https://doi.org/10.62836/jissh.v2i1.295

Global Science Publishing

JISSH

Journal of Integrated Social Sciences and Humanities

https://ojs.sgsci.org/journals/jissh

Article

Application of Modern Educational Technology in the Teaching Management of Secondary School Teachers in Nanning City, Guangxi Zhuang Autonomous Region

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Abstract: This study investigates the application of modern educational technology in teaching management among middle school teachers in Nanning, Guangxi Zhuang Autonomous Region. A questionnaire was administered to 140 teachers from the Second Middle School of Hengxian County. Data analysis using statistical methods revealed that teachers generally recognize and accept modern educational technology. However, challenges remain, including teachers' awareness, incomplete hardware and software, lack of integration with the curriculum, and individual teachers' technological proficiency. The study found that modern educational technology enhances teaching efficiency by extending time and space, increasing interaction among stakeholders, and transforming abstract knowledge into more accessible forms. Despite these advantages, issues such as information redundancy and weak boundary awareness persist. Recommendations include improving teachers' awareness and skills, updating facilities, and conducting regular training to enhance educational technology integration. Creating a collaborative atmosphere between teachers and students is also suggested to improve overall teaching management efficiency.

Keywords: modern educational technology; teaching management; the modern educational technology competence of secondary school teachers

1. Introduction

Since the widespread adoption of computers and other digital tools, modern educational technology—which refers to the application of electronic product-based information technology means in teaching management—has become an essential component of contemporary educational practices. This shift has transformed teaching management from a purely offline model to a hybrid approach that combines modern educational technology with traditional methods, addressing the limitations of traditional teaching management, which often lacks the ability to engage students effectively outside of classroom hours (Smith, 2020) [1]. Traditional teaching management, primarily teacher-led and syllabus-driven, has long been criticized for its passive approach, which can stifle students' initiative and lead to resistance and reduced learning efficiency (Johnson, 2019) [2]. This method often fails to achieve the overarching goal of curriculum teaching management, which is to foster students' comprehensive development. In contrast,

Received: 7 February 2025; Accepted: 17 April 2025.

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modern educational technology has been increasingly adopted by educators, yielding positive outcomes in classroom management and student engagement. It has been shown to enhance the delivery of knowledge and improve students' learning experiences (Brown & Green, 2021) [3].

However, despite the availability of such technology, several challenges remain. The existing equipment is insufficient to meet the growing demands of modern teaching, and the content often lags behind updates. Additionally, the integration of modern educational technology with the school's curriculum is not seamless, and teachers' proficiency in using this technology varies widely (Wang, 2022) [4]. These issues underscore the urgent need to enhance the application of modern educational technology in teaching management. This study aims to investigate the current state of modern educational technology in the teaching management of secondary school teachers and to explore its role in enhancing teaching management.

Specifically, the study seeks to assess the current application of modern educational technology in teaching management, identify the challenges and opportunities associated with its integration in secondary school teaching, and evaluate its impact on teaching management and student learning outcomes. The research focuses on a specific population and sample group, as well as defining key variables and the scope of the study. The population for this study comprises 220 teachers at Nanning Hengxian Middle School in Nanning City, Guangxi Zhuang Autonomous Region, with a sample group of 140 teachers selected through accidental random sampling. The key variable examined is the current situation of modern educational technology in teaching management, including teachers' perceptions, attitudes towards integration, and the overall impact on teaching management. The study explores the application of modern educational technology in teaching management by secondary school teachers, encompassing their understanding of modern educational technology, willingness to integrate it into teaching management, and the overall impact on teaching management. Conducted in 2022, this study highlights several advantages of integrating modern educational technology into teaching management. Firstly, modern computer-based educational technologies are highly interactive and provide a variety of functions that can inspire and motivate students to continue learning and progressing. This is particularly beneficial in the context of traditional teaching management, where modern educational technology can significantly enhance the efficiency and effectiveness of teaching management (Chen, 2021) [5]. Secondly, the application of modern educational technology extends beyond the classroom environment to encompass various aspects of education, including assigning classroom assignments, issuing notices, and managing attendance. Moreover, during the ongoing epidemic, modern educational technology has played a crucial role in facilitating online teaching and learning, ensuring that teaching management can continue seamlessly even when physical classrooms are not accessible (Zhang, 2022) [6]. Modern Educational Technology refers to the use of modern educational theory and information technology to optimize teaching through the design, development, utilization, management, and evaluation of teaching and learning processes and resources. In this study, modern educational technology specifically refers to the digital tools and resources that secondary school teachers can use in teaching management (Lee, 2020) [7]. Teaching Management involves the application of management science and teaching theory principles to plan, organize, coordinate, and control the various elements of the teaching process to ensure orderly operation and improved efficiency. In this study, teaching management includes teachers' planning, classroom management, and evaluation activities (Kim, 2021) [8].

