

Successful blended learning experiences in LMS based on TAM theory: a quantitative literature analysis approach

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Abstract: In the past 20 years, a lot of results have been achieved through the use of learning analytics to study students' LMS engagement, and many scholars have a lot of experience in successfully carrying out blended learning based on information systems and are worthy of learning from them. By studying the blended learning analytics of learning management system (LMS), we can provide solutions for LMS, help teachers to carry out innovative teaching modes, enhance students' awareness of independent learning and improve their theoretical and practical learning ability, and provide support for the construction of informationization in colleges and universities and the cultivation of talents. We conducted a datametric statistical analysis of the main literature on the basis of the database and a visual analysis of this topic to form a review. A total of learning management system (LMS) related topics on blended learning were explored: Chinese and foreign perspectives of blended learning, historical status of blended learning, research on blended learning in China, foreign research on blended learning, important content of blended learning research, and application of blended learning research platform. The study of Learning Management System (LMS) analysis technology enhances the awareness of university teachers to effectively conduct and implement blended learning research, helps students to improve the management ability of independent learning, strengthens the informationization of subject majors and courses, and also proposes a new practice mode and theoretical innovation ideas for further research on Learning Management System (LMS) design and assisted teaching in the future.

Keywords: Information Systems, Learning Management System (LMS), Blended Learning, TAM

1. Introduction

Blended learning is a kind of "Online + Offline" teaching method, mixing advantages of traditional teaching methods with e-learning. Through the sound combination of these two forms of teaching, learners are guided into learning from the superficial aspect to turn to in-depth thinking. The integration of traditional learning with E-learning technology was first proposed by American scholars Smith J. and Elibert Macieh. In China, it was He Kekang, professor in the Beijing Normal University that first put forth the blended learning---a comprehensive way of integrating the merits of both online and offline learning, while sticking to teacher's dominant role of guiding, inspiring, and monitoring in the teaching process and giving full play to students' initiative, enthusiasm and creativity as main bodies of the learning process^[1]. Since then, blended learning had come into Chinese scholars' view, and with endless practising, fruitful achievements had been made in such fields as research on theory and practice of blended learning. Many scholars are conducting research on blended learning from different perspectives, levels and disciplinary scopes, mainly on the paradigm, the content, the practice and the comparison of blended learning with other models, etc.

Therefore, blended learning is not only a method, but a model, a concept. Through the integration of modern and traditional teaching methods, a blended teaching theory is formed, which is applicable for the whole teaching processes, reflected in various teaching methods and displayed in the process of teaching and research activities at all levels. In this context, we should always practice on the spot, keep learning in conformity with practicing, forge ahead with the times, persist in pluralism, learn by analogy and weed through the old to bring forth to the new!

2. Literature Review

On the research of blended learning, many educators at home and abroad have made notable achievements, which provided a theoretical basis for people to better understand and explore the academic development in this field.

In 2014, Stein Jared and Graham Charles Ron put forward a practical, streamlined approach for creating effective learning experiences in their book *Essentials for Blended Learning: A Standards-Based Guide*, which was by blending online activities and the best of face-to-face teaching.

In China, He Kekang, Yu Shengquan and Li Kedong laid a foundation on the study of the concept and development of blended learning in terms of conceptual deduction; while many other researchers such as Yu Shengquan and Zhang Qiliang directly equated the concept of blended learning and blended teaching when using the term Blending Learning^[2]. In 2018, professor Feng Xiaoying in the Beijing Normal University put forward the conceptual and analytical framework of blended learning, systematically sort out and analyzed the practices and researches related to blended learning at home and abroad over the past 20 years. A universally recognized definition of blended learning is “An integration of online learning with face-to-face learning”^[3]. As for the research results, many innovative theories as well as practices had sprung out. For example, Feng Xiaoying, Sun Yuwei and Cao Jietai conducted research on learning theory and pedagogy in 2019 in the article *Blended Learning in the Internet Plus era: Teaching Theory and Methodology*^[4], which provided a pedagogical basis for blended learning and a theoretical and methodological framework for teachers to effectively design and promote blended teaching. In 2021, Feng XiaoYing, Guowanrong and Songjiaxin released an article *Teachers Blended Teaching Ability Development Model*^[5]: *Principles, Preparations and Strategies* of which a systematic literature review method was adopted to analyze the relevant research on the development of blended teaching ability over the last decade, to refine the strategies for the improvement of blended teaching ability, and to set up a development model through qualitative meta-analysis.

On the basis of previous theoretical and practical research, many scholars have then made further explorations by combining with different specific problems, and made innovative breakthroughs which promoted the further development of studies on blended learning.

