teaching standards. Within the blended teaching framework, it is imperative for teachers to institute a multi-faceted evaluation system, encompassing various dimensions such as students' online learning engagement, homework completion, and classroom participation. Additionally, emphasis should be placed on the timeliness and comprehensiveness of evaluation feedback, providing students with prompt guidance and constructive feedback to enhance their learning methodologies and optimize learning outcomes. By leveraging a comprehensive evaluation system, educators can effectively monitor students' academic performance, identify areas for improvement, and tailor instructional approaches to meet the diverse learning needs of students, thereby ensuring the overall quality of teaching and learning experiences.

### 3.2 Advantages and challenges of mixed teaching method in computer teaching reform

As a new teaching mode which combines traditional classroom teaching and online teaching, blended teaching method has shown remarkable advantages in computer teaching reform.

(1) The adoption of this novel teaching approach has indeed yielded tangible benefits, notably enhancing students' autonomy and enthusiasm for learning. By harnessing the capabilities of online learning platforms, students are empowered to engage in self-directed study endeavors at their convenience and from any location, facilitating exploration of topics aligned with their interests. This flexible and "free-wheeling" learning modality has proven instrumental in fostering a heightened sense of curiosity and intrinsic motivation among students. Furthermore, the integration of both online and offline interactive learning modalities has facilitated robust communication and collaboration between educators and learners, thereby nurturing students' innovative prowess and practical aptitude. Through active participation in collaborative learning experiences, students not only refine their academic acumen but also cultivate essential skills such as teamwork and problem-solving, positioning them for success in their academic pursuits and beyond.

(2) Indeed, the blended teaching method represents a paradigm shift in instructional delivery, offering educators a myriad of teaching tools and resources to enhance the learning experience. Through the utilization of online teaching platforms, teachers can furnish students with a diverse array of multimedia-rich learning materials, thereby rendering instruction more dynamic, engaging, and tailored to students' needs. These resources serve to elucidate complex concepts, stimulate student interest, and bridge gaps in understanding, ultimately fostering a deeper comprehension and mastery of subject matter. Moreover, the abundance of resources available through online platforms enables students to broaden their intellectual horizons, nurturing a spirit of inquiry and facilitating holistic personal development. By harnessing the power of blended teaching, educators can create immersive learning experiences that transcend traditional pedagogical boundaries, cultivating lifelong learners equipped with the skills and knowledge requisite for success in an ever-evolving global landscape.

(3) The blended teaching method serves as a catalyst for fostering robust interaction and communication between educators and students. Through the integration of online platforms, teachers gain real-time insights into students' learning progress and feedback, enabling them to provide personalized guidance and support tailored to individual learning needs. This timely intervention ensures that students receive the necessary assistance to overcome challenges and optimize their learning outcomes. Concurrently, students have the opportunity to pose inquiries and seek clarification from teachers via online channels, eliminating barriers to communication and ensuring that questions are addressed promptly. This reciprocal exchange of information and support not only cultivates a sense of trust and rapport between teachers and students but also cultivates a conducive learning environment characterized by open dialogue and mutual respect. By embracing this interactive learning paradigm, educators can nurture a culture of collaborative inquiry and continuous improvement, empowering students to actively engage in their educational journey and achieve academic success.

Although the mixed teaching method has many advantages, there are also some problems in the actual implementation process. Especially as shown in Table 1, computers are becoming more and more popular in education, so we need to pay more attention to them.

Table 1: Computer usage in education field

index	2016	2017	2018	2019	2020	2021	2022
Number of computers per 100 people (Taiwan)	91	93	102	108	108	106	118

(1) The adoption of the blended teaching method necessitates a higher level of proficiency in both information technology and pedagogy among educators. Teachers must acquire the requisite skills to effectively utilize online teaching platforms, create engaging multimedia resources, and facilitate independent learning among students. This entails not only technical prowess but also a deep understanding of instructional design principles and learning theory. Continuous professional development is essential to enable teachers to stay abreast of emerging technologies and pedagogical best practices. This may involve attending workshops, participating in online courses, collaborating with colleagues, and engaging in reflective practice to refine their teaching strategies. Moreover, fostering a supportive school culture that values lifelong learning and innovation is paramount to incentivize and empower teachers to embrace the challenges and opportunities presented by blended teaching. By investing in ongoing professional development and creating a supportive environment conducive to innovation, educators can enhance their capacity to leverage technology effectively in the

classroom and create enriching learning experiences that empower students to thrive in the digital age.

(2) The blended teaching method necessitates a shift towards more autonomous learning for students, requiring them to take greater responsibility for managing their learning process and engaging with online resources effectively. This entails not only the ability to organize their time and progress but also the capacity to discern credible information, critically evaluate sources, and integrate knowledge from various sources. To support students in developing these essential skills, schools and teachers must prioritize the cultivation of autonomous learning abilities and information literacy. This may involve incorporating explicit instruction on study skills, time management, and digital literacy into the curriculum, providing scaffolding and support to help students navigate online resources, and fostering a culture of inquiry and independent inquiry. Furthermore, educators can leverage a variety of instructional strategies such as inquiry-based learning, project-based learning, and collaborative activities to promote student autonomy and information literacy skills. By empowering students to take ownership of their learning journey and equipping them with the necessary tools and skills to navigate the digital landscape effectively, schools can prepare them to thrive in an increasingly complex and interconnected world.