2. Literature Review

2.1. Related Theories

2.1.1. Constructivism Learning Theory

Constructivism posits that while the world exists objectively, the understanding of it is constructed by each individual based on their unique experiences (Piaget, 1980) [9]. Constructivist learning theory emphasizes that learning is a process where students build new knowledge upon their existing experiences (Bruner, 1961) [10]. This theory includes three main concepts: the nature of knowledge, the nature of learning, and the nature of teaching.

Nature of Knowledge: Constructivists view knowledge as a dynamic interpretation of reality, rather than a fixed representation of it (Duffy & Jonassen, 2013) [11]. Knowledge is constantly evolving as individuals

encounter new experiences and contexts.

Nature of Learning: Learning is an active process where students construct meaning through their interactions with the environment and their prior knowledge (Brooks & Brooks, 1993) [12]. Students are not passive recipients of information but active participants in their own learning.

Nature of Teaching: Teaching should not be about knowledge transmission but about facilitating the construction of knowledge (Bednar et al., 1992) [13].

Constructivist learning theory supports the integration of modern educational technology by providing tools that facilitate active learning and knowledge construction. Research has shown that interactive simulations, online collaboration tools, and multimedia resources can enhance students' critical thinking and problem-solving skills (Jonassen, 1991) [14]. These technologies enable students to explore complex concepts in a hands-on manner, promoting deeper understanding and retention of knowledge (Clements & Sarama, 2007) [15].

Constructivism emphasizes the importance of teachers as facilitators who guide students through the learning process. Teachers need to develop strong skills in using modern educational technology to create engaging and interactive learning environments (Mishra & Koehler, 2006) [16]. Research indicates that teachers who effectively integrate technology into their constructivist teaching practices report higher levels of student engagement and achievement (Ertmer & Ottenbreit-Leftwich, 2010) [17].

In the context of educational management, constructivist principles advocate for learner-centered approaches that focus on the needs and experiences of both teachers and students (Tam, 2000) [18]. This approach can enhance educational efficiency and student outcomes by creating meaningful and interactive learning environments. Studies have shown that constructivist-based management strategies lead to improved student motivation and a more positive learning experience (Grennon Brooks & Brooks, 1999) [12].

2.1.2. Theory of Multiple Intelligences

The Theory of Multiple Intelligences (MI theory), proposed by Howard Gardner, suggests that intelligence is not a single trait but a collection of distinct cognitive abilities (Gardner, 1983) [19]. These intelligences include linguistic, logical-mathematical, spatial, musical, bodily-kinesthetic, interpersonal, intrapersonal, and naturalistic intelligences (Gardner, 1999) [20]. Each individual has a unique combination of these intelligences, which can be developed and applied in various contexts.

Support for Modern Educational Technology: Modern educational technology can be leveraged to create diverse and inclusive learning environments that cater to the multiple intelligences of students (Fogarty & Stoehr, 2008) [21]. Multimedia tools and interactive software can support linguistic and spatial intelligences, while virtual reality and simulation tools can enhance bodily-kinesthetic and logical-mathematical intelligences. Research has shown that technology-enhanced learning environments can significantly improve student engagement and learning outcomes (Thomas, 2000) [22].

Teachers need to develop the ability to identify and address the diverse intelligences of their students. Research indicates that teachers who apply MI theory in their classrooms report higher levels of student motivation and achievement (Armstrong, 2009) [23]. Teachers must also be proficient in using modern educational technology to design personalized learning experiences that address different intelligences. This requires ongoing professional development and support to enhance their technological pedagogical content knowledge (TPACK) (Koehler & Mishra, 2009) [24]. Educational management in the context of MI theory should focus on creating a flexible and inclusive learning environment that supports the diverse needs of students. Studies have shown that incorporating MI theory into educational management practices can lead to more effective and equitable learning experiences (Gardner & Moran, 2006) [25]. This approach also emphasizes the importance of teacher professional development to ensure that educators are equipped to implement MI-based strategies effectively.

2.2. The Definition of Variables

2.2.1. Modern Educational Technology

Modern educational technology refers to the application of electronic information technology in the teaching process to optimize teaching and learning. It encompasses a wide range of digital tools and resources that enhance educational processes and outcomes. According to Spector and Yuen (2016) [26], educational technology is defined as "the theory and practice of designing, developing, utilizing, managing, and evaluating learning processes and resources." This definition underscores the systematic and scientific nature of educational technology in promoting teaching and learning. Collins (1992) [27] emphasized that educational technology is not merely the use of tools but a systematic approach to designing, implementing, and evaluating the entire process of teaching and learning. He argued that the core of educational technology lies in using technological means to promote innovation in learning and teaching, thereby achieving diversification and personalization in education. Nguyen and Chung (2020) [28] highlighted that the application of educational technology has significantly changed during the COVID-19 pandemic. Many university teachers had to rapidly adapt to online and blended teaching models. They noted that educational technology has become essential for maintaining educational continuity and enhancing teaching effectiveness in remote settings. Costa et al. (2022) [29] proposed that the decolonization of educational technology requires a focus on knowledge justice and cultural diversity in the educational process. They argued that educational technology should promote the democratization of education rather than merely pursuing efficiency and profit. Pearl Sims and Steven Stone (2011) [30] provided a comprehensive overview of educational technology, emphasizing its role in enhancing educational experiences through the integration of various technological tools and resources. They highlighted the importance of using technology to create more engaging and effective learning environments.

