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Research on Blended Learning Activity Design Based on OBE

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Abstract: Blended learning has become the “New normal” of current education. However, since most teachers have not received special blended teaching training, they habitually continue to use the traditional teacher-centered concept when designing and implementing blended teaching, which has seriously hindered the development of blended teaching. The OBE concept of Outcome-Based Education is a learner-centered educational concept, which points out the direction for the development of blended teaching. This paper introduces the concept of OBE. Relying on the theory of Community of Inquiry and learning activity theory, this study designs blended learning activities based on OBE concept from four stages: the design of learners’ expected outcomes, the preparation, the implementation and the evaluation of blended learning activities. It is expected to provide operable suggestions and valuable references for teachers committed to the research and practice of blended learning, so as to contribute to the digital transformation in education in China.

1. Question Raising

In the traditional face-to-face teaching, the teaching time is divided into fixed time periods. According to the school teaching arrangement, teachers teach the same content to the whole class at a fixed time and place every week in a unified way. According to the teacher's teaching requirements, students learn the same content, complete the same homework, and take the same tests and exams. In the 2022 National Education Work Conference, the Ministry of Education of China proposed to implement the strategic action of education digitization, accelerate the construction of education digitization, and comprehensively reshape the education system and education ecology through digital technology. Studies have shown that blended learning can greatly promote learners' initiative, improve their sense of cooperation and inquiry, and effectively improve their learning quality and information literacy [1].Blended learning is conducive to the deep integration of college education, teaching and information technology, the dynamic accumulation and extensive sharing of high-quality teaching resources, and the organic combination of multiple forms of "teaching" and "learning", such as mobile learning, collaborative learning and intelligent teaching [2]. Driven by new educational policies, new educational reforms and new technological iterations, blended learning has become an important starting point for digital transformation in education in China. However, with the in-depth application of information technology in education in the new era, this state of teaching

and learning has not been effectively improved. Since most teachers have not received special training before the integration of information technology and teaching, they generally summarized their understanding of "Digital Transformation in Education" as the simple addition of online teaching and face-to-face teaching. Instructional design and implementation are aimed at completing teachers' own teaching tasks. In this teacher-centered teaching mode, students' personality cannot be developed, students' differences are growing, and education fairness and quality cannot be guaranteed.

In order to seek teaching innovation and breakthrough, this study attempts to change the teaching idea from “teacher centered” to “student centered”, and focuses on what students “learn”, not on what teachers “teach”. It introduces the OBE concept, and designs blended learning activities under the guidance of the community of inquiry model and learning activity theory.

This paper introduces the concept of OBE. Relying on the theory of Community of Inquiry and learning activity theory, this study designs blended learning activities based on OBE concept from four stages: the design of learners’ expected outcomes, the preparation, the implementation and the evaluation of blended learning activities, so as to realize the complementary advantages of online teaching and offline teaching, and to overcome the problems of neglecting students' individuation, emphasizing knowledge teaching and neglecting ability cultivation in the traditional teaching mode to a certain extent. It is expected that this paper can contribute to the digital transformation in education in China.

2. OBE and Blended Teaching

OBE (Outcome-Based Education), that is, outcomes-oriented education, was first proposed by American educator William G. Spady in 1981, and then applied and promoted in the education reform in the United States, Australia, the United Kingdom, Japan, Canada and other countries, and received good feedback. The OBE concept requires managers, teachers and students to focus their attention and efforts on the expected outcomes of the education. They should first clarify what students should do, and then organize courses, teaching and evaluation to ensure the final realization of the learning outcomes [1,2]. First of all, it is necessary to clarify the final learning outcomes achieved by students through learning. It is not only necessary to understand the core quality objectives of students' essential character and key ability to meet the needs of lifelong development and social development, but also to determine the operational implementation objectives of activities for different disciplines and specific curriculum contents. In addition, it is also necessary to clarify the ideological and political objectives of the curriculum around the key issues of what kind of people to cultivate, how to cultivate, and for whom to cultivate. Second, analyze the reasons why students have achieved such learning outcomes. According to the requirements of economic and social development and students' development needs, explain why students need to obtain such learning outcomes, and let students further understand the necessity and importance of achieving the expected learning objectives. Third, use strategies that can help students achieve such learning outcomes. Teachers and teaching organizers should think about what kind of learning content and resources they need to choose, and what teaching methods and strategies they should use to help and support students to achieve their learning goals. Fourth, evaluate whether students have achieved such learning outcomes. Evaluation should run through the teaching process, and process evaluation and result evaluation are indispensable. Reflecting on the problems reflected in the process evaluation can adjust the direction and progress of learning in a timely manner. The result evaluation provides the basis for the next round of new Instructional design and implementation, and continuously improves the quality of education.

