

Research Summary on the Smart Teaching Model and Its Application in Chinese Teaching

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Abstract: *Smart teaching models have important value in the field of education, especially in the context of smart education. Smart teaching models can improve teaching efficiency and promote students' individualized development. This article summarizes the research on smart teaching models, including the research on smart classroom teaching models in Europe, America, and Asian countries, as well as the research on smart teaching models in Chinese speaking and writing teaching. The article also proposes the constituent elements and teaching process design of smart teaching models and analyzes the advantages and limitations of smart teaching models.*

Keywords: Smart Education, Smart Teaching Model, Higher Vocational Colleges, Chinese Teaching

1. Introduction

Smart teaching mode is one of the important elements of smart education that is the new realm of education informatization.

Research on Smart Education Development and Smart Teaching Models in Europe, America and Asian Countries

With the rapid development of information technology, smart education has sprung up internationally. The United States, South Korea, Singapore, Malaysia and other countries have formulated programs in the research of smart education and have achieved more significant results. In Yonghan Li and Xiongjun Zhou's (2020) research named *A Review of Domestic and International Research on Smart Education*, the evolution of smart education and the status of research in the United States and several countries in Southeast Asia are organized by the literature method. The research review is conducted from the three aspects of the characteristic attributes, value orientation and development exploration of wisdom education. The results of this research are of reference value to the smart teaching models of this study.

The United States is the earliest country to conduct research on and apply computer-assisted instruction. In recent years, the literature on smart teaching in the United States mainly focus on the technical feasibility of technical systems and intelligence (e.g. Popescuetal, 2018; Satuetal, 2018; Abdellatif, 2019; DeNardis, 2020; Kwet.M, 2020). Educational technology in colleges and universities in the United States is shifting from being primarily an instructional tool and a means of acquiring knowledge to big data monitoring based on collecting data from

individual student devices to personalize education (Watters, 2017; Daniel, 2015). Learning paths and resource recommendations are based on the student's interests, abilities, and learning history, recommending the most appropriate learning paths and resources for them (Martinez-Maldonado; Buckingham Shum, 2021). 2015 saw the release of the U.S. National Educational Technology Plan (NETP), *Learning for the Future: Reimagining the Role of Technology in Education*, which emphasized the characteristics of smart education and leads the development of education informatization in five areas, including learning, teaching, leadership, evaluation and infrastructure, with emphasis on the use of online learning platforms, digital teaching materials and personalized learning systems to improve students' learning effectiveness and teachers' teaching efficiency. Literature studies on smart teaching models are mainly inclined to intelligent and personalized models. With enough data, they can assess people in ways that are useful for education. Their ideology expresses a cutting-edge logic that seeks to extend big data surveillance to education (Kwet, 2019b). Learning analytics aims to realize the decades-old dream of personalizing learning for individual students, often introducing one-on-one smart tutors that cater to students on an individual basis (Pardo et al., 2019). These studies also support the research idea of the smart teaching pedagogical model proposed in this study (personalized training with smart platform data monitoring).

In conclusion, the United States has achieved a lot of results in the research and practice of smart teaching, and through continuous innovation and practice, it provides important experience for this study to carry out the reform and innovation of smart teaching mode.

In 2022, the South Korean Ministry of Education released the education informatization implementation plan (Announcement of comprehensive plan for fostering digital talent2022[출처] 대한민국 정책브리핑) focusing on the integration of the latest smart technologies into the education informatization program to create an Information and Communication Technology (ICT) digitalization framework for education based on AI (Artificial Intelligence) + ICBM (an acronym for IoT, Cloud, BigData, and Mobile).

In 2006, the Singaporean government announced the iN2015 Plan, of which smart education is an important part, and its development goal is to enable citizens to use information technology to carry out ubiquitous learning and personalized learning. In 2007, the Ministry of Education of Singapore proposed the implementation of the Future Schools Project, and in 2014, Singapore reintroduced its Smart Nation 2025 Ten-Year Plan, which utilizes ICT for pedagogical development and articulates the basic requirements for students to master ICT.

In 1997, the Malaysian Ministry of Education issued *The Malaysia Smart School: A Conceptual Blueprint*, which elaborated on the concept of smart school, its components, educational objectives, and implementation plan, etc. In 2002, the Malaysian Ministry of Education issued the *Malaysia Smart School Implementation Plan*. The whole process of planning, implementing, evaluating, optimizing and upgrading the Malaysian Smart School project always puts the cultivation of teachers' smart teaching ability at the core. Smart teachers are the main human resources of smart schools and are the core elements of smart school construction. The TADI smart teaching model constructed in this study also puts the T (teacher) in the first place, which also reflects the primacy of teachers' wisdom in the smart teaching model.

