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Exploration on the Current Research on Chinese K-12 Blended Learning: A Content Analysis on ICBL Conference Papers

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Content

Abstract

K-12 blended learning has become a real fashionable topic in education research. However, the context of K-12 blended learning should not be ignored. In this article, texts from International Conference Blended Learning will be selected as sample texts to analysis. Through content analysis, it appears that K-12 blended learning in Chinese research has its characteristics. First, the theme is diverse and inclusive. Second, methods applied in the research is various. Finally, the trend of Chinese K-12 blended learning shows an optimistic development, in which scholars have more global perspective and gradually attempt to explore more possibility of applying theories in local practice.

Key words: Chinese K-12 blended learning; content analysis; context

Exploration on the Current Research on Chinese K-12 Blended Learning: A Content Analysis on ICBL Conference Papers

Introduction

During the unprecedented time in 2020, the formation of teaching and learning has witnessed a change around the globe. A large number of students moved to the mode of learning at home through various online platforms. In China, the Minister of Education (2020) launched a 'Suspension of Classes without Suspending Teaching and Learning (停课不停学)' policy encouraging students and educators to carry out the learning activities online. The government has built a national online learning platform which provides online textbooks, learning schedules, teaching demonstrations and other technical supports based on the syllabus of different areas (MoE 2020). In other countries like the US as well, students attended virtual school programmes to continue their learning projects (Almarzooq et, al. 2020). Globally, students from all stages were obligated to attend a massive online learning experiment with a shift in the learning pattern.

I witnessed and experienced this difficult time in a special position as a Chinese student in the UK. When the outbreak first came up in China, I just had a brief idea of my research project. With the situation becoming more and more serious, leading to a global pandemic, I gradually recognized the significance of studying the new learning patterns. I was born in an era when China began to open its gate to the world and accepted advanced pedagogical theories. During my student life, I experienced the most traditional Chinese education and the revolution in it. From merely blackboards and chalks in primary school to WeChat and social media online learning programmes after universities, I deeply sensed the excitement of development, yet also the pain of developing too fast. When I finally had the opportunity to experience the high-tech blended learning model in another country with students from diverse contexts, I did expand my horizon and thus was inspired with more ideas. This made me reflect our own blended learning models back in China. The pandemic triggered the new phase of development in K-12 blended learning, as it demanded every student in China to stay at

home using digital devices to attend classes. It is a new challenge for every part of society and the impact of post-pandemic on education should be taken into consideration.

As the whole world has to follow the social-distancing and other prophylactic measures, students who are allowed returning to school have to be faced with a different learning environment (Iwanaga et. al. 2020). It is urgent for educators and the government to rethink a more flexible and efficient learning model in the face of a challenging future. In some countries where lockdown has been eased, students gradually return to school with a mix learning model. Students of many universities in the UK, US and China are required to attend both online classes and traditional classes to meet the social distancing (Fu&Zhou 2020). It seems that for adult learners, this mixture of online and offline learning models is not a fresh idea as, since 2008, MOOC has led higher education into the digital era (García-Peñalvo et. al. 2018). However, K-12 education has more challenges than higher education as the learners need more instructions to adapt to a new learning model as well as the challenge for traditional schools in terms of creating a suitable learning environment (Kumi et.al. 2018). It appears that most concern about the education model after the pandemic would be related to K-12 education on social media, as immature students can come across more problems during the transformation process (Kumi et. al. 2018). In addition, according to the constructivism perspective, K-12 education forms a student's lifelong learning skills and social skills, which shapes an individual's future in a significant way (Kuiper et. al. 2005). Therefore, the exploration and examination of K-12 education models are highly required particularly in this special period.

Since 1999, the concept of blended learning has raised massive discussion among scholars and educators (Singh 2003). Following the evolution of technology, blended learning has developed over the past twenty years, thus brought various models among all ages of students (Graham 2006). It provides a new idea for educators to increase learning and teaching efficiency, and probably gives us a solution to the current "after-pandemic" pedagogy issue. In China, it is always problematic for K-12 education to search for an efficient, high-quality world-class education model due to the complex social circumstances (Zhang 2019). With the unique context of large population and geographically unequal development in education, research on Chinese K-12 blended learning should be reviewed to guide the future development in education.

Literature review

Definition of Blended Learning

Among all global discussions in terms of blended learning, its definition has been argued repeatedly by scholars since 2000 when this terminology appeared for the first time in Cooney and his colleagues' study (2000). At that time, blended learning was aimed to merge play with work in teaching and learning activities or to improve the instructions and teamwork by combining e-learning and traditional learning (Cooney et. al. 2002; Voci & Young 2001; Bonk et. al. 2002). In 2012, Güzer and Caner analyzed literature titled with the term 'blended learning' through Google Scholar, in which they pointed out that this term went through the first wave of definition discussions between 2003 to 2006 (Güzer & Caner 2012). One of the most cited definitions in this period was from Osguthorpe and Graham's work (2003), in which they suggested as follow:

> "Blended learning combines face-to-face with distance delivery systems…blended learning environments are trying to maximize the benefits of both face-to-face and online methods" (p. 230).

Meanwhile, they also illustrated three blending models, including 1) blending activities in both face-to-face environment and in online learning spaces; 2) blending different students in the classroom and online learning environment, and 3) appending online instructors into face-to-face classrooms (Osguthorpe & Graham 2003). Their definition redressed the past view that blended learning means teachers using the online technique in traditional classrooms and thus created a foundation for blended learning, leading to extensive discussion and research on this term. However, what they focused on was the benefits of a blended learning environment rather than blended learning as a pedagogical approach. Additionally, limited by technology and knowledge share, the definition was incomplete, thus had many drawbacks. Online or distance education, at that moment, was still being treated as a separated technique tool. In that case, Graham (2006) systematically analyzed the background of distance education, as well as the development of blended learning research and redefined a new definition for blended learning. The researcher suggested that the past definitions largely separated the traditional face-to-face learning environment and distributed learning environment due

to the technological limitation (Graham 2006). With the revolution and rapid development of technology, the implementation of blended systems has been increased. Therefore, Graham (2006) provided a new definition for blended learning, which has been cited and used in many works:

"Blended learning systems combine face-to-face instruction with computer-mediated instruction" (p. 5).

This definition has been viewed as a classic illustration for blended learning as it narrowed down the scope of blended learning into a specific teaching and learning system. Researchers began to think about blended learning as a result of a balanced combination of face-to-face learning and distributed learning. However, this definition still seems general and ambiguous. For instance, during the outbreak this year, many learners engaged in live video meetings to get 'face-to-face' instructions from teachers and then completed the whole learning project with the help of online learning products. It is difficult to identify this specific learning activity as blended or pure distance learning. The problem for this definition is that the delivery methods in this description are vague, ignoring the other components of the blended learning process that might have an impact on the learners. Some scholars like Alammary et.al. (2017) reviewed five types of delivery methods in course design (Gerzon et. al. 2006):

1. Face-to-face, instructor-led: Students attend classes that are led by instructors, including setting the learning pace, designing activities and materials or practice. This delivery method has little opportunity for interaction between learners and instructors.

2. Online instructor-led: This method is mostly employed in mere digital learning programmes such as the virtual classroom. Instructors will set the learning schedule and decide what kind of support to give through the online instrument. In this method, interactions take place via digital learning tools.

