Wisdom Classroom: The New Direction in Intelligent Age

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Abstract. New demands for talents are put forward in era of intelligence. The traditional classroom characterized by inculcation and memory is facing great challenge. Wisdom classroom is the new approach in the future. Wisdom classroom aims to promote the wisdom of students by creating smart classroom environment, reconstructing teaching process, optimizing instructional design. Wisdom classroom has the characteristics of smart environment, individualization of learning style, opening of teaching content, diversification of evaluation system and refinement of teachers' role. According to the theory of constructivism, situational cognition theory and anchored teaching, we designed the teaching process, the implementation and the teaching evaluation system.

Introduction

The shock brought by “man versus machine drama” has not disappeared. Driverless cars have already driven into streets. Self-service supermarkets have been densely distributed. This undoubtedly heralds a new era - the era of intelligence. In the era of intelligence, robots will replace human's mechanical and repetitive mental and physical labor, and human beings will turn to more new, deep and creative work. This will put forward new requirements for personnel training. The ability of innovative thinking and creative problem-solving, independent and lifelong learning, good communication and cooperation become the characteristic of future talents. The traditional classroom characterized by knowledge infusion and memory cannot meet the needs of future talent training. Some scholars even point out that "the new normal of learning is far away from teachers, far away from classroom". So, in the era of intelligence, how would we change our educational concept and build a future classroom that can meet the needs of talent training? This is a problem that every educator has to think about.

In 2008, IBM first mentioned the concept of "smart earth". That is, intelligent technology is applied to all aspects of life, making the earth more and more intelligent. This concept has rapidly impacted all fields, and constantly burst out new ideas. In the field of education, it has triggered the fourth wave of educational informatization-intelligent learning. As an important part of the smart learning ecosystem, wisdom classroom is also increasingly concerned by people. Wisdom classroom is gradually regarded as a new direction of future.

Literature Review

Definition of the Concept of Wisdom Classroom

Since 2011, China's academic attention to "smart learning" has shown an explosive growth trend. However, there are relatively few researches on wisdom classroom, and the definition of wisdom classroom is uncertain. In general, early research focused on the basic concept of wisdom classroom teaching. Wu Xiaojing et al. (2009) discussed the change of teaching purpose, teaching process concept and teaching evaluation concept in wisdom classroom. During this period, wisdom classroom is defined as a classroom in which teachers exert their teaching wisdom, pay attention to life and experience, focus on putting forward problems, solving problems, and actively exploring, cooperating and opening up. With the development of educational informatization, the definition of wisdom classroom has changed from concept oriented to technology oriented, and more attention has been paid to the application of the new generation of information technology. Sun Shuhui and
Liu Bangqi (2015) believe that wisdom classroom is an intelligent and efficient classroom built on the basis of constructivism learning theory, using a generation of information technology such as big data, cloud computing and the Internet of things. Some scholars also pay attention to the teaching purpose of the wisdom classroom. Tang Yiwei et al. (2014) believed that wisdom classroom is a new classroom with the support of information technology, through the reform of teaching methods, the integration of technology into teaching, the construction of smart classroom learning environment, so as to effectively promote the cultivation of wisdom. We believe that wisdom classroom is the deep integration of information technology and teaching philosophy. The use of technology is only a means rather than an end. The construction of wisdom classroom should not only pay attention to the construction of smart learning environment, but also pay attention to the deep reform of wisdom teaching concept, teaching method, teaching process and teaching evaluation.

Characteristics of Wisdom Classroom

Scholars also put forward different views on the characteristics of wisdom classroom. Tang Yiwei (2014) defined four characteristics of wisdom classroom: personality coordination, intelligence tracking, tool enrichment and activity intelligence. Jiang (2016) thinks that the basic characteristics of wisdom classroom include real-time transmission of teaching content, good interaction between teachers and students, collaborative learning between students, and intelligent record of learning behavior. Liu Bangqi (2016) believes the core features of wisdom classroom include data-based teaching decision-making, instant evaluation and feedback, three-dimensional communication and interaction, and intelligent resource push. Bian Jinjin et al. (2016) pointed out that the characteristics of wisdom classroom from the perspective of technology include hierarchical sharing of resources, real-time content push, learning situation collection, intelligent learning analysis, real-time feedback evaluation, collaborative interactive communication and mobile communication interconnection. Wang Juan (2017) pointed out that the wisdom classroom has the characteristics of innovation and creativity, integration and development, wisdom generation, multiple selectivity and combination of virtual and real on the basis of the change of wisdom classroom form. It can be seen that most scholars focus more on the technical characteristics. There is no in-depth discussion on the learning mode, teaching content system, evaluation system and the role of teachers in the wisdom classroom.

