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Research on the Application of Constructivism in China in the New Media Environment - Taking Educational Psychology as a Case Study

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Abstract

Purpose- This study aims to explore the application of constructivism in China under the new media environment. With the rapid development of new media, the way people acquire information and knowledge has undergone tremendous changes. New media provides people with a more open and convenient learning platform, and also poses challenges to traditional education models. While exploring constructivist theories, this study takes the course design and teaching practice of educational psychology as a case to test the feasibility and effectiveness of integrating constructivism with new media through practice.

Design/methodology/approach- This study intends to adopt constructivism as the theoretical framework, and take educational psychology curriculum as an example. Through literature review, questionnaires, teaching experiments and other research methods, it will discuss the specific application of constructivist teaching methods under the new media environment.

Findings – This paper theoretically demonstrates the feasibility of integrating constructivism with new media, and argues that the two have good synergies. We discussed the key points for constructivist course design under the new media environment, and proposed specific solutions. Through the course design and teaching practice of educational psychology in schools, although we have not proven that it significantly improves student academic performance, it greatly enhances students' learning interest. Finally, we also provide corresponding suggestions for educational administrations, teachers and schools. **Practical implications –** The practical significance of this study lies in the application of constructivist theories in practice by integrating them with new media. Through practice, we have identified some obstacles in applying theories, while also proving the feasibility of combining constructivism with new media in teaching. **Originality/value –** The value of this paper lies in providing a case study on the practice of constructivism under the new media environment. The rapid development of new media has also changed the education landscape. This paper explores the practical application and effects of integrating new media with constructivism, and conducts teaching practice in the educational psychology discipline in China, which is unprecedented in previous research and practice. It also offers suggestions on subsequent policy making and school teaching.

Keywords: new media, constructivism, educational psychology, curriculum design, learning methods

Introduction

With the thriving development of emerging information technologies such as mobile Internet, cloud computing, big data, and artificial intelligence, new media has profoundly influenced and changed people's work, life and learning. With its openness, interactivity, hypertextuality and other features, new media provides people with more convenient and quicker ways to acquire information and knowledge. It also poses tremendous challenges to traditional education models. Facing the changing learning needs in the new media environment, constructivist learning theory offers new ideas for education reform with its "learner-centered" and "meaning construction" concepts.

The origin of constructivism can be traced back to Piaget's cognitive development theory and Vygotsky's sociocultural theory in the 1960s. In the 1980s, constructivism began to be applied to the field of education. In the 1960s, Piaget put forward the cognitive development theory, emphasizing that learning is a process of students actively constructing knowledge. Vygotsky proposed (Vygotsky & Cole, 1978) the sociocultural theory, believing that learning is a social activity in a specific environment. These two theories laid the

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foundation for constructivist learning theory. In the 1970s, American educator Bruner applied Piaget's theory and proposed discovery learning, stressing that students acquire knowledge actively through exploration. This inspired the emergence of constructivist instructional design. In the 1980s, constructivist theories began to be directly applied to instructional design. Jonassen (Jonassen, 1991) proposed problem-based learning, encouraging students to solve practical problems through inquiry. Collins proposed cognitive apprenticeship teaching method to simulate experts' thinking process. These two teaching methods promoted the formation of constructivist teaching (Cunningham, 2013). In the 1990s, constructivist teaching developed further. Conceptual change teaching based on Piaget's theory emphasizes arousing students' cognitive conflicts (Stefanović-Marinović et al., 2022). Cooperative learning based on Vygotsky's theory stresses teacher-student and student-student interaction. The development of internet technology also facilitated the application of constructivist teaching in online education (Luca & Jack, 2021). In the 21st century, constructivist teaching methods have been widely applied in various educational settings, such as project-based learning, case-based teaching, and task-based teaching. The student-centered educational philosophy of constructivist teaching continues to influence the development of educational theories and practice (Chi & Wylie, 2014).

The introduction of constructivist theories in China can be traced back to the mid-1980s, going through the stages of introduction, validation, and innovative application. In the mid-1980s, some scholars began to introduce constructivist theories, such as Chen Guicelebration's systematic introduction of constructivism and its educational thoughts in *Contemporary Schools of Educational Theories* (1986). This laid the foundation for the dissemination of constructivism in China. In the 1990s, constructivist theories were gradually accepted by Chinese educators. Some scholars conducted validation studies on constructivist teaching methods, such as Tong Yuanmo and Liu Yi's experimental research on progressive teaching guided by constructivist theories. In the 21st century, constructivist theories have been widely applied in China, giving rise to a number of constructivist teaching methods with Chinese characteristics, such as internet cooperative learning based on Vygotsky's theory (Zhang Lixin, 2015), and micro-teaching integrating problem-based and cooperative learning (Roehrig et al., 2012). Constructivist approaches have also been applied to instructional design in subjects like history, Chinese language, and mathematics.

Constructivist learning theory believes that learning is a process in which learners actively construct knowledge, and teachers are facilitators and promoters of learning. Constructivist teaching methods emphasize situated and cooperative learning, attach importance to learners' subjective initiative, and cultivate their independent thinking and problem-solving skills.

The Chinese education system has long been criticized by students and parents, and many core issues remain unresolved. Chinese education generally adopts unified teaching plans, schedules and standards, ignores individual differences among students, and lacks targeted guidance, making it difficult to realize personalized education. Current education over-emphasizes the development of exam-taking skills. Teaching content and methods are designed around college entrance exams, paying insufficient attention to students' personality, ability and interest, which restricts their all-round development. The evaluation system relies excessively on standardized tests and over-stresses test scores rather than ability growth. This easily leads to exam-oriented education, affecting students' learning interest and innovative thinking. Existing teaching over-emphasizes the imparting of theoretical knowledge while neglecting learners' hands-on practice and life experience. This is not conducive to knowledge internalization and also limits the cultivation of innovation capabilities. The current teacher-student relationship still centers around teacher authority and is obviously hierarchical. This is not conducive to active student participation and also hinders the improvement of teaching quality.

China's emphasis on exam-oriented education has achieved good educational outcomes at the primary and secondary school stages. According to the PISA 2018 report, 15-year-old Chinese students ranked among the top in the world in mathematics, science and reading skills. However, when they reach higher education, these features lead to students losing interest and subjective learning abilities. In contrast, the goal of constructivism is to cultivate students' ability to learn actively and lifelong learning. By emphasizing the learning process, situated learning and individualized teaching, it helps students actively construct knowledge and abilities based on their own experience. This aligns with the problems existing in Chinese higher education. Therefore, using constructivism to reform and experiment in Chinese higher education is significantly meaningful.

On this basis, we take new media as an entry point for teaching experiments, utilize the rapid development

of new media today, and leverage the digitalization, networking, mobility and personalization of new media. Through new forms of communication, we can enhance students' learning interest and better exert the application of constructivism in education. In summary, this study intends to adopt constructivism as the theoretical framework and take educational psychology courses as an example. Through literature review, questionnaires, teaching experiments and other research methods, it will explore the specific application of constructivist teaching methods in the new media environment. The Chinese education theory circle has conducted related research on constructivism since the 1990s, but the promotion in practice has been slow. This article hopes to promote the practice of constructivism with new media as the entry point. Taking educational psychology as a case study is also the first attempt, thus possessing a certain innovation (Akareem & Hossain, 2016).

Research Problem

Constructivism has been well received in the education field since its introduction, but there are some inherent difficulties in its implementation in practice.

First, the role adjustment is challenging. Constructivism requires teachers to shift their role from knowledge presenters to facilitators and guides of learning, while students need to change from passive to active learners. However, many teachers and students find it difficult to make this role transition. Richardson (2003) points out that teachers need to transform from knowledge providers to learning facilitators and assistants, which entails changing their teaching philosophy. Brooks & Brooks (1999) suggest that effective training and clear role expectations are needed for teachers' role change.

Second, selecting appropriate learning content is difficult. Designing learning content based on students' prior knowledge structure is a constructivist requirement, but it poses a challenge for teachers to judge learners' cognitive developmental levels. Such individualized teaching demands are hard to achieve on a large scale, especially with big class sizes. Vygotsky (Vygotsky & Cole, 1978) proposes in his "Zone of Proximal Development" theory that learning content should be slightly above students' current level. Cohen (1999) points out judging students' prior knowledge structures to design learning content challenges teachers' assessment skills. Finally, changes in assessing learning outcomes. Constructivism emphasizes the learning process, so designing assessments that can genuinely reflect student learning is an issue (MOHAMMADI-SARPIRI et al., 2021). If traditional exams are used, students will fall back into the original test-driven education mode. But how to assess students under constructivism also becomes a dilemma. Phillips (1995) suggests focusing on process-oriented, continuous feedback for students.