From the perspective of teaching (teachers), how do teachers design blended curriculum and propose effective teaching methods for interactive teaching? How to carry out blended teaching and cultivate students' overall capabilities during the teaching process? To this end, teachers in universities and colleges, administrators and researchers conducted rolls of studies on the theory and practice of blended learning. In 2017, Feng Xiaoying together with other scholars published the article *Needs Model of Teacher Professional Development of Open Universities: Based on Grounded Theory*, a study adopted grounded theory, one of the qualitative research methods, to construct a needs model for open universities teacher professional development in China^[6]. Since 2012, studies on SPOC (Small Private Online Course), a new model of online learning in the “Post-MOOC era” have witnessed an increase.

From the perspective of learning (students), how do students develop meta-cognitive skills and self-regulated learning abilities? And how to ensure that students constantly question and ask questions and then get clear results while thinking deeply and applying relevant theories? To address these issues, a group of international and domestic students had also carried out research and made fruitful theoretical and practical results. In 2018, Roberta V. Nata conducted a problem-based learning design to examine students' perception, practice and performance while using a LMS (Moodle) in a blended learning environment. It was conducted with a case study approach among 335 students in two active learning classrooms as the investigated case units. Nine teachers and three persons from the service staff focus group were interviewed, and answers from the semi-structured interviews were analyzed by use of the qualitative data analysis tool Atlas.ti^[7].

The practice of blended learning is thriving in China, but correlated research, especially the empirical research based on practical cases, are inadequate. In 2019, Wang Jingxin, Feng Xuesong published *Mooc-based Blended Teaching: Mode, Effect and Trend---Analysis on SSCI and ERIC Database on Chinese University Teaching*. The paper studies the SPOC-based flipping classroom and other design researches that integrate MOOC elements based on the blended concept, as well as innovative research in other fields such as MOOC-based blended learning integrated learning analysis and game-based learning^[8]. The study explores blended learning, its underlying learning theories and pedagogies, in both learning and pedagogical perspectives. Blended learning in the Internet era can be regarded as individual knowledge acquisition informed by constructive and innovative knowledge generation based on connectivism. Therefore, blended learning is a disruptive innovation, instigating

fundamental changes in teachers' roles and responsibilities, facilitating their transformation from subject and knowledge transmitter to learning designer and learning facilitator. Both Community of Inquiry model and dynamic scaffolding blended teaching model serve as pedagogical foundations of blended learning, providing theoretical and methodological frameworks for teachers to effectively design and promote blended learning^[9].

To sum up, the research on blended learning is rich and diverse. The following is a visual analysis based on the highly cited or representative studies from those theoretical results, including analysis on the overall trend, discipline distribution, distribution on research levels, fund distribution and comparison, and the academic attention. And then the Chinese and foreign vision, the historical status, the content and application of blended learning will be elaborated one by one.

2.1. Visual analysis of blended learning

According to full-text search conducted on CNKI with the theme of “blended learning”, there were 25,400 Chinese articles, including 18,900 academic journals, 741 dissertations, 7 doctoral dissertations, 734 master’s dissertations, 345 proceedings (domestic 273, international 72), 7 newspapers, 1 Chinese book and 1 result. And 1,362 articles in the foreign language database, including 789 academic journals, 0 dissertations, 0 doctoral and master articles, 571 proceedings (domestic 0, international 255), 0 newspapers, 2 foreign books and 1 result. The overall trend analysis is shown in the Figure 1 below.

The quantitative visualization analysis of Chinese literature research (25,400 articles) is as follows:

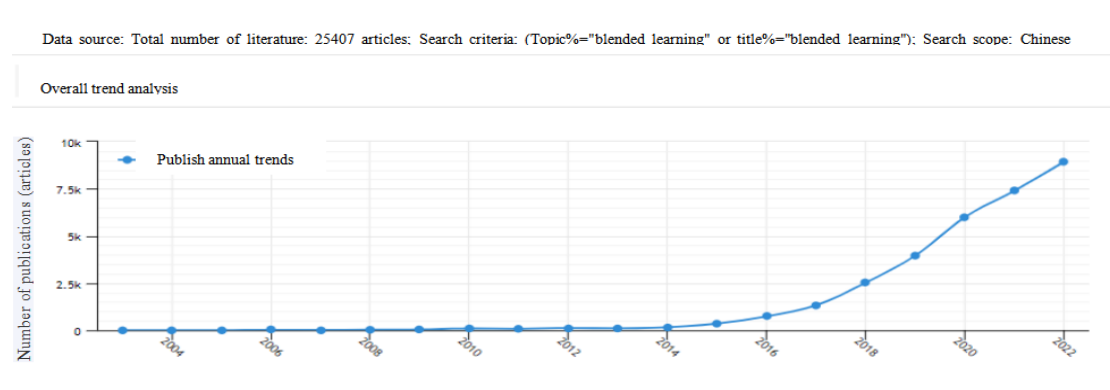


Figure 1 Overall Trend Analysis

Discipline distribution analysis (see Figure 2): there are 17,720 (29.53%) of educational theory and educational management, 16,216(27.03%) of computer software and computer applications and 5,549 (9.25%) of higher education. So it is clear that these three disciplines are the main research objects. Whereas there are studies in many other fields, the amount of relevant research literature is relatively small.