In the traditional face-to-face teaching, the implementation of OBE concept is also affected to some extent by the limitations of time, space and established content. The online and offline blended

teaching can use time and provide guidance in a more flexible way to better meet the needs of students, which is a kind of teaching reform innovation. With the rapid development of Internet and mobile technology, blended teaching has also been given new connotation. In the early stage, the concept of blended teaching was defined from the perspective of technology, with emphasis on the core role of technology in teaching and learning. Later, from the perspective of teachers, we gradually focused on the changes brought by the blended teaching environment to interaction and the corresponding changes in Instructional design. In the new era, blended teaching, from the perspective of students, focuses on "student-centered" and focuses on the improvement and promotion of learning effects. In the blended teaching, the role orientation of teachers has undergone a fundamental change, and the teaching model and concept have also undergone a change [3], promoting the development of the traditional "teacher-centered" teaching model to the "student-centered" personalized teaching model, which provides conditions for the implementation of OBE concept. The OBE concept points out the direction for the development of blended teaching, and the blended learning mode provides a feasible way for the practical application of the OBE concept, both of which coincide.

3. Theoretical Basis

3.1. Community of Inquiry Model

The community of inquiry model is jointly created by Canadian distance education scholars Garrison, Anderson, Archer and others. It refers to the process of creating deep and meaningful learning experience (educational experience) by developing the three interdependent elements of cognitive presence, social presence and teaching presence [4]. The three core elements of the community of inquiry model have jointly constructed a theoretical framework for learning participants to effectively cooperate in building knowledge, and developed a set of coding template and practical frameworks that match the model [5], as shown in Table 1.

Table 1: Community of Inquiry Coding Template

Elements	Categories	Indicators (examples only)
Cognitive Presence	Triggering Event	Sense of puzzlement
	Exploration	Information exchange
	Integration	Connecting ideas
	Resolution	Apply new ideas
Social Presence	Emotional Expression	Emotions
	Open Communication	Risk-free expression
	Group Cohesion	Encouraging collaboration
Teaching Presence	Instructional Management	Defining and initiating discussion topics
	Building Understanding	Sharing personal meaning
	Direct Instruction	Focusing discussion

Teaching presence refers to the design, promotion and guidance of the cognitive process and social process of learners by teachers, with the purpose of achieving the learning effect of learners with personal significance and educational value [6], including three categories of Instructional Management, Building Understanding, Direct Instruction. Teachers' tasks include the design and

development of curriculum content and resources, the organization and implementation of online and offline learning activities, and the management, supervision, guidance, support, evaluation and feedback of learners' learning activities. Teaching presence emphasizes the role of teachers in the whole teaching process. Compared with traditional face-to-face teaching, the role of teachers in blended teaching is not weakened, but strengthened.

Social presence refers to the establishment of social relations and sense of belonging among learners to solve the network loneliness in the process of asynchronous communication. It refers to the ability of participants to express "real" self in social and emotional aspects through communication media in the inquiry community, specifically expressed as Emotional Expression, Open Communication, Group Cohesion [7]. The social presence of learners can be generated from the cordial greetings, warm responses, body language, etc. on the opposite side of the line, as well as the online welcome to other students, the response to their questions, and other emotional expressions. On this basis, further open exchanges can be carried out through active questioning, approval, thanks, and forwarding views, so as to form a good atmosphere that can be easily and freely expressed, and finally achieve the group identity based on "we", Enhance group cohesion in cooperation and exchange.