Facing the rapidly changing world, Chinese higher education is confronted with a series of challenges. The traditional pedagogy of knowledge instillation has become inadequate for the new landscape. On one hand, knowledge impartation is overemphasized while ability cultivation is overlooked. In classrooms, teachers instill thoughts based on textbook knowledge points, and students passively receive them, leading to serious drawbacks of exam-oriented education where students lack analytical and practical abilities. Secondly, course offerings are disconnected from demands. Traditional courses are overly theoretical and academic, disconnected from social needs. Thirdly, evaluation methods are singular, still dominated by standardized tests while overlooking process assessments. In addition, students spend most time passively receiving class instillation, lacking self-directed study time. Teacher-student relations are relatively rigid, with teachers dominating classrooms and lacking interaction. These are issues facing and needing resolution in Chinese education (Youssef & Webster, 2022).

This research aims to adopt new media as an entry point and constructivism as a theoretical framework to design teaching courses, and present final research results through case studies. The integration of constructivism and new media can resolve some issues of constructivism in teaching, e.g. difficulties in situation settings and insufficient social interactivity. Meanwhile, students today rely heavily on new media like social media and short videos, so increasing new media in teaching environments and forms can enhance learning interest and self-directed abilities, aligning with constructivism's direction. Therefore, the two can achieve better integration.

Research Questions

Based on the above research problem, the following four research questions of this study can be articulated as follows:

RQ1: What are the existing problems of constructivism in current teaching?

RQ2: Is the integration of new media and constructivism feasible?

RQ3: How to leverage new media to enhance the application of constructivism?

RQ4: What are the outcomes of implementing constructivism through new media?

Research Objectives

The goal of this study is to explore how constructivist theories can be applied to educational psychology practices in China under the new media environment. The specific research objectives are:

1. Review the main viewpoints and principles of constructivist theories, and elaborate the connotations of constructivist learning theories, including the perspectives of different schools like cognitive constructivism and social constructivism.
2. Analyze the characteristics of new media as an emerging learning medium, and its impacts on learning environments, teacher-student roles, learning approaches, etc. Discuss the new opportunities and challenges new media environments bring to the application of constructivist theories.
3. Analyze the dilemmas faced in applying constructivism, such as the difficulty in transforming teaching philosophies and reforming assessment methods. Explore solutions that leverage new media to address these problems.
4. Conduct case studies by selecting educational psychology practice samples under the new media environment, and examine the application effects of constructivist theories in specific contexts.
5. Based on the case studies, propose strategic suggestions for applying constructivism in Chinese educational psychology practices under the new media environment, such as transforming teacher roles, building open and interactive online learning environments, and implementing constructivist-oriented learning assessments.
6. Forecast the development trends and prospects of applying constructivism in Chinese educational psychology practices under the new media environment, including theoretical development, teacher training, curriculum development, utilization of instructional technologies, etc. Provide theoretical support for better guiding Chinese educational psychology practices with constructivist theories.

By achieving the above research objectives, this study will reveal new characteristics of constructivism application brought by the new media environment, dissect the current dilemmas and development strategies of applying constructivism in Chinese educational psychology, and envision its future outlook, providing references for the application of constructivism in Chinese educational psychology.

Scope of the Study

Based on the research objectives outlined above, the scope of this study will focus on the application of constructivist learning theories in the field of educational psychology in China under the new media environment. In terms of theory, this study will give an overview of the key tenets and principles of constructivism, including both cognitive and social constructivism, to establish an understanding of this learning approach. The study will also analyze the features of new media and its impacts on learning environments, teacher-student roles, learning methods, etc., to identify the new opportunities and challenges it presents for applying constructivist theories. Regarding the application of constructivism in China's educational psychology, this study will examine both formal and informal learning scenarios. It will look at the current status quo of constructivist approaches in practice, and the dilemmas faced such as difficulties in transforming teaching concepts and changing evaluation methods. For specific case studies, the scope will encompass new media-based educational psychology practices that utilize constructivist principles. Examples include micro-classes, MOOCs, online interactions for psychology instruction. Both classroom teaching cases and out-of-classroom learning cases will be included. In terms of research methods, this study will utilize literature review, field surveys, interviews, observation, and case studies. Data will be gathered from literature sources, course materials, interviews with teachers and students, surveys of learners' perceptions, and first-hand observations of constructivist teaching practices. The geographical scope of this study focuses on China's education system, while the theoretical framework is centered around constructivism and its different aspects. The disciplinary scope is educational psychology and its teaching practices using new media technologies. Cases will be chosen from different educational institutions and

learning platforms in China. In summary, this study explores the intersection between constructivist learning theories, new media environments, and the application of educational psychology in China. Its scope enables an in-depth analysis of the opportunities, challenges, current status quo, and future directions of implementing constructivism in this specific discipline and context. The findings will provide valuable insights for applying constructivist approaches in China's educational psychology under the new media's influence.

Significance of Study

This research is of great significance in promoting the application of constructivist theories under the new media environment in China.

Firstly, it enriches the application studies of constructivist theories in Chinese educational psychology. Existing studies are mostly theoretical, with few empirical studies. This research can fill such a research gap.

Secondly, new media have achieved rapid development nowadays, providing more options for teaching with the emergence of new tools and forms. This research demonstrates the positive role of new media in constructivist teaching practices, bringing new possibilities for applying constructivist theories. The findings can facilitate effective integration of educational technologies and constructivist teaching methods.

Thirdly, by dissecting the dilemmas confronting constructivism application in Chinese educational psychology practices, this research can guide education practitioners to adjust strategies and achieve teaching philosophy transformation. The case analysis can provide successful experiences of constructivist approaches in specific educational psychology contexts for reference by other educational settings.

Finally, this research will propose development strategies for constructivist educational psychology practices under the Chinese context, serving as valuable references for related practitioners and policymakers.

Structure of the Thesis

The representation of different study segments that are connected to the research is dealt with by the study framework.

Chapter 1: This chapter first introduces the background and motivation of the research on applying constructivism in China's new media environment. Then it identifies the research problems, questions and objectives. After that, the scope and significance of the study are discussed. Finally, this chapter outlines the structure of the thesis and summarizes the key points.

Chapter 2: The literature review chapter focuses on five aspects: the main perspectives of constructivist learning theory; the status quo, trends and problems of integrating new media and education; the exploration of integrating constructivism in China's education reform; the core viewpoints of constructivist education theory; and the related strategies between constructivism and curriculum design.

Chapter 3: This chapter illustrates the research design ideas and methods, the selection of research objects and samples, the techniques for data collection and statistical analysis, and the reliability and validity control in the research process.

Chapter 4: The Application of Constructivism in the New Media Environment. Based on the literature review, this chapter analyzes the feasibility, key points and strategies of integrating constructivism with new media in curriculum design, to explore the application of constructivism in the new media environment.

Chapter 5: This chapter first introduces the background of the case. Then it evaluates the effects of applying integrated constructivism and new media. Finally, it analyzes existing problems and provides improvement suggestions.

Chapter 6: The concluding chapter summarizes the major findings, discusses theoretical and practical implications, acknowledges research limitations, and proposes future research directions.

Summary

The chapter first introduces the research background, motivations, questions and purposes, clarifying the significance of the study. Then it delineates the scope and limitations to help readers understand the research objects. In addition, the chapter outlines the overall structure to give readers a preview of the full thesis content.

In summary, Chapter 1 lays the foundation by giving readers a preliminary understanding of the overall research framework. The following chapters will build on this basis, and further develop the research on applying constructivist theories to Chinese educational psychology practices under the new media environment, through literature review, research methods, theoretical discussions, case analyses, etc, in order to accomplish the intended research purposes and goals.

The summary provides a clear overview of how Chapter 1 introduces and frames the overall study, while the subsequent chapters will delve deeper into the research topic through various approaches. Overall, it demonstrates a good understanding of Chapter 1's role and objectives in structuring the thesis.

Literature review

Constructivist theory

Constructivism is a learning theory that emphasizes that learning is an active process in which learners construct knowledge based on their prior experiences through meaning interpretation and knowledge reorganization. Its basic tenets include: Learning is an active process, learners do not passively absorb external knowledge but actively construct knowledge by building cognitive frameworks. Learning is based on learners' experiences, forming new knowledge on the basis of existing knowledge structures. Learning is an internal cognitive process of students, while external conditions only stimulate and organize this process. Learning should emphasize the learning process, value cooperative exchange and meaning construction. Teachers are facilitators and guides of student learning instead of knowledge transmitters. Teaching emphasizes eliciting, interacting, discussing, cooperating to help students learn actively.