In this study, modern educational technology specifically refers to the digital tools and resources that secondary school teachers can use in the teaching management process. These include multimedia technology, internet technology, online learning platforms, and intelligent teaching software. These tools and resources aim to enhance teaching quality and student learning outcomes by optimizing teaching design, increasing classroom interaction, improving teaching efficiency, and promoting student self-directed learning.

2.2.2. The Modern Educational Technology Competence of Secondary School Teachers

Definition of Modern Educational Technology Competence for Secondary School Teachers. The modern educational technology competence of secondary school teachers is a multidimensional capability that encompasses the integration of modern educational theories and information technologies into the teaching process to enhance teaching and learning outcomes. Li and He (2023) [31] emphasized the importance of teachers' ability to use information technology networks to improve their professional skills, suggesting that this is crucial for adapting to the demands of modern education. Similarly, Jin et al. (2022) [32] pointed out that modern educational technology can significantly enhance teaching effectiveness when used appropriately in subject-specific teaching, such as in chemistry education. Wang (2023) [33] also noted that educational technology plays a role in creating a rich and interactive teaching environment through the use of multimedia and internet resources. These studies collectively underscore the necessity for secondary school teachers to develop a robust competence in modern educational technology to meet the evolving educational landscape. Other scholars have also contributed to the understanding of educational technology competence. He (2023) [34] proposed a new definition of educational technology, stating that it is "the theory and practice of designing, developing, utilizing, managing, and evaluating education processes and resources with appropriate technological support to facilitate learning and improve performance". This definition emphasizes the importance of both teaching and learning in the application of educational technology.

Definition in This Study, the modern educational technology competence of secondary school teachers is defined as the ability to effectively integrate and utilize digital tools and resources to enhance teaching practices and student learning outcomes.

2.2.3. Definition of Teaching Management

In recent years, with the evolution and deepening of educational reforms, teaching management has become

one of the research hotspots in the field of education. Scholars have conducted in-depth studies on teaching management from various perspectives and have proposed many valuable insights. Liu Haibo (2021) [35] emphasized that the middle school stage is one of the most important stages in students' lives, and teaching management methods directly affect the formation of students' learning habits and play a key role in consolidating their learning foundation. He suggested that schools and teachers should improve, refine, modernize, and standardize teaching management to enhance the quality of teaching management from various angles. Qu Nan (2020) [36] focused on the modernization of teaching management in rural junior high schools in western China, using Q Junior High School as a case study. She pointed out that rural education constitutes a large proportion of China's education system, and the modernization of secondary school teaching management is inseparable from the study of rural middle school teaching management. She identified several challenges, including parents working in cities leading to inadequate supervision of their children, teachers having backward educational thinking and poor teaching ability, and an imperfect school management system. She proposed relevant measures for the modernization of secondary school teaching management, combining theory with practice to analyze and summarize the challenges faced by rural secondary schools. Zhang Shaoyu (2015) [37] discussed the application status and strategy of information technology in secondary school teaching management, using Zhongshan City as an example. He noted that with the development of society, the pace of educational modernization has accelerated, and the application of information technology in teaching management has continuously improved. Modern information technology in middle school teaching management is not just about using multimedia classes; it involves teacher management, student management, and the management of teaching resources. He investigated and analyzed existing problems in current teaching management and proposed corresponding countermeasures.

In this study, teaching management is defined as the comprehensive process of planning, organizing, coordinating, and evaluating all teaching activities to achieve the educational goals of the school. This includes the development of teaching plans, the implementation of teaching processes, the assessment of teaching quality, and the management of teaching resources.

2.3. Related Research

2.3.1. Teaching Management and Modern Educational Technology

The application of modern educational technology in teaching management has become an important direction in educational reform. Research indicates that the integration of technology can significantly enhance the efficiency and effectiveness of teaching management. Eka Nurhidayat et al. (2024) [38] pointed out that technology integration plays a crucial role in the development of 21st-century learning and can promote the development of teachers' competencies. Durak and Saritepeci (2017) [39] also found that the appropriate use of technology can improve classroom management outcomes. However, over-reliance on technology may lead teachers to overlook students' individual needs, thereby affecting teaching effectiveness. Additionally, Graham et al. (2020) [40] explored the practices and barriers of South African teachers using ICT in the classroom, noting that the rapid updating and high maintenance costs of technology pose economic burdens on schools.