Since the 1980s, foreign research on educational wisdom has gradually matured, and the research direction has begun to gradually change to the level of creating teaching situations. Max Van Meenen (1991), a professor of education at the University of Alberta, Canada, firstly

put forward the viewpoint of wisdom in education in *Teaching Wisdom - The Implications of Educational Wisdom*, and began to study six aspects of educational wisdom, including the nature, composition, effect, manifestation, realization and importance of wisdom in education. Besides, Fan Meinan pioneered the idea of wisdom and resourcefulness in education and in-depth inquired into the meaning of education from a phenomenological point of view contributed to a major shift in the study of smart teaching and learning by considering how to make better use of pedagogical resourcefulness in the process.

From the foreign research, the research on smart teaching models is still in its infancy, mainly focusing on transforming the existing classroom teaching with modern information technology and designing diverse smart teaching models.

Demir, K. A. (2021) developed a smart education framework in the *Smart Education Framework*, based on which a smart education design methodology was developed. It also shows how the framework and design methodology can be used to develop smart instructional designs by the examples of a history course and an algebra course. It included determining educational goals, determining pedagogical methods, analyzing existing smart education systems and technologies used, determining required enrichment and support technologies, designing smart education to collect learning materials, evaluating the effectiveness of the design, and evaluating the effectiveness of the curriculum. The strength of this study is the use of a systematic literature search, which showed that the framework has the ability to describe smart education systems. From the content of the study, it can be seen that the design and realization of a smart teaching system mentioned in the study is the design of the smart teaching model in this study. The study also states that this study observes that there are only a handful of smart education system designs or implementations reported in the literature (Demir, K. A. 2021, p36), which is the main research objective of this study.

Singh, H., Miah, S. J. (2020) describes the state of the art in smart education research as a theoretical basis for the introduction of an initial innovative approach known as the Student Career Assistance System (SCAS) in the *Smart Education Literature: A Theoretical Analysis*. Content analysis techniques are used to process meta-details as key findings. The key findings show that smart education is a rapidly evolving area of research, complemented by the application of a range of state-of-the-art technologies. Combining them, a new framework for smart education product innovation is introduced as a case demonstration based on SCAS for mobile devices (see Figure 2-11) (Singh.H, et al ,2020). The strength of this study is that a systematic literature review and quantitative analysis was conducted to identify the most relevant existing research in the field of smart education thereby establishing a preliminary smart instructional design. Meanwhile, the disadvantage of this study is that the instructional model design does not incorporate a specific curriculum and can only be called a theoretical smart instructional model design.

Technologies and Tools for Smart Education by Yanyan Li, Jian Cui, (2018) is a monograph on technologies for smart education. It introduces the technologies and tools needed for smart education, including aspects of artificial intelligence, virtual and augmented reality, gamified learning, Internet of Things, and cloud services for a better understanding of technologies and tools for smart education (Li et al, 2018). The strength of this monograph is that it explores important issues in smart education such as curriculum design, assessment of smart teaching models and teacher training. At the same time, the disadvantage is that it does not construct a specific smart teaching model.

In conclusion, research on smart teaching models in Europe, America and Asia is characterized by the following:

First, there are studies on smart teaching models that emphasize the learning activity itself. For example, *Beyond LMS: Expanding Course Experience with Content Collaboration and Smart Assignment Feedback* by Ivana Bosni (2010) argues that a smart teaching model should embody the concept of interaction. The study describes tools for content collaboration between students and instructors as well as automated assignment validation. Assignment validation helps students solve the most common problems and provides instant feedback on the content they submit. Rania Albalawi (2013) in USA argues that mobile-based interaction promotes both interest and socialization of learners (Albalawi R, 2013).

The second aspect is the study of smart classroom teaching models that aim to highlight the learner's subjectivity and are committed to the individualization of the learner. For example, enkiran, MA (2002) in USA believes that the smart classroom teaching model should meet the needs of learners' individualization and initiative, and based on this model, proposes the adaptive collaborative distance learning system SMART-Learning so that the learners can achieve personalization and autonomy (Benkiran, M.A, et al ,2002).

The third aspect emphasizes the importance of teachers' instructional strategies in the smart teaching model, for example Tamar Shamir Inbal (2022) from Israel describes teachers' experiences leading emergency distance learning (ERT) in K-12 and blending synchronous and asynchronous instruction during the COVID-19 pandemic. It emphasizes the need to regularly incorporate experiences with distance learning and online activities into school agendas in order to develop critical digital competencies for teachers and students (Shamir Inbal, et al, 2022). These research findings provide relevant case references and practical experiences for this thesis.

It can be concluded that foreign research on smart teaching model is based on the traditional model to highlight the realization of learners' own development as the core, break through the classroom space limitations, broaden the channels of knowledge acquisition, enrich the teaching and evaluation methods, and finally promote the formation of learners' competence.

2. Research on the Development of Smart Teaching and Smart Teaching Models in China

In April 2018, the Chinese Ministry of Education released the *Education Informatization 2.0 Action Plan*, emphasizing the comprehensive promotion of digital campus construction and the implementation of the *Norms for the Construction of Digital Campuses in Vocational Colleges*, while also proposing actions for innovative development in smart education.