The constructivist theory originated in the 1960s. Piaget (Piaget, 1950) proposed the stage theory of cognitive development in *The Psychology of Intelligence*, laying the foundation of cognitive constructivism. Bruner (1961) put forward discovery learning theory, emphasizing the importance of learners actively discovering patterns and constructing knowledge. Piaget (Piaget, 1950) proposed cognitive development theory, viewing learning as students' active construction of knowledge, and used assimilation and accommodation to explain cognitive development. Papert (Papert, 2020) further studied Piaget's theory and proposed that programming learning based on constructivism can stimulate children's intrinsic learning motivation and inquisitiveness. Driver et al. (1994) found that compared to traditional instruction, constructivist teaching can facilitate students' conceptual change. Ge et al. (2010) found that constructivist teaching enhances medical students' learning motivation. Von Glasersfeld (Von Glasersfeld, 1989) stressed that knowledge is not an internal representation of the objective world, but a construct of subjective concepts and patterns. Learning emphasizes the meaning construction process. Jonassen (Jonassen, 1991) elaborated the design principles of constructivist learning environments, such as creating authentic contexts, enhancing cooperation, supporting diversified representations, etc. Ernest (Ernest, 1995) proposed that constructivist mathematics teaching needs to focus on students' prior experiences and encourage evaluating the learning process rather than outcomes. Bednar et al. (Bednar et al., 2013) distinguished that cognitive constructivism focuses on individual cognitive construction, while social constructivism emphasizes social cultural influences. Duffy & Jonassen (Duffy & Jonassen, 2013) clarified that constructivist teaching needs to focus on context, representation, cooperation, conversation, etc. Loyens & Gijbels (Loyens & Gijbels, 2008) proposed a multidimensional approach to analyze the effects of constructivist learning environments. Kalman (Kalman, 2011) used reflective writing to promote students' science conceptual understanding in constructivist teaching. Roehrig et al. (Roehrig et al., 2012) proposed a conceptual framework for applying constructivist theory in STEM education. Chi (Chi, 2013) presented a constructivist theory based virtual reality digital learning design model. Ultanir (Ültanir, 2012) compared the constructivist learning views of Dewey, Piaget and Montessori from an epistemological perspective. Kalina & Powell (Kalina & Powell, 2009) proposed constructivist application strategies for effective classrooms. Harasim (Harasim, 2017) explored the application of constructivist learning theory in online education

Vygotsky (Vygotsky & Cole, 1978) proposed the social constructivist theory. Vygotsky believed that social culture has significant influence on cognitive development. He proposed the concept of the "zone of proximal development", emphasizing the facilitating role of language and cooperation in learning. Vygotsky argued that the sociocultural context and collaboration with others play crucial roles in cognitive development. He proposed the "zone of proximal development" concept, believing that learning benefits

development. Social constructivist theory stresses that knowledge is constructed through social interaction and negotiation in a sociocultural context. Vygotsky studied the impact of language and culture on knowledge acquisition, as well as knowledge differences under various cultural backgrounds. Bruner (1990) proposed that symbolic systems promote cognitive development, arguing that language and other symbolic systems carry culture, and learning is a process of joining a culture. Lave and Wenger (1991) proposed the concept of communities of practice, viewing learning as peripheral participation and knowledge being situated in specific contexts. Rogoff (1990) presented the concept of apprenticeship in which learning involves novices observing experts and appropriating skills through interaction. Salomon (1998) emphasized the vital role of social interaction in cooperative learning for cognitive development. Wertsch (1991) argued that human mind develops through utilizing tools or symbols in sociocultural activities. Gergen (1999) stated that knowledge and meaning are not innate discoveries of the individual but social constructions. Burr (2015) pointed out that our understanding of the world is constructed by social processes and language collectively. Cobb (1994) proposed that knowledge is established through shared understanding in social interaction and discourse.

Both social constructivism and cognitive constructivism view learning as an active process of meaning and knowledge construction, emphasize the subjectivity of learners, and regard the learning process as more important than learning outcomes. In differences, cognitive constructivism focuses more on individual internal cognitive processes, stressing the restructuring of individual experiences, and how individuals construct conceptual knowledge. Social constructivism pays more attention to sociocultural influences on learning, underlines the social construction of knowledge, and focuses on the negotiation process of different perspectives. Social constructivism highlights the sociality and situatedness of learning, emphasizing the social construction process of knowledge and meaning.

In addition to the two main theories of cognitive constructivism and social constructivism, there is also critical constructivism. Henri Giroux (1997) proposed the theory of critical constructivism in education, emphasizing that school education should cultivate students' critical thinking abilities and pay attention to the role of power relations and ideologies in education. Peter McLaren (1999) combined critical pedagogy and constructivism, arguing that education should expose mainstream ideologies and cultural hegemony to help oppressed groups achieve liberation. Joe L (Lo & Pan, 2016). Kincheloe (1991) proposed the view of teachers as researchers. Teachers should take a critical stance and reveal various power dynamics in the educational process. Shirley Steinberg (2007) advocated critical multiculturalist education, concerning the power relations between multiple identities of race, class, gender, etc., and promoting educational justice. Elizabeth Vallance (2004) explored the social construction of scientific knowledge in science education. She proposed that science teachers should take critical constructivism to examine the value positions of scientific knowledge (Feng).

In general, past research has shown that, compared to traditional teaching methods, constructivism is superior in improving learning motivation and the use of deep learning strategies (Ge & Land, 2003). Lebow (1993) argued that constructivist ideas also facilitate the design of online learning environments. Marshall & Horton (2011) found that constructivist mathematics teaching can enhance students' inquiry abilities and mathematical thinking. Constructivist theories have gradually matured in previous research. Future research should focus more on how to apply constructivism to practice, design based on different scenarios in practice, and solve the many problems that have arisen in the application process.

Integration of New Media and Education

The integration of new media and education mainly stems from the rapid development of new media in the last decade, people's over-reliance on mobile networks, and the emergence and popularity of new media tools. More and more teachers have incorporated new media into their teaching to bring some convenience (De Bruin & Harris, 2017; O'Flaherty & Phillips, 2015).

Before 2011, research on the integration of new media and education was mainly focused on online courses, mobile learning, etc. Representative perspectives include the flipped classroom concept by Kennedy et al (Kennedy, 2006). Kennedy et al. (2007) first proposed the concept of "flipped classroom", advocating that teacher lecturing should transition to student self-learning, and class time should focus more on communication and internalizing knowledge.

From 2011-2015, research began to pay attention to new technologies like social media and big data

analytics. Representative studies include Junco's research on social media and student engagement. Junco (Junco, 2012) found that the frequency of Facebook use was positively correlated with student engagement. Spector (Spector, 2014) pointed out that smart learning environments optimize the learning process through automation and personalization. Buckingham (Buckingham, 2013) examined the impact of social changes behind digital culture on children's learning.

From 2016-2018, virtual reality and AI technologies triggered a new wave of research enthusiasm. Representative studies include Spector's research on smart learning environments. Kurucay & Inan (Kurucay & Inan, 2017) found that online interaction can improve learning satisfaction.

After 2019, the COVID-19 pandemic led to a surge of research on remote teaching technologies. Representative perspectives include Whiteside's model of community-engaged remote teaching. Whiteside (Whiteside, 2020) proposed that remote teaching requires community participation to establish social and cognitive presence.

In addition to these studies, abundant research has shown that the integration of new media and education is feasible and has proposed many practical solutions. Handayani (2020) found that social media provides opportunities for English teaching practice, cultural exchange platforms, and possibilities for collaborative learning, but also led to issues like unequal technology access and cyberbullying (Grant, 2018). Al-Rahmi et al. (2018) built a model of integrating social learning tools into e-learning systems, considering technology, teachers, learning and other factors. Balbay and Kilis (2017) found that using mobile apps like Flipper in flipped classrooms positively impacted student attitudes and engagement. Kurucay and Inan (Kurucay & Inan, 2017) examined the effects of online interaction on learning satisfaction and outcomes. Results showed appropriate online interaction can facilitate collaboration and improve satisfaction. Kent and Leaver (2014) explored the learning ecology of Twitter, arguing it facilitates knowledge sharing and collaboration. Buckingham (Buckingham, 2013) discussed the impact of digital culture on children's learning and socialization, arguing the cultural changes behind technology warrant attention. Gunawardena et al. (2009) constructed a theoretical framework for building online communities of practice using social networking tools.

In summary, current research has mainly examined the integration of new media and education from perspectives like technology application and learning outcomes, providing frameworks and pathways for relevant research.

With the thriving development of information technology, new media has deeply penetrated every aspect of education and profoundly impacted teaching and learning. A series of teaching models based on new media technologies have emerged, including flipped classrooms, smart teaching, virtual simulation, online courses, etc., bringing unprecedented changes to the landscape of education. The flipped classroom subverts the traditional knowledge imparting model, with students becoming the masters of the classroom. Big data and AI allow teaching to be more personalized and precise. Virtual reality creates immersive digital learning environments. Online open courses break the limitations of time and space, realizing the sharing of educational resources. The reasons lie in the interactive, open, connected and convenient features of new media as digital mass communication mediums, which match and facilitate the reforms in education models (Kinzel & Kusch, 2018).

Facing the impact of new media, educational concepts and practices are also changing. Students' learning is transforming from passive knowledge acquisition to active knowledge construction. Teachers' roles are shifting from knowledge instructors to supporters and facilitators of learning. The focus of learning assessment is moving from testing memory to cultivating abilities. Educational resources are becoming more open and shared. Learning is expanding from classrooms to campuses and even virtual spaces. All these changes demonstrate that education is transitioning from the traditional standardized and ossified status towards individualized and open modernization.

Although there are also some problems in applying new media to teaching, like fragmented resources, cognitive overload, and unequal technology access, these do not affect the overall trend of deep integration of new media and education. In fact, the large-scale online teaching practices during the COVID-19 pandemic have accelerated this trend. Looking ahead, the combination of new media and education will rise to a strategic level, becoming an important approach to achieving the modernization of education. Education policymakers and practitioners need to adapt to this trend, and continuously explore innovative

applications of new media in areas like teaching, management and assessment, so that new media can truly become a powerful tool to improve educational quality and equity.