These studies show that although modern educational technology has significant advantages in teaching management, there are also challenges that need further research to optimize its application. Despite existing research revealing the positive role of modern educational technology in teaching management, the challenges brought about by the rapid updating and application of technology still need in-depth exploration. In particular, how to effectively integrate technology to enhance teaching management efficiency under limited resources remains a field worthy of further research. Moreover, teachers may encounter technological barriers when adapting to new technologies, leading to interruptions in teaching activities and delays in student learning. Such technological barriers may affect teachers' acceptance and application of modern educational technology.

2.3.2. Modern Educational Technology Competence for Secondary School Teachers and Modern Educational Technology

The modern educational technology competence of secondary school teachers is crucial for the effective application of educational technology. Research indicates that teachers' digital competencies directly affect the application outcomes of modern educational technology. Napal Fraile et al. (2021) [41] found through a survey that insufficient digital competencies of teachers are one of the main factors restricting the effective application of educational technology. Liu et al. (2011) [42] also pointed out that teachers' educational beliefs significantly influence their technology integration capabilities. The acceptance and application capabilities of modern educational technology by teachers are closely related to their educational beliefs. Additionally, Jang and Tsai (2012) [43] explored the TPACK model among elementary mathematics and science teachers in Taiwan using interactive whiteboards, finding that the integration of teachers' technological knowledge, pedagogical knowledge, and content knowledge significantly impacts the application outcomes of technology.

These studies show that teachers' modern educational technology competencies are key to the effective application of educational technology. Despite existing research highlighting the importance of teachers' competencies for technology application, the dependence of teachers on technology and the neglect of traditional teaching methods still need further research. In particular, how to balance technology application with traditional teaching methods to enhance teaching effectiveness remains a field worthy of in-depth exploration. Robertson (2011) [44] pointed out that over-reliance on technology by teachers may lead them to overlook students' initiative and creativity in teaching. This dependence may result in excessive reliance on technology by students, thereby affecting their autonomous learning abilities. Moreover, Mayes et al. (2015) [45] mentioned that the rapid development of technology may lead teachers to overly depend on technological tools in teaching methods while neglecting traditional interactive teaching methods. This dependence may weaken the interaction between teachers and students, affecting teaching effectiveness.

Therefore, it is necessary to further explore how to find a balance between technology application and traditional teaching methods to enhance teaching effectiveness.

2.3.3. Teaching Management and Modern Educational Technology Competence for Secondary School Teachers

Teaching management has a significant impact on the development of modern educational technology competencies among secondary school teachers. Liu Haibo (2021) [35] emphasized that the middle school stage is one of the most important stages in students' lives, and teaching management methods directly affect the formation of students' learning habits and play a key role in consolidating their learning foundations. Guitert et al. (2021) [46] proposed a digital competence framework for primary and secondary school teachers in Europe, highlighting the importance of teacher training in enhancing teachers' digital competencies. Through systematic training, teachers can better utilize modern educational technology to improve teaching quality and student learning outcomes. Additionally, Ghateolbahra and Samimi (2021) [47] studied classroom management strategies among novice and experienced teachers in online environments, finding that teachers' self-efficacy significantly impacts their technology application capabilities. The higher the self-efficacy of teachers, the stronger their ability to apply modern educational technology in teaching. These studies show that teaching management has a significant impact on the development of teachers' modern educational technology competencies.

Despite existing research highlighting the impact of teaching management on teachers' competencies, the technological barriers and unfamiliarity that teachers encounter when adapting to new technologies still need further research. In particular, how to provide effective training and support to help teachers overcome these barriers remains a field worthy of in-depth exploration. Livingston (2017) [48] pointed out that teachers may encounter technological barriers when adapting to new technologies, leading to interruptions in teaching activities and delays in student learning. Such technological barriers may affect teachers' acceptance and application of modern educational technology. Moreover, Martz and Shepherd (2007) [49] mentioned that teachers' unfamiliarity with technology may lead to difficulties in teaching management. This unfamiliarity may cause teachers to feel confused and uneasy when using modern educational technology, thereby affecting

the effectiveness of teaching management.

Through the above literature analysis, it is found that there is a close correlation between teaching management, modern educational technology competencies of secondary school teachers, and modern educational technology. Effective teaching management can provide teachers with good support and resources, promoting the development of their modern educational technology competencies. Meanwhile, teachers' modern educational technology competencies directly affect the application outcomes of modern educational technology in teaching, thereby enhancing teaching quality and student learning outcomes. However, the rapid development and application of technology also bring some challenges, such as technological barriers, teachers' unfamiliarity with technology, and over-reliance on technology. These challenges may affect the effectiveness of teaching management and teachers' application capabilities of modern educational technology. Therefore, it is necessary to further explore how to optimize teaching management and enhance teachers' modern educational technology competencies to better apply modern educational technology and achieve a comprehensive improvement in educational quality.