Cognitive presence refers to the degree to which learners construct meaning through continuous critical reflection and dialogue in the inquiry learning community [8], which can be enhanced through the four categories of Triggering Event, Exploration, Integration, Resolution. Teachers can trigger learners' confusion about learning by asking questions, setting discussion topics, presenting text, audio and video and other events, and then learners can seek explanations for the resulting confusion through cooperation and exploration. In this process, learners need to integrate the views obtained through information exchange with their peers, and mobilize their own knowledge and experience to think. Finally, learners can solve the problems that initially caused confusion by organizing language, text and other application solutions. At the initial stage of teaching, cognitive presence is at a low level, which needs to be promoted through teaching presence and social presence.

The community of inquiry model provides a unique perspective, method and tool for the study of blended learning, and has been verified by a large number of empirical studies. It is an effective teaching theory in the field of blended learning [9]. The community of inquiry model has built a "bridge" between classroom teaching and online learning, reversed the "weak connection" between classroom teaching and online learning in blended learning [10], and reduced the loneliness and anxiety of learners in online learning. Only when the cognitive presence, social presence and teaching presence in blended learning reach a high level, can effective learning occur [11]. Therefore, we regard it as one of the learners' learning objectives that all three kinds of presence reach a higher level.

3.2. Learning Activity Theory

The proposal of the activity theory confronts the traditional education characterized by "knowledge based" and "teacher centered", which neglects the student's main position and despises the student's main activity, and is characterized by indoctrination [12]. The activity system includes three core elements: subject, object and community, as well as three secondary elements: tools, rules and division of labour. These six basic elements interact and are closely related to each other to form the activity system, as shown in Figure 1. Learning activities are a collection of relevant learning procedures implemented by learners and learning groups based on specific learning objectives and game rules in learning groups, using efficient and practical learning tools [8].

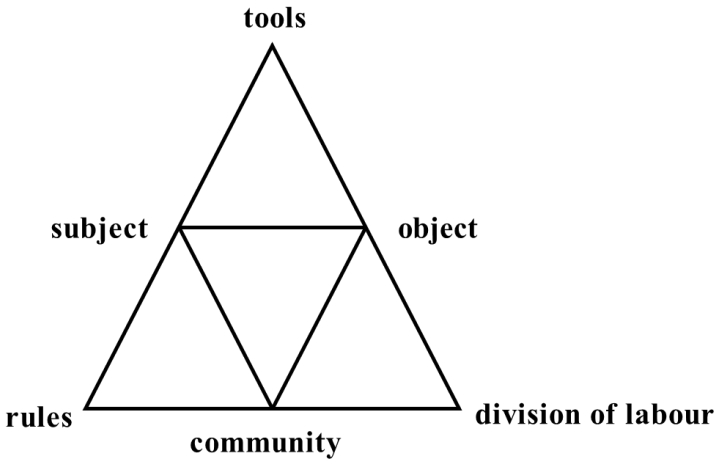

Figure 1: Structure of activity system

The value of activity theory is not to explain existing teaching, but to construct Instructional design based on learning activity theory [13]. According to constructivist learning theory, learning occurs in the process of interaction between learners and the environment, and the interaction between learners and the environment is learning activity [14]. Instructional design and implementation guided by learning activities is an important direction of current research [15]. Activity theory emphasizes that the implementation of teaching activity process should be centered on learners' learning activities, and the design of learning activities has an important impact on students' learning effect in the blended learning environment. The task of learning activity design is to scientifically and reasonably arrange the various elements in learning activities and the relationship between them. Blended teaching must be based on effective learning activities to promote the internalization of knowledge and the occurrence of learning. In blended teaching, the main body of learning activities is learners, and the development of learning activities is learner-centered; The object of learning activities can correspond to learning objectives, that is, the expected learning outcomes that learners should achieve first determined in the OBE concept, and the design and implementation of blended teaching based on the learning objective object; The community of learning activities is naturally learners and teachers who participate in blended learning activities. The main form of composition is learners and learners, learners and teachers. The most important unit of learning community is group partners who complete group tasks around learning objectives; Learning tools can be understood as the necessary network platform, learning resources, and even the strategies used to better carry out learning activities; In order to complete the group task, the study group needs to carry out specific division of labour for its members. The division of labour here is determined by the internal discussion of each group; Of course, in order to achieve the expected learning objectives, teachers and learners need to jointly abide by the norms and evaluation criteria of online and offline activities, namely rules.