China's pedagogical reforms and constructivism

The comprehensive state-wide education reform in China includes pedagogical change (that is recognised as 'new curriculum reform') launched by the Ministry of Education (MOE) in China (Chen, 2018). According to Tan (2016), the objective and agenda of the educational reforms are documented mainly in the 2001 paper with the heading "Outline of the Curriculum Reform for Basic Education."

This demonstrates that the current curriculum for basic education is ineffective to the requirement of modern education; the MOE vision is to enhance 'quality-targeted education' whereby restructuring its curriculum mechanisms that comprise frameworks and teaching techniques. The phrase "quality-oriented education" is important since it contrasts with the conventional idea of "exam-oriented education.". The current Chinese educational system emphasises information transfer, didactic instruction, topic mastery, and a lot of practice in order to achieve academic success on difficult tests (Bell & Liu, 2019). The reform in China aspires to create "all-rounded learners" who are "endowed with a culture of invention, kinds of strategies, and basic innovation, creativity, and methodologies to participate in lifelong learning" in order to satisfy the needs of a knowledge economy (Chen, 2018). Since the start of the curriculum reform in 2001, a swarm of policy measures covering school administration, curriculum content, pedagogy, appraisal, tutor training, etc., have been implemented in China's primary and secondary schools. Hence, this research's contributions in this segment will discuss China's pedagogical reform—that is, elements of the new curricular reform that have to do with teaching.

The main goal of the educational reform is to "move away from an obsessive focus on passive learning, rote memorising, and technical instruction to one that fosters learners' active engagement, official investigation, practical capability, problem-solving abilities, and cooperation" (Hoidn and Manja Klemenčič, 2020). Teachers are supposed to concentrate on the "three phrases of research aim," which include instilling the necessary "sentiments, attitudes, and values" in pupils as well as teaching "comprehension and practical" through suitable "procedures and techniques" to foster holistic advancement. Along with encouraging their students to question, research, enquire, and learn via practice, teachers should place emphasis on developing their independence and autonomy. They should also encourage their students to engage in active, personalised studying under the teacher's direction. Teachers should also take into account the unique characteristics of each student, catering to their various learning needs, and create an environment in the classroom that encourages active participation, piques students' interest in learning, and helps them to develop a positive outlook on learning as well as skills in knowledge mastery and application.

The succeeding instructional strategies have been suggested by MOE to educators in order to support the shift from a practice test to a quality-oriented concept: incorporate real-world scenarios into classroom instruction so that schoolchildren can connect their own experiences to the teaching texts; implement activity-based activities in the classroom so that learners can access by doing; implement "learners dominant learning techniques" like inquiry-based and mutually supportive learning, and combine these pedagogical methodologies (Singal et al., 2018). The Chinese state has given schools several types of training and materials to help the pedagogical transformation. These include seminars, field trips, on-site assessments of the new national curriculum criteria's implementation, operational procedures, formative assessments, instructor assessment, and professional growth for instructors (for more details, see Weiland et al., 2018 and (Montecinos et al., 2020)). Chinese academics and instructors have recognised constructivism as the prevailing theory, despite the fact that the official texts did not describe the underlying ideas for educational reform (e.g., see Tan, 2014, Waldow, Takayama and Sung, 2014; Wang and Clarke, 2014; Yang, 2015; (You, 2019)). The ongoing reform objective of developing a "quality-oriented education" through student-centred and self-directed techniques is linked to constructivism. Constructivism, according to Chinese scholars De Bruin and Harris (2017) (De Bruin & Harris, 2017) and Gunawardena and Wilson (2021), has had a significant influence on China's reform, as evidenced by the emphasis placed on having applied knowledge to real-world situations, the encouragement of students to solve cross-disciplinary difficulties consciously, the expectation that teachers foster conversation and group work, and the emphasis placed on the necessity of formative assessment (Yan, 2015). According to Cai and Ding (2015), teachers and academics in China frequently emphasise constructivist theories, viewpoints, and conclusions. The authors cited that the updated Chinese language curriculum as an illustration of how the instructional goal is now to support

students' autonomous learning, with teachers serving as catalysts and guides, rather than to impart systematic and comprehensive language knowledge. The perception that constructivism provides an appealing and practical alternative to the conventional transmission technique is a major factor in constructivism's popularity in China (and worldwide). The transmission strategy has been criticised for encouraging rote memorization, passive learning, and didactic instruction, whether valid or not (Tan and Ibrahim, 2017; Ismail, Sawang and Zolin, 2018; (Bell & Liu, 2019)). Teachers in China are supposed to create and choose educational resources, techniques, tactics, and settings that will motivate their students to develop, express, and debate a variety of opinions in line with the pedagogical revolution.

Constructivist Education Theory

Constructivism's central tenet is that Chinese students construct new ideologies and perceptions by evaluating them in light of prior knowledge (Jaiswal et al., 2021). Others give new concepts meaning, and this process is an example of learning. This suggests that learning is an active procedure in which Chinese students can study, code, decode, and understand new concepts and ideas rather than merely being exposed to new information (Hattie and Donoghue, 2016). In order to create and improve their schemes, students choose and alter the information they use, create "hypotheses," and depend on cognitive frameworks (Münscher, Vetter and Scheuerle, 2015). In essence, Bruner stresses that humans make sense of their environment by comparing and contrasting various things and occurrences. As a result, when Chinese students compare new concepts to ones they already know, they discover parallels and contrasts that help them learn. The kind of information a Chinese student will absorb as well as the cognitive procedure they employ to create and apply schemas, are greatly influenced by their sociocultural history and current circumstances (Du, Su and Liu, 2013).

These concepts, which are heavily influenced by Jean Piaget's theories, are at the heart of the topic of improving educational design that follows in this article. He altered the conventional techniques while dealing with kids to enhance standardized intelligence tests by doing more than just recording a kid's response. Piaget taught kids to use logic to solve the issue he presented to them. As a result, he saw that younger learners were not any "dumber" than older ones or behind in any manner. More youthful children just had an entirely different perspective on things than the older ones because they had a different view of the universe (Gardner, 1972). Bruner compares the variations in cognition between various cultures, whereas Piaget looked at the disparities between younger and older children. In this sense, cultural differences result from practical considerations. All civilisations create customised customs, rituals, and pastimes to meet their unique demands. The culture's cognitive growth and studying, including the relative strengths and limitations critical to forming and modifying schemas, are specially tailored to help satisfy these demands. These necessities are derived from environmental and a variety of other variables. This fundamental review of how surroundings and cultures affect people's cognitive development will be followed by a discussion of some of Bruner's constructivism's, more explicitly, educational implications.

Bruner not only acknowledged that individuals from all cultures learn in various ways, but he also created an instruction theory that is nearly always relevant. This theory's central tenet is fundamental constructivism, according to which a teacher's principal responsibility is to transform the material that has to be learnt into a form that is appropriate for the Chinese learners' level of comprehension. Four crucial segments of the learning procedures are addressed by constructivist instruction theory: (1) Chinese learners' propensity for learning; (2) how to organise understanding so that it can be comprehended by the pupil; (3) the most efficient order in which to organise instructional objects; and (4) the type and pace of inspirational rewards and sanctions. Teachers should encourage learners to learn the lesson's concepts on their own, especially through active discussion with the teacher and other learners (Sullivan et al., 2014). Based on Socrates' contention that debate stimulates a learner's mind more than listening to lectures, active dialogues are a component of Socratic learning. This is so that students may actively participate in the debate rather than just passively listening to a speaker or teacher. This study will compare traditional and constructivist educational methods after outlining the main assumptions of educational constructivism.

Constructivism and Curriculum Design

Constructivist teaching emphasizes situated, diverse instructional support to guide students' active learning and construction of knowledge.

Wood et al. (1976) proposed the concept of scaffolding instruction. It emphasizes teachers providing

support tailored to students' ability levels to help them achieve deeper understanding. Bruner proposed the "Zone of Proximal Development" concept, arguing that children can solve more complex problems with appropriate help. The gap between what they can do independently and with assistance is the "zone of proximal development".

Effective teaching should aim at moving students through this zone. Bruner advocated spiral curricula based on fundamental concepts, structures and techniques for gradual mastery. His research also emphasized active discovery of patterns rather than passive knowledge acquisition. Teachers should provide situational problems to stimulate active learning. Larkin (2002) used metacognitive scaffolding to improve problem-solving. Metacognitive scaffolds can guide students' planning and monitoring. Roehler and Canton (2002) proposed the gradual release of responsibility model, fading supports over time to cultivate self-directed learning. Saye and Brush (2002) used scaffolding strategies like questioning and feedback to support critical thinking when teaching novels. Azevedo and Hadwin (2005) developed computer-based scaffolded self-regulated learning systems that provide dynamic supports based on students' abilities. Belland (2017) showed computer-based interactive scaffolding can monitor and provide personalized support. Anchored instruction uses anchor cases or problems to motivate learning. It presents vivid cases as "anchors" to grab attention and interest, often using video or multimedia. Anchors reflect complex real-world situations to enhance knowledge application through situated learning.

