Design and Integration of Interdisciplinary Curriculum Based on Artificial Intelligence

Liu Ruxiang, Tai Yue
Department of Electronic and Information Engineering, Bozhou University, Bozhou, Anhui, China

Abstract: Artificial intelligence has been applied to every aspect of people's lives in the rapidly developing society. In order to improve the effectiveness of artificial intelligence reform in institutions of higher learning, this paper analyzes the possible utility of artificial intelligence in the design and integration of interdisciplinary courses and the prerequisite for the application of artificial intelligence. A questionnaire survey was conducted on the current situation of the interdisciplinary curriculum design and integration of AI in Colleges and universities, and the results of the questionnaire survey were analyzed. The author puts forward the countermeasures and suggestions on the design and integration of interdisciplinary courses based on artificial intelligence, and provide suggestions for the design and integration of interdisciplinary courses in the teaching of higher institutions.

Keywords: Artificial Intelligence; Curriculum Design; Integrated Strategy; Questionnaire Survey

1. Introduction

With the development of Internet technology and information technology, artificial intelligence has been applied to all walks of life, and has achieved good results in the industry. Artificial intelligence is applied in intelligent hardware and robots, intelligent security, business intelligence, virtual scene and traditional fields. In order to adapt to the development of the Internet age and cultivate the talents of the new era, colleges and universities have also begun to carry out the reform research on the design and integration of interdisciplinary courses in artificial intelligence, and have made some achievements [1-5]. However, AI needs further research in the field of Interdisciplinary Design and integration, which will provide new opportunities for curriculum reform in colleges and universities. This paper analyzes the possible utility of the application of artificial intelligence in the design and integration of interdisciplinary courses and the prerequisite for the application of artificial intelligence. A questionnaire survey is made on the design and integration of the interdisciplinary courses of artificial intelligence in colleges and universities at the present stage, and the results of the questionnaire survey are analyzed. the author puts forward the countermeasures and suggestions on the design and integration of interdisciplinary courses based on artificial intelligence, and provide suggestions for the design and integration of interdisciplinary courses in the teaching of higher institutions, so as to achieve the efficient development of teaching reform in colleges and universities [6-10].

2. Analysis of the Application of Artificial Intelligence in Interdisciplinary Curriculum Design

2.1 The Possible Utility of Applications

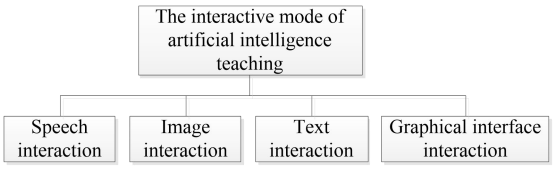

Figure 1: Artificial Intelligence Interactive Pattern

The most important of artificial intelligence is the interaction between human and intelligent equipment. Artificial intelligence integrates various media information, such as text, graphics, image and sound, and integrates the information or interest information of students into the intelligent system, and provides students with various teaching interactive ways to meet the students' demand for knowledge. An artificial intelligence interaction pattern is shown in **Figure 1**.

With the rapid development of science and technology in today's Internet and information society, AI can provide different courses for different students. With the advancement of artificial intelligence in interdisciplinary curriculum design and integration, teachers can use artificial intelligence to teach different students in accordance with their aptitude, provide individualized teaching for students, and help colleges and universities to choose corresponding teaching strategies according to their individual needs and individual differences, thus reaching higher levels of higher learning. the purpose of individualized teaching is to optimize the teaching effect.

There are many teaching resources on the Internet. AI can help integrate the teaching resources on the Internet and inject new vitality and knowledge into the classroom teaching in Colleges and universities. Artificial intelligence can also be used to share teaching resources and strengthen teaching cooperation with other institutions of higher learning. the use of artificial intelligence in interdisciplinary curriculum design and integration can help to improve the traditional teaching mode and change the situation of "teacher based" in the teaching of colleges and universities. It provides individualized teaching for students, gradually forms a "student-centered" teaching situation, and strengthens the students' ability to solve problems, thus realizes the individualized development of students, and trains high quality talents needed by the society and the state.

2.2 Application Precondition

The application of AI in interdisciplinary curriculum design and integration requires understanding the purpose of curriculum design. It is also necessary to know whether the hardware conditions of artificial intelligence in Institutions of higher learning can meet artificial intelligence operation and the purpose of the design and integration of interdisciplinary courses through artificial intelligence. AI has higher requirements for computer hardware equipment, and professional personnel are responsible for later operation and maintenance. Colleges and universities need to take into consideration the school environment and make necessary analysis of AI.