4. Design of Blended Learning Activities based on OBE Concept

To implement the new education concept, substantially improve the teaching quality and make students benefit from it, teachers need to carry out creative practice in the classroom [16]. The OBE concept emphasizes learner-centered, expected learning outcomes-oriented, and continuous improvement of learning quality. At the same time, under the guidance of the community of inquiry model and learning activity theory, the role of teachers is not becoming unimportant, but it is necessary to provide learning support for learners in the whole process of the activity, and further promote the teaching presence, social presence and cognitive presence to reach a higher level at the

same time by starting with the teaching presence. According to the practice and research of blended learning activity design, the author constructs a design framework of blended learning activity based on OBE concept, as shown in Figure 2.

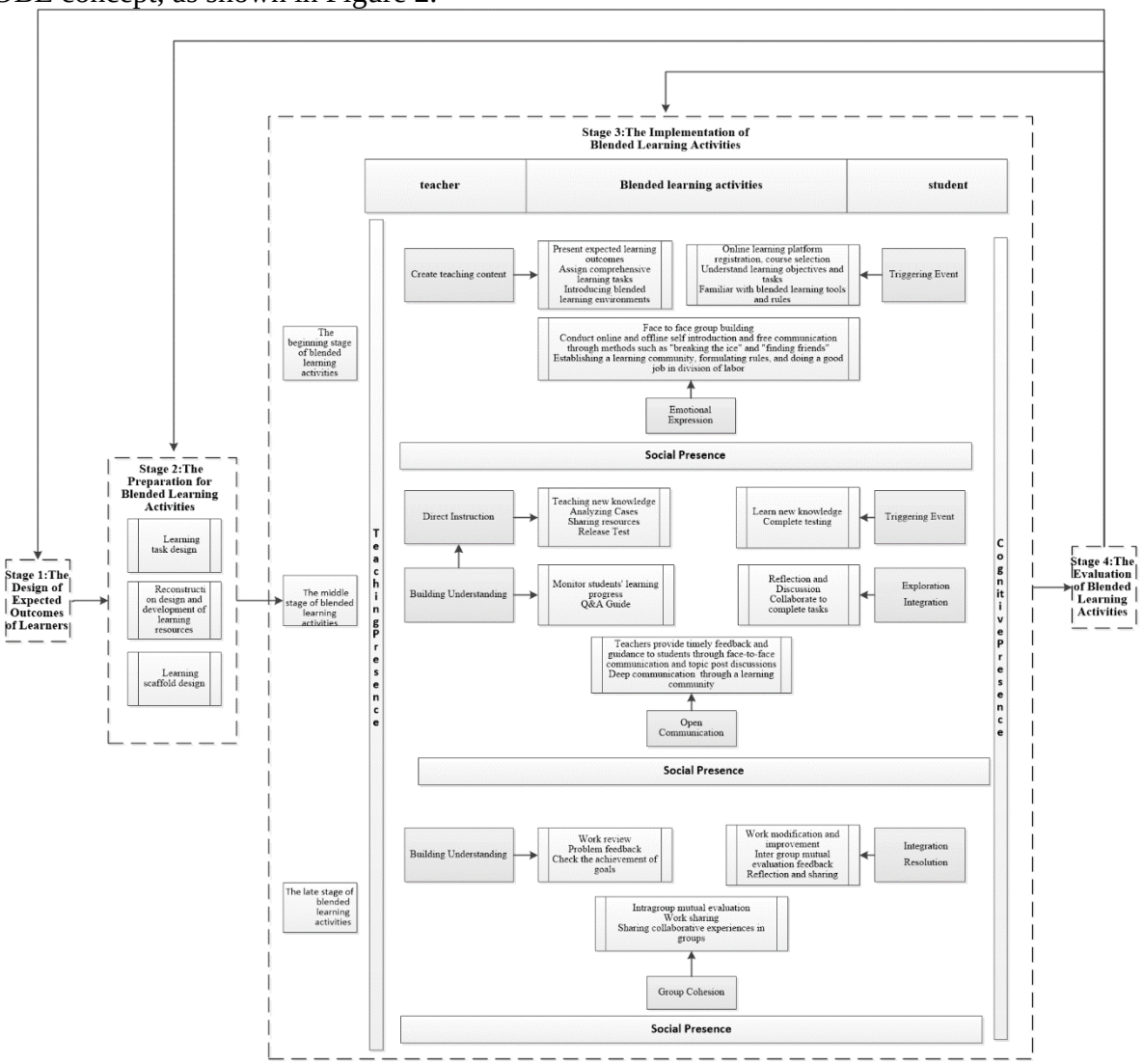

Figure 2: Design framework of blended learning activities based on OBE concept

The design framework of blended learning activities based on OBE concept will be elaborated in detail from four stages: the design of expected outcomes of learners, the preparation for blended learning activities, the implementation of blended learning activities and the evaluation of blended learning activities.