Teaching Design of Wisdom Classroom

Scholars have discussed the teaching design of wisdom classroom from different perspectives. Sun Shuhui et al. (2015) put forward the "8 + 8" teaching process structure of wisdom classroom. On this basis, Liu Bangqi (2016) further proposed the "three stages and ten steps" teaching process model. Three sections are pre class, in class and after class; ten steps are learning situation analysis, preview evaluation, teaching design, scenario creation, inquiry learning, real-time detection, summary and promotion, homework after class, micro class guidance, reflection and evaluation. Bian Jinjin et al. (2016) also designed the learning mode of wisdom classroom based on the segmentation before, during and after class. Wang Juan (2017) discussed the design process of intelligent curriculum from four stages: building network learning platform, teaching and learning model innovation, learning content organization and design, intelligent management and evaluation. Li Yi et al. (2017) discussed cognitive strategies, metacognitive strategies and interactive strategies to promote the generation of wisdom in classroom. Liu Jun (2017) explained the key path of wisdom classroom development from four perspectives: the smart upgrading of classroom environment, the smart reconstruction of classroom teaching, the smart optimization of learning process, and the smart development of classroom evaluation. The above researches respectively explore the design of wisdom classroom from the perspectives of teaching process, learning mode, teaching strategy and development path. However, the existing researches still lack the complete design of teaching process, teaching implementation and teaching evaluation of wisdom classroom.
Guiding Theory of Wisdom Classroom

Learning Theory of Constructivism

Constructivism theory, first put forward by Piaget in the 1990s, is the further development of contemporary educational psychology after behaviorism and cognitive theory. According to the theory of constructivism, knowledge is only an explanation and assumption of real problems, not an answer to them. In order to acquire knowledge, students need to use various learning resources, including non-structural knowledge, to complete the active construction of meaning with the help of others. That is, based on their own experience background, students actively select, process and process external information, and establish a connection between new and old knowledge through repeated and two-way interaction, so as to deeply understand the nature, laws and internal relations between things. The core of constructivism is student-centered, emphasizing students' active exploration, active discovery of knowledge and active construction of the meaning of knowledge. Constructivism requires that students' original knowledge and experience should be regarded as the growth point of new knowledge in teaching activities, and teachers, as organizers, guides, helpers and promoters of students' construction activities, should make full use of learning environment elements such as situation, cooperation and dialogue to give full play to students' initiative, enthusiasm and initiative spirit, and finally achieve the learning goal of meaning construction. According to the theory of constructivism, we should pay attention to the differences of students' original knowledge and experience, emphasize students' initiative in learning, self-control and self-feedback, and play an important role in cooperation and communication.

Situational Cognitive Theory

The theory of Situational Cognition regards "situational" as an important feature of knowledge, and holds that knowledge is constructed in the process of interaction between individuals and situations and is based on real situations. The essence of learning is a process in which individuals participate in practice and interact with the learning community or practice. It is also a process in which individuals form the ability to participate in practical activities and improve the level of socialization. The theory of Situational Cognition emphasizes that the design of learning should take learners as the main body, and the arrangement of content and activity should be connected with the specific practice of human society. It is better to organize teaching through the way similar to the real practice of human beings in the real situation, and integrate knowledge and acquisition with the development and identity construction of learners. According to the theory of Situational Cognition, intelligent classroom should create real and meaningful situations for teaching activities, support students to use the acquired knowledge to solve practical problems, and promote the growth of wisdom.

