Exploration on the Hybrid Teaching System of Preschool Courses based on the Internet of Things Platform with Computer Assistance

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Abstract. The existing problems of traditional preschool education and its teaching status are analyzed, a hybrid teaching system is proposed, and then the computer-assisted preschool curriculum hybrid teaching according to the Internet of things platform is discussed carefully. With the help of the Internet of things platform, a hybrid teaching system is constructed from pre-school analysis, teaching resources, teaching activities, and teaching evaluation. Afterwards, the average score of three classes in the large class of kindergarten is selected as the assessment standard, and its teaching effect is compared and analyzed. The research results show that the hybrid teaching system of preschool courses according to the Internet of things platform with computer assistance is important in improving the teaching quality. In general, this paper provides some theoretical and experimental support for the exploration of preschool curriculum hybrid teaching system on the basis of the Internet of things platform.

1   INTRODUCTION

Due to the computer network technology develops quickly, the Internet of things, as the core of the development of modern society, is more and more used in teaching, especially with the wide popularization of mobile terminals and mobile phones, mobile teaching and mobile learning become more and more important. Recently, for improving the informatization level of teachers and the

internationalization level of schools, "Internet of things" online and offline teaching has promoted the improvement of China's education quality into the fast lane, which is also important to improve the construction of China's education system [1]. However, with the 2019-new coronavirus raging around the world, the "Internet of things" teaching is recognized by teachers and students. In addition, the online and offline hybrid teaching model has gradually been replaced by traditional teaching, and the various online and offline conferences has also been accepted by more organizations and schools. Online and offline hybrid conferences and teaching refer to experts, scholars or teachers using online teaching platforms, mainly through smart cloud classrooms to build online teaching resources, such as conference reports, course plans, courseware, micro-classes, videos, and animations wait. While the students should use the Internet, terminals, etc. to carry out self-study on a purposeful online network platform and participate in conference reports at any time. Teachers can also check student self- taught status and participate in student discussions online, reply to student questions, etc., and adjust according to student preview teaching plan [2]. In addition, in classrooms or meetings, teachers or experts and scholars will give targeted explanations based on the knowledge that students have mastered to help students break through major difficulties and achieve teaching goals. After class, teachers then provide development resources based on students' new experiences to help students consolidate and improve their knowledge. Recently, with the development of education network information and the normalization management of COVID-19, the educational reform of the Internet of things platform based on computer is constantly trying to carry out. The computer-aided IoT platform refers to the establishment of a connection to the target object and real-time remote monitoring through a variety of information sensing devices and technologies such as sensors, RFID technology, and global positioning system. In the process, it is connected to the Internet in accordance with relevant protocols. A network method that used the network to exchange and communicate information and data, which can realize the intelligent identification, positioning, tracking and management [3-6]. Therefore, colleges and universities in China have successively established various online education resource platforms based on the Internet of things platform to support learning, in order to increase the auxiliary effect on teaching, maximize the utilization of teaching resources, keep close to the current social information development, and make hard efforts for computer majors to contact the latest computer cutting-edge technology [7,8]. As it is a new cutting-edge theory, technology and knowledge, there is no mature fixed teaching materials and teaching methods at home and abroad, so the demand is more urgent. Therefore, it is of positive research significance to explore the teaching mode according to the Internet of things platform with computer assistance. Preschool course is a very subject. We should take philosophy, human physiological anatomy and brain as the stepping stones to the preschool education, afterwards, the basic concepts of children's development and children's education should be learned, and how to implement education according to the laws according to the characteristics of children in language, society, science, art and body should also be learned [9]. Meanwhile, we should attach the importance to practical teaching.

For the hybrid teaching system, only in theory, hybrid teaching is "online + offline" teaching mode combining the advantages of online and traditional teaching. Hybrid teaching is not only the exclusion of traditional classroom teaching, but also combining the two, which can provide communication space for teachers. What's more, teachers can also communicate effectively and learn each other's teaching methods, so that students can deeply master theoretical knowledge and flexibly apply it to practice to improve the technical ability of secondary vocational schools [10]. In such a classroom environment, students can learn more cutting-edge knowledge. Teachers use high-quality teaching resources to teach students. In general, students mainly study independently and constantly explore different knowledge. The purpose of hybrid teaching is combining the respective advantages of "offline" classroom and network-based "online" teaching, and use scientific network resources and information platform to achieve the optimal effect of hybrid teaching through students' online learning and teachers' offline guidance. By exploring how to implement the online and offline teaching mode of "student-centered and teacher led" in