3. Method

3.1. Research Participants, Sample, and Instruments

The population for this study consisted of teachers at Hengxian Middle School in Nanning City, Guangxi Zhuang Autonomous Region, with a total of 220 teachers employed at the school. A sample of 140 teachers was selected using a random sampling method to ensure diversity across different subjects and teaching experiences. The primary research instruments included a literature review and a questionnaire survey. The literature review provided a theoretical foundation for the application of modern educational technology and its role in teaching management. The questionnaire survey was employed to collect both quantitative and qualitative data to assess the current status of modern educational technology in the teaching management of secondary school teachers.

3.2. Data Collection and Questionnaire Design

The questionnaire survey was the primary method used for data collection in this study. The questionnaire was designed around the research objectives, integrating relevant literature and practical experiences in teaching management to ensure the scientific validity and practical utility of the questions. The questionnaire consisted of 12 items divided into two sections: Section 1 investigated the basic information of the teachers, including years of teaching experience, grade level taught, subject area, and academic qualifications. Section 2 focused on the current status of modern educational technology in teaching management, covering topics such as time spent using computers, production of multimedia content, satisfaction with technological skills, participation in relevant training, and specific applications of modern educational technology in teaching management. The questionnaires were distributed in paper form to the 140 sampled teachers. Participants completed the questionnaires after being informed of the study's purpose and assured of the confidentiality of their responses. The questionnaires were collected promptly after completion to ensure a high response rate.

3.3. Reliability and Validity of the Questionnaire

To ensure the reliability and validity of the study results, the questionnaire underwent reliability and validity assessments. Reliability was assessed using Cronbach's alpha coefficient to evaluate the internal consistency of the questionnaire. According to Zhang (2007) [50], a Cronbach's alpha value between 0.8 and 1.0 indicates very high reliability, between 0.7 and 0.8 indicates good reliability, between 0.6 and 0.7 indicates average reliability, and below 0.6 indicates low reliability. In this study, the Cronbach's alpha value for the questionnaire reached 0.809 (Table 1, Questionnaire Reliability Test), which is well above the acceptable threshold of 0.70, indicating high reliability and stable results. For validity assessment, content validity was ensured by consulting experts in the fields of educational technology and teaching management during the questionnaire design phase.

Additionally, a pilot test was conducted to optimize the questionnaire, enhancing its clarity and relevance. The pilot test results showed that the validity indicators met the study's requirements and accurately reflected

the current status of modern educational technology in the teaching management of secondary school teachers.

Table 1. Questionnaire reliability test.

Questionnaires	The Number of Items	Cronbach'α
Investigation on the current situation of the application of modern educational technology in the process of secondary school teacher education management	12	0.809

4. Data Analysis

Through data analysis, it is found that the school attaches importance to the application of modern educational technology in education and teaching, and the required equipment can meet the daily needs of modern educational technology. It will regularly organize and carry out special training for teachers to improve their modern educational technology ability, so as to adapt to the new normal of online teaching and online and offline mixed teaching. Teachers' ability to use modern educational technology and the use of the environment meet the needs of basic education and teaching, and even build a bridge between home and school. With the support of modern educational technology, teachers' teaching and students' learning are more convenient and efficient than before. It should be noted that although the performance of the data is acceptable, there is still much room for improvement. The existing problems can be discussed around the teaching mode, teaching design, classroom organization, teaching management and other strategic methods and network information security, so that teachers' ability to use modern educational technology can be improved (see Table 2).

Table 2. statistical data.

Items	Average Value
Policies or planning	3.8636
Funding	3.6534
Training courses	2.8682
Facilities	3.9272
Classroom environment	3.7863
Teachers' application ability	3.8016
Students' application ability	3.3551
Communicate with parents	3.6732

4.1. Basic Information of Teachers

Table 3 is the basic information statistics of teachers in the teaching management of modern education technology for secondary school teachers, and it can be seen that the number of teachers surveyed in this survey is 140, and the basic information includes grades, disciplines, teaching age, and academic qualifications, as shown in Table 3.

Table 3. Basic information of secondary school teachers.

Project	Composition	Number of People	%
grade	first year of junior high school	50	35.71%
	second year of junior high school	8	5.71%
	hird year of junior high school	82	58.58%

Table 3. Cont.