3. Face-to-face collaborative work: Pedagogical methods that encourage students to attend learning activities with peers, such as group projects or peer study, to interact with others during the learning process.

4. Online collaborative work: Shifting of the learning environment to the online platform from the traditional face-to-face venue. Instruments such as online

forums and online learning communities are examples which provide a different form of

5. Online self-paced: Approaches that allow students to set their own learning pace and order. Examples include podcasts, social media learning channels and many learning applications aimed at this kind of learning method that maximizes learners' authority.

This classification gives a general view of delivery methods that can be blended into learning, yet it is not sure what components should be blended and what could be the ideal ratio of this blend. But this identification is just like clarifying the ingredients of blended learning in that researchers can conduct more exploration under this perspective. Some researchers have noticed this issue and proposed a new framework to make the definition completed. Cronje (2020) pointed out the irony of the current blended learning definition explaining that the present blended mode of learning certainly did not contain the concept of learning at all. The author overviewed definitions provided by scholars from 2012 to 2018 to present the current views about defining blended learning. Some authors build their definition based on Graham's (2006) theory, adding terms like 'learning', 'teaching and learning' and 'pedagogy and value', yet treat technology as a delivery instrument (Uziak et. al. 2018; Kintu & Zhu 2016; Onguko 2014; Gynther 2016). Other authors use the term 'ingredients' to present knowledge delivery methods (Banditvilai 2016; Tshabalala et. al 2014) and some suggest the mixture of online and face-to-face instructions as a pedagogical strategy (Soeiro et. al. 2012). Their definitions refined the former ones by identifying the role of blending. However, the concept of 'learning' is still ignored. In this case, Cronje (2020) introduces some new elements into defining blended learning, for example, context. He combined objectivism and constructivism to build a learning framework and then mixed different contexts and technologies. As a result, Cronje (2020) gives a more refined definition of blended learning:

"The appropriate use of a mix of theories, methods and technologies to optimize learning in a given context" (p. 120).

This new definition of blended learning to some extent shares the similarities with Singh and Reed's (2001) 5R definition: "Blended learning focused on optimizing achievement of learning objectives by applying the 'right' learning technologies to

match the 'right' personal learning style to transfer 'right' learning skills to "right" person at the 'right' time" (p. 2). Both definitions focus on the learning objects rather than the delivery methods, emphasizing on 'learning' instead of 'blended'. Cronje's (2020) views explain the meaning of the 'right' in the 5R definition, making the illustration more concentrated. Therefore, it is important to consider blended learning in a bigger picture rather than only drawing attention to delivery methods or technology application. It is a comprehensive and integrated learning model requiring deep thinking and research especially in terms of the context.

The Unique Chinese K-12 Blended Learning Context

According to Lexico, an online dictionary, the word 'context' means "the circumstances that form the setting for an event, statement, or idea, and in terms of which it can be fully understood." In the education field, context can be understood as a broad background including various factors that may influence research objectives. Some scholars in the last century had pointed out the characteristics equipped by Chinese classrooms. Biggs (1996) pointed out that Chinese classrooms are always in large size, with directive instructions and absolute authority from teachers. Similarly, Cheung and Lau (1985) maintained that Chinese classrooms are strictly controlled by teachers. However, a paradox exists in past literature. Even though the collective learning in traditional classrooms seems to be contributing to students' rigid thinking patterns, Chinese students have performed well in many international competitions (see Zhou et. al. 2012; Philipson & Lam 2011). The paradox existing in Chinese traditional classrooms is the impact of many factors. On one hand, historically Confucianism deeply influenced Chinese education in the hierarchy and teacher-student relationship (Tan 2017). This cultural factor emphasizes the importance of respecting teachers and students' compliance, which leads to a learning environment where teachers are always in the position of dominance (Philipson & Lam 2011). On the other hand, with China's opening gate and learning from western countries, the challenge and revolutions on education take advantage of progressive pedagogical theories, which brings new attempts on the formation of classrooms, such as smaller classroom size and enhancement on students' authority (Zhou et. al. 2012). Series of transformations shaped the current Chinese K-12 education terrain, along with the social reality of large

population and geographical distinctions. K-12 blended learning in China thus develops in a complex circumstance, experiencing a long journey and remaining further to go.

Blended learning research in China

In 1981, a journal called *Television University (电视大学)* published in China, as the first journal to introduce some educational activities through television. Aimed at following the 'education modernization' policy in the 1980s, this journal became the first attempt to publish works on studying modern education technology and approach. The journal then changed its title to *Distance Education in China （中国远程教育）* in 1999, mainly introducing modern and advanced educational approaches, theories and technology into China. At the same time, the Ministry of Education published a policy called *Education for the 21st Century Revitalization Action Plan （面向 21 世纪教育振兴计划）*, particularly required for carrying out distance education project, building open education network and conducting lifelong learning system (MoE, 1999). In this phase, regular colleges and universities cooperated with radio and television schools, developing modern distance education based on bidirectional interactive satellite television and computer networks (Ding, 2009). As the government invested more in the construction of domestic information technology systems and technological devices such as computers stepping into people's lives, the online education began its journey in China (Ding 2009; Chen & Bao 2014). Online education came into universities and educational institutions like the New Oriental. After the MOOC was established in 2008 and Khan Academy was introduced in China in 2010, more and more universities and education industries drew lessons from western countries with their advanced online education system (Chen & Bao 2014). Moreover, as the rapid development of mobile communication technology has brought more support to online learning, people from all ages can access the most advanced online courses by using smartphones and other devices for any learning purposes (Wang and Li 2015; Gao & Lv 2006).

Along with the boost of online education, the research upsurge of blended learning spread into China. In 2004, a professor named He Kekang first introduced the concept of 'blended learning' into the domestic learning area. In his article, he defines blended learning as 'combining the advantages of traditional education and e-learning' (He 2004). He thinks that blended learning is essentially the discussion between student-centred education and teacher-leading education. The argument focuses on the suspect

for constructivism, in which learners should be treated as the core of the learning process. He explains the meaning of blending as 'the mixture of both teachers' guiding and students' autonomy' (He, 2004). This definition refines blended learning from a different perspective and acts as an inspiration to future studies in China. However, this definition seems vague in terms of "advantages" and simply focus on discussing about delivery theories. In the last century, there was a debate about whether delivery method can affect students' learning performance (Clark 1994; Kozma 1994). Their debate was mainly focusing on the function of delivery methods applied in the learning process. It appears that simply talking about delivery is kind of controversial, which means other elements in blended learning should be taken into consideration.