Cognition and Technology Group (1990) first proposed "anchored instruction". It uses videos to display authentic situations and then sets related questions to promote learning transfer. Cognition and Technology Group (1991) designed the "Jasper" series video courses, which helped students master mathematical concepts by simulating real environments. Bransford et al. (1990) found that anchored instruction can enhance learning motivation and help students apply knowledge to solve problems in new environments. Herrington & Oliver (1995) enabled students to broaden their horizons and form personal understanding of learning content through multimedia anchored instruction. Dunlap et al. (2007) used virtual simulation as an "anchor" in chemistry lab teaching to enhance students' ability to apply what they learned. McNeil & Krajcik (2008) used cases as "anchors" for science learning to help students apply scientific concepts to explain everyday life scenes. Hofer et al. (2010) used patient cases as "anchors" of knowledge in medical education to strengthen the development of clinical thinking skills. In summary, anchored instruction arouses learning interest through real situations and promotes in-depth understanding and application extension of knowledge.

Random Access Instruction is another constructivist teaching strategy. Random access instruction allows students to freely choose and organize multimedia learning resources according to their own needs and interests to actively construct knowledge. The theoretical basis of random access instruction is Piaget's cognitive development theory and Bruner's discovery learning theory, emphasizing the initiative of learners. This teaching strategy was first proposed by Hannafin and his colleagues in the 1980s. Hannafin and Land (1997) proposed the open learning environments theory, emphasizing providing students with sufficient resources and learning scaffolds to support their active construction of knowledge. Hannafin (1999) designed random access multimedia learning environments that allow students to freely choose and organize pictures, videos and other resources. Hill and Hannafin (2001) found that random access instruction can increase students' learning interest and engagement. Lawless and Brown (1997) found that random access instruction suits students with different learning styles, especially visual learners. Oliver and Hannafin (2000) guided and monitored students' random access learning through metacognitive tools to improve its effects. Song et al. (2004) designed a web-based random access English learning system with positive learning outcomes. Su et al. (2005) applied random access learning to computer programming courses to develop students' ability to explore independently. Chou et al. (2012) developed a random access mobile learning app using multimedia resources like text, graphics, animations.

Random Access Instruction requires providing abundant open-ended, nonlinear multimedia resources such as videos, audios, pictures, texts. Students can choose freely. Teachers mainly provide learning support and tools instead of direct instruction (Hannafin et al., 2014). This teaching approach can meet personalized learning needs, increase learning initiative and engagement, and develop self-directed learning abilities. But it also has obvious disadvantages. It can lead to fragmentation of learning resources and easily lose direction. It requires students to have self-directed learning skills (Baines et al., 2014).

Methodology

Introduction

This chapter will introduce the research methods, procedures, and related considerations adopted in this study. First, this study employs a qualitative research paradigm to thoroughly explore the application of constructivist teaching under the new media environment. The case study method is utilized to investigate the research questions. Case studies are suitable for in-depth and comprehensive data collection and analysis of specific cases. Since the purpose of this study is to explore the application of constructivist teaching methods in educational psychology courses in China, the case study method can provide detailed and holistic information.

Secondly, the research participants include two educational psychology course teachers and thirty students. The researcher adopts purposive sampling to select information-rich and typical cases. The main data collection methods are open-ended interviews, classroom observation, and document analysis. To control research quality, the researcher conducts a pilot study before formally collecting data, and reflects throughout the research process to enhance interviewing and observation skills. Data collection is achieved through open-ended interviews, classroom observation, and document analysis. To ensure research quality, the researcher conducts a pilot study and continues to reflect to improve interviewing and observation skills. Finally, the researcher follows research ethics to protect participant rights by obtaining informed consent and ensuring integrity and transparency. This chapter demonstrates the rigor and credibility of the research by describing the research methods and procedures in detail. The selection and design of research methods directly affects the reliability and validity of the results. In summary, this chapter outlines the considerations and procedures of adopting a qualitative case study approach for this research, laying a solid methodological foundation for readers and enhancing the persuasiveness of the research findings. The following sections will elaborate on the specific operations and implementation of each step.

Research Design

Purpose of Research

The purpose of this study is to explore the application of constructivist teaching methods in educational psychology courses under the new media environment. Specifically, the researcher hopes to understand the feasibility of increasing the application of constructivist teaching methods combined with new media tools, as well as teachers' and students' feelings and evaluations towards its application. The study will explore the promoting role of new media on constructivist teaching through qualitative research and case analysis. The paper will help provide theoretical basis and practical suggestions for teaching educational psychology courses in China.

Time Dimension of Study

This is a cross-sectional study spanning one semester (first half of 2023). This ensures that the researcher has sufficient observation of the teaching process to obtain complete and reliable data.

Research Design Strategies

This study adopts a qualitative case study approach. Case studies are suitable for comprehensive and in-depth data collection and analysis of specific cases (Creswell, 2013). The researcher can focus on the case, systematically observe and record the teaching process and participant feedback to refine themes and conclusions.

Unit of Analysis

The unit of analysis of this study is a case of an educational psychology course, involving two teachers and eight students, ten participants in total. Collecting and analyzing their perspectives and experiences through open-ended interviews, classroom observation, document analysis and other methods will help examine the research questions from multiple dimensions.

Population, Sample Size and Sampling Procedures

The sample and case selected for this study are from Xiamen Ocean Vocational College, in the major of educational psychology. There are 30 students in this class. As purposive sampling is adopted, eventually

eight students participated in this study after recommendation by the teacher and voluntary application.

Data Collection Methods and Analysis Methods

This study uses three main methods to collect data, including open-ended interviews, classroom observation, and document analysis.

Open-ended interviews are the core data collection method of this study. The researcher conducts one-on-one interviews with each participant, using semi-structured questions to encourage participants to elaborate their views on the application of teaching methods in detail. Each interview lasts about 45-60 minutes, covering descriptions of teaching and learning processes, feelings about using constructivist methods, difficulties encountered, etc. Interviews are conducted in a relaxed and natural environment to build trust and obtain rich data. All interviews are audio recorded and transcribed verbatim to retain original meanings accurately.

Classroom observation can directly understand the specific application of constructivist teaching methods. The researcher observes each course at least 6 times, recording the details of teacher-student interaction, behaviors, classroom atmosphere, etc. Observations should cover different stages of the courses. The researcher acts as a complete observer, not participating in the classroom to minimize researcher effects. Observation results are recorded in the form of notes.

Document data comes from syllabi, courseware, student assignments, etc. The researcher collects and analyzes these documents to supplement interview and observation data for a comprehensive understanding of the course information.

This study uses literature analysis and case study methods, collecting required materials through open-ended interviews, classroom observation, and document analysis.

Feasibility Analysis of Combining Constructivism with New Media

The combination of new media and constructivist teaching methods refers to the use of new media tools to assist the implementation of constructivist teaching methods in the teaching process. The core is to use new media tools to create contexts and stimulate learners' intrinsic motivation and ability to actively construct knowledge. The core of constructivism is to let students actively construct their own knowledge systems. In traditional education, teachers act as knowledge instructors taking the initiative, while students passively receive knowledge. In long-term teaching, it is easy for students to feel tired and bored. This transmission of knowledge is relatively mechanical. According to constructivism, knowledge is not passively accepted, but shaped by the interaction between learners and their environment. These interactions include communication and collaboration with teachers, classmates, surroundings, objects, etc. As such, constructivism emphasizes learners' autonomy and participation. The rapid development of new media provides more optional tools for teaching, greatly promoting the practice of constructivist teaching methods. Although many disciplines have advocated teaching based on constructivist theories, there are often many problems in practice (Pham & Renshaw, 2013).

First, constructivism emphasizes situational construction. In the past, it was difficult to introduce research questions through situational introduction, mostly through traditional media forms such as video playback. However, the emergence of new media has provided more choices. For example, VR virtual reality can immerse learners and generate a realistic experience, thus stimulating learning motivation.

Second, constructivist methods require more cooperation and communication between participants. In a traditional constructivist scaffolding teaching environment, teachers are required to provide support based on students' cognitive levels to help them reach their potential development levels. Here teachers need to find the "zone of proximal development", which is different for each student. In the past, teachers needed to do a lot of communication work to understand students' learning progress, making it difficult to support teaching for a larger number of students. With the rapid development of AI technology in the current environment, language AI models like ChatGPT have emerged to better identify human semantics and provide answers. Through AI technology, teachers can automatically indicate students' "zone of proximal development" (ZPD) by having students communicate with AI systems. We can build a workspace for the class through apps like SLACK for students to communicate and interact with each other and AI models,

allowing teachers to easily obtain students' learning progress (Rorty, 2009).