Project	Composition	Number of People	%
discipline	the language	10	7.15%
	mathematics	9	6.43%
	English	9	6.43%
	political	9	6.43%
	history	8	5.71%
	the geographical	14	10%
	physical	8	5.71%
	chemical	15	10.71%
	biological	12	8.57%
	music	14	10%
	sports	14	10%
	art	10	7.15%
	Information technology	8	5.71%
Teaching age	within five years	56	40%
	6–10 years	14	10%
	11 to 15 years	60	42.86%
	more than 16 years	10	7.14%
Degree	Junior College or below	90	64.29%
	the undergraduate course	46	32.85%
	Master degree or above	4	2.86%

4.2. Secondary School Teachers Produce Multimedia Plug-Ins Frequently and Use Computer Time per Week

From Table 4, it can be seen that the frequency of secondary school teachers producing multimedia courseware is polarized, with 67.86% of them often using it, 30.71% of them never using it, and 1.43% of the respondents occasionally use multimedia plug-ins to assist in teaching management. Most of the time spent using computer-aided teaching and management exceeds 1 h, accounting for 2.14%, and the proportion of computer use time is 1–5 h, 6–10 h, 11 h and above, which are 55%, 26.43% and 16.43% respectively. It can be seen that not all teachers use computers to make multimedia plug-ins, and the time spent using computers every week is mostly 1–5 h, and the rational use and efficiency of time are more urgent.

Table 4. Frequency of multimedia plug-ins produced by secondary school teachers and weekly computer time.

X\Y	A. Often	B. Occasionally	C. Never	Total
A. Within 1 h	3	0	0	3
B. 1–5 h	52	1	24	77
C. 6–10 h	23	1	13	37
D. 11 h and above	17	0	6	23

4.3. Secondary School Teachers Are Satisfied with Their Own Modern Educational Technology Ability and the Number of Times They Have Participated in Refresher Training

From Table 5, it can be seen that 52.14% of teachers are satisfied with their modern educational technology

capabilities, and 47.86% of teachers believe that their modern educational technology capabilities need to be improved. The proportion of teachers who have never participated in teacher training on modern educational technology ability is 45.71%, and other teachers interviewed have participated in modern educational technology training from time to time, and the training time and frequency are different.

Table 5. Secondary school teachers' satisfaction with their modern educational technology abilities and the number of times they have participated in refresher training.

X\Y	A. Never	B. Attend Once per Semester	C. Participate Once a Year	D. A Few Times
A. Very satisfied	14 (50%)	10 (35.71%)	4 (14.29%)	0 (0.00%)
B. satisfied	19 (42.22%)	13 (28.89%)	12 (26.67%)	1 (2.22%)
C. don't satisfied	31 (46.27%)	22 (32.84%)	13 (19.40%)	1 (1.49%)

4.4. Middle School Teachers Use Modern Educational Technology Scenarios

As can be seen from Figure 1, the scenarios in which secondary school teachers use modern educational technologies are daily classrooms, open classes and after-school schools. The check frequency reached 93.57%, 80% and 74.29% respectively, and the scenes of secondary school teachers using modern educational technology are rich and can achieve wide use in various forms.

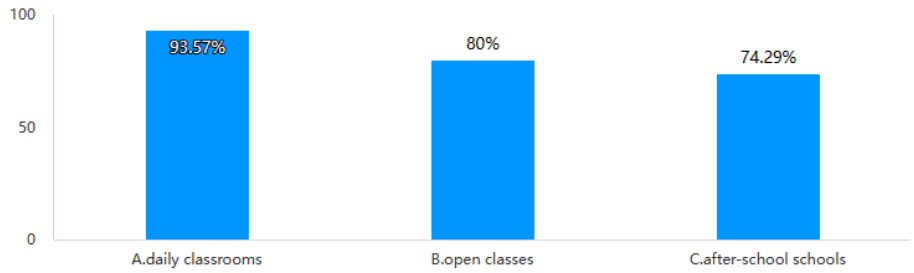

Figure 1. Scenario of secondary school teachers using modern educational technology.

4.5. Effective Form for Secondary School Teachers to Improve the Ability of Modern Educational Technology

From Figure 2, it can be seen that the effective forms of secondary school teachers' training for improving their modern educational ability include teacher refresher training, self-study, and consulting others, accounting for 42.86%, 42.14%, and 13.57%, respectively, and 1.43% of teachers choose other forms. For teachers, teacher training and self-study are more in line with the requirements of teachers to improve their modern educational technology capabilities.