curriculum teaching, teachers organically combine online students' autonomous learning with game teaching in offline classroom, obtain timely learning feedback, and create a vivid and image information classroom [11,12]. In the form of group cooperation, through task driven teaching methods, offline game activities are carried out to timely obtain students' learning situation and feedback, create a vivid and image information classroom, and complete the teaching process of enlightenment before class, internalization in class and transformation after class. In line with the concept of comprehensively establishing ideological and political education in professional learning and curriculum teaching, in order to ensure the organic connection between value dissemination and knowledge cohesion in teaching practice, we genetically integrate curriculum ideological and political education into professional courses, starting from the objectives of curriculum ideological and political education and mining the elements of curriculum ideological and political education, to the carrier, educational activities [13]. Paudel and Neupane [14] found that hybrid teaching system of preschool curriculum based on the Internet of things platform has a great resonance in the whole society, especially in kindergartens. At present, more and more educators and institutions study it. Hansen et al. [15] aimed to expand the types and quantity of learning resources that can be searched. Due to the majority of children in poor areas in the world and backward educational conditions, the Internet of things learning platform can provide a relatively better learning environment. Hughes-Lartey et al. [16] also studied the Internet of things learning platform, and its main goal is to use advanced information internet technology to develop relevant learning software and terminal app online learning framework for mobile learning. The African prairie Internet of things learning project carried out by Yaseen [17] used information technology and high-end mobile technology (terminal APP) to enrich and expand learners' unknown learning fields. Lyócsa [18] had jointly developed an Internet of things learning platform called "multimedia broadcasting system". As long as they register, learners can use other people's microblogs and words published on it to learn. The "my art space" application platform developed by the University of Nottingham in the UK also has the above similar functions. Therefore, the problems in the current preschool curriculum education is studied carefully, and the hybrid teaching system of preschool curriculum is discussed. Subsequently, the construction of the hybrid teaching system in detail through the Internet of things platform assisted by computer is studied to provide some theoretical support for the hybrid teaching of preschool curriculum.

2   PROBLEMS IN CURRENT PRESCHOOL CURRICULUM TEACHING

2.1   Fixed Teaching Content
Science education teaching integrates theory and practice. It is difficult for traditional teaching models to pass on the content to students in a limited time while applying the theory to practice. For realizing the functionalization of classroom, a teacher's teaching must have content and some choices. In the actual teaching activities, the syllabus needs to be fixed and unified to reflect the planning and presupposition. However, in the process of practical application, the effect is poor, and it is difficult to carry out smoothly.

2.2   Consistency of Education Progress
Due to the influence of the assessment methods of education, students accept unified arrangements, teachers tend to carry out targeted training in teaching, and have less opportunities for active learning and thinking. Students passively accept the exported learning content, listen to the arrangement and organization of teachers, and emphasize unity in the process of participating in learning, which cannot reflect the difference of students' development.

2.3   Unreasonable Preschool Curriculum Arrangement
In the construction of preschool curriculum, its related theme activities are not perfect, and there is

no better penetration in the application of curriculum content, form and other elements. Although some of the life theme activities have been applied to a certain extent in terms of penetration, the overall coverage effect is relatively limited. The daily life of the children's garden is very rich. We can't just connect one or several of them with the actual life, but should cover the whole day life of the children's garden and endow each living element with educational significance.

2.4 The simplification of School Life

In the application of life-oriented content, many teachers find it more difficult due to the relatively fragmented educational materials. Some parents themselves also have some unreasonable educational requirements, eager for quick success and quick success to let children master more systematic cultural knowledge. In such an environment, the entire pre-school education is difficult to make children feel happy. Many courses are also more serious, so that students do not feel the joy of learning, which has a great adverse effect on their learning behavior.