In 2019, the State Council of China issued the *China Education Modernization 2035* and the *Accelerating the Implementation Plan for Education Modernization (2018-2022)*, further pointing out the need to accelerate educational reform in the information age, construct intelligent campuses, and coordinate the construction of integrated intelligent teaching, management, and service platforms.

This study takes smart teaching as the theme, and with the help of visualization software, 19,476 pieces of literature in the field of smart education in the CNKI database in recent years are analyzed by metrological visualization (as in Figure 1), and the analysis shows that research on smart teaching in China has gradually increased in the past ten years, and it reached a peak

of 3,030 pieces in 2020, and the research related to smart teaching in China gradually began to focus on the design and application of teaching models after 2016. After that, research related to smart teaching in China gradually began to focus on shifting to the design and utilization of teaching models. The high-frequency keywords are smart classroom, educational wisdom, teaching mode, smart teaching, etc. (as in Figure 2). Among them, teaching mode appeared as frequently as 754 times.

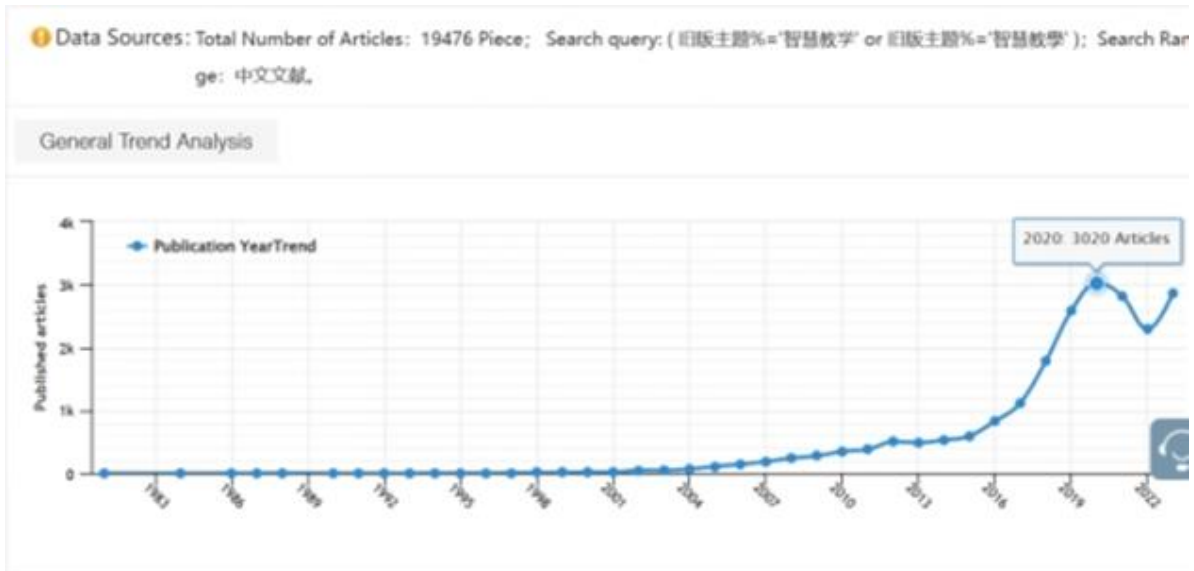


Figure 1: Metrological Visualization of literature in the field of smart education in the CNKI database

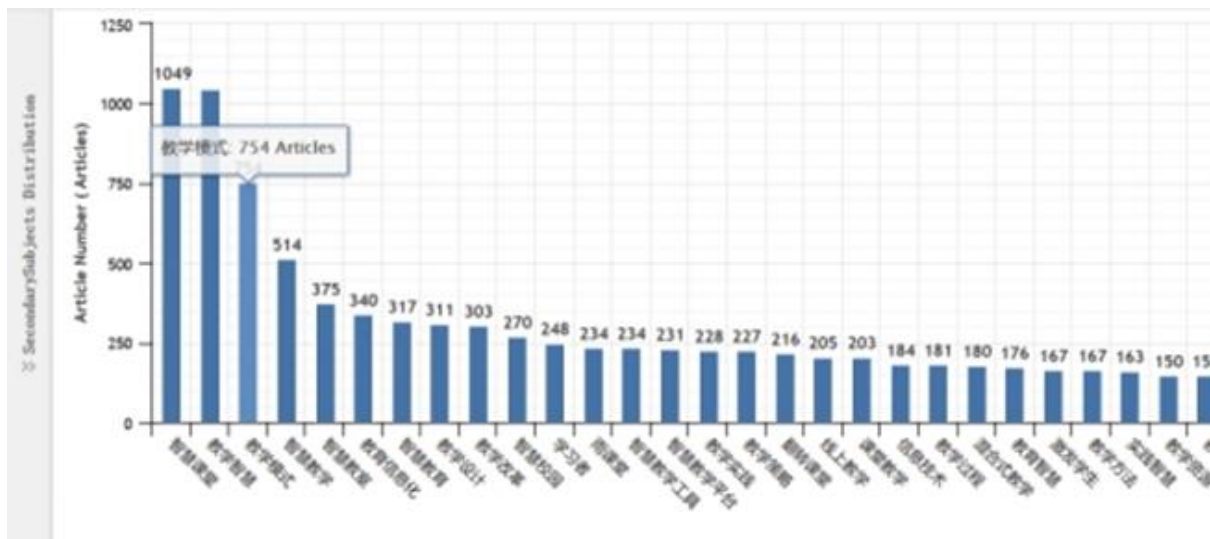


Figure 2: Keywords frequency of literature in the field of smart education in the CNKI database