4.1. Design of Expected Outcomes of Learners

Based on the OBE concept, the first step in designing blended learning activities is to design learners' expected outcomes. The expected outcomes of learners are not the learning results that can reach the shallow goals of memorizing and grasping knowledge that cannot be transferred and applied after graduation, but the actual knowledge, ability and quality that students need to work and live as citizens in the face of accelerating economic globalization and increasingly fierce international competition. The design of learners' expected outcomes should focus on "what students learn", grasp the overall situation from the overall and long-term perspective, and consider repeatedly to establish

the key learning outcomes that students should achieve through blended learning activities [17], such as being able to produce specific products and solve practical problems.

When designing learners' expected outcomes, teachers should take the training objectives and graduation requirements of their majors as the guidance, gradually refine the implementation direction of blended learning activities and the specific learning objectives achieved by learners' expected outcomes, and clarify the specific requirements that learners should meet in terms of knowledge and skills, processes and methods, emotional attitudes and values. The most important thing is to clarify the logical relationship between objectives, processes and results. Only through scientific planning and process control can students' actual learning results infinitely close to the preset objectives [18]. After the learners' expected outcomes are determined, the preparation, implementation and evaluation of blended learning activities are all carried out around the achievement of "expected outcomes".

4.2. Preparation for Blended Learning Activities

The preparation stage of blended learning activities provides guarantee for the effective implementation of blended learning activities. According to the determined learners' expected outcomes, teachers refine the learning objectives into small task sequences, and provide the reconstruction design and development of learning resources for students to successfully complete learning tasks, as well as the design of learning scaffolds.

4.2.1. Learning Task Design

The learning task is the direct embodiment of the knowledge and skills into specific problems in the blended learning activities, and is the training process that learners need to complete in order to achieve the expected learning outcomes. The design purpose of learning tasks is to provide learners with an immersive and experiential learning environment, and to drive real learning with various practical tasks in real situations (such as designing surveys, making explanations, designing models, expressing views, etc.) [19]. High-quality activities and tasks should not only link new and old knowledge and skills, but also establish links with learners' actual life practices [20]. In addition, based on the requirements of blended learning activities, the design of learning tasks should not only take into account the characteristics of online and offline learning, but also take into account the individual construction of learners and the group construction of learning communities. When designing learning tasks, teachers should first grasp the expected learning outcomes of learners as a whole, then refine the learning objectives into specific small tasks, and make them adapt to the characteristics of different learning environments and different learning objects by reasonably arranging different task sequences.

4.2.2. Reconstruction Design and Development of Learning Resources

The reconstruction design and development of learning resources is based on learners' expected learning outcomes, and reprocessing and re-representation of learning resources. The reprocessing of learning resources is not a simple move of traditional textbooks, but should filter, screen and classify learning resources to be clear and concise, so as to avoid additional cognitive load caused by information loss to learners. For example, some resources are suitable for online self-study, and some resources are more suitable for offline interpretation; Some resources need to be discussed and exchanged, and some resources are more suitable for personal internalization. The re-representation of learning resources is to meet the different cognitive styles, learning preferences and other characteristics of different learners. The presentation form of learning resources can be represented in a variety of different ways, including micro-class videos, multimedia courseware, reference and

expansion materials, learning guides, exercise databases, forum discussion posts, etc.

The design of blended learning activities based on the OBE concept is essentially to transform the teaching centered on teachers' "teaching" into the learning centered on students' "learning". Therefore, the reconstruction design and development of learning resources is to support students' learning, is to build a support for students' learning, and is not to support teachers' teaching as an alternative form of teaching [21].