3 CONSTRUCTION OF PRESCHOOL COURSE HYBRID TEACHING SYSTEM ACCORDING TO THE INTERNET OF THINGS PLATFORM

Mixed instructional design about preschool curriculum education focuses on promoting students' learning ability. On the basis of full investigation, teachers establish a hybrid teaching model of preschool curriculum based on the Internet of things platform assisted by computer, and design it from the aspects of preschool analysis, teaching objectives, teaching difficulties, teaching strategies, teaching implementation process, teaching evaluation and so on. Focus on the effective construction of students' knowledge, so that students can find effective methods to solve problems in the integration and transfer of knowledge, activate old knowledge and acquire new knowledge at the same time. The research uses the Internet of things platform as a teaching assistant, takes the learning teaching method as a guide, and relies on the school's professional courses to achieve the purpose of "Online + offline" hybrid teaching. After two rounds of upgrading and iteration of teacher-student interaction activities, such as pre class, in class and after class, the hybrid teaching mode with pre class guidance, in class teaching and after class evaluation is gradually constructed, which is shown in Figure 1.
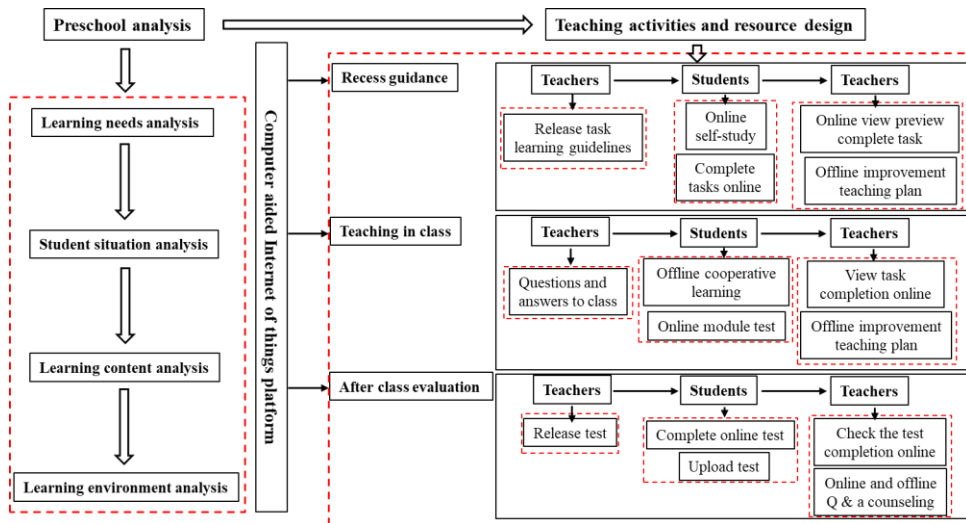

Figure 1：Computer-assisted mixed teaching mode of preschool courses based on the internet of things platform.

3.1 Design of Hybrid Teaching System for Preschool Courses

The development of mixed instructional design in science education for preschool children focuses on promoting the improvement of students' learning ability. Teachers integrate the environment and sort out resources according to the full research. Focus on the effective construction of students' knowledge, so that students can find effective methods to solve problems in the integration and transfer of knowledge, activate old knowledge and acquire new knowledge. In general, the method of collectively solving common problems and individual counseling for individual problems. Make students' understanding of knowledge no longer stay on the surface, but deep understanding and practical application.

3.1.1 Allocation of Teaching Resources for Dimensional Courses

The allocation of teaching resources is a necessary foundation for the implementation of courses and provides resource support for the continuous construction of courses. Routine supporting resources include teaching syllabus, teaching plan, teaching plan, teaching ppt, problem set, test question bank, etc. Conventional resources need to be constantly updated and improved according to actual needs, and the construction process must be strictly controlled, broad and precise. Teachers can also introduce valuable network resources into the construction of curriculum resources, such as online quality courses, cutting-edge materials, and related web pages. The jointly built curriculum resource library is presented on the network platform to realize resource sharing.

3.1.2 The Overall Design of Advanced Teaching Activities

For the mixed teaching, the teacher's design is promoted through three stages: before class, during class, and after class. This design model revolves around the subjectivity of students and the dominance of teachers. Teachers and students can interact better and organically integrate online and offline. This article uses an online ball picking and extracurricular throwing activity as a teaching case. The main objective of the mixed teaching can be described as to cultivate students' autonomous recognition and hands-on ability. The skill goal is to increase students' defense knowledge and hands-on practice level. Figure 2 shows the students' independent learning ability and teamwork spirit.
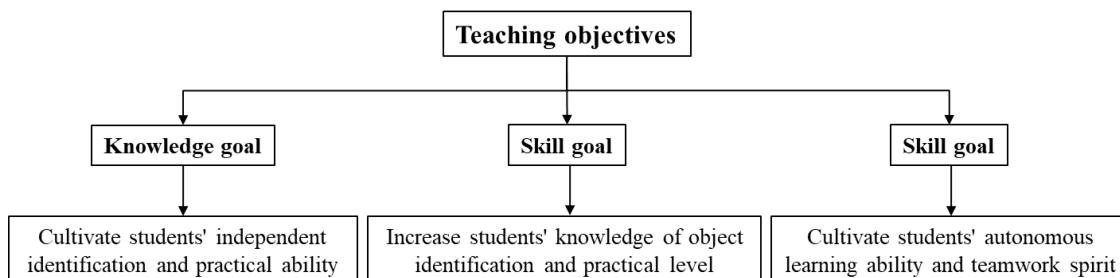

Figure 2: Expression of teaching objectives.