Shuhui Sun and Bangqi Liu's (2016) monograph, *The Smart Classroom*, is the first work in China to specifically and systematically study the theoretical and practical issues of the smart classroom based on an informatization perspective. It mainly adopts the case study method, which verifies and embodies the effectiveness and value of the application of the smart classroom in different scenarios by introducing several cases of smart classroom practice. Quantitative and qualitative research methods are also combined to make the findings more comprehensive and credible and explains the basic issues of smart classroom, constructing smart classroom, and how to apply smart classroom specifically in classroom teaching practice for this study. The advantage of this study is that the qualitative research method is used to give

the application strategies of the smart classroom and the practical application cases of each discipline, which provides a concise and practical guide to the theory and application of the smart classroom, and also shows the feasibility and necessity of adopting the smart teaching model.

Knowledge Mapping Analysis of Wisdom Education in China by Wei Zhao and Lingjun Li (2021) analyzes the research situation of smart education in China by knowledge mapping analysis method and proposes that the current research in the field of smart education is still at the conceptual stage, resulting in the situation that although the concepts and connotations of smart education are rich, the case studies and practical applications are still insufficient. Although some literature innovatively proposes to create smart classroom, related new teaching equipment and methods and other practical measures, in general, are still theoretical conceptions, rather than an analysis of successful cases and evaluation of specific application practices (Zhao et al. 2021). This study sketches the status of wisdom education development in China and suggests the inadequacy of research in terms of specific cases and applications. This study aims to assess the smart teaching model through the teaching of a specific university language course, applying quasi-experimentation, and using the cultivation of higher vocational students' speaking and writing skills as a case study, so this thesis can make up for the insufficient case study analysis and practical application to a certain extent, which also reflects the necessity and research value of this study.

In conclusion, the research on smart classroom teaching mode in China, from the research literature, is still in the stage of theoretical construction, mainly focusing on classroom teaching in primary and secondary schools, and there is also a lack of empirical research and application of smart teaching mode in specific courses. Although there are fewer studies combining language subjects, this study also sees that the research on smart teaching mode combining subjects has been enriched in recent years, which also provides a lot of theoretical and practical references for this study. By analyzing the literature, there are two main following aspects of research on China's smart classroom teaching model.

First, the research focus on analyzing the advantages and necessity of the smart teaching mode and conducting a theoretical construction research. *Smart Classroom Model Based on Dynamic Learning Data Analysis* by Shuhui Sun and Bangqi Liu (2015) analyzes the construction of the smart classroom information technology platform, describes the theoretical model of the teaching structure of the smart classroom and elaborates on the main application value of the smart classroom by comparing it with the traditional classroom (Sun et al., 2015). The disadvantage of this research is that it only constructs a smart teaching model at the theoretical level without empirical research.

The second is the construction of a specific smart classroom based on a certain smart platform and course. Honghong Zeng's (2020) *Design and Application Research on Smart Teaching Model Based on Rain Classroom* constructed a smart teaching model for the course of *Computer Application Fundamentals*. And through quantitative research, it was concluded that the smart teaching model based on rain classroom platform helps teaching implementation and evaluation. The efficiency of learning, learning performance has been improved, and the students' interest in learning, motivation attitude has been improved (Zeng, 2020). The advantage of this study is that the effectiveness of the smart teaching model was verified through empirical research. But only 100 students were selected for this study, which is a relatively small sample size, and the application of *Computer Applications Fundamentals* as a

practicum course was not designed to include course-specific instructional competency objectives.

3. Research on Smart Teaching Models in Chinese Language Teaching in Higher Vocational Colleges and Universities

After removing non-academic articles such as those in conferences and newspapers, there are 200 journals, 4 master’s theses and 0 doctoral dissertations in the China Knowledge Network (CNKI) database with the keyword “smart teaching mode”. 433 results were found by searching with the title of “smart teaching mode” (as in Figure 3), all of which were in the last 5 years.