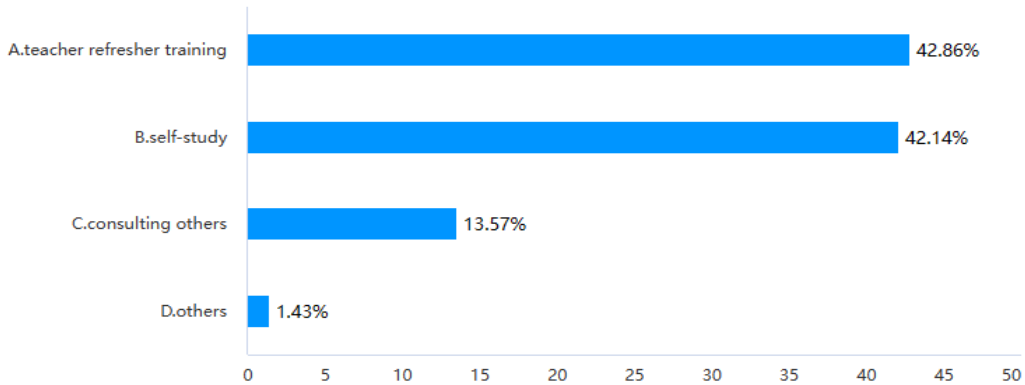

Figure 2. Effective forms of training in modern educational technology competencies.

4.6. Compared with Traditional Teaching Management, Modern Educational Technology Has Achieved Certain Results

From Table 6, secondary school teachers believe that the current modern educational technology has changed the traditional teaching method, improved students' subject performance, improved learning efficiency, helped teachers and students to communicate, and teaching evaluation is more convenient, but for teachers, it also increases part of the teaching burden. Secondary school teachers generally believe that modern educational technology teaching management has changed the traditional teaching method compared with traditional management, which is the most important and crucial for education and teaching.

Table 6. Secondary school teachers believe that the achievements of current modern educational techniques have been achieved.

Options	Count	%
A. Change the way of teaching	116	82.86%
B. Improve students' academic performance	86	61.43%
C. It increases the teaching burden	107	76.43%
D. Improve learning efficiency	15	10.71%
E. Facilitate communication between teachers and students	91	65%
F. Teaching evaluation	68	48.57%

4.7. The Direction of Future Progress in the Teaching Management of Modern Educational Technology for Secondary School Teachers

From Table 7, it can be seen that secondary school teachers believe that there is still room for progress in modern educational technology in the teaching management of secondary school teachers. It is mainly to increase investment in software and hardware, strengthen information technology training and educational technology training, create a good atmosphere of modern educational technology, support relevant systems, and optimize the dimension of teaching evaluation. Software, hardware, teacher capabilities, and atmosphere are the key aspects that secondary school teachers believe need to be improved.

Table 7. What aspects of modern educational technology can be improved in the teaching management of secondary school teachers.

Options	Count	%
A. Increase hardware investment	124	88.57%
B. Increase software investment	106	75.71%
C. Strengthen information technology training and educational technology training	94	67.14%
D. Create a good atmosphere for modern educational technology	88	62.86%
E. Supporting relevant systems to encourage the use of modern educational technology	30	21.43%
F. Teaching evaluation	46	32.86%

5. Discussion and Conclusions

5.1. Discussion

The findings of this study highlight the significant role of modern educational technology in the teaching management of secondary school teachers. Data analysis shows that the school places a strong emphasis on integrating modern educational technology into education and teaching, with existing equipment meeting the daily needs of

modern educational technology (see Table 2). This finding is consistent with the widely recognized transformative impact of technology on education in recent years (Darmawansah et al., 2023; Liu et al., 2011) [51,52]. The school's regular organization of specialized training to enhance teachers' capabilities in modern educational technology is commendable, as it aligns with the evolution of online and blended learning (Huang et al., 2022) [53]. However, despite the acceptable performance indicated by the data, there is still considerable room for improvement.

The basic information of the surveyed teachers (see Table 3) indicates that the teacher group is diverse in terms of teaching experience, academic qualifications, and subject areas. This diversity suggests that the application of modern educational technology should be tailored to meet the specific needs of different teachers and subjects. For example, teachers with over 16 years of teaching experience (7.14%) may require different training approaches compared to those with less than five years of experience (40%). This finding is consistent with the view that teachers' attitudes and readiness to adopt new technologies may vary based on experience and background (Fullan et al., 2018) [54].

The frequency of secondary school teachers producing multimedia plug-ins and their weekly computer usage (see Table 4) reveals a polarization: 67.86% of teachers frequently use multimedia tools, while 30.71% have never used them. This indicates that while the majority of teachers actively use modern educational technology, a significant portion may require additional support and training to effectively integrate these tools into their teaching practices. The majority of teachers spend 1–5 h per week using computers for teaching and management, suggesting a need for more efficient time management and technology utilization. This finding is supported by research on the importance of effective time management in the context of technology integration (Howland et al., 2011) [55].

Teachers' satisfaction with their modern educational technology abilities and their participation in retraining (see Table 5) show that while over half of the teachers are satisfied with their current capabilities, nearly half believe further improvement is necessary. This highlights the importance of continuous professional development in modern educational technology. The data also indicate that a significant number of teachers have never participated in relevant training, suggesting a need for more accessible and targeted professional development opportunities. This view is consistent with research emphasizing ongoing teacher training to enhance their Technological Pedagogical Content Knowledge (TPACK) (Morris et al., 2021) [56]. The scenarios in which secondary school teachers use modern educational technology (see Figure 1) demonstrate a wide range of applications, including daily classrooms, open classes, and after-school tutoring. This indicates that modern educational technology is being utilized in various forms, which is a positive sign for the integration of technology into teaching practices. However, the effectiveness of these technologies in different scenarios needs further exploration to maximize their potential. This view is supported by research emphasizing empirical evaluation of technology integration in authentic educational settings (Lee & Lai, 2024) [57].