The course teaching adopts the "task driven method", which divides the course implementation process into three parts: pre class guidance, in class teaching and after class evaluation. The in-class teaching consists of six teaching links, namely: task introduction - making plan - Reviewing plan - task implementation - Process Management - summary and evaluation. Figure 3 shows the mixed educational process of preschool curriculum. It can be seen that the teaching design is complete and fully reflected the integrated teaching concept of "student-oriented, action oriented and teacher-oriented".
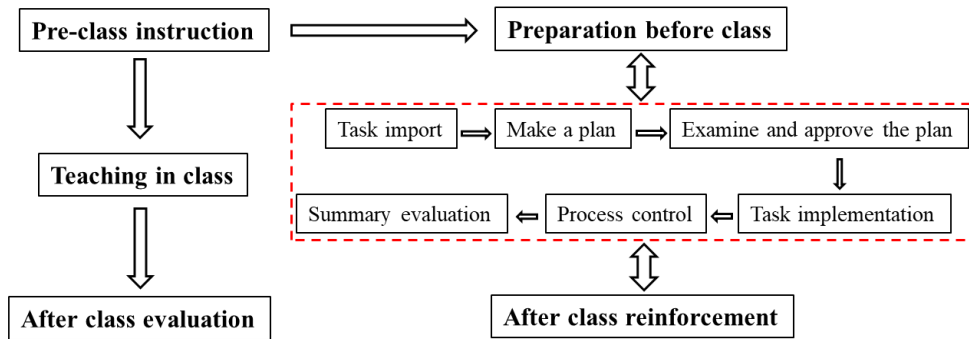
Figure 3: Mixed educational process of preschool curriculum.

Before class, due to the individual differences of students, in order to enable students with different learning abilities and cognitive levels to reach the understanding level of new knowledge in the pre class learning stage, teachers need to provide various types and rich autonomous learning resources to meet students' personalized learning needs. Teachers use the computer platform to send teaching courseware, learning materials, homework and other contents uploading to the Internet of things platform. Therefore, the students can learn by themselves based on their own situation. Moreover, the teachers can establish the knowledge task points according to the requirements of course content to clarify the key points and difficulties through the Internet of things platform. Afterwards, the students preview and self-test about the chapter points in the online classroom, and then the teachers adjust the teaching points in the classroom through the platform statistical data. What's more, the answers to common questions and individual answers to individual questions can be quickly collected. For the practical key points of preschool course education, the key point interpretation and lecture and lecture videos are broadcast in advance. Students modify the guidance points according to the content designed by themselves. In self-adjusting understanding, the learning is targeted, and the prepared activity design has been upgraded for the first time before the formal implementation of the course. This kind of operation is an adjustment at the conceptual level. The practical operation in the implementation of the next course makes students' understanding of this problem no longer "talk on paper", but "work with real guns". Such implementation will help students improve on the original basis, reduce unreasonable design, make the preset activity design more in line with the needs of "simulation activities", and effectively promote the interaction between teaching and learning. In class, students "guess" their "experience" and "bring" problems ". The classroom is no longer the teacher's "single-talk" and "wishful thinking". The early network interaction between teachers and students has laid the foundation for the next activities. Teachers can solve problems by means of" group communication "and" project tasks ". "Word cloud" can feed back the main points of students' discussion in real time. The data of course test points realize the dynamic display of students' learning status. By setting up the learning situation and activating the classroom atmosphere, the methods of "rush answer" and "selection" can be used alternately to improve students' classroom participation. The process of students' participation in the classroom is also the process of solving problems. Different students' treatment of the same problem shows diversified results, which is also the real value of the curriculum. Active state is the real learning state of students and an important feature of personalized development. After class, teachers release tasks to consolidate the learning content in class. Through homework and post-test, students can complete them online in the form of individual or group, and teachers can review them online.