According to a systematic literature survey in 2019, since 2003 there are five main study topics among Chinese blended learning: 1) The fundamental theories of blended learning; 2) Pedagogical design and practice; 3) Blended learning platform; 4) Digital resource for blended learning and 5) blended learning outcomes intervention (Zhang 2019). Papers focusing on theories mainly argue about the definition and thus give instructions and suggestions on conducting a suitable blended learning design in China (Li 2016; Wang 2016; Liu 2014). Articles related to designing blended learning mainly concentrate on typical learning models like SCOP and MOOC. Scholars examine different learning models in terms of different learning groups or contexts in order to design their own new models or assessment (Mu 2014; Ding 2017; Wang 2010). Research which discusses blended learning platforms and learning digital resources are more about blended learning technological support. Many learning platforms like MOOC, Moodle, Coursera, and applications like WeChat, represent the current support for blended learning from the technology perspective. They serve people in different ways and thus form different learning models, which may inspire technological development (Zhang & Liu 2009; Kong & Gao 2008; Du & Li 2016). Others who attempt to examine the outcome of blended learning mostly apply qualitative research. They intervene and monitor learners' learning process and outcome in a certain blended learning model, figuring out key elements that may influence the learning activity (Kong 2009; Dong et. al. 2017). These studies represent the map of Chinese blended learning research topics. However, there is a deficiency in this area. For example, studies on blended learning in China mainly focus on higher education, ignoring the young learners and special learner groups like the disabled or the ATSD group (Zhang, 2019). It is understandable that mature learners in higher education may have more

adaptability when they meet the challenge of new learning models and apply new technology into learning activities. However, it does not mean that research in other ages can be underestimated. The pandemic shows the significance of reviewing, developing and evaluating the research on K-12 blended learning education, as this important large group is in the face of more serious challenges than higher education to the extent of learning practice.

Blended Learning Applied in K-12 Education

Blended learning is not a concept that can be simply understood as a mere combination of instructions. In fact, the context of learners and teachers, the learning environment, learning theories and technologies have considerable impacts on the practice.

Since the term first appeared in the 2000s, blended learning emerged mostly in higher education and corporate training. Blended learning has shown its strength in boosting learning efficiency, personalizing the learning progress and improving learning outcomes in universities and colleges around the world (Jung & Suzuki 2006; Huang & Zhou 2006). Meanwhile, blended learning has also brought learning success in international businesses like IBM and Microsoft, allowing their staff to study beyond work (Lewis & Orton 2006; Ziob & Mosher 2006). The profit that blended learning has generated attracted attention from researchers, investors and educators. Soon, the wave of blended learning spread to secondary schools and other education fields.

Research on K-12 online learning practice has a long history. When the World Wide Web was introduced in the 1990s, K-12 schools in America began to deliver instructions through this new instrument (Schwirzke et. al. 2018). Since then, virtual schools and distance education gradually popularized among American context and other countries as well. Barbour (2018) analyzed the traces of evolution in the American context and the outside regions, and summarized the consistencies and inconsistencies between the two:

Consistencies	Inconsistencies

• The evolution of K-12 distance education follows this trend: correspondence education → various media → online learning → blended learning.	• Some K-12 schools in international contexts are still in the stage of correspondence education of delivering instructions by televisions or radios.
• Early online education projects in both contexts were supported and invested by the government.	• Even the primary running power comes from the government; internationally the online and blended learning in K-12 lacks free-market principles.
• Most K-12 online programs use terms like supplemental or full-time, state-based or province-based.	• Most countries apply online and blended learning in secondary school.

Figure 2.1, based on Barbour (2018)

It is not hard to see that in K-12 education, blended learning has not become the main trend or covered the whole K-12 field in most countries. Blended learning in K-12 is widely understood as "the next evolution of effective technology integration" (Barbour 2018, p. 26). Thus, research on blended learning in K-12 both theoretically and practically has a long way to go.

K-12 blended learning was first defined by the Clayton Christensen Institute in 2011 from the perspective of students:

> Blended learning is a formal education program in which a student learns at least in part through online learning with some element of student control over time, place, path, and/or pace and at least in part at a supervised brick-and-mortar location away from home (Horn & Staker 2011a, p. 7).

This definition has distinguished blended learning from the past models of correspondence schools, home schools and online virtual schools, embodied the specific technological and pedagogical, even geographical contexts. According to OECD (2014),

"(formal education) is organized and structured, and has learning objectives" (p.). Horn and Staker (2011a) set the boundary of blended learning as it happens under circumstances that learners intentionally acquire knowledge or skills with professional instructions. In another article, Horn and Staker (2011b) described the rise of blended learning, suggesting that since the online learning began to rise in 2000, most of the growth exists under the circumstances in a blended learning model. The 'classic disruptive' fashion, as they argued, has caused fondness among educators towards creating a blended learning environment, in which students "learn online in an adult-supervised school environment for at least part of the time" (Horn & Staker 2011b, p. 2). As blended learning models have reduced the budget compared with pure online schools and increased teachers' efficiency at the same time, the numbers of blended learning environments have risen remarkably. Based on the theory of hybrid and disruptive class, the authors depict four blended learning models in 2012. Figure 2.2 shows a brief description of every model.

Model		Description
Rotation model	•Station-Rotation model •Lab-Rotation model •Flipped-Classroom model •Individual-Rotation model	Students rotate between learning modalities on a fixed schedule or following teachers' instruction. At least one of these modalities is online learning. Other modalities may contain different collaborative activities, individual tutoring or assignments. According to the variety of rotation, the rotation model can be divided into four different secondary models.

Flex model		Mainly instructed by the Internet, students change learning modalities based on a fluid schedule customized individually, with teachers recording online and supporting face-to-face.
Self-Blend model		Students make their own decisions on courses to learn online or in a traditional face-to-face classroom. Online courses can be taken on campus or off site with the teacher's supervision.
Enriched-Virtual model		Students will experience the whole-school learning which is divided into attending campus and learning remotely with online instructions.

Figure 2.2, based on Horn&Staker (2012)

In addition, global studies on the application of blended learning in K-12 are more than above. According to *Handbook of Research on K-12 Online and Blended Learning* (2018), studies regarding online and blended learning in K-12 focus on aspects of learning and learners, teaching, content domains, student support structures, instructional designs and learning environment. The content of this book presents a comprehensive view of current research terrain, which conducts an instruction for researchers to classify their research direction (Ferdig & Kinnedy, 2014). However, if

we follow a more inclusive definition of K-12 blended learning in which the context should be taken into consideration, many studies were conducted upon western pedagogy context. It is debatable that when it comes to other contexts, for instance, different school culture, the conclusion may vary.

K-12 blended learning in China is not a new name, though research, to some extent, seems insufficient in this field. According to a report from iResearch in 2015, K-12 online education was the largest part of investment in the education industry, taking account for 25.8% (iResearch 2015). This represents that K-12 online education has great potential, and it is spreading all over the country with the support of industrial development. Meanwhile, the report also shows that the number of K-12 online product users have experienced a long-term, rapid increase. In 2018, there were approximately 41.7 million people using K-12 online learning products, compared with 10 million five years ago (iResearch, 2015). Under the current pandemic circumstances, the number of online learning products to support traditional learning activities is increasing rapidly (Agarwal& Karushik 2020). The growth in the K-12 online learning market shows the bright future of K-12 online education in China, yet there is insufficient identification on the practical effectiveness of blended learning in K-12 education.

As K-12 education in China is faced with many limitations like geographic differences, large population and traditional views, the K-12 online or blended learning is more difficult to be designed well and put into massive practice. Many studies have shown the progress made in the practice of new technology and in the designing of new pedagogy strategies. For example, some works concentrated on the local design of a new blended learning model in K-12 classroom (Zhang & Wang 2014). Some scholars focused on blended learning in the perspective of teachers (Du 2007). These works are conducted domestically and independently, which presented the impacts of Chinese context and set good examples for further experiments and evaluations. However, it is uneasy to find a comprehensive review of these domestic research rather than research from western countries. For example, Shi (2016) discussed the diverse methods utilized in American K-12 blended learning models. Zhang (2019) explored K-12 blended learning models in America in order to inspire domestic research. The terrain of domestic research in terms of K-12 blended learning is vague. Only a few focus on reviewing one's own research under the global perspective, staying in the position of evaluating the outcomes of borrowing others' theories. A review of research in the

Chinese context is helpful to understand the present situation in this discourse and what future implication it holds especially in the post-pandemic time.