Similarly, collecting and analyzing student data through new media can also identify students' individualized needs and truly teach students in accordance of their aptitude. Again, mobile new media allows learning to break free from time and space constraints. Learners can engage in fragmented and uninterrupted learning as needed. In recent years, mobile network, mobile devices, mobile applications and other mobile new media technologies have made great progress, providing powerful technical support for learning. Smartphones, tablets and other mobile terminals, together with 4G, 5G and other networks, have freed learning from the traditional restrictions of time and space, enabling learning anytime and anywhere. Mobile learning can make full use of fragmentary time for knowledge acquisition, such as during commuting and waiting for people, to complete a certain degree of learning progress. This fragmented learning style is more attuned to the rhythm of brain cognition, and also suits the busy work and life characteristics of modern people, making it easy to sustain.

Based on mobile devices, learners can build personalized knowledge systems and set their own learning pace and methods. Learning is no longer passive acceptance of instruction, but an active self-planned inquiry process tailored to needs. Mobile learning platforms can provide intelligent real-time feedback for learners to adjust their learning based on the results and improve learning efficiency. At the same time, mobile new media can support remote collaboration between learning groups for knowledge sharing, discussion of views, experience exchange, and reaching common understanding (van Hover & Hicks, 2017).

Finally, constructivist pedagogy often faces the issue of difficult criteria determination in the final evaluation process. Due to the personalized teaching, students may focus on different aspects, making it hard to adapt to the traditional exam-oriented assessment. Constructivism emphasizes procedural evaluation, but traditional assessments like exams are still hard to completely eliminate. The final evaluation is difficult to diversify. However, in today's new media environment, we can transform the evaluation ideology from teacher assessment to social assessment. Students can showcase their learning outcomes through short videos or live streaming, and determine the final evaluation based on social feedback. This solves the problem of non-unified evaluation criteria under the personalized learning of constructivism, and also motivates learners to apply theories into practice (Wallace & Priestley, 2017).

In summary, we believe that the application of new media tools can better promote the implementation of constructivism under the new media environment. There are good integration points between them in practice. It is feasible to implement constructivist pedagogy in the new media environment.

In addition, we have interviewed teachers and students and conducted questionnaires to collect their opinions on new media teaching. A total of 80 questionnaires were distributed and 76 valid questionnaires were collected. Among them, 20 were completed by teachers, and 56 were completed by students. The teachers were from different disciplines, while the students were all from the same major (Educational Psychology). The results showed that 92.8% of students supported the increased application of new media technology in teaching and were willing to try new teaching models, while only 60% of teachers agreed with this proposal. This also showed that students' willingness was higher than that of teachers in practice.

Further analysis of the respondents found that the average age of the 60% approving teachers was around 34 years old, while the average age of the disapproving teachers was around 42 years old. This showed that senior teachers were usually more conservative towards new media teaching and could hardly accept the changes brought by new media to traditional teaching methods. They may have higher new media learning costs. However, in general, the vast majority of students and teachers still held a positive attitude towards the promotion of new media technology in teaching. Constructivism could also gain better support under the new media environment. Therefore, we conclude that the implementation of constructivist pedagogy is feasible under the new media environment

Key Points of Curriculum Design for Constructivist Pedagogy in the New Media Environment

Contextualized and collaborative learning

The use of new media tools to build contextualized learning scenarios can greatly increase students' learning interest. The main tools for scenario building are AR and VR technologies. AR virtual reality technology

can create highly simulated three-dimensional environments, giving learners an immersive experience in the virtual scene. For example, operating instruments in a virtual laboratory makes learning more intuitive and concrete. The immersion of VR can increase learning engagement. AR augmented reality enables the enrichment and expansion of scenarios. AR technology can project virtual elements onto the real world to enrich and expand real scenarios. For example, embedding historical figures, ancient relic models, etc. into real campus scenes to achieve immersive learning through the integration of time and space.

In addition, simulation software can also be used to create virtual operating environments, which is very useful for many vocational education programs. It takes students beyond the original two-dimensional teaching and allows them to gain a deeper understanding of knowledge.

In practice, we need to consider cost factors in scenario building. The production costs of AR and VR are not low, which is not realistic for many schools. In practical teaching, we often need to choose the most economical and effective way of scenario building.

Collaborative learning is relatively easier to implement compared to scenario building. In constructivist teaching, problems will be raised through situational simulation. We usually set up multiple study groups, where group members cooperate to complete problem solving. Learning communities or work areas can be set up among groups, with teachers providing guidance within the communities. Such communities are usually built using some social software. Teachers can easily keep track of students' learning progress and problems encountered within the communities. The communities should be open, allowing the establishment of the same community across schools of the same major. Teachers are mainly responsible for maintaining order and facilitating communication between different groups, while answering questions students encounter during self-directed learning.

New media has unique advantages in scenario building and collaborative learning, which has gained wide recognition especially during the COVID-19 pandemic. The Chinese government implemented strict control measures during the pandemic, leaving students to study at home. The entire teaching environment was built virtually using new media. New media not only promoted teaching reform, but also ensured the continuation of teaching. Although teaching methods did not change much during this period, students gradually adapted to the new media teaching environment, paving the way for the application of new media in future teaching reforms.

Support for personalized learning

Constructivism emphasizes students' self-directed learning, and the content and depth of self-directed learning depends on the individual student's construction of their own knowledge system. Teachers need to provide personalized teaching for each student, and new media can promote personalized learning in many ways.

First, new media can collect various learning data and conduct learning diagnostics through data analysis algorithms to identify each student's learning methods, interests, strengths, etc., providing a basis for personalized learning. Teachers should build a corresponding database for each student, collecting relevant information through new media, regularly updating records, to find each student's ZPD.

Teachers should establish a multidimensional mechanism to find students' ZPDs, using diagnostic assessments, daily observations, communication with students, etc. to assess students' current development levels and mastery of knowledge in various aspects. Teachers ask guiding questions during the learning process, observe students' reactions, see what level of problems they can complete, and determine the upper limit of the ZPD. At the same time, students should be allowed to try learning tasks slightly above their current level but achievable, judging the ZPD range by the completion. Teachers need to systematically organize cooperative learning, observe the level students can reach with others' assistance, to determine if the ZPD is appropriate. All these need to be recorded in detail in the student database.

Trial and error is sometimes also a good way to determine students' ZPDs. Teachers first design a series of tasks with increasing difficulty, with reasonable fineness in difficulty gradients. Let students try these tasks of different difficulties and judge their current ability levels based on the completion. Observe students' reactions when facing tasks of different difficulties, such as whether they become interested, confident, give up immediately, etc., to see the abilities reflected. Analyze the critical point between students' successful and failed tasks, which is their current developmental level.

Small adjustments can then be made around the critical point to find tasks slightly difficult yet achievable for students. At the same time, provide necessary assistance and guidance for students to complete slightly difficult tasks. The most difficult task that a student can complete with some help indicates the upper limit of their ZPD. Continue to fine tune task difficulties to determine the ZPD range and dynamically adjust with the student's progress. Finally, other teachers and parents can also use the trial and error method to judge the student's ZPD for multidimensional evaluation.

New media can provide technical support in this process. The biggest obstacle for constructivist teaching methods in implementing personalized learning is the inability to attend to each student. Without new media, it is difficult for teachers to care for each student, making it hard to achieve equal education. With new media, teachers can understand students' ZPDs through big data, video playback, etc. Software design can also facilitate trial and error in sections to better understand each student's learning progress.

Transformation of Teacher's Role

In traditional teacher-student relationships, teachers play a dominant role in teaching, actively lecturing knowledge while students passively receive and memorize. Teachers have strong authority that cannot be challenged, and students are in a subordinate position. Communication and feedback are also very limited in teaching, especially in Chinese classrooms. Teachers only value the final performance, with a serious and distant relationship between the two parties.

Under the constructivist teaching model, this relationship will change. Students' subjectivity is significantly enhanced, and teachers become facilitators or guides. The relationship between the two will ease markedly, with teachers and students on equal footing. They jointly construct the connotation of knowledge, become learning partners, strengthen communication and feedback, focus on process evaluation, and weaken the subordination in traditional education, which is beneficial to both parties.

The Flipped Classroom refers to students self-studying theoretical knowledge through videos, online learning, etc. before class, and focusing on discussions, exercises, exchanges and other active learning activities in class. It originated from two American chemistry teachers, Jonathan Bergmann and Aaron Sams. In 2007, they recorded course videos for students who missed classes to watch. Later they found pre-class video learning could improve classroom efficiency, thus gradually developing the flipped classroom model. Salman Khan also created the Khan Academy in 2008, producing teaching videos to promote flipped classrooms.

This is an effective implementation of constructivist theory, and emerging information technologies represented by mobile internet, internet of things, and cloud computing have provided effective support for this teaching method. In recent years, the increasingly popular famous university open courses, Khan Academy, TED videos have become important components of the information age learning ecosystem, providing innovative concepts for course design, development, sharing and application. In China, there are also massive open education resources like micro-courses, MOOCs, NetEase Open Courses that are readily available.

This solves the fundamental problem of teachers' role transformation. Robert Talbert (2011), combining his own teaching practice of the "Linear Algebra" course, summarized the implementation process and links of the flipped classroom, and proposed a systematic framework. His flipped classroom includes pre-class and in-class phases: Before class, students first watch teaching videos, then do guided assignment practices; In class, students first complete a small number of quizzes quickly, then internalize knowledge by solving problems, and finally summarize and provide feedback.