(3) The establishment and upkeep of online platforms for blended teaching require significant investments of manpower, materials, and financial resources. Schools must allocate sufficient resources to develop and maintain these platforms effectively to ensure the smooth implementation of blended teaching.

Investments may include:

**Hardware and Software:** Procuring necessary hardware equipment such as computers, tablets, and internet infrastructure, as well as acquiring or developing teaching software and online learning platforms tailored to the school's needs; **Training and Professional Development:** Providing ongoing training and professional development opportunities for teachers and technicians to familiarize them with the use of online teaching platforms, instructional design principles, and cybersecurity best practices; **Content Development:** Investing in the creation or acquisition of high-quality educational content, including multimedia resources, interactive simulations, and digital textbooks, to enrich the online learning experience for students; **Platform Maintenance and Security:** Allocating resources for regular maintenance, updates, and security enhancements to ensure the stability, functionality, and cybersecurity of the online teaching platform; **Technical Support:** Establishing a dedicated support team or help desk to provide technical assistance and troubleshooting for teachers, students, and parents encountering issues with the online platform.

By investing strategically in these areas, schools can build robust online teaching platforms that facilitate effective blended learning experiences for students while ensuring the long-term sustainability and security of the infrastructure..

#### **4. Discussion**

In the rapidly evolving landscape of science and technology, the fusion of diverse technologies with educational frameworks is increasingly prevalent. However, this integration does not always guarantee seamless synergy; at times, it may introduce unforeseen complexities or "impurities" into educational paradigms. Therefore, a meticulous evaluation of the application of the blended teaching method within the context of computer education reform is imperative. This evaluation necessitates a thorough examination of the efficacy of current teaching methodologies and the alignment of instructional objectives with anticipated outcomes. The blended teaching method, with its amalgamation of online and offline pedagogical approaches, relies on various factors for its effectiveness. These factors include the quality of online resources, students' ability for autonomous learning, educators' proficiency in online guidance, and more. A comprehensive assessment of teaching quality is essential to gain a nuanced understanding of how these variables impact instructional efficacy, enabling educators to make timely adjustments to teaching strategies and optimize educational methodologies.

Furthermore, the evaluation of teaching quality acts as a catalyst for driving advancements in computer education reform. Through systematic appraisal of teaching practices, valuable insights and lessons can be distilled from experiences with the blended teaching method in computer education reform. These insights create a reservoir of knowledge that informs future educational initiatives, facilitating continuous improvements and nurturing a culture of innovation within the realm of computer education.

Expanding on this discussion, it is essential to delve deeper into the specific impacts of the blended teaching method on student engagement, learning outcomes, and overall educational experiences. By analyzing data on student performance, feedback on teaching methodologies, and the integration of technology in the learning process, educators can gain valuable insights into the effectiveness of blended teaching in enhancing student learning and fostering critical thinking skills.

Moreover, exploring the role of adaptive learning technologies, personalized learning pathways, and collaborative online platforms in the context of blended teaching can provide a comprehensive understanding of how technology can be leveraged to create dynamic and engaging learning environments. By embracing innovative pedagogical approaches and leveraging technology effectively, educators can empower students to become active participants in their learning journey and cultivate essential skills for success in the digital age.

In conclusion, the ongoing evaluation and refinement of the blended teaching method in computer education reform are essential for driving continuous improvement and innovation in educational practices. By embracing a culture of reflective practice, data-driven decision-making, and collaborative learning, educators can harness the transformative potential of blended teaching to create engaging, inclusive, and effective learning experiences for all students.

## 5. Conclusion

Through a comprehensive exploration of the advantages and challenges inherent in the hybrid teaching method within the context of computer education reform, it becomes evident that this approach holds substantial promise and practical significance. Notably, the hybrid teaching method exhibits considerable versatility and efficacy in enhancing students' learning experiences and outcomes while concurrently diversifying instructional modalities and resources, thereby fostering heightened efficiency and engagement within educational settings. Moreover, the integration of hybrid teaching fosters enhanced interaction and communication between educators and learners, thereby cultivating a more conducive and positive learning milieu. Nevertheless, the blended teaching method is not devoid of challenges. Key among these challenges are the imperative for educators to enhance their technological literacy and pedagogical acumen, the necessity for students to cultivate heightened levels of autonomous learning proficiency and information literacy, and the substantial investment of resources requisite for the establishment and maintenance of online platforms. Addressing these challenges necessitates pragmatic exploration and resolution within the crucible of educational practice.

In light of these considerations, we maintain a steadfast belief that, in tandem with the relentless march of information technology and the evolving landscape of educational paradigms, the hybrid teaching method will assume an increasingly pivotal role in driving computer education reform forward. Accordingly, we are committed to further inquiry into the optimal application modalities, pedagogical strategies, and evaluation methodologies pertinent to the blended teaching method within the sphere of computer education reform, with the overarching aim of refining teaching efficacy and catalyzing innovation and advancement within the domain of computer education.

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