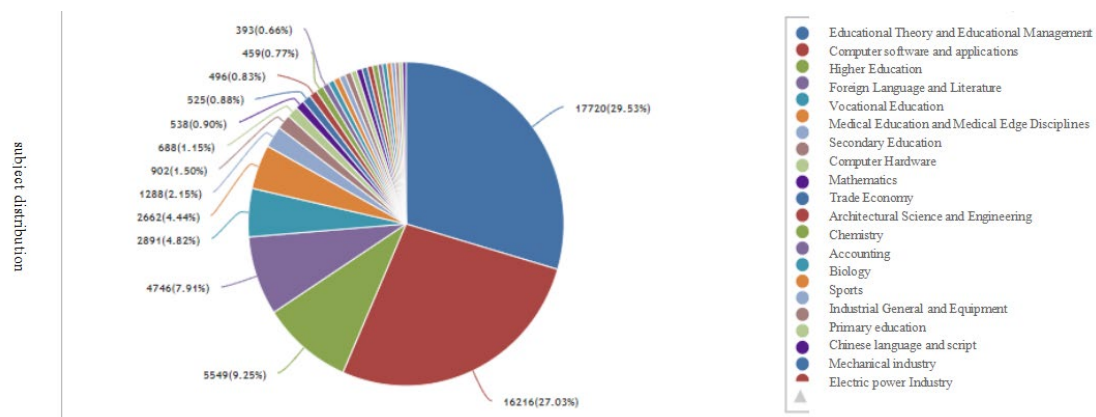


Figure 2 Discipline Distribution analysis

Analysis on the distribution of research levels (see Figure 3): In descending order of the amount of literature, there are subject pedagogy, applied research, development research, development research-management research,etc. Thus it can be seen that most research has focused on subject

pedagogy, engineering and project management, applied research-project management, applied research-management research, and practical research.

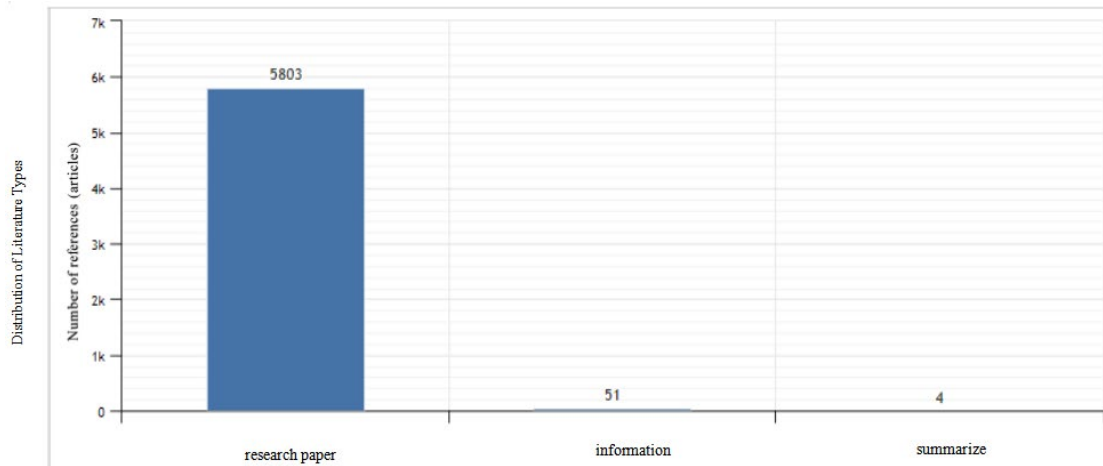


Figure 3 Analysis on Distributions of research levels

Analysis on fund distribution (see Figure 4): National: National Natural Science Fund of China (202), the National Social Science Fund of China (73), National Education Sciences Planning (67), Ministry of education of Humanities and social Science project (43). There are quite a lot of literature provincially on the education and teaching reform of colleges and universities, the scientific planning of education and teaching, and the teaching quality project. “Blended learning” has been the inexorable trend and hotspot for the current research works.