Anchored Instruction

Anchored instruction is a new information-based teaching mode based on constructivism and situational cognitive theory. This mode emphasizes the use of technology to create a real learning situation, in which students can solve complex problems through independent learning and collaborative learning, and use interdisciplinary comprehensive knowledge, so as to improve students' ability to explore and transfer, and master useful knowledge. "Anchor" generally refers to the real situation containing some problems or tasks. The authenticity of situation helps students to understand the connection between what they have learned and the real world and stimulate their learning motivation. In the above situations, the students are asked to solve the practical problems closely related to the current learning theme, that is, "anchor". After "breaking down", teachers provide students with clues to solve problems, and students carry out independent learning to obtain, use and evaluate relevant information and materials. At the same time, for some complex problems, students, teachers and students to carry out exchanges and discussions, collaborative learning. Finally, through the evaluation of learning process, group evaluation and other ways to evaluate the improvement of students' ability. In anchored instruction, the role of teachers changes from information provider to "coach" and "learning partner" of students, which can encourage and
support students' generative learning and provide students with scaffolding and guidance. The content design of anchored teaching centers on "anchor" and allows students to explore independently. The teaching goal remains relatively open and the teaching result is flexible. We should pay attention to the differences of students’ learning experience, learning needs, learning motivation and cognitive structure, and encourage the diversified development of individuality. According to the anchored instruction, the intelligent classroom is designed with the task-oriented research and creation teaching method.

**Connotation of Wisdom Classroom**

Whitehead once said "the whole purpose of education is to make people have active wisdom". In the age of intelligence, the connotation of wisdom has changed. We define "wisdom" as the ability to creatively solve complex problems by means of information technology, the ability to learn independently and efficiently, the teamwork ability, and the ability to communicate and express clearly and skillfully. Wisdom classroom is a new classroom which uses artificial technology to build an intelligent and efficient classroom environment, reconstruct intelligent teaching process, optimize teaching design, and realize students' wisdom growth. Wisdom classroom has the following characteristics.

**Smart Learning Environment**

The construction of wisdom classroom needs the support of smart learning environment. Smart learning environment is a kind of learning place that can provide students with virtual real situation, identify students' characteristics, record students' learning process and evaluate learning results, intelligently push resources, timely feedback and provide efficient multi-dimensional interactive platform. Smart learning environment includes hardware system and software system. Hardware system mainly refers to basic equipment and teaching resources. Software system refers to various software collections running on hardware system. The wisdom classroom shall be equipped with virtual reality equipment, interactive smart electronic whiteboard, multimedia interactive system, hand-held smart mobile terminals (smart phones, tablet computers), intelligent devices (such as smart bracelets) and other infrastructure hardware facilities to build a teaching resource library that meets the characteristics of modularity, small granularity, high recognition, etc. In addition, the smart learning environment can support teaching activities from the following aspects. First of all, teachers can use virtual reality equipment to create the real situation needed to complete the learning task, so that students can learn in real time and enhance their motivation and interest in learning. Secondly, intelligent learning environment can provide the basis for dynamic modeling, recognition and analysis of learners' characteristics, learning situation analysis, group collaborative learning and teacher intervention. Thirdly, smart software tracks and records students' learning trajectory, evaluates students' learning achievements, and starts automatic intervention and early warning mechanism for students who may have the risk of academic completion. Fourth, smart learning platform can provide instant feedback mechanism. Students give immediate feedback to teachers in class, and teachers respond to it by giving individual guidance or adjusting the overall teaching plan. On the other hand, students' homework and test results are fed back immediately, which is convenient for students' self-assessment and self-control. Finally, the intelligent learning environment can provide an efficient platform for communication between teachers and students, students and experts to meet the needs of collaborative learning.