It is, therefore, necessary to learn about the current research in terms of K-12 blended learning in China especially under the global perspective. It is not only to figure out the present stage of the K-12 learning model and reflect on its effectiveness, but also to search for an instruction for future blended learning both local and global. In that case, the conference papers of International Conference on Blended Learning (ICBL) published by Springer in the past five years have been selected as a data pool, in order to have a glimpse of Chinese K-12 blended learning on the global perspective.

For this paper, the research questions (RQs) are identified as follow:

1. What certain topics/themes did Chinese K-12 blended learning concentrate on in ICBL during the past five years (2016-2020)?
2. What common research methods were applied to support Chinese K-12 blended learning research in ICBL through the past five years?
3. What research trends have the Chinese K-12 blended learning studies in ICBL indicated from 2016 till now?
4. What are the main inspiration and guidance for future Chinese K-12 blended learning under the international research environment?

Methodology

A topic or a theme of an article is always revealed by its content, hiding between the lines. When attempting to understand authors' logic, indication or guidance, one is supposed to read through the words carefully, tracking keywords in the text and interpreting to readers. In that case, content analysis, as a flexible and accessible method for analyzing texts, is suitable for the research that focuses on exploring the deep meanings. Compared with other interpretive methodology, content analysis has its unique strengths, especially in this research.

Content analysis, as a method used in various fields, has a long history and maintains its own popularity among researchers. Shapiro and Markoff (1997) defined content analysis as "any methodological measurement applied to text (or other symbolic materials) for social science purpose" (p. 14). Another later definition is given by Krippendorff (2018) called content analysis as "a research technique for making replicable and valid inferences from texts (or other meaningful matter) to the contexts of their use" (p. 24). Compared with the former definition, Krippendorff emphasized on the essence of this analysis as 'inference', which shows the flexibility of content analysis as it can be both a qualitative and a quantitative method. The content analysis focuses mainly on the language used in certain texts or materials, by which researchers are capable to identify the underlying themes in individual work or collaborative work (Weber 1990). Over the past decades, scholars in many disciplines like media, psychology and social science applied content analysis to achieve their research goals (Matthes & Kohring 2008; Hara et al. 2000; Dart 2014). Even though content analysis inevitably has its own limitation on subjectivity as material selection might contain bias, it is still capable of strengths especially for our research here.

First, content analysis has a unique flexibility when analyzing texts (Duriau et. al. 2007). Content analysis is positioned at the intersection of qualitative and quantitative research methods, as it can focus on both manifest content (the exact text that produced originally by author) and latent content (the interpretation conducted by the researcher according to manifest content) (Holsti 1969; Woodrum 1984; Drisko & Maschi 2015). When analyzing manifest content quantitatively, text statistics can be collected and revealed. This quantitative method part to some extent enriches the validity and

reliability of the method, as it uses objective statistics to present results. Applied in this work, the first phase is to use its quantitative function to analyze the distribution of data, which can probably indicate the general status. In this phase, we can visualize the proportion that research on Chinese context take. The quantitative method here is capable of the ability to visualize the literacy in another statistical way. When analyzing latent content, researchers can achieve deeper themes under the surface of language through interpretation. The qualitative part helps enrich the perspective of the research, leaving an open space for deeper and further discussion. In this paper, both inductive and deductive methods need to be used to make the research as comprehensive as possible, and content analysis will be of help to achieve that purpose.

Second, content analysis provides a methodology to reach deep themes under the text both in individual cognition and in collaborative cognition (Huff 1990; Carley 1997). Through interpreting certain words or summarizing the common points, it is possible for researchers to access embodied meanings like views, attitudes, preferences and values (Kabanoff 1996). Meanwhile, content analysis enables researchers to design longitudinal research (Weber 1990) as the information accessed through this way is available for comparison through a period of time. Combining these two advantages, content analysis has the capability to improve the research design and thus support the validity and reliability of the conclusion for this research under a certain context. Examples like *Trends in Distance Education Research: A Content Analysis of Journals 2009-2013* (Bozkurt et. al. 2015) and *Research and Trends in Science Education from 1998 to 2002: a Content Analysis of Publication in Selected Journals* (Tsai & Wen 2011) proved that content analysis is applicable to such kind of research, which is similar to our research in this paper.

Therefore, it appears that content analysis is an appropriate choice when solving the proposed research questions and a combination of both quantitative and qualitative method will be applied. The sample texts selected in this research should be with a global perspective and focus on local practice. So, this study will review the papers published by Springer in ICBL (International Conference on Blended Learning) from 2016 to 2020, selecting the research objects meeting the Chinese K-12 blended learning fields. Following Weber's guide in 1990, conducting content analysis basically including four phases:

Data collection

In this paper, the data will be collected from the ICBL note papers published by Springer from 2016 to 2020. International Conference Blended Learning is a platform for scholars in blended learning to share and communicate the latest relative research projects. It was first held in Hong Kong in 2008, with the title of International Conference on Hybrid Learning. Through 12 years the conference has become more inclusive and distinctive. Organized and sponsored mainly by top universities in Hong Kong and mainland China, the ICBL, to some extent, breaks the monopoly of western countries in this field, giving more space for other developing countries to speak for their own research. Meanwhile, the ICBL has cooperative relationships with many international institutions, which increases its validity and inclusiveness. Compared with other data resources, texts from ICBL publish are more concentrated on blended learning fields, reducing the ambiguity related to the searching range. Besides, as its papers are published in decent academic English, the ambiguity caused by language can be lessened suitably. Upon conducting initial research on databases like Google Scholar, it was difficult to set the keywords and there were over 3,000 papers both in Chinese and English that seemed to be related to K-12 blended learning. However, these papers relate to many fields including marketing, economics and politics etc., which is an overly large scope for this research. Additionally, this study aims to research under a global perspective. This characteristic is hard to judge by searching for exact words or phrases. The ICBL provides the possibility for us to approach research applying for both global perspective and local practice, more concentrated on certain contexts, less influenced by other leading research in this field and equipped with the vision of international big picture at the same time. ICBL provides a platform for Chinese scholars to introduce and share the latest research with the world. It is a useful and effective tool to choose sample texts. By using keywords 'K-12' or 'primary school' or 'middle school' or 'high school' and 'China/Chinese', the selected texts as research objects in this paper meet the criteria as follows:

● Research on objects in the context of K-12

According to Wikipedia's explanation, 'K-12' represents the range of stages from kindergarten to the 12th grade in America. However, as the grade setting is different in China, K-12 in the Chinese context is the supported education stage before college.

Texts should relate to any research focusing on objects equipped with this context, such as participants related to this stage, programs and projects set in this background etc.

- Research has the background and context of China

The selected papers here focus on the questions in the context of Mainland China, Hongkong, Macau and Taiwan. We do not set limitations on the authors' nationality and context.