4.2.3. Learning Scaffold Design

In blended learning activities, learning scaffold is conducive to promoting learners' learning achievements and higher-order thinking ability [22], and the lack of necessary student support is an important reason for learners' shallow learning [23]. Learning scaffold, also known as "scaffolding", is a series of learning support services provided by teachers based on constructivism to promote students' deep learning and help students achieve learning goals [24], and is an indirect representation of teachers' professional guidance and support. In blended learning activities, providing appropriate learning support for difficult points that learners may encounter in the learning process can help learners better participate in learning activities, such as designing heuristic questions in the learning discussion area to guide students to think and discuss, or providing a learning case to guide students to analyze, and so on [25]. However, it should be noted that when learners acquire corresponding knowledge and skills, they should remove the scaffold in time.

4.3. Implementation of Blended Learning Activities

The implementation of blended learning activities is the key to blended learning activities. According to the theory of learning activities and the changes of the three existing strengths and weaknesses in the community model, the author expounds the three stages of the implementation of blended learning activities from the early, middle and late stages.

4.3.1. The Beginning Stage of Blended Learning Activities

At the beginning of blended learning, it is generally the first two weeks of the new semester, and teachers and students are unfamiliar with each other. At this stage, teachers should start with teaching presence and promote the emergence of social presence by organizing corresponding activities, thus leading to students' cognitive presence. Teachers can break the ice by self-introduction and inviting students to self-introduce themselves, close the psychological distance between each other, help students adapt to and become familiar with the blended learning environment, and then further create a friendly organizational atmosphere by discussing the learning objectives and tasks, course learning content and methods, expected media tools and rules to be followed, course plans and assessment requirements and other information related to the course, Reduce learners' learning defense psychology.

According to the learning task requirements, learners also need to form learning groups. The team adopts the principle of autonomy and voluntariness under the established rules, and each team should clarify the specific division of labour and make a task plan. In addition, the technical environment is also an important factor that affects the efficiency of blended learning. Teachers also need to introduce and train learners on the selected online learning platform, and provide timely help when they encounter difficulties in registering and selecting courses. At this stage, offline face-to-face teaching is the main method. However, due to the limited time and large number of students, the parts that cannot be completed in face-to-face classroom teaching can be extended to online, such as student self-introduction, group formation, etc., and further interaction between teachers and students or learners can be carried out through online learning platform or other media tools such as WeChat

group, QQ group, etc.

4.3.2. The Middle Stage of Blended Learning Activities

The focus of blended learning activities in the middle stage is to promote the "real occurrence" of students' learning behavior, that is, to enable students to actively participate in, actively learn, and independently manage their behavior, which is the stage for learners to exchange information and construct knowledge. After a series of activities in the early stage, learners have established a certain degree of identity and sense of belonging. The establishment of identity and sense of belonging can enable learners to form a close learning community and group centripetal force [26]. At this stage, teachers should further strengthen the social presence between learning communities through direct teaching and promoting dialogue, and then promote the development of cognitive presence to a higher level.

At this stage, teachers provide teaching, case analysis and expanded resource sharing based on the knowledge required by learners to complete learning tasks. Students connect new and old knowledge for learning tasks, and conduct group discussion, cooperative exploration, and reflection and exchange. In the blended learning environment, learners' continuous participation and input in the learning group directly affect learners' learning outcomes. Teachers can set up topic posts, publish test questions, etc. on the online learning platform to guide learners to conduct continuous learning and communication, and can also remind learners of their learning progress through WeChat, QQ and other instant messaging tools, such as group announcements, etc, In addition, it is necessary to continuously monitor and timely feedback learners' learning situation on the online learning platform.

4.3.3. The Late Stage of Blended Learning Activities

In the later stage of the blended learning activity, the focus is to promote the meaning construction within the learners, so that the learners can finally achieve "learning and success" [27], which is the stage of knowledge development. On the basis of learning in the early and middle stages, learners comprehensively apply the knowledge they have learned to form solutions, works and other learning results for real or complex problems [28]. The research results of learning science show that the evaluation of learners' perception operation, feedback recovery and opportunities to modify on the basis of feedback will effectively improve the efficiency and innovation level of the learning process.