**Personalized Learning Style**

According to the theory of individualized learning, students' mental level, cognitive structure, learning habits, learning motivation and other characteristics are different. Only by paying attention to the individual differences of each student, can we truly realize individualized teaching and promote the intelligent growth of students. The mature development of artificial intelligence technology provides an opportunity for the realization of personalized learning. The four pillars of personalized learning in wisdom classroom include: dynamic modeling of learners, self-selection of
learning objectives and learning paths, individual intervention and guidance of teachers, and multiple evaluation of learning effects. Learner modeling is the core theory to promote personalized learning, and the dynamic modeling method is feature-based modeling. Intelligent software analyzes learners' learning style, preference, learning attitude, ability, learning interest and cognitive characteristics, tracks and records students' information in knowledge acquisition, interactive communication, group cooperation, task completion, and dynamically modifies learners' models. Secondly, teachers design hierarchical teaching objectives, students choose learning objectives and receive learning tasks according to their internal needs, and the completion of learning tasks is based on the learning path of independent choice. Thirdly, teachers should give full consideration to students' individual characteristics in their counseling and intervention, and make targeted counseling programs according to students' characteristics and difficulties encountered in learning, so as to intervene students with the risk of academic failure. Finally, the teaching evaluation mechanism fully respects the individual characteristics of students and adopts a multi-agent, multi-directional and multi-dimensional comprehensive evaluation mechanism.

**Open Teaching Content**

In the information age when knowledge is growing at a fission rate, the simple content of teaching materials is far from meeting students' learning needs. The wisdom classroom with students' wisdom growth as the core demand should build an open teaching resource system, realize the integration of structured resources and unstructured resources, online and offline resources, school and social resources, domestic and international resources. The teaching content is always in a state of dynamic update, timely elimination of outdated and obsolete knowledge, absorption of high-quality knowledge with the times and cutting-edge. The teaching content is rich, authentic, international, dynamic, developmental and creative. In addition, in the selection of teaching content, we should fully consider the cognitive structure of students, through the decomposition and reorganization of teaching content, and take a reasonable form of presentation, effectively reduce the cognitive load of students.

**Diversified Evaluation System**

The wisdom classroom takes the students' wisdom growth as the core demand, and the teaching evaluation system should serve the teaching goal. Therefore, the wisdom classroom implements diversified teaching evaluation. First, the evaluation subject is diversified. Teaching evaluation is no longer limited to one-way evaluation of teachers and students, but includes evaluation of teachers and students, mutual evaluation of students, expert evaluation, self-evaluation of students, mutual evaluation within the group and other multi-body evaluation system; secondly, the richness of evaluation content. Wisdom classroom evaluates students' abilities of autonomous learning, creative problem solving, teamwork and communication. The specific contents of the evaluation include: the time, frequency and effect of students' self-study, the level of task selection, the degree and effect of their efforts to complete the task, the technical means and methods used to complete the task, the working attitude, the amount of tasks they undertake and the contributions they make when working in a team, the activities of participating in communication and discussion, questions and answers, brainstorming, etc. Third, the multi-dimensional evaluation direction. Teaching evaluation is not only limited to the evaluation of behavior results, but also pays more attention to behavior process and behavior selection.

**Refinement of Teachers' Role**

Horizon report (Higher Education Edition) of 2017 new media alliance regards "Rethinking the role of teachers" as a thorny challenge among the six key challenges. In the information society, teachers are no longer the only source for students to acquire knowledge, or even the main source. In the era when students can easily get the information they need through the Internet, the traditional role of teachers as "knowledge transmitters" has lost its value. With the deepening of education and teaching reform and the change of teaching ideas and teaching methods, teachers' responsibilities and roles must be changed. Taking students as the center and aiming at students' intelligent growth
in the smart environment, new learning methods, such as active learning, personalized learning, research and creative learning and cooperative learning, require teachers to change their roles from traditional "preachers and educators" to "creators of teaching resources", "designers of teaching process", "accompanies of teaching activities", "interveners of learning activities", "interveners of teaching activities" Learning effect evaluator". The refined division of teachers' roles is conducive to the balanced development of students' knowledge, skills, abilities and conduct.