The effective forms of training to enhance secondary school teachers' modern educational technology abilities (see Figure 2) highlight that teacher retraining and self-study are the most favored methods. This suggests that schools should continue to support these forms of professional development while exploring other innovative training methods to meet the diverse needs of teachers. This view is consistent with the idea that multiple pathways for professional development can enhance teachers' technological competencies (Huang et al., 2024) [58].

Compared to traditional teaching management, modern educational technology has achieved certain results (see Table 6), including changes in teaching methods, improvements in student performance, and enhanced learning efficiency. However, it also increases the teaching burden on teachers, indicating a need for better support systems to mitigate this impact. The most significant achievement is the change in teaching methods, which highlights the transformative potential of modern educational technology in education. This view is consistent with research emphasizing the impact of technology on teaching and learning outcomes (Geng & Su, 2024) [59].

5.2. Conclusions

This study concludes that while modern educational technology has been effectively integrated into the teaching management of secondary school teachers, there are areas for improvement. The school's investment in hardware and software, along with regular training programs, has laid a solid foundation for the application of

modern educational technology. However, the findings highlight the need for more targeted training programs, better time management strategies, and enhanced support systems to address the challenges faced by teachers. Future directions for improving modern educational technology in teaching management should focus on increasing investment in hardware and software, strengthening information technology and educational technology training, creating a supportive atmosphere for modern educational technology, and optimizing teaching evaluation dimensions (see Table 7). By addressing these areas, schools can better leverage modern educational technology to enhance teaching and learning experiences, ultimately leading to improved educational outcomes.

6. Limitations and Future Research

6.1. Limitations

While this study provides valuable insights into the application of modern educational technology in secondary school teaching management, it is not without limitations:

1. Sample Size and Representativeness: The study was conducted with a sample of 140 teachers from a single school, which may limit the generalizability of the findings. Future research should include larger and more diverse samples to enhance the representativeness and reliability of the results.

2. Self-Report Data: The data collected through questionnaires relied on teachers' self-reports, which may be subject to biases. Future studies could incorporate multiple data sources, such as classroom observations and student performance data, to provide a more comprehensive analysis.

3. Limited Focus on Student Perspectives: The study primarily focused on teachers' perspectives and experiences. Future research should also include students' perspectives to provide a more balanced understanding of the impact of modern educational technology on teaching and learning.

4. Short-Term Impact Assessment: The study assessed the immediate impact of modern educational technology on teaching management. Longitudinal studies are needed to evaluate the sustained effects and potential long-term benefits or challenges associated with technology integration.

5. Technological Context: The study was conducted in a specific technological context, which may not be representative of other regions or educational settings. Future research should consider different technological contexts to understand the variability in technology integration and its impact. By addressing these limitations and exploring the suggested directions for future research, the field of educational technology can continue to evolve and provide more effective solutions for enhancing teaching and learning in secondary schools

6.2. Future Research

Based on the findings of this study, several directions for future research are suggested to further explore the application and improvement of modern educational technology in secondary school teaching management:

1. Comparative Studies: Carry out comparative studies between different schools or regions to identify best practices and contextual factors that influence the effectiveness of modern educational technology. This can help in developing more tailored and effective strategies for technology integration.

2. Impact on Student Learning: Investigate the specific impact of modern educational technology on student learning outcomes, including cognitive, affective, and psychomotor domains. This will help in understanding the multifaceted benefits of technology in education.

3. Teacher Training Programs: Conduct in-depth research on the effectiveness of various teacher training programs in enhancing teachers' technological pedagogical content knowledge (TPACK). This will provide insights into the most effective training methods and content for continuous professional development.

Integration of Emerging Technologies: Explore the integration of emerging technologies such as artificial intelligence, virtual reality, and the Internet of Things (IoT) in secondary school teaching management. This will help in identifying innovative ways to enhance teaching and learning experiences.

Funding

This research received no external funding.

Author Contributions

Writing—original draft, Z.Y., N.P. and W.I.; writing—review and editing, Z.Y., N.P. and W.I. All authors have read and agreed to the published version of the manuscript.

Institutional Review Board Statement

Not applicable.

Informed Consent Statement

Not applicable.

Data Availability Statement

The data presented in this study are openly available via the links provided in the data section. More detailed information can be obtained upon request to the corresponding authors.

Conflicts of Interest

The authors declare no conflict of interest.

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