- Research belongs to blended learning field

The data resource, ICBL, is the collaboration of literature in blended learning fields and fits in the definition of blended learning we adopt in this paper.

The time frame in this paper is from 2016 to 2020 as this period completely covers the current ICBL publication. Though the conference has been postponed due to the outbreak and was held online, the papers submitted to the council were before February. So the impact of the pandemic on these conference papers is excluded. Meanwhile, researches in this period represent the latest outcome in this field, which are more capable of worth to discuss. In total, there are 43 papers selected as research data.

Coding

In Weber's instruction, coding in the content analysis means classifying texts words into much fewer content categories (Weber 1990). Due to the questions, we are interested in, the selected texts will be generally divided into two aspects, method and theme. Understanding of problems caused by the ambiguity of categories and definition of certain concepts, we use the reference of SAGE research method framework as the method category and themes framework in Handbook of Research on K-12 Online and Blended Learning as referenced theme category. The referenced themes are:

- Background and Historical Perspective
- Learning and Learners
- Teaching
- Literature Review
- Students Support Structure
- Instructional Design

- Learning environment
- Around the world

To minimize the ambiguity and to simplify the referenced themes, the following categories were finalized:

- <u>Theory Development</u>: the historical and global development of theoretical concepts
- <u>Literature Review</u>: reviewing the existing literature related to a certain topic
- <u>Learners and Learning</u>: learners' psychological/behavioural responses and learning models
- <u>Teachers and Teaching</u>: teachers' psychological/behavioural responses and teaching models
- <u>Supportive Facilities</u>: matters support achieving blended learning, e.g. technology
- <u>Practice Design</u>: design a practice using related theory, e.g. course design
- <u>Learning Environment</u>: an environment where learning activities take place.

Analysis

The analysis in this research will cover two sections, theme and method, along with a basic proportion of relative papers. We will first count the frequency of keywords, then find evidence to classify the themes that sample texts cover. Finally, we will analyze the methods used in every paper. This part is aimed at answering RQ 1 and RQ 2.

Interpretation

Since the further purpose of the research is to achieve inspiration and guidance in the future, it is necessary to understand (a) the consistency and inconsistency among selected texts, (b) relationship between research and research environment, (c) characteristic of selected papers and (d) any other element that may be identified in the process of research. We will carry out interpretation through the findings of the analysis.

Findings

General Data Distribution

From 2016 to 2020, there are 173 papers published in the Journal of ICBL. We analyzed every published work and selected papers related to the Chinese context. The principle of selection is that the research was evidently conducted within the Chinese context, which includes the Chinese audience as researching target, research carried geographically in China and other evidence showing the project with Chinese context. Under this principle, we found totally 95 papers including 15 papers in 2016, 27 papers in 2017, 21 papers in 2018, 15 papers in 2019 and 17 papers in 2020. During these five years, papers related to the Chinese context take proportion respectively as 0.44, 0.64, 0.60, 0.52 and 0.52. Among these 95 papers, research mainly focusing on K-12 context cannot be underestimated, as 43 papers found to be related to this field, accounting for almost a half of the papers identified of the Chinese context. There are 10 papers in 2016, 11 in 2017, 21 in 2018, 15 in 2019 and 17 in 2020. The proportions that K-12 blended learning papers take in research on Chinese context are 0.66, 0.41, 0.38, 0.40 and 0.47. The figure below shows the number and proportion of related papers.
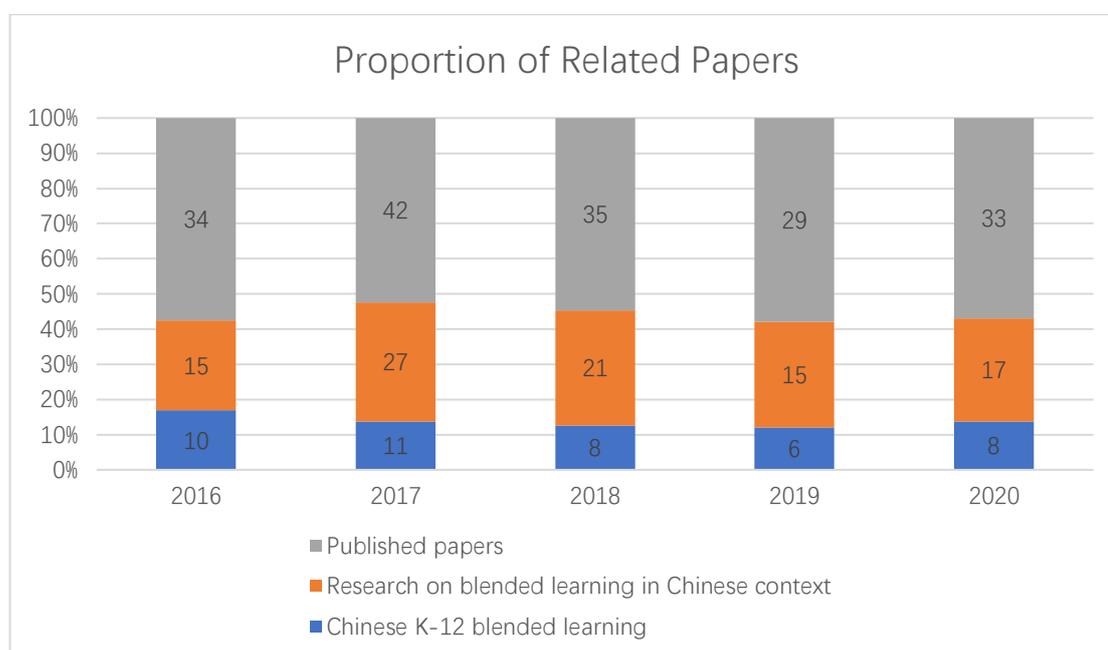
Keywords Frequency

Each and every paper has its keywords selected by authors. We examined the word frequency among all of 177 keywords listed in the 43 selected papers and picked those words existing more than twice (T≥2)[1]. Totally, 'K-12 education', 'smart classrooms', 'mathematics', 'wearable devices' and 'information literacy' appeared 2 times;

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[1] Word existing in the same work will be calculated as once.

'collaborative learning', 'games/gamification' appeared 3 times, 'E-schoolbag' appears 5 times and 'blended learning' appears the most time, approaching 6 times.

Keywords	T=	Date
K-12 education	2	2018; 2020
smart classrooms	2	2016; 2020
Mathematics	2	2016; 2017
Wearable devices	2	2018; 2019
Information literacy	2	2018; 2020
Collaborative learning	3	2016; 2018; 2020
Games/gamification	3	2017; 2018; 2019
e-Schoolbag	5	2016; 2017
Blended learning	6	2016; 2017;2018

Research Themes

The selected papers discussed diverse topics, showing a large range of interests that scholars have. We use a figure here to show the numbers of papers in each theme category.

