Research on the Integration of Artificial Intelligence and Education

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Abstract. With the development of big data intelligence, deep learning, brain-like intelligence, autonomous control and other new generation of artificial intelligence technologies, the integration of artificial intelligence and education has become an inevitable development trend. Intelligent education system, such as virtual reality, educational robot, intelligent tutoring system, online learning system, learning analysis and so on, needs the seamless integration of human and machine cognitive intelligence. Understanding-based teaching is the fundamental way to realize the high integration of human and machine cognitive intelligence. In this paper, the experimental research of understanding-based teaching is carried out, and the results show that understanding-based teaching in the network environment can promote the development of students' creativity more than traditional teaching.

1. Introduction
Understanding is the basis for the flexible application of knowledge, and “Understanding” refers to deep understanding of those abstract and conceptual content, rather than just mastering some simple knowledge.[1] Through understanding, On the one hand, individual facts can be linked into a unified whole, on the other hand, the knowledge and skills learned can be flexibly used in specific environments. [2] Knowledge can only be transferred and applied when it is understood, and many studies have shown that rich knowledge and experience are the source of creativity. The creativity of students is constantly developed in the process of learning various subjects. With the coming of information society, creativity has become a necessary ability to meet the needs of social development. In recent years, the rise of understanding-based teaching in China is to pursue the true understanding of knowledge, not just the memory of knowledge. Obviously, it is of great significance to study the relationship between understanding-based teaching and the development of creativity. At present, the teaching in the network environment provides the possibility for us to move towards the understanding-based teaching. In the network environment, the understanding-based teaching is to mobilize the initiative of teachers and students through the use of multimedia teaching methods, rich network education functions and educational resources, so as to realize the real understanding of knowledge. Based on the existing research at home and abroad, this study empirically studies the relationship between the understanding-based teaching and the development of students' creativity in the network environment with the help of the teaching of statistical course.
2. Related theories
Statistical thinking is a kind of creative thinking. [3] This kind of thinking ability can be formed only when we have corresponding professional knowledge and special thinking training. The cultivation of statistical thinking is an active process of construction. Many characteristics in the network environment coincide with constructivism. The key point of constructivism learning view is to use the existing knowledge structure of learners to assimilate or adapt, so as to complete the mastery of knowledge. In this paper, the relationship between understanding-based teaching and creativity development in the network environment is mainly based on the following two theories.

2.1 Creativity and knowledge understanding
The research of cognitive psychologists shows that knowledge and experience are the basis of creation. Creativity is not only related to cognitive process, cognitive structure and metacognition, but also closely related to cognitive style, motivation attitude and social environment. Grant Wiggins and Jay McTighe, American curriculum experts, divide “knowledge understanding” into six dimensions: explanation, interpretation, application, insight, empathy and self-knowledge. Each dimension represents a level of understanding. With the development of understanding level, the understanding depth is also advancing. The understanding of the former level becomes the cornerstone of the realization of the latter. [4] Obviously, with the gradual progress of knowledge understanding level, all kinds of influencing factors of creativity will be promoted and developed, which naturally improves the creativity. There is isomorphism between creative activities and knowledge understanding, which is mainly reflected in the similarity and consistency of the two activities in terms of elements and operation mode.

2.2 Network environment and understanding-based teaching
With the rapid development of information and network technology, there has been a teaching method that takes the network as the media, which is called network education. [5] Through the use of multimedia teaching methods and rich educational resources, it can provide educators and learners with an understanding oriented teaching and learning environment. On the other hand, in the modern information society, the ability of understanding can improve students' ability of appreciation, judgment and criticism, and help students to classify and sort out vast knowledge and information. [6] It can be seen that the network environment is the material and ideological basis to promote the knowledge understanding from the low level to the high level, and it is the reliable guarantee to implement the understanding-based teaching. Obviously, the understanding-based teaching will also be the main development trend of the network education in the information age.

3. Teaching implementation
Statistics was originally produced to solve practical problems. [7] Case teaching of statistics course is a new teaching form, which belongs to the real simulation of practical activities. In recent years, many studies have shown that discussing and solving problems with open characteristics is not only conducive to the consolidation and mastery of statistical knowledge and statistical methods, but also conducive to the improvement of thinking quality and the cultivation of innovative spirit. And the derivative topic is that can reproduce and derive new problems, so as to inspire people to continue to explore. Here, we choose a series of derivative teaching cases with open characteristics in the statistical course to form the network course content based on knowledge understanding.