3.2 Evaluation and Analysis of Preschool Curriculum Education
For blended learning, teaching evaluation needs the combination of online and offline evaluation, and the assessment methods are diversified. This task adopts the combination of online

assessment mode (pre-class assessment accounts for 10% + in class assessment accounts for 25% + after class assessment accounts for 15%) and offline assessment mode (identification ability assessment accounts for 40% + hands-on ability assessment 10%). The online assessment consists of the tasks completed by students and the activities released by their teachers. The score of offline assessment is composed of student self-assessment (30%), group mutual assessment (30%) and teacher (40%), and the specific composition is shown in Figure 4.
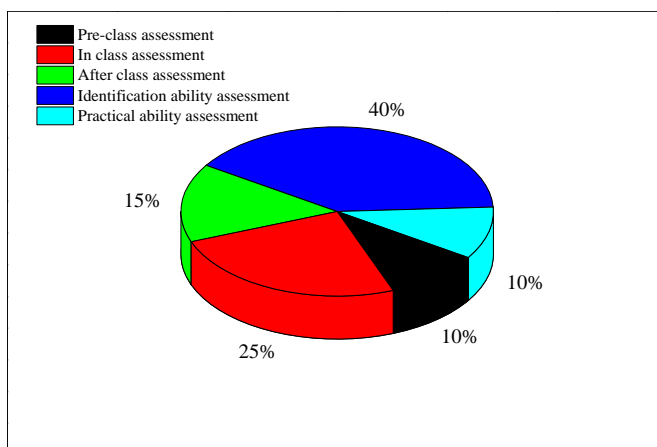
Figure 4: Assessment criteria for preschool curriculum education.

Pre-school education evaluation was conducted for 30 students in each of the three classes in the kindergarten. Figure 5 shows the online education evaluation scores, while the Figure 6 and Figure 7 suggest the offline evaluation scores. And the assessment scores of different classes online and offline and the average score are shown in Figure 8. It can be seen that the class 1 has the best online and offline assessment results, and the total average score is also the highest, then followed by class 3 and class 2. The above results show that the students in class 1 can better complete online and offline tasks, and their comprehensive ability is also the best among the three classes. In general, according to the management function of the Internet of things platform, view the learning process report of each student and scientifically analyze the learning situation of students. Master the learning effect of students in time, and understand the error prone points, key and difficult points of students' learning. In online feedback, students are encouraged to actively perform in participation and interaction, and assign tasks in online homework, online test, online test and other links of the course. Students experience in participation and feedback in consolidation. Under the mixed teaching mode, the traditional "moving" homework is broken, and the examination and test of students' learning effect is no longer scattered and linear, but network and three-dimensional. The assessment of students' comprehensive quality is more objective and fair. Meanwhile, the above results can also improve students' learning efficiency, let students learn to learn and apply what they have learned, reverse the dull atmosphere in the classroom, and create a positive classroom environment in which teachers and students help each other and grow each other. On the one hand, it can improve students' academic level, on the other hand, it can promote teachers' professional growth.

4   CONCLUSIONS

According to the Internet of things platform assisted by computer, the hybrid teaching system of preschool curriculum, constructs and designs the hybrid teaching mode of preschool curriculum are

discussed and analyzed in the paper, then the evaluation system is established, and three large classes of kindergarten are taken as an example to make a better statistical analysis of the hybrid teaching system. The conclusions are as follows:
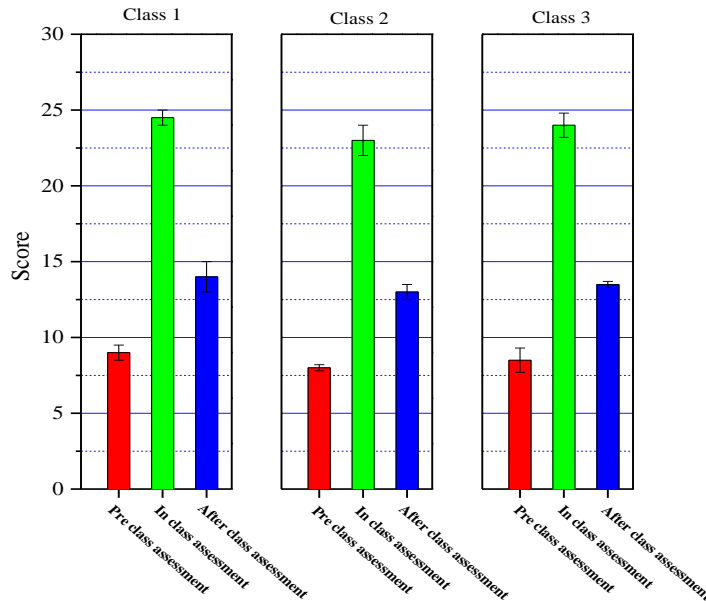