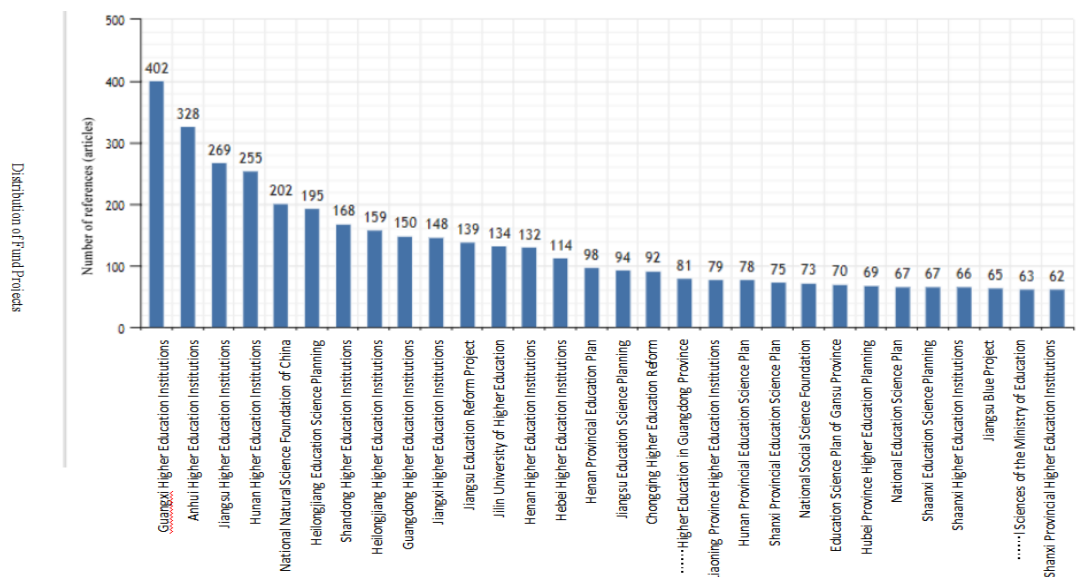


Figure 4 Fund Distribution Analysis

Comparative analysis of the distribution of funds(see Figure 5), the National Science Fund of China (202), the National Social Science Fund of China (73), National Education Sciences Planning (67), Ministry of education of Humanities and Social Science project (43), educational reform of Jiangsu and Jiangxi provincial colleges and universities (148) or the philosophy and social science fund of colleges and universities (269) are selected for the comparative analysis. The study found that differences existed in the amount of literature research on educational reform, provincial education sciences planning and provincial teaching quality engineering in local provincial colleges and universities. And the research trend of “blended learning” is obvious in Jiangsu , while it is relatively weak in Jiangxi.

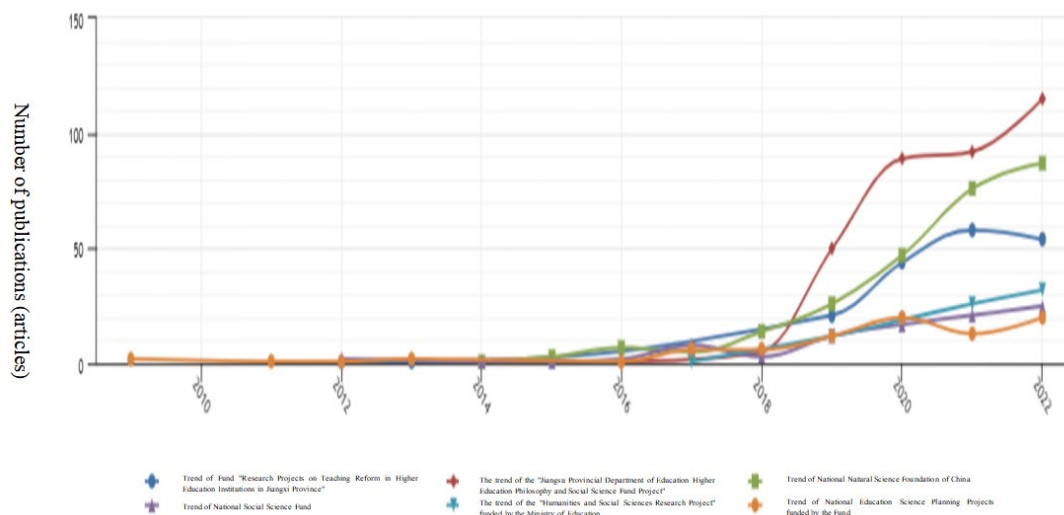


Figure 5 Analysis on distribution of funds

Analysis on academic attention : From 2002 to 2021, with the key words of “blended learning”, selected representative studies with high citation rate show that the number of Chinese-related literature is 5,497, accounting for 22.00% of the total amount, while foreign-related is 196, accounting for 34%, showing an upward trend as a whole both at home and abroad.

On the basis of visual analysis of the academic theoretical achievements, further study is being carried out to better understand and explore the blended learning.