3. Questionnaire Analysis of Interdisciplinary Curriculum Design of Artificial Intelligence

3.1 Data Acquisition and Description

In order to further understand the actual situation of the interdisciplinary curriculum design and integration of artificial intelligence in colleges and universities, the effective reform strategy of the interdisciplinary curriculum design and integration of artificial intelligence is put forward. the interview and questionnaire survey are carried out on the students of university and the related teaching reform personnel, and the questionnaire data are carried out by using SPSS19.0. the questionnaire survey was used for students in Colleges and universities. 450 questionnaires were issued, 398 were recovered, 16 were invalid, 382 were valid, and the efficiency of the questionnaire was 84.9%. The questionnaires were distributed randomly, involving a total of three freshmen, sophomores and juniors of different majors in arts, science and engineering. the questionnaire survey accords with the principle of comprehensiveness and rationality, which provides reliable data support for analyzing the interdisciplinary curriculum design and integration of AI in Colleges and universities. Face-to-face interviews with related teaching reform personnel in Colleges and universities are mainly involved in the application of artificial intelligence at the present stage and the reform of artificial intelligence in teaching, especially in the design and integration of interdisciplinary courses.

3.2 Reliability Validity Test

The reliability and validity of the questionnaire for the design and integration of the interdisciplinary curriculum of artificial intelligence in higher education institutions are first tested. the reliability test is generally done by the kroner Baja coefficient test. the Krone Baha coefficient is generally between 0~1. the greater the kroner Baja coefficient, the higher the consistency of the questionnaire is, the more credible the questionnaire results are. the general kroner coefficient of Baja should be above 0.7, which indicates that the whole questionnaire is of high credibility. the criterion of Krone Baha coefficient is shown in **Table 1.**

SPSS and AMOS software is used to analyze the reliability of the interdisciplinary curriculum design and Integration Questionnaire for the recovery of AI in Colleges and universities. the reliability test of Kron Baja system is 0.819, which shows that the reliability coefficient has reached the goal of the design and integration of interdisciplinary courses for the study of artificial intelligence, and the results of the questionnaire are reliable. the validity of the questionnaire is generally tested by KMO test. the larger the KMO coefficient is, the higher the validity of the questionnaire is, the more effective the questionnaire results are. This shows that the whole questionnaire is effective and can truly reflect the survey results. the criteria for the KMO test are shown in **Table 2**.

Table 1: Kron Baja Coefficient Criterion

Kron Baja system	Reliability of questionnaire survey
More than 0.900	Very nice
0.800~0.899	Very good
0.700~0.799	good
0.600~0.699	Reluctantly
0.500~0.599	Low effect
Less than 0.500	If the effect is poor, it should be deleted

Table 2: KMO Test Criteria

KMO value	Judgment	Factor analysis adaptability
More than 0.90	Very suitable for factor analysis	Very good
More than 0.80	Suitable for factor analysis	Good
More than 0.70	Factor analysis can be carried out	Moderate
More than 0.60	Reluctance to carry out factor analysis	Ordinary
More than 0.50	Not suitable for analysis of factors	Poor
Less than 0.50	It is very unsuitable for factor analysis	Unacceptable

The KMO validity test of the interdisciplinary curriculum design and Integration Questionnaire for higher education AI was carried out. the validity test value of KMO is 0.84, and the validity test is good, which meets the standard of validity standard. the questionnaire survey is suitable for the analysis of the present situation of the interdisciplinary curriculum design and integration of artificial intelligence in Colleges and universities.

3.2 Data analysis of Questionnaire Survey

Table 3: Statistical Analysis of the Degree of Satisfaction of School AI in Curriculum Design and Integration

Satisfaction degree	Student satisfaction ratio /%
Satisfied	14.2%
General satisfaction	36.7%
Defective	28.5%
Dissatisfied	20.6%

Based on the analysis of the factors that influence the design and integration of interdisciplinary curriculum in artificial intelligence in universities, part of the questionnaire is selected for detailed analysis.

In the effective questionnaires recovered, the selected items and statistical results for this question of "What is the degree of satisfaction with the design and integration of AI in schools?" are shown in **Table 3**.