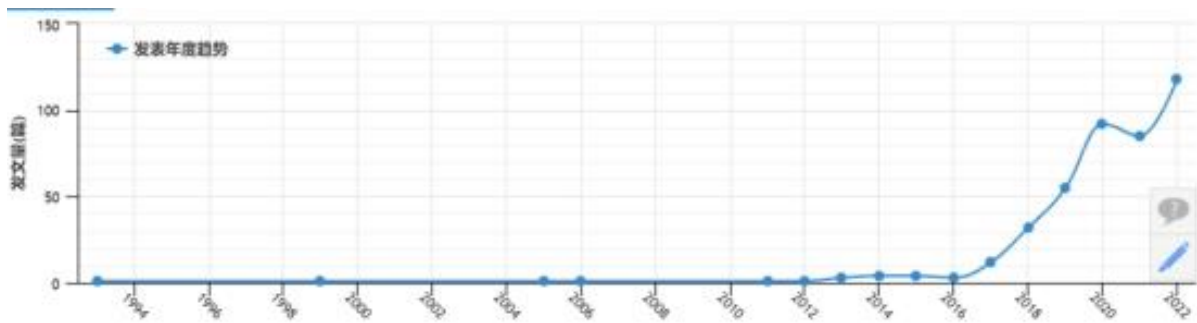


Figure 3: Academic Articles In The China Knowledge Network (CNKI) Database With The Keyword “Smart Teaching Mode”

From the distribution of the retrieved disciplines (as in Figure 4), the only journal papers involving specific higher vocational courses are those in which Computer Information Technology and College English are the object of study. For example, research was conducted on the topic of smart experiential teaching mode of tourism English in higher vocational education (Chen, 2021), and on the topic of smart experiential teaching mode of tourism English in higher vocational colleges - taking a micro class as an example (Huang, 2020). It can be seen that smart teaching mode has become a research hotspot in the past three years, accounting for only 2.56% in the field of vocational education, and only two articles are related to Chinese language.

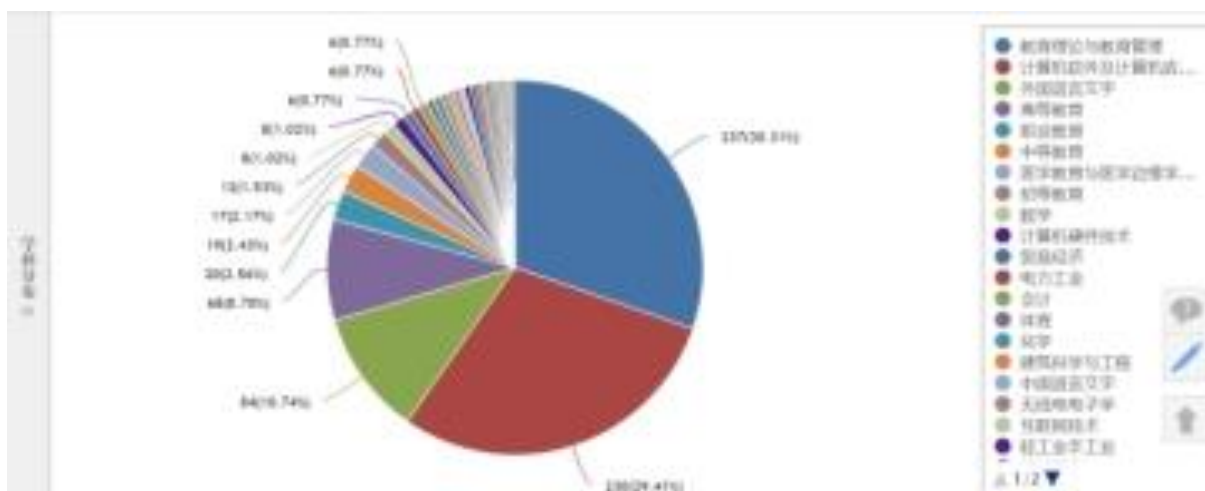


Figure 4: Keyword

A total of 0 articles were found by searching with the keywords “Chinese speaking and writing teaching” and “smart teaching mode” and 1 article were found with the keyword “smart teaching mode of college language”, which is the journal paper *Research on the Creation and Application of Smart Classroom Teaching Mode of Chinese Language in Universities* published by Jinjing Chen (2021) in the Journal of Social Sciences of Jiamusi University. The study analyzes the dilemmas and pain points of the traditional teaching of Chinese language in universities and points out that the research results can provide reference and reference for the implementation of smart classroom teaching mode in higher vocational colleges and universities. The research results can provide reference and material for the implementation of smart classroom teaching mode for Chinese language in higher vocational colleges and universities. The advantage of the study is to build a new smart and efficient intelligent classroom teaching mode structure, but the study also has obvious shortcomings: first, there is no actual teaching experiments and empirical research, and there is no survey research and corresponding data, and second, there is no specific and systematic smart teaching mode, but only a generalized intelligent teaching platform, adopting flipped classroom, task-driven, cooperative learning, role-playing, contextual teaching, and so on. It so happens that the above two points are also the focus of this thesis.

In the Chaoxing (SuperStar) Digital Library, a total of 26 books were searched with “smart teaching” as the keyword of title, mainly focusing on the period of 2007-2021. Searching with the title keyword of “speaking and writing, smart teaching”, three books were found, and all of them focused on the teaching of language subjects in primary and secondary schools as the object of research.