**Teaching Design of Wisdom Classroom**

**Teaching Process Design**

1. Set up teaching objectives and task system in different levels

   The setting of teaching goal needs to consider the change of talent demand in the background of the times and the difference of individual characteristics of students. In the era of intelligence, it is the training goal of wisdom classroom to be able to skillfully use information technology to solve complex problems creatively, have the ability of independent learning in the information environment, has the ability of clear and skillful expression and communication, and good team cooperation. On the other hand, due to the different cognitive level, learning motivation and learning style of students, the setting of specific learning objectives cannot be uniform, but should be set in layers. The specific requirements of each level are different. Under the teaching goal of each level, further establish the task system of classification and hierarchy. According to their own needs, students choose learning objectives that match the level, enter the task system under the level, and choose their own learning path.

2. Task Oriented Modular Teaching Content

   Reverse combing the method system and knowledge system needed to complete the task, so as to reconstruct the teaching content. Break the restrictions of teaching according to the chapters of teaching materials, and construct the knowledge point module according to the knowledge system required for the completion of tasks. After receiving the learning task, students choose the modules of related knowledge points to learn according to the needs of task completion. The content of knowledge point module is not limited to textbook knowledge, but should follow the principle of openness, including all available and directly related Internet resources, industry resources, inter school resources and international resources. In the design of knowledge module, the cognitive load of students should be reduced. When the difficulty of learning materials is too high, the knowledge points are further decomposed into several small modules presented one by one to reduce the internal cognitive load.

3. Carry Out Independent Learning and Complete Phased Tasks

   Autonomous learning ability is one of the core qualities of learners in the age of intelligence. Here, autonomous learning refers to the process of learning by using various learning resources, such as independent learning, classroom learning, group collaborative learning, etc., which is a broad category. Autonomous learning does not necessarily exclude classroom teaching. One of the ways of students' self-study is to take students as the center of differentiated and individualized classroom teaching. Autonomous learning is not single combat learning either. Proper cooperative learning and communication with peers, teachers and experts can reduce the cognitive load of complex tasks and improve learning efficiency. In the process of self-study, students need to find problems, define problems, represent problems, design problem-solving strategies, implement problem-solving, and conduct self- reflection and evaluation. This process can effectively promote students from knowledge mastery to ability formation.

4. Pass the Test

   Research shows that the integration of Gamification into education can arouse students' enthusiasm and make their learning motivation continue better. The teaching design of wisdom classroom can introduce game elements and game thinking, so that students can get a sense of learning pleasure and constantly strengthen learning motivation. Specifically, after students complete their learning tasks, they conduct online test on the learning platform. If the pass is
successful, the student will be rewarded immediately and promoted to the next pass; if the pass is unsuccessful, the student will return to the learning stage of the original knowledge point; after all the tasks of the pass are completed, the student can enter the learning of the next task package. After a level of learning task is completed, students can choose whether to enter a higher level of learning.

**Classroom Teaching Implementation**

1. Pre-Class Stage: Learning Situation Analysis

   Accurate analysis of learning situation is the first step to ensure the teaching effect. In the information age, the analysis of learning situation can rely on the technology of learner modeling. Learner modeling technology refers to the use of artificial intelligence technology for data mining to complete the analysis of learner characteristics. Learners’ characteristics include learners’ cognitive structure, learning motivation, learning objectives and learning styles. Modeling methods include lead model, covering model, differential model, perturbation model, Bayesian model, constraint model and so on. According to the actual needs, we can choose the appropriate single model or combination model, and complete the modeling by artificial intelligence. After using the initial characteristics of learners to complete the modeling, the intelligent system also obtains and updates the dynamic information of learners according to certain algorithms and technologies. According to the results of the model, teachers can not only understand the personality characteristics of students, but also accurately grasp the degree of students’ self-learning before class, learning path, emotional state, problems encountered in learning and other important information, and reasonably design classroom teaching.