Theme Category	Number	Date
Theory Development (TD)	1	2016
Teacher and Teaching (TT)	4	2016; 2017; 2020
Learning Environment (LE)	7	2016; 2017; 2019; 2020
Learner and Learning (LL)	9	2016; 2017; 2018; 2019; 2020
Supportive Facilities (SF)	9	2016; 2017; 2018
Practice Design (PD)	13	2017; 2018; 2019; 2020

There is only one paper discussing blended learning theory development (Wang and Li 2016). 4 papers exploring topics related to teachers and teaching. Zhu and colleagues discussed key factors that influence K-12 teachers' intention of digital devices (Zhu et. al. 2016). Wang and the team focus on current teachers' internet technology teaching ability to apply e-schoolbag in China (Wang et. al. 2017). Another two papers relating to teachers and teaching are from 2020. One argued about Chinese K-12 teachers' ICT

self-efficacy and factors can influence them (Wu et. al. 2020). Another talked about a kind of generative teaching model when dealing with Chinese primary reading class (Chen et. al., 2020). 7 papers discussed the current K-12 blended learning environment in China. In 2016, discussions about the smart classroom environment were involved in 2 papers. Li and his colleagues focused on scientific inquiry activities, finding the new way that smart classrooms can provide for them (Li et. al. 2016). Another paper by Xie et. al. also focused on a smart learning environment. Distinguished from others, this paper mainly discussed the improvement strategies for students' self-efficacy provided by the smart learning environment (Xie et. al. 2016). The interests in discussing the learning environment in rural areas were maintained through these years. In 2017, both Li et. al. (2017) and Cai et. al. (2017) focused on the student groups in rural China, examining the effect of remote synchronous teaching and learning. Another paper by Zuo et. al. (2019) applied case study to evaluate a learning environment equipped with teacher resource sharing. However, in 2020, Zhu et. al. (2020) carried out an investigation on students' information literacy by examining the informational learning environment, which presented a new perspective on this topic.

Learning environment influences students' learning performance that is part of the reason that research on learners and learning behaviour is also necessary. 9 papers discussed this topic. 2 papers mainly focus on students' learning models under the blended learning environment. Yang and his team use a case study to propose an expansion of the present blended learning model, introducing a collaborative teaching method (2016). Another paper regarding evaluating learning models comes from Fan et. al. (2017). They investigated related literature to examine the blended learning model based on the Electronic Schoolbag, aiming to figure out its characteristics and application trend. These two projects are the evaluation and review of the current learning models and attempt to put theories into real practice. Several works concentrate on the learning strategies that are supported by the blended learning model. Miao and Qu (2016) reviewed the flipped classroom learning strategies in an extra-curricular English case. Another paper from Qin's team (2020) explored the impact of cooperative learning strategies, mainly related to children's learning engagement within the blended learning environment. Beyond these works, some papers focus on the perspective of learners. Though it seems that learners and learning should not be split when reviewing research, as learners and their learnings are integrated, the classification of papers in this thesis mainly considers the research purposes that the author indicated in the texts.

Some research emphasizes on watching learners from a physical perspective. For instance, Zuo et. al. (2020) examined students' behavioural engagement in synchronous online learning environments when influenced by classroom discourse and seating location in Chinese rural areas. Another study in 2016 research on students' learning actions under the personalized education strategy, combined with visualization learning methods (Sun et. al. 2016). Additionally, more papers focus on exploring learners' performance on the mental perspective. In 2018, Zhu and colleagues focused on learners' information literacy (Zhu et. al. 2018). They conducted research from a different perspective, suggesting that parents' and teachers' attitudes towards the Internet may have impacts on learners' information literacy. A paper in 2019 researched on K-12 students' acceptance of educational games (Jiang et. al. 2019) while another contemporaneous paper investigated students' motivation, emotional intelligence and ability of attention control in the blended learning environment (Hu et. al. 2019). A study conducted in 2020 was different from other works on this topic. It reexamined the community of inquiry framework by doing a survey on K-12 students' learning experience to analyze the factor that may influence instrument validity (Wei et. al. 2020). This work combined the past framework with exploratory research method, reevaluated and adjusted the 'old' theory to 'new' practice and context (Wei et. al. 2020). Besides, the perspective of learning and learners, there are 9 papers examining the facilities that support the blended learning environment.
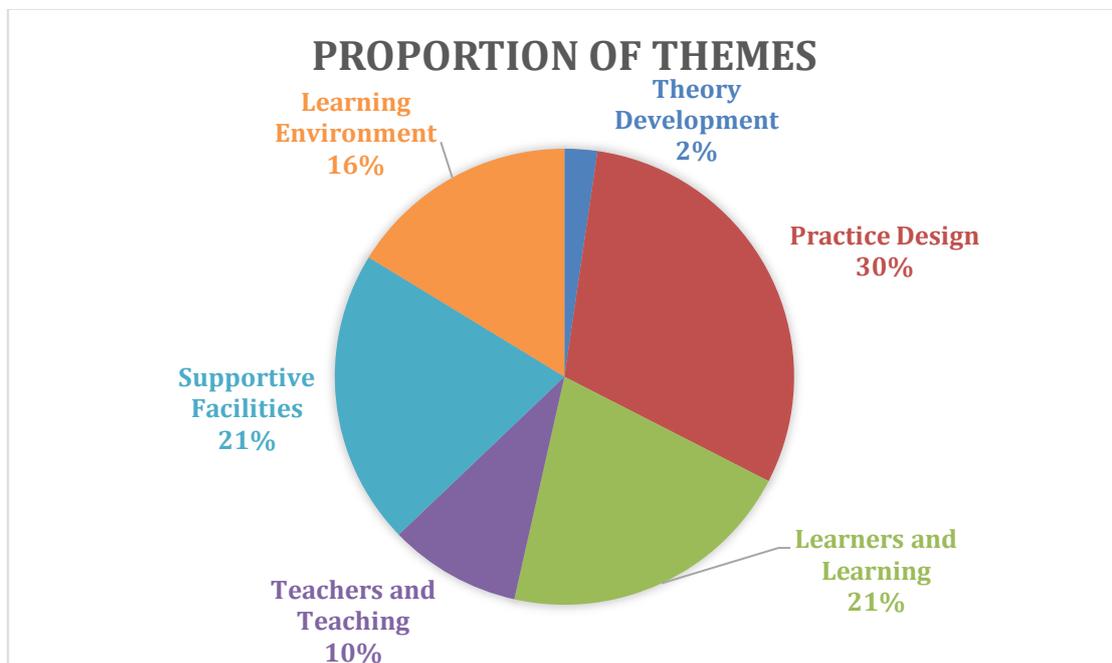
In 2016, Pan et. al. focused on the primary Chinese discipline, examined its effectiveness when supported by 3G3L instructional model and flipped classroom, along with the exploration of e-Schoolbag, one of typical Chinese K-12 blended learning technique assistants (Pan et. al. 2016). Another work by Zhang et. al. (2016) evaluated OUC cloud classroom system with regard to its assistance to Tibet teacher training (Zhang et. al. 2016). Hui et al. (2017) also paid their attention to the e-schoolbag facilitating primary Chinese discipline. Different from Pan's work in 2016, this paper mainly argued about the E-schoolbag usage impacts on students' active and engaged learning effectiveness, rather than talking about the learning environment supported by the mixture of e-Schoolbag and other learning models or theories (Hui et. al. 2017; Pan et al. 2016). Cheng et. al. (2017) also concentrated on the function of blended learning facilitates like Google Earth. Their project investigated the effectiveness of using Google Earth on elementary science courses. In 2018, four papers mainly discussed the facilities related to the K-12 blended learning model. Both Miao

et. al. (2018) and Liu et. al. (2018) evaluated the effectiveness of certain facilitated technology like wearable devices in physical education and Automatic Speech Evaluation technology in English learning. A team from Hong Kong mainly discussed the tools that can help children learn Chinese. They built a mobile computer-supported collaborative learning tool to examine its impacts on students' peer tutoring (Tsuei & Huang 2018). The final paper related to learning facilitator is from Wang and Wu (2018). They designed an expert system for plant learning in biology lessons to evaluate students' mental load and assess their performance (Wang and Wu 2018). There seems no paper exactly related to the learning facilitator in 2019 and 2020, but the practice of all kinds of facilitators is mentioned many times.