According to the analysis of statistical results, the degree of satisfaction of artificial intelligence in curriculum design and integration is general, and the ratio of "satisfactory" and "general satisfaction" is 50.9%. the proportion of students who think AI is "defective" and "dissatisfied" in curriculum design and integration is 49.1%. According to the result analysis, it can be concluded that there is a great controversy about the design and integration of artificial intelligence in college students, which is related to the new Internet technology in contact with college students. the school's artificial intelligence equipment is generally backward, or cannot be updated in time, and the students' own mobile clients are generally more advanced, and they have a high demand for the ability to interact with the intelligent equipment.

In the effective questionnaires recovered, the selected items and statistical results for this question of "Through the reform of curriculum design and integration of artificial intelligence, which aspect did you gain the most?" are shown in Table 4.

In Institutions of higher learning, through the reform of artificial intelligence in curriculum design and integration, most of the students have gained greater interest in learning. They are more willing to learn knowledge through AI and increase knowledge reserves. the

effective percentage of the autonomous learning by artificial intelligence is 60.7%, which is basically consistent with the purpose of artificial intelligence in the course design and integration of the institutions of higher learning. It can be seen that in the daily teaching activities of universities, the reform and application of AI in curriculum design and integration are good.

Table 4: Statistical Analysis Table of Through the Reform of Curriculum Design and Integration of Artificial Intelligence, Which Aspect Did You Gain the Most

Student harvest options	Frequency	Effective percentage
Improved interest in learning, and willing to learn knowledge through artificial intelligence.	114	29.8%
Increasing knowledge reserves and learning autonomously through AI	118	30.9%
Through AI, students are more willing to communicate with teachers in class.	97	25.4%
Simply interested in artificial intelligence	35	9.2%
There is no artificial intelligence, not much gain	18	4.7%
Total	382	100%

4. Strategies and Suggestions for Interdisciplinary Curriculum Design and Integration Based on AI

We should strengthen the training of teachers, improve the quality of teachers, pay attention to the training of teachers' information technology, set up a suitable teaching evaluation system, and strengthen the development and operation of the system.

4.1 Pay Attention to Teaching and Learning

Through the survey of artificial intelligence in curriculum design and integration, it is found that students are lack of autonomy in learning under the network environment. Because of the deep-rooted influence of traditional teaching methods, students are too dependent on Teachers' guidance and education. Students lack the ability to study independently. They cannot formulate relevant learning plans, establish learning goals, and conduct self-study management and evaluation on their own learning conditions. In the future study, schools should adopt corresponding training in the classroom, so as to enhance the cultivation of students' autonomy and arouse students' enthusiasm for learning. Students lack the ability to self-control in the network environment. Because of the advent of the Internet era, students begin to get relevant information through the network, and can use computers flexibly, and have enough network application level. However, due to the lack of network information management, there is much information that is not conducive to the healthy growth of students. Besides the characteristics of the student group, they do not have enough self-control ability to distinguish the information from the network. Therefore, it is easy for students to be deceived by much network information in the process of learning through network classes, and the trap of network information cannot improve the learning ability and affect their physical and mental development. Students lack timely emotional communication. Students learn through the Internet. In their learning, they are oriented to an intelligent machine without emotional changes and emotional communication. Computer network cannot timely analyze students' current mental state and learning situation through students' facial expressions. Students lack timely emotional communication, which is not conducive to timely understanding of students' learning and lack of enthusiasm for students in learning. Therefore, we should pay attention to the relationship between "intelligence" and "teaching" in the design and integration reform of interdisciplinary curriculum of AI. Intellectualization is not only the main purpose of teaching, but also the means of teaching.

4.2 Pay Attention to The Training of Teachers' Information Technology

In the reform of interdisciplinary curriculum design and integration of artificial intelligence, not only students have some problems in learning, but also teachers themselves have many problems in teaching. Teachers have been innovating in the application of interdisciplinary curriculum design and integration reform of artificial intelligence.