The learning community modifies and improves the work according to the feedback provided by teachers and other students, and carries out group work sharing, exchange and self-evaluation in the classroom, and then upload it to the online learning platform, and other groups conduct mutual evaluation. The teacher reviews the group work, and carries out work feedback and problem analysis in class in combination with the group mutual evaluation results, focusing on solving common problems in the work, and checking and filling the gaps according to the achievement of learners' expected learning outcomes. Finally, learners will reflect and share their participation in this semester's blended learning activities, and exchange their experiences based on group cooperation. At this stage, through continuous cooperative exploration, the learning community has formed group cohesion, and the learning task has been basically completed. The three kinds of presence have basically reached a high level at the same time.

4.4. Evaluation of Blended Learning Activities

In the design of blended learning activities based on OBE concept, the monitoring and evaluation of blended learning activities is an essential link. Because learning is not only a process of increasing existing knowledge, but also a process of constantly restructuring existing knowledge, and monitoring and evaluation should help students link the new knowledge they have learned with their existing

knowledge, so the evaluation task must provide students with a real opportunity to prove what they have learned and help them determine what they need to learn [29]. Monitoring and evaluation are the basis of improvement. The realization of continuous improvement depends on an effective quality monitoring and feedback mechanism. With students' learning performance as the evaluation criteria, the evaluation of the degree of achievement of expected learning outcomes must be decomposed into the whole process of tracking and progressive evaluation of students' learning process [30]. The biggest difference between OBE education concept and traditional education concept is that the learning effect is evaluated by learning output. The evaluation must be closely linked with the expected learning outcomes. It focuses on the assessment of students' actual application ability rather than the degree of students' memorization and understanding of subject knowledge. Therefore, the formulation of evaluation criteria should also reflect the characteristics of ability assessment and evaluate the learning effect with the achievement of ability objectives. In addition, unlike the differential evaluation under the traditional teaching concept, the evaluation of blended learning activities based on the OBE concept pays more attention to the diversity and personalization of learners, so the evaluation system should also adopt multiple and hierarchical evaluation criteria, and can use process evaluation and diagnostic evaluation to monitor the progress of blended learning activities.

5. Conclusion

One of the reasons why the OBE concept can help learners succeed is that it encourages teachers to be fully prepared, make teaching purposeful and systematic, help learners take responsibility for their own learning, allow students to develop their interests, and develop their personality and academic. This paper introduces the concept of OBE, based on the theory of community of inquiry model and learning activities, and designs the blended learning activities from four stages: the design of expected outcomes of learners, the preparation for blended learning activities, the implementation of blended learning activities and the evaluation of blended learning activities. In the blended learning activities, we should pay attention to the learners' external behavior participation and promote the learners' knowledge internalization; It not only pays attention to the construction of individual learners, but also pays attention to the construction of social learning community; It not only has the expected learning design, plan and rules, but also continuously pays attention to the changes and problems in the learning process. Through the design of blended learning activities, help learners maintain a high level in the three dimensions of cognitive presence, social presence and teaching presence, and run through the whole process of blended learning activities, so as to improve the learning effect of learners. It is hoped that this study can properly clean up the serious obstacles in the process of promoting the development of blended learning, and provide reference for teachers who are interested in the practice and research of blended learning activities.

References

[1] Chen Y. J. & Sun A. J. (2022) Study on the Results of Online and Offline Mixed Teaching in Universities in the Post-epidemic Era. Continuing Education Research, No. 279 (11): 87-93.
[2] Gan J. H., Yang Y. & Zhao B. (2017) Innovating the Mode of Blended Learning and Promoting the Reform of Higher Education Online Teaching. Academic Exploration, No. 209 (04): 140-144.
[3] Spady W. D. (1994) Outcome-Based Education: Critical Issues and Answers. Arlington, VA: American Association of school Administrators. 1-10.
[4] Killen R. (2000). Outcomes-based education: Principles and possibilities. Unpublished manuscript, University of Newcastle, Faculty of Education.
[5] Feng X. Y., Wu Y. J., Pang X. Y. & Cao, J. T. (2021) Mixed Teaching Reform: Are Teachers Ready -- Research on the Development Framework and readiness of Mixed Teaching Reform. China Educational Technology, (01): 110-117.
[6] Garrison D. R., Anderson T. & Archer, W. (1999). Critical Inquiry in a Text-Based Environment: Computer