2.2. Chinese and foreign vision of blended learning

Visions of blended learning are various worldwide, which include studies on the theory, practice and comparison. And for the content of the blended learning, many effective researches have been carried out by educators in and outside of China. The results of their researches provided theoretical basis for people to better explore the academic progress in this field.

For theoretical research, Lorna Uden et al. put forward in the referred proceedings *Dario Liberona. learning Technology for Education in Cloud. MOOC and Big Data* of the second International Conference on Hybrid Learning held in Macau, China in August 2009 that “The papers are organized in topical sections on interactive hybrid learning systems, effective content development, pedagogical and psychological issues, outcome based teaching and learning, student prospects, improved flexibility of the learning process, computer supported collaborative learning, hybrid learning experiences, practices borderless education, digital library and content management, organizational framework and institutional policy, and learning theory”^[10]. Dziuban Charles D. proposed in the *Conducting Research in Online and Blended Learning Environments: New Pedagogical Frontiers* that “Conducting Research in Online and Blended Learning Environments examines various perspectives, issues, and methods for conducting research in online and blended learning environments. The book provides in-depth examinations of the perspectives and issues that anyone considering research in online or blended learning will find insightful as they plan their own inquiries. Grounded in educational research theory, this is invaluable to both the serious researcher as well as the occasional evaluator. Conducting Research in Online and Blended Learning Environments provides comprehensive, useful information on research paradigms, methodologies, and methods that should be considered in designing and conducting studies in this area^[11].” In addition, a flexible blended learning strategy was proposed by foreign scholars which had been successfully implemented. Students do not like a completely virtual teaching method, they prefer a blended learning model with a large amount of supplementary learning materials.

In 2021, Peimani Nastaran, Kamalipour Hesam published *Online Education in the Post COVID-19 Era: Students' Perception and Learning Experience* published in *Education Sciences*. The paper conducted research on the experience of learning and teaching the Research Methods and Techniques subject in the postgraduate programme of a MA Design in a British university during COVID-19 pandemic. During the research, an online survey was designed and carried out to explore students' perception of online teaching and learning activities, feedback and assessment, and digital platforms

based on their experience during the subject delivery period in the 2020–2021 academic year. They reached a conclusion that “Facilitating synchronous communication through effective interaction among diverse peers has been quite challenging in small-group online reading seminars, and that attending live online lectures was more helpful than watching prerecorded lectures”^[12]. The outcomes of this paper can effectively assist educators who consider delivering programmes by adopting a blended online learning environment design model in the post COVID-19 era but also provide guidance for further developments and improvements in using digital technology and blended online learning.

In 2004, Li Kedong, Zhao Jianhua released *Principle and Application models of Blended Learning* published in *E-education Research* where they pointed out that “Blended learning is emerged as a popular terminology in the field of education, particularly in educational technology after people’s reflection on e-learning, of which the main idea is to form a pretty new teaching model that is cost-effective by integrating face-to-face teaching with online teaching”^[13]. In 2019, Feng Xiaoying and other researchers proposed in their paper *Blended learning in the Internet Plus era: Learning theories and pedagogical foundations* that blended learning in the Internet Plus era has endowed learning with new meaning, transforming learning from common standard knowledge acquisition to individual knowledge construction and innovative knowledge generation. The study explores blended learning, its underlying learning theories and pedagogies, in both learning and pedagogical perspectives. Blended learning in the Internet era can be regarded as individual knowledge acquisition informed by constructive and innovative knowledge generation based on connectivism. Therefore, blended learning is a disruptive innovation, instigating fundamental changes in teachers’ roles and responsibilities, facilitating their transformation from subject and knowledge transmitter to learning designer and learning facilitator. Both Community of Inquiry model and dynamic scaffolding blended teaching model serve as pedagogical foundations of blended learning, providing theoretical and methodological frameworks for teachers to effectively design and promote blended learning^[14].

In addition, there are many other researches recorded excellent results in this field. For example, Yu Shengquan, Lu Qiu and Chen Shengjian published *Blended Teaching in the Network Environment---A New Teaching Model* in *China University Teaching* in 2005^[15]. Huang Ronghuai and others have also conducted researches, but all these are not go beyond the scope of the above-mentioned researches.

2.3. Historical status of blended learning

The history and current status of blended teaching are diversified, which involves the evolution of the concept of blended learning, the research purpose of blended teaching and the basic paradigm of research of blended learning. There are also many researches on these contents of blended learning done by educators in and outside of China, which produced a number of influential results, providing a theoretical basis for people to understand and explore the academic development in the field.