Through the training of teachers' Internet application level, teachers have the ability and level of using computer multimedia, and can flexibly produce electronic courseware related to book knowledge. But the electronic course wares are short of new ideas. the teacher merely converts the knowledge of textbooks into electronic courseware, and has no serious difficulties. This has not changed the traditional "Teacher centered teaching" mode. It is not conducive to students to play their own thinking ability, to enhance their own level of expression. It increases the working hours of the teachers. In the traditional way of teaching, teachers should understand the relevant knowledge. But in today's classroom network environment, teachers should not only understand and prepare lessons that will be taught in advance in class, but also convert relevant knowledge into electronic courseware, which not only causes teachers to be unable to meticulous and full thinking about teaching knowledge, but also increases the working time of teachers and the burden of teaching. According to the survey, it can be found that school teachers are generally facing a problem. If there is a power failure and multimedia problems, it is impossible to continue teaching, which is too dependent on electronic courseware. Teachers no longer use traditional textbooks to carry out classroom teaching, and blackboard writing ability is degraded. Moreover, teachers are fixed on the multimedia platform, which hinders the emotional interaction between teachers and students, and reduces the enthusiasm of students.

4.3 The Timely Updating and Operation of School Hardware and Equipment

The hardware environment mainly means that the hardware of the school classroom is limited by the capital of the school, which is not complete enough to fully meet the learning needs of the design and integration of the interdisciplinary curriculum of artificial intelligence. the number of computers cannot meet the present school students' artificial intelligence teaching and learning at the same time. AI software is not the latest software system, and the school computer center did not carry out system check in time. the software environment mainly refers to the multimedia system that teachers use in class, and the activities of teachers and students are realized through multimedia system. the advanced software environment is the basis for ensuring the design and integration of AI courses.

5. Conclusion

In the Internet era, the development of all walks of life cannot be separated from the network. the use of AI in the design and integration of interdisciplinary courses in Institutions of higher learning is in line with the reform objective of colleges and universities, and is conducive to the completion of teaching reform. This paper analyzes the possible utility of the application of artificial intelligence in the design and integration of interdisciplinary courses and the prerequisite for the application of artificial intelligence. A questionnaire survey is carried out on the design and integration of the interdisciplinary courses of artificial intelligence in Colleges and universities at the present stage. the reliability and validity of the questionnaire are tested and the results are good. the questionnaire can truly reflect the interdisciplinary curriculum design and integration of AI in Colleges and universities. the author analyzes the results of the questionnaire survey, and puts forward the countermeasures and suggestions on the design and integration of interdisciplinary courses based on artificial intelligence in the aspects of teaching reform, teachers' accomplishment, and students' interest in learning. It provides suggestions for the design and integration of interdisciplinary courses in the teaching of Higher Education and the high efficiency development of the teaching reform of the higher schools.

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References

[1] Head B A, Schapmire T, Earnshaw L, et al. Evaluation of an Interdisciplinary Curriculum Teaching Team-Based Palliative Care Integration in Oncology [J]. Journal of Cancer Education the Official Journal of the American Association for Cancer Education, 2016, 31(2):358-365.

[2] Jacobs H H E. Interdisciplinary Curriculum: Design and Implementation [J]. Association for Supervision & Curriculum Development Cited in T, 1989:99.

[3] Campbell C, Henning M B. Planning, Teaching, and Assessing Elementary Education Interdisciplinary Curriculum [J]. International Journal of Teaching & Learning in Higher Education, 2010, 22:179-186.

[4] Karakus, Memet Uyar, Melis Yesilpinar. the Implementation and Evaluation of an Instructional Design Based on the Interdisciplinary Approach: Conscious Consumer Education. [J]. Journal of Education & Learning, 2017, 7(2):65.

[5] Zang W, Wang Y. Exploration and practice of medical interdisciplinary integrated curriculum based on problem-based learning [J]. China Medical Education Technology, 2010.

[6] Okada Y. On the Structure of Interdisciplinary Curriculum in Undergraduate Education: Based on Pedagogic Codes Theory [J]. Japanese Journal of Curriculum Studies, 2001(10):145-158.

[7] Raviv A. An Intervention Model Based on an Interdisciplinary Curriculum to Promote Underachievers [J]. Learner Collection, (3):85-112.

[8] Zhang W, Zhang H, Zhu F M. Discussion of Curriculum Based on the Interdisciplinary Biomedical Materials Science [J]. Guangzhou Chemical Industry, 2012.

[9] Zhang E. Possibillity and Limitation of Curriculum Interdisciplinary Integration of Physics and Chinese [J]. Education Research Monthly, 2013.

[10] Zhao K, Ji A G, Zhou L J, et al. Curriculum Design and Teaching Method of Interdisciplinary Research-Based Course [J]. Electronic Technology, 2017.