The transformation of teachers' roles needs the support of new media. New media provides massive learning resources for teachers to quickly find suitable materials for students. In the new teacher-student relationship, teachers play a guiding role. Teachers need to use new media to guide students in selecting, processing and utilizing information in the vast ocean, exerting guiding effects. New media can provide process data for teachers to better observe and assist students' learning process.

Diversification of learning assessment

Constructivist teaching assessment focuses on process evaluation rather than result evaluation. New media can record detailed learning process data. Teachers can evaluate students' learning time investment, learning

path choices, operation interactions and other learning processes, and provide feedback on the process. Students can use new media tools to create creative works, and teachers can evaluate works rather than standard answers to assess students' thinking abilities and problem-solving skills. Currently, there are many knowledge-based internet celebrities on short video platforms like Tik Tok. Students creating knowledge-based short videos independently or in groups are also a good means of teaching assessment. The creation of such works can help students achieve better understanding of the knowledge learned. Socialized evaluation can give students a greater sense of recognition and enhance their motivation to learn. Obtaining more feedback from society through the use of social media, students can also easily discover deficiencies in their own knowledge during communication with others. In this process, teachers should provide technical support to help students complete the creation of works.

Teachers can organize online peer review activities for students to evaluate works according to certain standards, diversifying the subjects of evaluation. Conducting online live broadcasts in the form of groups is also a good way to assess learning outcomes. This is somewhat similar to roadshow activities, and can be done by organizing students to conduct live video connections to discuss problems encountered during the learning process or raise difficulties faced during practice. On the one hand, this gives students greater pressure to prepare them for society in advance. On the other hand, it also motivates students to study more independently to meet sudden challenges.

Fragmentation and reorganization of knowledge

In the new media environment, students often obtain a lot of fragmented knowledge through the Internet, such as various micro-course videos, knowledge points, and other materials. Students can learn fragmented knowledge as needed. Fragmented knowledge consists of isolated points of knowledge without coherent context, which easily leads to fragmentation of the knowledge system. This is not conducive to the transfer and application of knowledge and the cultivation of innovative thinking. In order to avoid the defects caused by the acquisition of fragmented knowledge, teachers need to build fragmented knowledge networks by associating fragmented knowledge points through keywords, tags, correlations, etc. Teachers should provide students with knowledge network graphs in advance before teaching, using tools such as knowledge graphs and mind maps to describe the architecture of the knowledge system. This allows students to clearly know the content and framework to be learned. In this way, while students study fragmented knowledge autonomously, they will connect the learned knowledge points to the mind map, gradually constructing a knowledge network.

Secondly, teachers should design a spiral progressive learning path for students, allowing fragmented knowledge to appear repeatedly and be integrated deeply. Use problem-driven and project-driven learning tasks to force internalization and integration of knowledge application. Key knowledge will be repeatedly used in the application process to deepen students' understanding of key issues.

Finally, through organizing discussions, case analysis and other activities, teachers can promote knowledge transfer and connection through communication. For fragmented knowledge, the content learned by each student is different. Students can better understand their own learning deficiencies and make up for each other's deficiencies through group discussions, case analysis and other communication activities, achieving common progress.

Case Analysis of Constructivism Application - Educational Psychology Major in a Vocational Education College

Case Introduction - Course Design Using Anchorage Strategies Combined with New Media

This case is from the author's university, selecting a psychology major class with 30 students. The course time is the first half of 2023, with constructivist teaching applied to the educational psychology course. We selected a lesson from educational psychology for course design, to help readers understand the application of new media in constructivist teaching.

The total teaching hours for this psychology course is 68 hours. The textbook used is Educational Psychology edited by Professor Shi Xiaoli, a local university textbook (published by Jiangxi University Press). Here we only take one lesson as an example to introduce the combined application of new media and constructivism. The section we selected is Piaget's Cognitive Development Theory in Chapter 2 on

student psychological development.

The teaching objectives set for this lesson are:

Table 1: Teaching objectives

Topic	Content: Piaget's Cognitive Development Theory
Teaching Objectives	<p>Knowledge Objectives: Be familiar with the viewpoints and characteristics of each stage in Cognitive Development Theory, understand the structure of development, and understand the conclusions of several representative experiments.</p> <p>Ability Objectives: Be able to use Cognitive Development Theory to explain the behaviors and psychological characteristics of people at different stages.</p> <p>Other Objectives: Cultivate students' cooperation skills and better self-presentation.</p>
Teaching Methods	Based on the constructivist Anchored Instruction method, complete the teaching objectives in 5 stages, including pre-class preview, situational introduction, group discussion, results presentation and effect evaluation.
Teaching Preparation	<p>1. Send pre-class preview materials, including mind maps and short video information</p> <p>2. Infer and record different students' ZPD based on the results of last class</p> <p>3. Prepare situational introduction video materials for use in class</p>

This lesson adopts the Anchored Instruction teaching strategy. Anchored instruction is a situated teaching method based on an "anchor". This "anchor" is usually an engaging story, situational problem or case. The teaching content then revolves around this "anchor", set in a specific situational context. This strategy was proposed in 1990 by the Cognition and Technology Group at Vanderbilt University. They believed that situating learning content in a specific, meaningful situational context can greatly improve learning outcomes. In teaching, first "throw out an anchor" with a case, problem or situation to arouse students' interest and motivation. Then design a series of learning activities based on this "anchor", allowing students to inquire knowledge, solve problems, and achieve learning goals in this context.

We divide the entire course into 5 stages:

Stage 1: Pre-class preview stage. In this stage, students need to take the initiative to preview the main content and knowledge points of the course. The teacher provides preview materials to the students. For this lesson, we selected the pre-class recommended materials to be a short video course released by the knowledge-based Douyin blogger liruoxin8793. The estimated study time for this short video course is 15-20 minutes. Through a short pre-class preview, students can quickly understand the basic framework of Piaget's Cognitive Development Theory and form a preliminary cognition. Due to the short time, students can flexibly utilize their fragmented time for learning without additional burden. In addition, the teacher will release a mind map of this chapter to help students integrate knowledge points afterwards. The mind map is shown in Figure 1 below.

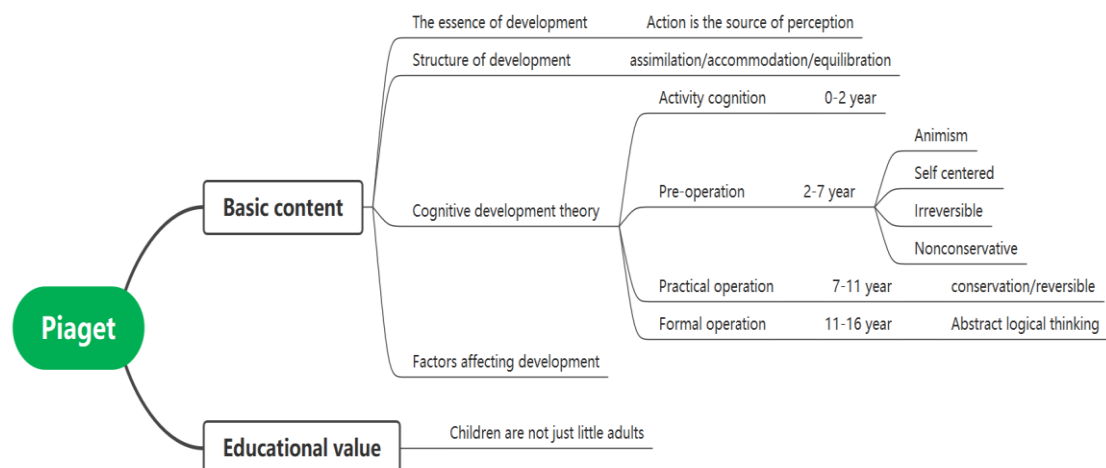


Figure 1: Piaget Theoretical Thinking Map

Stage 2: Situational introduction stage (15-20 min). We will play several groups of important representative experiments in video form, including the Three Mountains experiment, conservation experiments,

pendulum experiment, as well as a homemade life vlog showing child-centric living stories. Generally when using the Anchored Instruction teaching method, we throw out real events as anchors to arouse students' interest. After that, the teacher raises several specific questions, such as what do the results of different experiments demonstrate, which mentioned experiments correspond to the cases in the story, analysis of the reasons for these results, what are the differences between Piaget's Cognitive Development Theory and Watson and Freud Theory.

Stage 3: Group discussion stage (20-30 min). There are 30 students in this class, divided into 6 groups with 5 people each. Generally, the number of members in a group discussion should be limited to 4-6 people. Less than 4 people will lack sufficient exchange of views, while more than 6 will limit speaking time for each member, making it difficult to build consensus and regulate, while also reducing personal responsibility. Therefore, 4-6 people is generally most appropriate. In each lesson, the situational introduction will generate 2-3 questions, which are assigned to different groups for discussion, with each question being discussed by at least two groups. This facilitates strengthening students' cognitive knowledge in the subsequent presentation stage. In this stage, students will be allowed to search and organize information through the Internet, mobile devices, etc., without too many restrictions. The main task for teachers in this stage is to inspect each group, understand the discussion progress in real time, and understand students' mastery of knowledge through the discussion progress, which also supports subsequent understanding of students' ZPDs.