2.3.1. Researches on the blended learning in China

After over 20 years’ development of blended learning (BL), “Internet+” education has given its new meaning. However, the understanding of blended learning at home and abroad is still confusing and bewildering. A clear, systematic conceptual framework and analytical framework has been lacking to guide the research and practice of BL. In 2018, Feng Xiao Ying, Wang Ruiue and Wu Yijun published *A Literature Review on Blended Learning: Based on Analytical Framework of Blended Learning* in the *Journal of Distance Education*, of which the author constructed a conceptual framework and analytical framework of blended learning after analyzing the relevant literature at home and abroad. Firstly, the concept of BL evolution experience three stages: “the stage of technology application, technology integration and the “Internet+” phase. And the BL purpose experienced two stages: alternative theory/auxiliary theory”, “strengthening theory/ evolution theory”. Secondly, the analytical framework of BL consists of three dimensions: readiness, design and implementation, and impact. In addition, this framework is applicable to the analysis of the practice and research of BL. This frameworks provide a basic paradigm for analyzing the research status of BL at home and abroad in the past ten years^[16]. Analysis results show that the researchers generally optimistic about the BL research and the application prospect, at the same time, the current BL is less empirical research, theoretical research lags behind that of the practical application. In the future, the research and practice of BL need to focus on five aspects: “Internet+” BL model, the preparation of blended teaching ability, blended teacher training and teacher professional development, institutional level, and BL evaluation, learning analysis of BL environment.

2.3.2. Foreign researches of blended learning

Blended learning was first put forward by foreign researchers, through years of research and exploration, many innovative results had been produced. In the book *EduTech Computer-Aided Design Meets Computer-Aided Learning* made by Carlos Delgado Kloos and Abelardo Pardo in 2004, they proposed their views on EduTech: Computer-Aided Design Meets Computer-Aided Learning; the proceedings of the EduTech2004 workshop, which was held in August 2004 in conjunction with the 18th IFIP World Computer Congress in Toulouse, France and that the teaching of Design Automation tools and methods is particularly amenable to a distant or blended learning setting^[17]. In 2017, Simon K.S. Cheung, Lam for Kwok, Will W.K.Ma, Lap Kei Lee and Harrison Yangd released a book---*Blended Learning. New Challenges and Innovative Practices*, which constitutes the referred proceedings of the 10th International Conference on Blended Learning, ICBL 2017, held in Hong Kong, China. The 42 papers presented were carefully reviewed and selected from 100 submissions, the papers are organized in topical sections named. Keynotes of the proceedings included Experience in Blended Learning; Strategies in Blended Learning: Assessment for Blended Learning; Computer-Support Collaborative learning; Improved Flexibility of Learning Processes; Open Educational Resources; Pedagogical and Psychological issues^[18].

Looking at the historical status of research on blended learning, these results provide a solid foundation for future development. At present, the computer-aided learning and intelligent education platform of blended teaching are constantly developing and innovating, and more achievements will be made in teaching theory, computer-aided learning technology and blended learning tools.

2.4. Important contents of the researches on blended learning

The contents of blended learning research are various, which involve the model, strategy, blended ratio and teaching ability of the blended learning. Effective researches have been conducted at home and abroad, and a package of influential results they produced make a big difference by providing theoretical basis for people to understand and explore the relevant development in this field.

For the research on blended models, Lam J put forward in his book *A Thematic Analysis of the Blended Learning Experiences of Undergraduate Students in Hong Kong* that “In the blended learning model, a series of elements such as learning environment, media, teachers, teaching strategies, and students are undoubtedly important, but the more important is the reasonable integration of these elements, which is the core in the whole teaching process, so as to provided students with an overall learning experience”^[19]. Stefania Baroncelli and three other researchers pointed out in their article *Teaching and Learning the European Union that* “This volume examines the EU’s changing educational context and its challenges. Based on an extensive survey of more than 2000 European Studies courses in 30 European countries, it maps and analyses the features of teaching methodologies as they emerge from both disciplinary as well as interdisciplinary curricula. It presents a series of case studies on some of the most-used innovative teaching tools emerging in the field such as simulation games, e-learning, problem based learning, blended learning, and learning through the use of social networks. Based on the contributors’ own experiences and academic research, the book examines both strengths and possible pitfalls of these increasingly popular methods. The book’s critical approach will inspire educators and scholars committed to improving the teaching methods and tools in the area of European Studies and other programmes of higher education facing similar challenges”^[20]. Through the blended learning model, teaching methods can get improved; through case studies, teaching strategies can be advanced; and through the sound integration of all the factors in the blended learning environment, an overall learning experience will be created.