2. During Class—Task Oriented Research and Creation Teaching

   Problem-based learning and project-based learning are effective learning methods to develop learners' advanced cognition and develop their wisdom, both of which have dual driving effects. Research and creation teaching is a kind of intelligent teaching method with problem learning and project learning as its main content. Research and creation teaching requires teachers to create a real situation that can reflect the ultimate application of knowledge, and design learning tasks associated with the real world for students. Problem learning is that teachers guide students to identify the problems to be solved in creating situations, describe problems, establish hypotheses, and students plan their own ways to solve problems, and carry out learning and exploration activities. After forming the solution, display and share the results of the inquiry. In the process of solving problems, teachers encourage students to explore from different perspectives, express different views, and provide students with opportunities to communicate with experts. Project learning is to decompose learning tasks into multiple projects, and hand over relatively independent projects to students. Students experience the whole process of information collection, planning and design, discussion and exchange, project implementation, project evaluation, and teachers guide them. Due to the high complexity of the project, it is required to complete the task in groups, so as to exercise the team cooperation ability of students. In addition, in the process of classroom teaching, teachers organize students to conduct "brainstorming" on key issues in the task, encourage students to actively discuss, clearly express their views and debate. In the research-based classroom teaching, we should give full play to the students' main position and initiative, and the teacher should act as a guide and a helper.

3. After class: Individualized Counseling and Intervention

   In the after-school stage of wisdom classroom, in addition to completing the regular after-school extended learning tasks, it is more important for teachers to provide personalized guidance and intervention. On the basis of students' behavior analysis, effective learning guidance and intervention is an important guarantee to improve the quality of teaching. Students’ behavior can be divided into classroom behavior and out of classroom behavior. Classroom behavior can be observed directly. According to the students' active participation in classroom activities, the content and frequency of speech, the degree of classroom concentration and other behavior performance, teachers can preliminarily judge whether the students' learning state is normal, actively
communicate with the students who have lagged behind in classroom behavior, find out the reasons, and provide necessary individual guidance. However, in the new teaching mode, more learning activities take place outside the classroom. This requires using the learning analysis system of intelligent platform to track and record students' learning behavior, and using data mining technology for analysis and prediction. When students are predicted to have the risk of academic failure, the system sends an early warning signal and presents the possible causes of failure. The teacher analyzes these reasons and makes a judgment to decide whether to intervene. For the students who need to be intervened, we should provide directional guidance and help according to their personality characteristics. For example, push intervention resources, strengthen learning motivation, adjust learning objectives, etc.

Teaching Evaluation System

The purpose of wisdom classroom is to develop students' wisdom. Therefore, the teaching evaluation is carried out from these four dimensions. First of all, for students' autonomous learning ability, teachers' evaluation and self-evaluation are combined. The evaluation direction is behavior process and behavior result. The evaluation content includes the time, frequency and test results of autonomous learning; secondly, for the ability of students to creatively solve complex problems, teachers' evaluation and experts' evaluation are combined. The evaluation direction is behavior selection, behavior process and behavior result. The evaluation content includes the level of task selection, the degree of effort in the process of completing the task, the technical means and methods used to solve the problem, and the degree and effect of completing the task. Thirdly, for the team cooperation ability of students, the method of intra group evaluation is adopted. The evaluation direction is behavior process. Students evaluate the performance of the group members in the following aspects: the workload of the student when completing the group task, the contribution of the student to the completion of the group task, the cooperation and help provided by the student for other students in the group, the attitude of the student when completing the task; Finally, for the communication and expression ability of the students, teachers' evaluation and students' mutual evaluation are adopted. The evaluation direction is behavior process. The evaluation content includes the activity of students' participation in discussion and exchange (including discussion and exchange in the classroom and through the intelligent learning platform outside the classroom), the frequency and performance of students' public expression of their views in the classroom and learning platform, the situation of students' raising questions and answering other students' questions in the learning platform, and the performance of students' participation in "brainstorming".

Conclusion

Artificial intelligence, is subverting all walks of life, school education has also been greatly impacted. As the main position of school education, the classroom must change as soon as possible to adapt to the complex external environment. In the past few years, intelligent technology has been gradually applied to classroom teaching, however, we need to go further. Artificial intelligence changes not only the classroom teaching environment, but also the teaching concept and teaching mode. At present, the teaching reform of wisdom classroom has been carried out in some colleges and universities, but the teaching reform is often based on a certain project, a certain subject. Once the project and the subject are finished, the teaching returns to the traditional mode, and the reform lacks normalization. In addition, the current talent training system and teacher evaluation system hinder the promotion of wisdom classroom to a certain extent. The construction of wisdom classroom has a long way to go.

References