It is a little problematic when sorting out papers that relate to the practice design, because from a wider perspective, papers referring to the learning environment, learning and learners are to some degree involved into a discussion about practice. In that case, we checked the purposes and research process narrated by authors and identified 13 papers related to blended learning practice design. Some papers mainly focused on the practice design supported by new hardware or software while some papers concentrated on building abstract instructional practice. For example, Li and co-writers (2017) explored the practice design of V-China program in elementary education on the purpose of building multiple blended learning models. Similarly, Guan et. al. (2017) designed and developed an Intellectual Skills Assessment (ISA) app to evaluate pupils. Han et. al. (2018) designed and implemented Augmented Reality technology, into designing makerspace-based biological courseware. Both Jia & Yu (2017) and Huang et. al. (2019) conducted research on the Online Learning Assessment Index (OLAI) model in terms of practice in mathematics. The former project aimed at studying the application of this model in adaptive learning while the later research was in the purpose of improving students' learning performance. Different from these 5 papers, some papers focused on the instructional model designing. Fan and Yang (2017) examined the 3L5G learning model on fostering students' computational thinking. Hu and Shang (2018) introduced the instructional design on the gamification in math. Li and Li (2018) designed a new instructional model STILE based on visual learning. Huang et. al. (2019) and Wang et. al. (2020) studied the instructional design of Chinese characteristic STEAM courses in the blended learning environment. Except for these research discussing the design under the perspective of teaching and learning, there is a paper in 2019 provided an analysis model when dealing with wearable devices in physical

education, which introduced a practice design on conducting related research (Dong et. al., 2019).

To visualize the analysis of themes, we use a pie chart to show the proportion of each topic.

PROPORTION OF THEMES

- Theory Development 2%
- Practice Design 30%
- Learners and Learning 21%
- Teachers and Teaching 10%
- Supportive Facilities 21%
- Learning Environment 16%

Research Methods Applied in Sample Texts

This section aims to discuss the research methods employed by the authors of the selected texts for this research. Keeping eyes on research methods seems to be inspired when dealing with similar research. Among all 43 sample papers, there are only two papers using quantitative research methods. One is related to using Z-score to analyze students' performance under the impact of E-schoolbag (Hui, 2017). Another research introduced a data analysis model to evaluate the effectiveness of wearable devices (Dong et. al. 2019). Four papers applied the method of narrative literature review in their research, related to topics including learning environment (Cai et. al. 2017), practice design (Guan et al., 2017), learner and learning (Fan et al. 2017) and theory development (Wang & Li 2016). Six papers used case study as the main approach for research, including topics on learner and learning (Yang et. al. 2016), teacher and teaching (Chen et. al. 2020), learning environment (Xie et. al. 2016; Zuo et. al. 2019) and practice design (Liu et. al. 2018). Two of the papers applied action research in their studies in terms of examining the practice design (Wang et. al. 2020; Fan & Yang

2017). Besides, using a single research methodology in the text, there are five papers using mixed methods in terms of learning environment, practice design and teacher and teaching. These works share the similarity that part of research applied qualitative methods to collect data while using quantitative methods to analyze data. Rest of these papers mainly choose survey and experiment as their research methods, referring to all topic categories except theory development.

Method	Approach	Number	Topics
Quantitative Research		2	LL; SF
Qualitative Research	Experiment	13	LL; TT; LE; SF; PD
	Survey/Investigation	11	LL; TT; LE; SF; PD
	Case Study	6	LL; LE; SF; PD
	Narrative Literature Review	4	LL; LE; PD; TD
	Action Research	2	PD
Mixture		5	LE; PD; TT

Discussion

The content analysis of these 43 sample texts is meaningful and enlightening. Before carrying out this research process, the review of past domestic literature produced a vague picture of the present research status. However, after analyzing the sample texts, it is easier to understand the discourse and some ideas in terms of Chinese K-12 blended learning.

Diversity and Consistency of Themes

By classifying the theme categories of sample papers, it was found that research on Chinese K-12 blended learning covered a wide field over the past five years. From objectives applying in the blended learning environment to subjects involved in the learning process, from specific course designing to deep model exploration, from an internal development to external transformation, these papers show inclusive perspectives and laudable efforts that are put into research in this field. Different from 5 topics in Chinese blended learning that Zhang (2019) had analyzed (see in Chapter 2), the sample texts here have shown more specific and more inclusive than his view. For example, through systematic literature review, Zhang (2019) has divided the theme into 1) The fundamental theories of blended learning; 2) Pedagogical design and practice; 3) Blended learning platform; 4) Digital resource for blended learning and 5) blended learning outcomes intervention. However, from the outcome of analysis to sample texts, topics related to learners and teachers should not be ignored or simply classified as any titles Zhang (2019) mentioned. It appears that instead of focusing on the general evaluation to blended learning model, research on K-12 blended learning in China began to include individuals' reflection through the learning process. In addition, as selected texts are from an international research platform, many projects are the fruit of teamwork rather than individual programs. Scholars behind the papers belong to different contexts, which also brings various perspectives in a single topic. As discussed before, the Chinese context has its own complexity because of a large population, unique culture and regional inequalities, which may cause part of gaps between research in Chinese K-12 blended learning and research in western countries. However, K-12 blended learning is a vast puzzle that contains countless pieces of small pictures. It is endless for researchers to keep searching for the missing pieces. The papers used for

research purpose in this research kindly filled the gaps in this field. The research on the learning environment in rural areas helps to introduce the situation to more people, encouraging more investment and research projects to notice these groups. Like Zhang (2019) suggested that Chinese blended learning research mainly concentrated on the universities and adult learners and lack of taking vulnerable groups into consideration, the ICBL publish appears that gradually topics are becoming more and more inclusive. Though it seems that the focus on vulnerable learners and learners from rural area is still inadequate, we still find some efforts that devoted into attracting peoples' attention. It is meaningful for education equality and sets an example for research in a similar context. Furthermore, it appears that Chinese K-12 blended learning research covered many disciplines. Among these 43 papers, there are studies on subjects like Chinese and English learning, mathematics, STEAM, biology, physical education and music, as well as studies on the different forms of courses. Distinguished from what traditional literature that mainly focus on the main subject learning in Chinese formal classrooms (), texts selected here seem like contain more formation and disciplines. Apart from traditional subject like Chinese, English and Math, we can find research on Physical Education, Music and even extra English classes. This status shows that the practice of blended learning in Chinese K-12 stage has spread into all kinds of subjects in normal school education. However, whether these practices are all valid and effective still remains to be discussed.