Chinese researchers Li Kedong and Zhao Jianhua pointed out in the article *Principles and Application Models of Blended Learning* that the proportion of online and offline learning, and how to reasonably control the “blended degree” to make teaching more effective are problems that need to be considered. Some scholars pointed out that MOOC was just a way of teaching not educating. Although online e-learning can realize the teacher-student and student-student interaction, it cannot achieve the effect of face-to-face communication to a large extent, and that is why the traditional teaching model can never be completely replaced by the online e-learning. Therefore, we should integrate various factors to choose the appropriate blended learning model, reasonably allocate proportions, and strive to achieve “maximum benefit”^[21]. Teachers in the Beijing Normal University pointed out in *Teachers’ Blended Teaching Competency Development Model: Principles, Preparations and Strategies* published in the *Open Education Research* that “This study uses a systematic review to analyze relevant research on the development strategies for teachers’ blended teaching competency in the past 10 years, refines

systematic and effective development strategies for teaching competency development model through qualitative meta-analysis methods^[22]. Through the research on blended teaching competency, we strive to promote the formation of blended teaching ideas and the enhancement of teaching competency.

Li Kedong pointed out that the essence of the blended learning research is the study of information transfer channels, and the key is the selection and combination of media, which is more of an access of information acquisition than just a tool in the blended learning process.

In addition, there are many other research results, like Zhang Qiliang's, but all their studies do not go beyond the theoretical domain of the above-mentioned studies.

2.5. Application of platform for blended learning research

The application of the blended learning is also extensive, which involves the technical application of the teaching platform of blended learning, and application of the electronic schoolbag, so on and so forth. Many experts both at home and abroad have done researches on the selection and technical application of online learning platform, including the e-teaching platform, smart class and teaching software. For the selection of environment and technical applications, lots of studies have been carried out at home and abroad, which produced a number of influential results, providing a theoretical basis to people's further understanding and exploration of this field.

For the research of the application of platform, Stephanie Smith Budhai and Ke'Anna Brown Skipwith discussed in their book *Best Practices in Engaging Online Learners Through Active and Experiential Learning Strategies* which was published in the *Taylor and Francis* in 2021 that "The integration of active and experiential learning approaches and activities include simulations, gamification, social media integration, project-and scenario-based learning, virtual tours, and online micro-credentialing as they relate to the development of authentic skill-building, communication, problem-solving, and critical-thinking skills in learners"^[23]. And in 2020, William J. Hunter and Roger Austin published the *New Technologies and Opportunities for Intercultural Education in the Taylor and Francis*. In-depth case studies showcasing successful projects in Europe, Northern Ireland, and Israel explore blended learning and illustrate how schools and educators have embraced online technologies to foster national and international links both within and beyond communities. By showcasing international, European, and community-based projects, this volume explores how online technologies, collaborative and blended learning can be used to bolster social cohesion, and increase students' understanding of what it means to be a global citizen^[24]. This thought-provoking text will be of interest to researchers, academics, and postgraduate students in the fields of international and comparative education. Educators and school leaders concerned with how multiculturalism and technology play out in the classroom environment will also benefit from reading this text. And the *Essentials for Blended Learning: A Standards-Based Guide* made by Stein Jared and Graham Charles R in 2014 provides a practical, streamlined approach for creating effective learning experiences by blending online activities and the best of face-to-face teaching^[25]. Scholars and researchers have made more and more fruitful research results in the blended learning, and their perspectives become more extensive with specialized theoretical research, media platform research, practical application studies, comparative studies and so on.

Li Fengqing pointed out in his paper *The Theoretical Basis and Instructional Design of Blended Teaching* towards the teaching media that "One of the core differences between blended learning and traditional learning lies in the selection of teaching media and the design of teaching strategies. As the former mainly emphasizes on how to help teachers present the teaching content better, while the latter put more emphasis on better support students' learning." In traditional teaching, the media is a presentation tool used to support teachers' teaching, while in blended learning, the role of the media has changed^[26]. Fan Minsheng, Wu Fati and Wang Yu put forward in the *Research On Blended Learning Model Based On Electronic Schoolbag* which emphasizes that learning is a process of meaning construction, which is learner-oriented, while the teachers' guidance role is equally important. The cognitive constructivism puts emphasis on how learners apply their cognitive structures and beliefs to build up new knowledge, emphasizing a self-regulated, social and contextual learning theory^[27]. And three instructional application models are summarized.

In addition, many other researchers have produced results in this field, among whom Su Xiaohong and three other researchers have also conducted related research. They published the article *Exploration and Practice of Blended Learning Based on MOOC+SPOC* in 2015, proposing that "Blended learning based on MOOC+SPOC is beneficial both for teachers and the students. Differences

are that SPOC is available for students in a certain class while MOOC is publicly available for all the online elective students. There are two kinds of SPOC: synchronous and asynchronous. Synchronous SPOC is completely followed by a source course of MOOC that is in session, which teachers can only supplement the content but cannot modify the original content of the course. Asynchronous SPOC is to copy the semester content of a source course that has been completed, which teachers are entitled to delete or add contents of the original one. And there are two parts of the SPOC: the first part is to share the content with the MOOC, while in the second part, teachers can upload different teaching contents from the MOOC they follow^[28]. But all these studies do not go beyond the domain of the previous research. Ismail, S. N., Hamid, S., Ahmad, M., Alaboudi, A., & Jhanjhi, N. (2021). Measures should be taken to enhance the security system of the learning management system as privacy and security issues are a growing concern for students^[29]. In recent years, scholars have evaluated the user behavior accounted for by learning management systems^[30].