In the Huayi (Airitilibrary) Academic Literature Database (journals, theses, and e-books from Taiwan), “smart teaching” was used as the keyword (all fields AND ‘smart teaching’ = Title. Keywords. Abstract) a total of 81 journal articles (7 journals with irrelevant content have been excluded), 8 dissertations, and 5 e-books were retrieved.

Comparatively speaking, the application of smart teaching in primary and secondary education is more extensive and the research is more in-depth, while the results of smart teaching application and research in higher vocational colleges and universities are fewer, especially the results of research on the smart teaching mode of higher vocational Chinese classes are even more scarce.

Similarly, there are studies on the issue of smart teaching mode for cultivating the speaking and writing ability of higher vocational students. Through the search of various databases, it is found that the application of smart teaching in primary and secondary education is more extensive, and the research is more in-depth, while the results of smart teaching application and research in higher vocational colleges and universities are fewer, especially the results of research on the smart teaching mode of higher vocational Chinese classes are even more scarce.

3.1 Definition of a Smart Teaching Model

Referring to the definition of smart classroom in Shuhui Sun and Bangqi Liu’s (2015) *Smart Classroom Model Based on Dynamic Learning Data Analysis*, this study argues that a smart teaching model is an intelligent and efficient teaching model based on the constructivist learning theory and utilizing the new generation of information technology such as big data, cloud computing, and Internet of Things.

Based on dynamic learning data analysis and the application of Cloud + End, the smart teaching mode realizes the data-based teaching decision-making, instantaneous evaluation and feedback, three-dimensional communication and interaction, and intelligent resource pushing, comprehensively changes the form and content of classroom teaching, and builds the information classroom teaching mode in the era of big data (Sun et al., 2015).

3.2 Components of a Smart Classroom Teaching Model

As for the components of the smart teaching model, this study refers to the smart classroom teaching model constructed in Ting Chen's (2017) research on the *Design and Application of Smart Classroom Teaching Models in the Context of Internet + Education*, which mainly consists of theoretical foundations, prerequisites, teaching objectives, interactive activities, and teaching assessment, and the classroom design also centers on these elements.

Ying Yu and Wenwen Chen (2018) pointed out in *Exploring the Progressive Development of Smart Classroom Teaching Models* that smart classroom teaching models need to match the stage of smart classroom development, and that progressive teaching models can promote the qualitative change of the stage of smart classroom. These studies argue that the deep integration of education and information technology can effectively improve the efficiency of classroom teaching.

The TADI teaching model proposed in this study is also in line with these components: new constructivism as the theoretical basis, Teacher Intelligence (T) to set the context, so that students can experience and develop the ability to speak and write in simulation, and Artificial Intelligence (AI) to carry out the interactive activities, the teaching process, and the evaluation of personalized differentiation (DI).

3.3 Types of Smart Teaching Models

Through the literature analysis method this study divides the current Chinese smart teaching models into two main categories:

One category is the teaching model that integrates and develops with multiple elements. For example, Shuhui Sun and Bangqi Liu (2015) proposed the "ten steps and three stages" smart classroom teaching practical process model and the "8+8" smart classroom teaching structure theoretical model, and later Bangqi Liu (2019) and other scholars combined with the teaching characteristics of primary and secondary school disciplines and proposed the disciplinary smart teaching "4+N" characteristic model according to the common characteristics and individual characteristics of disciplines. Jueqi Guan (2019) and other researchers in the study of smart classroom teaching, video analytics was utilized to analyze the curriculum in depth, and the development of efficient classrooms based on smart classroom environments became one of the directions of practice. Lin Chen and Yaohua Chen (2016) believe that an important factor in developing a smart curriculum is the fusion smart teaching mode, which is the fusion of traditional and modern, the fusion of student body and teacher-led, the fusion of multiple teaching methods, the fusion of multiple theories, the fusion of inside and outside the school, the fusion of theories and practices, the fusion of domestic and international integration, and other omni-directional Integration.

Another category is the smart teaching model based on new intelligent technologies. For example, researchers such as Yanhong Feng (2017) explored the use of big data technology for smart teaching. Researchers such as Yufei Xu (2016) and Wenhui Xu (2017) proposed a smart teaching model based on the Internet of Things and the Internet. Tingfang Nie (2021) proposed

a teaching model of “three elements, five rings, and five modules” based on the smart teaching platform and summarized the three online teaching modes commonly used at present based on network learning spaces: synchronous live teaching mode, online independent learning mode, and accurate teaching mode based on learning analytics (Nie et al., 2021, p81). Bin He’s (2018) doctoral dissertation, *Research on Differentiated Teaching Models in the Perspective of Intelligent Education*, confirms the obvious advantages of differentiated teaching models in improving students’ academic performance, developing intellectual ability, and enhancing learning experience in the teaching experiment of course named *Modern Educational Technology Application* in NTSF of a specific university. The research results of these existing research results have provided the basis for this thesis to propose the TADI smart teaching model research emphasizing teacher intelligence, intelligent technology, and differentiated and individualized teaching (TADI). Differentiated and Individualized Instruction" (the acronym of “Teacher + AI + Differentiated Instruction” is TADI) provides certain theoretical and practical references. However, these studies mainly take primary and secondary school students or college students as research samples, ignoring the uniqueness of students in higher vocational schools, which also leaves room for further research in this thesis.