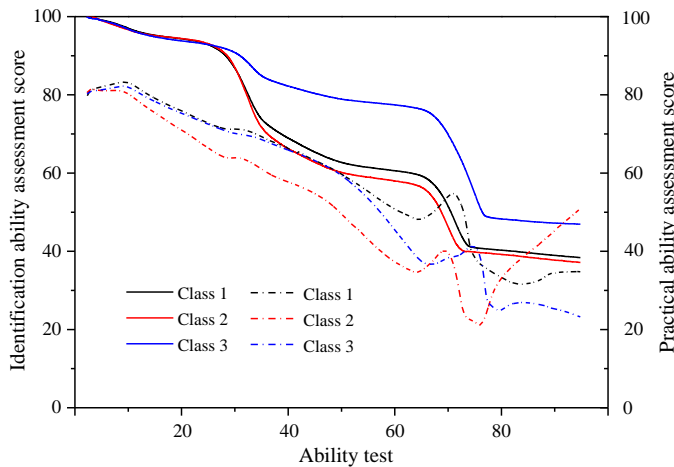**Figure 5:** Assessment scores of different classes online.

Figure 6: Identification ability and practical ability assessment scores of different classes offline.

(1) The mixed teaching mode injects fresh blood into the traditional teaching, realizes the transformation from "teacher-centered" to "student-centered", enables teachers and students to always hold a knowledge-seeking attitude of continuous learning and accepting new things, challenge themselves, adapt to this rapidly changing society, and cultivate the ability of lifelong learning.

(2) For kindergarten students in the same class, the assessment standard consists of online and offline assessment. Online assessment can greatly improve students' identification ability,

while offline assessment can improve students' practical ability. Generally, this hybrid preschool teaching system has good application potential.
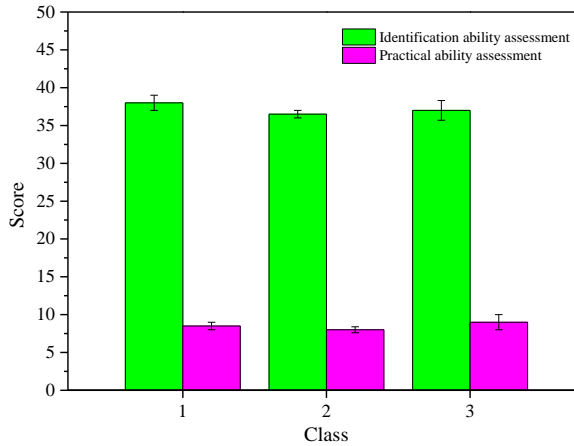

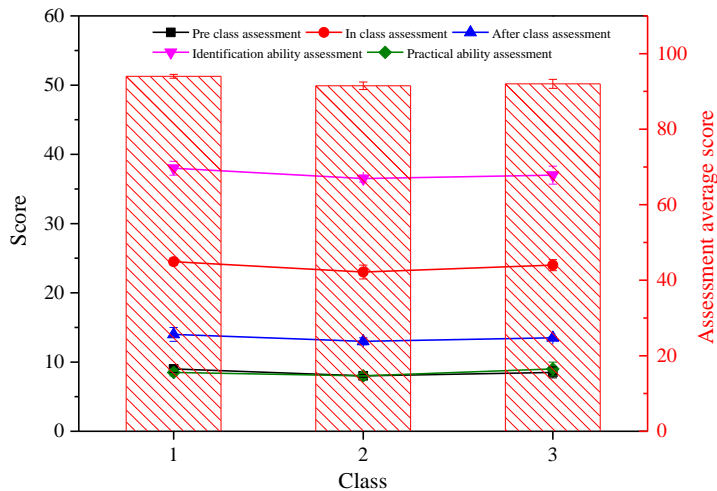**Figure 7:** Assessment scores of different classes offline.

Figure 8: Assessment scores of different classes online and offline.

(3) The assessment of mixed teaching of preschool courses is of great significance to optimize the evaluation of teaching quality, and can better meet the needs of personalized teaching. Through the Internet of things platform, teachers can obtain a large number of objective, quantitative and qualitative teaching feedback data information, fully understand students' learning needs, learning progress and learning results before, during and after class, better optimize teaching design and build high-quality diversified interactive learning classes.

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