Conferencing in Higher Education. The Internet and Higher Education, 2, 87-105.
[7] Lan G. H. (2018) Exploring community Theory Model: Research Paradigm of Online Learning and Blended Learning. Open Education Research, 24 (01): 29-40.
[8] Anderson T., Rourke L., Garrison D. R. & Archer W. (2001). Assessing teaching presence in a computer conferencing context. Journal of Asynchronous Learning Networks, 5 (2), 1–17.
[9] Garrison D. R. & Arbaugh J. B. (2007) Researching the Community of Inquiry Framework: Review, Issues, and Future Directions. The Internet and Higher Education, (3): 157-172.
[10] Garrison D. R., Anderson T. & Archer W. (2001). Critical thinking, cognitive presence and computer conferencing in distance education. The American Journal of Distance Education, 15, 7-23.
[11] Yang J., Bai X. M. & Ma H. L. (2016) Review and Prospect of Research on inquiry Community. Educational technology research, 37 (07): 50-57. (in Chinese)
[12] Wu X. E. & Chen X. H. (2017) Research on online Presence Teaching Model from the perspective of Mixed Learning. China Educational Technology, (8): 66-73.
[13] Yang L. J. (2000) Activity theory and Constructivist view of Learning. Educational Science Research, (4): 61-65.
[14] Zhao C. L. & Xu J. J. (2015) Study on Adaptability and Development of Learning Ability in Flipped Classroom: From the perspective of Learning Activity Design. China Educational Technology, (06): 92-98.
[15] Sun H. M. & Liu P. F. (2015) Study on Learning Activities based on Activity Theory. China Educational Technology, (08): 29-35.
[16] Yang K. S. (2004) On a paradigm and Two orientations of instructional design theory Research. China Educational Technology, (3): 15-19.
[17] Liu Q. T., Ye Y. M. & Zhu K. (2014) Research on MOOC Learning activity design from the perspective of Activity Theory. Journal of Distance Education, 32 (04): 99-105. (in Chinese)
[18] Pan J. L. (2021) Creating the peak Experience in Devoting to Learning -- Taking the teaching reform of the national first-class undergraduate course "Educational Scientific Research Method" as an example. Chinese University Teaching,
[19] Cao H. Y., Sun Y. D., Luo Y. C. & Shan Y. G. (2021) Thinking on Student-centered Learning Design of Blended Teaching Courses in Colleges and Universities. Research in Higher Education of Engineering, (01): 187-192.
[20] Hu M. & Li L. (2022) Study on the Influencing Factors of OBE-oriented Learning Output: Based on the questionnaire survey of seven universities in Shanghai. Research in Higher Education of Engineering, (03): 139-145.
[21] Li L. & Gao Y. H. (2021) Research on Mixed Teaching Design of Colleges and Universities Promoting Deep Learning. Heilongjiang Higher Education Research, (05): 148-153.
[22] Feng X. Y. & Wang R. X. (2019) Hybrid Learning Design Model guided by Core Goals in the era of "Internet Plus". Distance education in China, (07): 19-26+92-93.
[23] Wu P. Z. (2006) Design of Classroom Learning activities -- A Case Study based on FTP File Transfer and Application. Educational Exploration, (10): 85-86.
[24] Ma Y. & Zheng Y. L. (2021) Toward Deep Learning: Design and Application of Reflective Scaffolding in Blended Learning Context. Modern Distance Education, (03): 89-96.
[25] Winnips J. C. (2001) Scaffolding by Design: A Model for Www-based Learner Support. Enschede: Universiteit Twente, 39.
[26] Zhang J. (2017) Research on the Design of Learning Support in STEM+ Education. Modern Educational Technology,
[27] Wu B., Zuo M. Z. & Song Y. (2021) The mechanism and strategy of blended Learning support Services: Based on the whole-perspective learning theory. Journal of Distance Education, 39 (04): 83-93.
[28] Wang Z. J. (2012) The Establishment and maintenance of Network communities in online Tutoring: The Ability of Tutors in Social Dimension. China Educational Technology, (08): 46-50.
[29] Feng X. Y., Wu Y. J., Cao J. T. & Guo L. W. (2021) Strategies for Blended Learning Activity Design in the "Internet Plus" era. Distance education in China, (06): 60-67+77.
[30] R. Keith Sawyer. Translated by Xu, X. D. (2010) Cambridge Handbook of Learning Science. Beijing: Educational Science Press, 32.