4. Teaching and Learning Processes of the Smart Teaching Model

Smart teaching mode teaching process design is the design of teachers and students in the realization of common tasks in the design of activities, commonly known as the teachers’ teaching and students’ learning activities design, including the design of the context, resources, media, course organization and teaching methods, is the core of the entire smart teaching model, which is the core of the whole smart teaching mode.

Shuhui Sun and Bangqi Liu (2015) analyzed the structure of the smart classroom information technology platform and compared it with the traditional classroom in the *Smart Classroom Model Based on Dynamic Learning Data Analysis*, describing the theoretical model of the “8+8” teaching structure of the smart classroom. The disadvantage of this study is that it only constructs the teaching process of the smart teaching model at the theoretical level without empirical research.

Honghong Zeng’s (2020) *Design and Application Research on Smart Teaching Mode Based on Rain Classroom* builds a smart teaching mode for the *Basic Computer Application* course, which includes the design of teaching objectives, the design of teaching resources, and the design of teaching and learning activities of teachers and students.

5. Advantages of the Smart Teaching Model

Smart teaching model is the product of the deep integration of artificial intelligence technology and education and teaching, and smart teaching mode is the core element of smart education.

Referring to the main application value of the smart classroom proposed by Shuhui Sun and Bangqi Liu’s (2015) *Smart Classroom Model Based on Dynamic Learning Data Analysis*, this study considers that the smart teaching mode has the following advantages:

(1) It is conducive to building a teaching environment and learning environment under the constructivist ideal. Utilizing a variety of new media, new technologies and intelligent devices, it is conducive to collaborative and inquiry learning, realizing the construction of the meaning of learners’ knowledge, and can very well satisfy the four major elements of context,

collaboration, conversation and meaning construction proposed by the constructivist learning theory for the learning environment.

(2) It is conducive to the integration of industry and education, and the fusion of science and education. The training goal of higher vocational education is to cultivate high-quality and high-skilled personnel, with teachers and students using the Internet and cell phones, smart APP, etc., and each student realizing the Chinese course including situation experience of speaking and writing and rapid feedback evaluation. So the significant changes in classroom morphology and the deep application of modern information technology tools in smart classroom teaching will be facilitated, and significant changes in classroom morphology can take place.

(3) It promotes innovation and change in teaching concepts, teaching content, teaching methods and teaching processes, truly realizing personalized teaching and tailored teaching.

(4) It can construct the whole process of learning evaluation system based on dynamic learning data analysis of the smart classroom, the core of which is to carry out dynamic, real-time diagnostic evaluation and feedback on the whole process of students' learning.

(5) It isn't subject to time and space constraints, interactive communication at any time, to achieve the normalization of the application of intelligent education.

References

- Albalawi R. (2013) Evaluating Tangible User Interface-based Mobile-learning System for Young Children
- Announcement of comprehensive plan for fostering digital talent (2022) [출처] 대한민국 정책브리핑 [EB/OL] (www.korea.kr) <https://www.korea.kr/news/policyNewsView.do?newsId=156521928>
- Benkiran, M.A. & Ajhoun, R. (2002). An Adaptive and Cooperative Telelearning System: SMART-Learning. *International Journal on E-Learning*, 1(2), 66-72. Norfolk, VA: Association for the Advancement of Computing in Education (AACE). Retrieved January 1, 2023 from <https://www.learntechlib.org/primary/p/15104/>.
- Bosni, I., Orli, M. & Āzagar, M. (2010). Beyond LMS: Expanding Course Experience with Content Collaboration and Smart Assignment Feedback. *International Journal of Emerging Technologies in Learning (iJET)*, 5(4), 11-16. Kassel, Germany: International Journal of Emerging Technology in Learning. Retrieved January 1, 2023 from https://www.learntechlib.org/p/4506_5/.
- Chen, L., Chen, Y., Li, K., & Zhao, M. (2016). Development of intelligent curriculum core in smart education. *Modern Distance Education Research*, 33-40.
- Chen, T. (2017). Research and Application of Smart Classroom Teaching Mode Design under the Background of "Internet + Education" (Master's thesis, Jiangsu Normal University). [Link](<https://kns-cnki-net.ez pustaka2.ups i.edu.my/KCMS/detail/detail.aspx?dbname=CMFD201702&filename=1017814240.nh>)
- Demir, K. A. (2021). Smart education framework. *Smart Learning Environments*, 8(1), 1-36.
- Feng, Y., Sun, G., Yu, H., Shi, P., & Qin, J. (2017). Research on intelligent teaching mode based on big data technology. *Software Guide*, 16(02), 200-20.