The design of understanding-based teaching in the network environment is to realize the goal of “knowledge understanding”. In the understanding-based teaching, as the main body of learning, the role of students is especially critical. Students' all-round participation in learning and equal dialogue between teachers and students are the core to promote knowledge understanding. Therefore, in the process of understanding-based teaching design, we should pay attention to the whole teaching process, including the formulation of understanding-based teaching objectives, the design of understanding-based activities and the continuous evaluation of each teaching stage. The understanding-based
teaching is to use the network environment to create a problem situation, so that students can personally experience the whole process of finding, analyzing and solving problems from the social and economic reality, so as to achieve the purpose of “knowledge understanding”. According to the theory of problem solving and network curriculum design, [4] the following steps are given to the statistical case teaching in the network environment. The first step is to provide the knowledge background related to the problem. Creativity comes from the basic cognitive process. Statistical teaching must emphasize the comprehensiveness of statistical cognitive activities. Network environment can provide rich knowledge background for students to acquire corresponding knowledge through analysis, induction, abstraction and generalization of knowledge background. The second step is multiple representation of statistical problems. Problem representation is problem understanding and the most important part of problem solving. The computer can provide multiple external representations, which can promote multiple internal representations. The knowledge acquired by students is full of vitality, and the connection between knowledge becomes complex and rich. The third step is the teaching of statistical thinking method. Statistical thinking method is not only the deep basic knowledge, but also the thinking strategy to solve the problem. With the help of network multimedia technology, which is convenient, interactive and diverse, students can understand and master statistical thinking methods more easily, and promote the improvement of statistical ability. The fourth step is problem solving and expansion. Problem solving is a learning activity that creatively applies statistical knowledge to solve statistical problems. The network environment extends students' learning content in time and space, and students can release the potential of creative thinking by finding, solving and summarizing problems. In the process of implementing these steps, it is necessary to always keep stimulating students' learning motivation. The network environment can create a relaxed psychological environment for students and enhance their initiative and independence in solving problems. Computer's timely evaluation of understanding activities can help to determine the level of understanding, and make new knowledge always in the "Recent Development Zone", so as to stimulate learning motivation.

4. Empirical research

4.1. Subjects
The subjects of this study are two classes in grade one, class A is the experimental class and class B is the contrast class, with 37 and 35 students respectively.

4.2. Experimental treatment
The experimental class uses the understanding-based teaching method in the network environment, and the contrast class uses the traditional class teaching method.

4.3. Dependent variable determination
The experimental dependent variable is the score of the campus investigation carried out by two classes.

4.4. Test materials
The pretest material is Williams' creativity tendency questionnaire, which can get four dimension scores and total creativity tendency scores. The four dimensions mainly evaluate the performance of the subjects in the four aspects of challenge, adventure, curiosity and imagination. There are 50 questions in this test, including 11 adventure questions, 14 curiosity questions, 13 imagination questions and 12 challenge questions. In the positive questions, 3 points for “complete conformity”, 2 points for “partial conformity”, 1 point for “complete non conformity”, and the reverse questions' scoring rule is the opposite. Here, the statistical problem of experimental research is to carry out a campus survey, including (1) The survey of College Students' Online Shopping Consumption.  (2) The survey of College Students' Interest in Professional Learning. (3) The survey of College Students'
Views on Marriage and Love. (4) The survey of College Students' Physical Quality. The total score of each part is 30 points, and the assessment mainly includes three aspects: (1) The ability to obtain the actual information and materials related to the survey in the network environment, and to sort out and analyze the materials. (2) The diversity of the survey. (3) The students' new understanding and new viewpoints through the survey. These three aspects account for 20%, 40% and 40% of the total score respectively.

4.5. Experimental design
This experiment adopts the unequal control group design in the quasi experimental design, this design can be expressed as follows:

Experimental class \( O_1 \ X_1 \ O_2 \)

Contrast class \( O_3 \ X_2 \ O_4 \)

Here, \( O_1 \) and \( O_3 \) represent the pre-test scores, \( X_1 \) is the understanding-based teaching mode in the network environment, \( X_2 \) is the traditional teaching mode, \( O_2 \) and \( O_4 \) are the test scores of two classes. In this experiment, independent large sample Z-test was used to analyse the scores.

4.6. Results and analysis
Through the test, the average value, standard deviation and significance test results were obtained, as follows:

Table 1 Mean value, standard deviation and significance test results of creativity tendency

| Type       | Class   | Adventurous | Curiosity | Imagination | Challenging | Creativity |
|------------|---------|-------------|-----------|-------------|-------------|------------|
|            | \( \overline{X} \) | s   | \( \overline{X} \) | s   | \( \overline{X} \) | s   | \( \overline{X} \) | s   |
| Experimental | 27.82   | 2.20        | 36.58     | 3.58        | 29.53       | 4.82       | 30.71      | 2.81       | 124.64     | 9.47       |
| Contrast    | 28.70   | 2.74        | 35.16     | 3.16        | 30.81       | 4.98       | 31.47      | 3.03       | 126.14     | 10.71      |
| P          | >0.05   | >0.05       | >0.05     | >0.05       | >0.05       | >0.05       |

Table 2 Mean value, standard deviation and significance test results of open exercise test

| Class       | Number | \( \overline{X} \) | s   | P       |
|-------------|--------|--------------------|-----|---------|
| Experimental| 37     | 127.34             | 4.93| <0.05   |
| Contrast    | 35     | 113.77             | 6.74|         |

The results show that the experimental class has more problem-solving solutions than the contrast class. We can also see that the students in the experimental class have a deeper understanding of life and learning.

5. Conclusion
In the network environment, understanding-based teaching mode should be a long-term pursuit, which will be perfected with the development of computer technology. Because of the restriction of network environment and the practical teaching viewpoint, it is not feasible to carry out the understanding-based teaching mode in the network environment, but we should choose the mode of combining the understanding-based teaching and the traditional teaching in the network environment. This new mode enhances the interaction between teachers and students, which can effectively promote the dissemination and transformation of knowledge. In the network environment, the understanding-based teaching of statistics course has a good effect on the cultivation of creativity, but it should be recognized that the derivative thesis and creativity measurement are two important factors that affect the experimental results, and these should be further studied in the future.
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