3. Theoretical construction

The Technology Acceptance Model (TAM) was first proposed by Davis in 1989, which aimed to provide an explanatory account of the determinants of widespread acceptance of computers^[31]. In order to enhance the acceptance and explanatory nature of the TAM, it was revised in 1996 by Davis et al. Davis et al. concluded that the moderating effect of user's attitude between perceived usefulness, perceived ease of use and behavioral intention in the original model was not significant and the variable of attitude was excluded^[32]. Honglei and Jihong argued that e-learning is cannot be separated from the electronic information system, so the technology acceptance model is based on the specific situation of learners, and the technology acceptance model is extended by introducing previous experience, IT ability and self-efficacy factors to further explore the mechanisms that affect users' willingness to continue using^[33]. From the above literature, it can be seen that the technology acceptance model has been widely used in a number of fields involving information technology, and other influencing factors are introduced to extend the technology acceptance model to study the corresponding user willingness to use or user behavior according to the specific use situation.

After more than 20 years of development, research on blended learning has developed rapidly at home and abroad, and blended learning has also achieved further development and made breakthroughs in the application of continuous practice, which has deepened researchers' study on blended learning.

First, as a theory, it helps us understand and study the blended learning, guiding us to find the new connotations of blended learning in the "Internet Plus Education" era.

Second, as a method, it helps us to find new rules and approaches, guiding us to effectively conduct blended learning designs.

Third, as a paradigm, it helps us carry out case study, guiding us to form effective blended learning models.

Fourth, as an concept, it helps us establish a blended learning idea, promoting the formation of the teaching ideas and the enhancement of teaching skills.

Fifth, as a medium, it helps us scientifically analyse data, enhancing students' self-regulated learning awareness and in-depth learning experiences.

From the perspective of the current academic research scope, achievements of academic theoretical research of blended learning mainly focus on such fields as studies on the theory, content, application, and the comparison with other teaching models. From the perspective of research methods, discussions are primarily made by historical research, comparative research, interview, and the combination of quantitative and qualitative methods. However, there are also shortcomings in the theoretical research, that is, the research perspective is relatively single. Most of researches focus on education and educational technology, while less are conducted to combine with management, psychology, informatics, communication and other in-depth analysis and research, that is why the emphases of the results are varied. Therefore, the research results of blended learning under the interdisciplinary research background are need to be elaborated with a more scientific and systematic theory.

Studies have shown that user behavior studies related to information systems are based on the TAM Technology Acceptance Model. Therefore, in multidisciplinary fields such as management information systems, software engineering, etc., based on the Technology Acceptance Model (TAM) proposed by Davis users' acceptance of information technology as well as the influence mechanism, further research

should be carried out in multiple directions such as system security protection, multi-tasking, machine learning, etc., in the LMS research.

4. Conclusion

Blended learning is an important issue in the current teaching research at home and abroad, particularly amid the Covid-19 pandemic, which has brought convenience to students worldwide not limited by time, space and regions. Research on blended learning is also thriving with its research perspective constantly expanded. Teachers are no longer pure knowledge-transmitters, but also theoretical researchers. They play an important role in promoting the development and innovation of blended learning by integrating their personal practice and the teaching theories.

Major research on blended learning at home and abroad can be summarized in several aspects: the theory, method, paradigm, concept, and the platform application of the blended learning. Based on literature analysis, a method according to research orientations to sort out literature and then analyse the theories, viewpoints of its representatives, research mainly includes:

First, through the theoretical research, enrich the academic theoretical construction of “blended teaching”.

Second, through research on the methods, grasp the rules and methodologies.

Third, through research on the paradigms, promote the application and practice of the blended learning model among the colleges and universities.

Fourth, through research on the concepts, enhance the formation of blended ideas and the improvement of teaching skills.

Fifth, through research on the platform, improve students’ self-regulated learning abilities and the in-depth learning experience.

Seen from the existing research, much remains to work further: Expand the research perspective and method, break new ground in blended learning, exploring from the perspective of management, psychology, communication with a mixed research methods. Pay attention to the innovative practice and application of cutting-edge blended learning models and conduct research on the relevant theories and practices to enrich the theory of blended learning.

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