- Guan, Y., Chen, Q., Lou, Y., & Zhu, Z. (2019). Analysis of Classroom Teaching Structure in Smart Classroom Environment. *Educational Technology*, (03), 75-82.
- Huang, R. (2014). The Triple Realm of Smart Education: From Environment, Model to System. *Modern Distance Education Research*, (6), 3-11.
- Kwet, M., & Prinsloo, P. (2020). The 'smart' classroom: a new frontier in the age of the smart university. *Teaching in Higher Education*, 25(4), 510-526.
- Li, Y., & Zhou, X. (2020). Overview of Smart Education Research at Home and Abroad. *China Educational Technology Equipment*, (19), 141-144.
- Liu, B., Li, X., Yuan, T., et al. (2019). Innovation and Application of Subject Teaching Mode Based on Smart Classroom. *Educational Technology*, 2019. (4), 85-91.
- Ministry of Education in Singapore (2007). MOE Selects First Five Future Schools @ Singapore [DB/OL]. <https://www.moe.gov.sg/media/press/2007/pr20070522.html>.
- Ministry of Education of the People's Republic of China. (2018-04-18) Education Information 2.0 Action Plan [EB/OL]. [Link](http://www.moe.gov.cn/srcsite/A16/s3342/201804/t20180425_334188.html).
- Ministry of Education. The Malaysian smartschool[EB/OL].[2020-06-10]. <https://www.slideserve.com/tomas/the-malaysian-smart-school>.
- Nie, T., & Hu, C. (2021). Exploration of Smart Teaching Mode under the Construction of "Smart Campus" in Primary and Secondary Schools. *Contemporary Education Forum*, (03), 81-88. doi: 10.13694/j.cnki.ddjylt.20210311.001.
- Popescu, R., D. Ponescu, H. Roibu, and L. Popescu. (2018) .“Smart Classroom – Affective Computing in Present-day Classroom.” 28th EAEEIE Annual Conference (EAEEIE) 2018. doi:10.1109/eaeeie.2018.8534286.
- Shamir Inbal, T., Blau, I. & Hadad, S. (2022). Which Pedagogical Strategies are Prevalent in Emergency Remote Teaching Crosschecking Teachers and ICT Coordinators' Perspectives. In E. Langran (Ed.), *Proceedings of Society for Information Technology & Teacher Education International Conference* (pp. 790-794). San Diego, CA, United States: Association for the Advancement of Computing in Education (AACE). Retrieved January 1, 2023 from <https://www.learntechlib.org/primary/p/220814/>.
- Singapore launches "Smart Nation 2025" plan (2014). [EB/OL] [Link](http://sg.xinhuanet.com/2014-08/19/c_126887171.htm)
- Singh, H., & Miah, S. J. (2020). Smart education literature: A theoretical analysis. *Education and Information Technologies*, 25(4), 3299-3328.
- Sun, S., & Liu, B. (2015). Smart Classroom Mode Based on Dynamic Learning Data Analysis. *China Educational Informatization: Basic Education*, (11), 21-24.
- Sun, S., Liu, B., & Li, X. (2015). Construction and Application of Smart Classroom in the Era of Big Data. *China Information Technology Education*, (Z1), 112-114.
- The Central Committee of the Communist Party of China and the State Council. (2019). "China Education Modernization 2035" - Ministry of Education of the People's Republic of China Government Portal Website (moe.gov.cn) [EB/OL] [Link](http://www.moe.gov.cn/jyb_xwfb/s6052/moe_838/201902/t20190223_370857.html)
- U.S. Department of Education Office of Educational Technology (2015) . Future Ready Learning: Reimagining the Role of Technology in Education [EB/OL]. <https://tech.ed.gov/files/2015/12/NETP16.pdf>.
- Watters, A. (2017) . “Education Technology and the New Behaviorism.” Hack Education. <http://hackeducation.com/2017/12/23/top-ed-tech-trends-social-emotional-learning>.
- Xu, W., & Zhong, M. (2017). Research and Practice of New Teaching Mode Based on "Internet +" Smart Teaching. *Vocational Education Forum*, 2017(32), 58-61.

- Yanyan Li, Jian Cui & Shengquan Yu (2018) *Technologies and Tools for Smart Education*, Springer
- Yu, Y., & Chen, W. (2018). Analysis of the Advanced Development of Smart Classroom Teaching Mode. *China Educational Technology*, (11), 126-132.
- Zeng, H. (2020). Design and Application of Smart Teaching Mode Based on Rain Classroom (Master's thesis, Jiangxi Agricultural University). [Link](<https://kns-cnki-net.ezpustaka2.upsi.edu.my/KCMS/detail/detail.aspx?dbname=CMFD202102&fileame=1021007393.nh>)
- Zhao, W., Li, L., & Jin, X. (2021). Analysis of Chinese Smart Education Knowledge Map. *Cooperative Economy and Technology*, (14), 102-103. doi: 10.13665/j.cnki.hzjyjkj.2021.14.039.
- Zhu, Z., & He, B. (2012). Smart Education: A New Realm of Educational Informatization. *Basic Education Theory*, 87.