After reviewing these papers longitudinally, it appears that some of the themes remain consistent through the past five years. For example, when it comes to blended learning models, there was research on a new proposal of model expansion in 2016 and later in 2018 and 2020, research became mainly focusing on examining and evaluating the validity and effectiveness of the past models. Meanwhile, through the process of practising and correcting, the K-12 blended learning models gradually became more suitable in the Chinese context. This is a delightful finding that reveals the progress made over the past five years. Research on Chinese K-12 blended learning seems like applying theories and methods from other countries into its own real practice. Another track of research transformation is from studying the external environment to studying personal internal capability. In 2016, 2017 and 2018, many papers spared much space for discussing learning facilitators and research environments. However, since 2019, more and more papers have begun to focus on participants' behavioural performance as well as practice effectiveness. To some extent, it might explain the research on theories

being completed and the hot spot of research turning to practice and people getting involved. But it also may indicate another problem of the research in this field, that is, for Chinese K-12 blended learning to build its own theoretical framework.

Relationship between research and environment

China has developed rapidly through these five years. As the last five years in the process of *The Outline of National Medium and Long-term education Reforms and development Program (2010-2020)*, China has pushed forward many deepened reforms on education informatization and improving the fairness among all regions (MoE, 2010). The research topics reflected the encouragement of policy. Through 2016-2020, papers related to Chinese blended learning take account for almost 50% in all published papers. Though it might be because of the selection of the conference itself, the proportion reveals that research on Chinese blended learning benefits from a favourable environment. At the same time, it may also suggest the gap before coming from a less advantageous research environment. With the help of the environment, it is believed that future research will be more creative and fruitful.

Strength and Limitation

The current research is aimed at narrating a research terrain on Chinese K-12 blended learning context and was conducted in the content analysis method. Under this circumstance, the research has several advantages. First, the research topic is new and meaningful. In the past, most articles were likely to review the literature from other developing countries, which is worth learning yet lacks self-autonomy. For example, Li & Zhao (2004) discussed the theory of blended learning and introduced the learning model by reviewing literature from western countries. However, they did not give a possible learning model that may apply in Chinese own context. Besides, works like Liu et al. (2008) conducted in 2008 about exploring the American Entrepreneurship Education model in universities introduced the advanced pedagogy practice in western countries, yet not combined with our own Chinese context to detect its validity. Our research here, through content analysis, has partly indicated that the trend of research in this field is changing. Papers are not only mainly in regard to introducing theories and model but included practice in certain context (Yang et. al. 2016). Therefore, this article

attempts to narrow down the research scope and digging deeply, aiming at through the process of analyzing the content, the researchers of this study gained deep acknowledgement for remarkable projects in this field and it will hopefully give hints to the future research. Second, the research method is valid and efficient. Content analysis is a method good at illustrating changes happening within a certain period. It is necessary that we learn about the development of research status so that we can possibly figure out the next step to go.

Moreover, selecting articles published by related international conferences is more efficient compared with searching in databases. Particularly in the circumstance of a pandemic, with the impacts of the external environment and mental struggle against loneliness, anxiety and stress, content analysis narrowed down the research scope and made it concentrated. Nevertheless, conducting research in this way is also problematic. First, the research may be too small to clarify the real status of Chinese K-12 blended learning. As mentioned above, K-12 blended learning is a big puzzle that includes countless pieces of pictures. These small pictures, in another word, small research areas, cannot represent the whole terrain on its own or in groups. Many scholars devoted themselves to studying Chinese context and published articles on various platforms. It is important to explore more on those databases too. Second, the ICBL as a database may not be inclusive to some extent. It is an international platform including many contexts and weakened the influence of western countries dominance, but the papers submitted to this conference related to Chinese conferences mainly come from top universities in China. It is understandable that universities at a higher level are more capable of conducting larger projects and achieving creative results. But it does not mean that the research achievements from other institutions can be ignored.

Therefore, many problems remain to be solved yet luckily, we approach some findings to think about. The journey to explore more suitable and advanced blended learning models, as well as research conduction, is still a long way to go.

Conclusion

The idea of this research came out at the beginning of the pandemic and the whole process was conducted under the circumstances of isolation, anxiety and stress. The

findings of research are delightful, as it changed some past personal views that research in this K-12 blended learning field in China are discursive, exclusive and undeveloped. By analyzing the past five-year texts in international publish, there seems exist remarkable changes in this field. First, the theme of research is inclusive and diverse. The range of topic is not only related to the pedagogical design practice, but also include discussion about context, individual reflection, and resources. Different from the past literature which mainly discuss single perspective, it exists some papers that include various points of view. They focus on the development of theories outside the country, but keep focusing on the domestic application as well. Second, the method applied in research is various and developed. Apart from doing interpretive methodology, some papers also use quantitative methodology to conduct systematically research on a certain topic. Finally, the trend of Chinese K-12 blended learning appears to include more focus on the Chinese own context. Instead of introducing the theories and practice from other developed countries, Chinese K-12 blended learning research and researchers began to apply them into local circumstance, which helps to build a theoretical framework that suitable for this context. It seems like an optimistic trend as it increases diversity of K-12 blended learning research or blended learning field. Meanwhile, study on a certain research context appears to be inspired, because it reminds researchers to realize the importance of context inside the project.

The Covid-19 pandemic has shown everyone that the globe is a unity (). It is also important for sociologists to think both inclusively and exclusively. The pandemic has changed the teaching and learning pattern and more or less, research pattern. Researchers are faced with tremendous challenges during the pandemic such as ethics problems, individual mental issues, resource restriction and technique limitation. For example, this research on K-12 blended learning in Chinese context has another possibility to be conducted in a survey on groups that experienced the blended learning under pandemic. However, because of the restriction of outbreak, the research was forced to stay at home, be desk-based. It was a special research experience also provided an opportunity to learn about current literacy. On the other hand, the experience brought a great challenge and limitation to research and researcher. Because of the restriction of technique and ethics, researchers were forced to search for every possible research method, database and digital support to complete the process. But it causes considerable influence on researchers' mentality. Besides, it seems that the restriction of technique has influence on research itself. It is hard to prove which kind of

research is suitable for a certain topic and the restriction of technique even decrease the number of options. All these challenges were real difficulties run across in this research and build the strength and weakness of it.

However, despite of these challenges met in the process of research, the experience was inspired and valuable for the future. Firstly, as a new data resource, ICBL was introduced in this paper so did many papers that published on this platform. Hopefully, there will exist more research papers and more platform for papers to speak for their own context, to make the terrain diverse and colourful. As a conference mainly held by Asian context institutions, it is likely for more research from developing context to join in. Secondly, the research kind of presents a sample of study equipped with global perspective. Language is one of difficulties when studying a topic under a certain context, as the interpretation will probably cause ambiguity and misunderstanding. Analyzing papers drafted and published originally in English can partly reduce the risk of these issues. However, authors' context impacts on their writing style, research style and perspectives. It is important to be critical when dealing with this issue in the future research, at which is also this paper aimed. Finally, every research has its own shortcomings waiting for further discussion. To inspire the future research, some questions can be raised: What is the relationship between learners' context and learners' learning? How can context really affect individuals' learning performance? Is it possible to develop K-12 blended learning into massive Chinese formal school? Does blended learning can replace traditional teaching and learning in Chinese context?

Hopefully, answers to the above questions can be figured out in the short future under the big challenge of post-pandemic time. This research is an attempt to explore a possibility under this unprecedented circumstance and we wish it can inspire the future.

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