Stage 4: Presentation stage (40-60 min). Representatives from different groups present their discussion results. Presentations should be followed by Q&A and discussion sessions. For problems encountered during the discussion and presentation, the teacher should provide guidance. Throughout the presentation process, the teacher should actively guide students to expand their thinking to make up for deficiencies in the discussion, and after completion of the presentations, use mind maps to help students organize the knowledge context and form complete knowledge constructs.

Stage 5: Evaluation stage. Constructivist teaching methods emphasize process evaluation, which we also adopt in the overall assessment, but considering some students' specific needs for assessment and evaluation, we added post-class assessments. We set up two different assessment methods: one is for the previous groups to shoot knowledge dissemination vlogs and upload them to social media, with outstanding works selected by social feedback as student scores; the other is to conduct Q&A with students through post-class live streaming, where other students can learn problem-solving ideas during the Q&A process to further consolidate what they have learned and deepen memory. Effect evaluation should not be conducted immediately after class, but the next day or later, on one hand to give students time to digest knowledge, on the other hand, teachers should determine students' ZPDs based on their demonstrated abilities and cognition in previous discussion and presentation stages, record them in the database, and ask targeted questions in the later live assessment to maximize learning efficiency.

5.2 Case analysis

At the end of this semester, due to the curriculum requirements of the school, although the teaching methods of the class have changed, the students' grades still need to be determined through exams after the semester. We compared the exam scores of this class with those of the adjacent classes in the same major. The score comparison is as follows:

Table 2 Distribution of exam scores between the experimental group and the control group

Score range	Experimental group		Control group	
	Number of students	Percentage	Number of students	Percentage
>=90	3	10.00%	1	3.33%
80-89	14	46.67%	15	50.00%
70-79	10	33.33%	8	26.67%
60-69	2	6.67%	4	13.33%
<60	1	3.33%	2	6.67%

We used Stata to compare students' exam scores before and after the experiment. We found no significant difference in exam scores before the experiment ($P>0.05$). The difference remained insignificant after the experiment, but the proportion of students scoring over 90 (excellent) in the experimental group reached 10%, which was significantly higher than that in the control group. Due to the small sample size of students,

it is still insufficient to fully demonstrate the effectiveness of the constructivist approach. Further observation with more samples is needed, but at least it shows that the constructivist teaching method does not negatively impact students' performance.

We further broke down the exam scores. Table 3 shows the score differences in different question types in the final exam. We performed t-tests on scores of different question types between the experimental and control groups. The results show that the total scores of the experimental group were slightly higher than the control group, but the difference was not statistically significant. In terms of question types, we found that the experimental group scored significantly higher on case study questions compared to the control group. This indicates that under the constructivist teaching environment, students are more familiar with applying knowledge through simulated multi-scenario practices.

Table 3 Comparison of total scores and scores in different question types in the final exam

Question type	Experimental group	Control group	T value	P value
Objective question	25.3	27.53	0.51	0.063
Concept questions	27.22	25.32	1.32	0.072
Case questions	29.51	27.31	3.87**	0.004
Total score	82.45	80.22	2.12	0.531

* $p < 0.05$ ** $p < 0.001$

We reviewed students' evaluations of the course instructor. Students are required to evaluate each teacher at the end of each semester. In the past 3 years of the course, without the constructivist teaching experiment, the average evaluation score for the instructor was 3.89/5. After the experimental course, the students' evaluation score for the course was 4.67/5, showing a significant increase in students' interest and motivation in learning the course.

In summary, under the new media environment, the constructivist approach to education is feasible and effective. Although the total exam scores did not increase significantly, students' interest in learning and evaluation of the teacher improved markedly. Students' motivation to learn rose sharply and their ratings of the course also increased significantly. In this case, we adopted the Anchored Instruction teaching strategy. In actual teaching, a mix of strategies is often used to alleviate students' fatigue and achieve better teaching results.

Conclusion

Research Summary

This study focuses on the application of the constructivist approach in teaching under the new media environment, and illustrates its effectiveness through a case study. The results show that the constructivist teaching method is feasible. New media and the constructivist teaching method can be well integrated. Adopting new media in teaching can better promote the practice of constructivist teaching theory and contribute to the reform of the education system.

New media provides technological support for the concept of constructivist teaching, enabling better implementation of constructivist teaching methods. This article discusses the impact of new media development on constructivist teaching, and provides relevant new media technology solutions to the situational and personalized requirements advocated by the constructivist teaching method.

At the same time, through actual teaching cases and course design, we demonstrate the practical application of the constructivist teaching method under the new media environment to readers, providing practical support for future promotion. Although the experimental group applying the constructivist teaching method emphasizes process evaluation rather than outcome evaluation, the experiment group still showed some improvement in test results under the traditional assessment model. Although not statistically significant, at least there was no decline in grades. Despite the change in teaching methods, students' academic performance and learning outcomes did not decrease. We still believe the constructivist teaching method has promoted students' academic achievements.

Judging from students' evaluation of the experimental course, after a semester of learning and adaptation, students' evaluations of the teacher and the course improved significantly. This indicates that implementing

constructivist teaching with new media can stimulate students' interest and motivation in learning. More students are willing to join the constructivist education model. We also hope to promote this teaching method in more majors and schools in the future.

Issues and Deficiencies

We have also discovered many issues during this teaching practice. In the process of promoting the practice, students were more enthusiastic than teachers. Some teachers still found it difficult to break away from the traditional teaching methods. They lacked understanding of the educational concepts and approaches of constructivism and were also resistant to the new media educational methods. Our analysis suggests that such resistance stems from the fear of new things. The older the teachers were, the more reluctant they were to accept changes in teaching methods and new media. This requires reforms from the upper levels of the education system.

Constructivist teaching emphasizes evaluating students' learning process rather than just their final exam results. However, in reality, due to factors like school systems, student evaluations, etc., Chinese students still find it hard to break away from the examination-focused assessment. Fortunately, based on our final exam results, the constructivist teaching approach did not seem to underperform.

In addition, we also need to be aware of some deficiencies in the constructivist teaching approach itself. New media and constructivist teaching methods can both lead to fragmentation of students' knowledge acquisition, which is very likely to happen in the current environment. The integration of fragmented knowledge often requires teachers to spend considerable effort. Moreover, due to the autonomy and freedom of learning, the fragmented knowledge acquired by each student is not the same. How to provide personalized management for each student is also a challenge. With the generally large class sizes in China, constructivist teaching approaches may face certain difficulties in realizing personalized management for each student.

Suggestions and Research Outlook

Through this study, we first suggest that schools strengthen the training of teachers to improve their constructivist teaching abilities and cognition. Secondly, we recommend that schools increase investment in new media educational resources, which can enrich constructivist teaching strategies and facilitate designing suitable learning tasks and teacher-student interactive environments. Finally, reforms should be made to the existing assessment system. Students should not be assessed solely based on traditional teaching models under the constructivist teaching approach. This needs to be changed in a timely manner to adapt to the new education models.

For teachers, we suggest strengthening their understanding of constructivist and new media teaching methods. Constructivist teaching not only requires students to improve their self-initiated learning abilities, but also poses the same requirement on teachers. Teachers need to timely transform their roles to adapt to the new teacher-student relationships in the new environment, and make their own psychological shifts.

From a policy-making perspective, we suggest that the Ministry of Education increase training on constructivist teaching approaches, change the evaluation models for schools and students from the top-level system, clear obstacles for the implementation of constructivist teaching practices, as part of the reforms and innovations in education. The traditional education models have their specific historical reasons. For the Chinese education system, there used to be fewer teachers and more students, with scarce educational resources. As China has reached a turning point in population, it is very likely that the teacher-student ratio will be reversed in the future. Traditional education models will no longer suit the new environment. Therefore, we still recommend that the Ministry of Education promote constructivist education reforms in a timely manner, prioritizing the promotion of constructivist teaching models.

The teaching environment of new media often requires substantial investment. The hardware investment is relatively easy, while the software is currently severely lacking in China. In practice, we often suggest that schools and teachers consider the most cost-effective ways to achieve teaching objectives. We hope that through coordination between the Ministry of Education and multiple schools, related software and curriculum systems can be jointly developed. This would greatly reduce relevant investment in new media and also encourage schools to implement constructivist teaching models.

Lastly, we believe there are still some deficiencies in the case study research in this paper. We also have insufficient experience in practice, such as difficulty in identifying students' ZPD. In the future, we will continue to refine the entire curriculum design. Due to the limited preparation time, many new media example cases were not ready in the teaching environment, failing to achieve expected results. We will also continue to update the example cases used. For the final case analysis, we believe the sample data was too small, reducing the research value. We hope to increase the sample size through the continuous advancement of educational practice, in order to obtain more stable research conclusions.

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