

Exploration of Teaching Strategies for Artificial Intelligence-Oriented College Students' Autonomous Learning

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Abstract: Big changes are taking place in China: big changes in business, society and the world view. These major changes require college students in the new era to strengthen the autonomy of learning, enhance the comprehensive competitiveness of college students, enhance the international competitiveness of the country, and promote the construction of cultural power. Aiming at the problems existing in the teaching of ideological and political courses in colleges and universities, this paper proposes a multi-level fuzzy evaluation model based on artificial intelligence. The experimental results showed that in the "smart" classroom, 45 students could do their own preview. Although many students lack the ability of independent learning, they can still be well guided in independent learning. Therefore, intelligent education can effectively guide students to self-study in ideological and political teaching in colleges and universities.

1. Introduction

The explosive growth of software makes people live in an era of media technology. Due to the immediacy, low cost, personalization and diversification of new media, the application of new media is more and more extensive, and the number and frequency of students' use is also high. By using artificial intelligence, teachers can break through the constraints of time and space and more intuitively understand the needs of students. Students and teachers can be connected through personal salary, which not only improves the interaction between teachers and students, but also improves the ability of teachers to guide students. At the same time, through the new media learning group, students can get the required materials more quickly and also solve some difficult problems in a short time. ^[1-3] From a theoretical and practical point of view, the academic and political curriculum of university students must be reformed. This paper discusses the autonomy of college students from two aspects: theory and practice. In curriculum teaching, research methods and student-teachers are interwoven. From the aspects of theory construction, practice method, guidance technology, curriculum construction, etc., it has formed operational, implementable and effective methods and practical activities. ^[4-5] It can make up for the gap in understanding and application of

ideological and political theory courses in contemporary colleges and universities, so that it can more accurately reflect the educational purpose of "life reflects practice, design is based on life".

2. Fuzzy Evaluation of Courses

2.1 Fuzzy Sets and Operations

The "intelligent" teaching of ideological and political courses in colleges and universities should first be constructed from four aspects: school, school, teacher and student. System construction is a kind of system guarantee that universities carry out on the basis of artificial intelligence. Strengthening planning and monitoring during implementation; The aim of the "master plan" is to lay the foundation for the implementation of "smart" teaching on campus and in the university, and to create a "holistic" environment. Since educators are the main source of moral education in primary and secondary schools, it is very important to improve the quality of their intellectual education. College students must define their role in this approach to achieve deep enrollment, efficiency, and interaction.

In autonomous learning, the roles of teachers and students are generated by the progressive advancement and development of the six group roles of life, activity, experience, learning, thinking and growth, as shown in Figure 1.

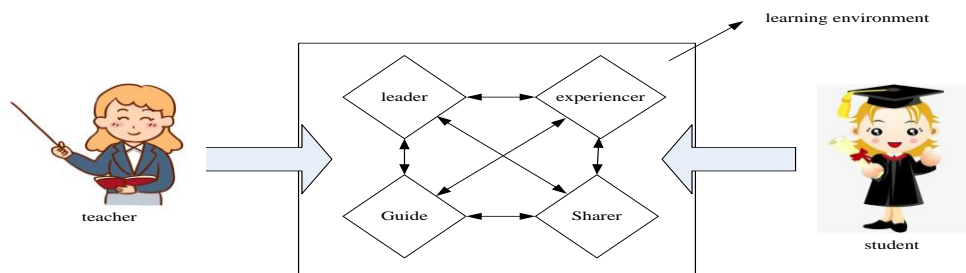


Figure 1: The role relationship diagram of smart education

Independent learning focuses on the development needs of educatees and strengthens their rights and freedom. Based on the subject of education, the form and content of experience activities are designed and constructed. At present, the experience guidance for students by teachers of ideological and political courses in universities is not enough. In education, experience is based on life and reality. Personal thoughts in personal experience and negative thoughts in society are inevitably brought into the experience by the experiencer. Without proper guidance, adverse effects are likely to occur, which runs counter to the guiding principle of "autonomy," as shown in Figure 2.

Therefore, regardless of whether the experience generated by the participants in the process of interaction is positive or negative, leaders must guide the experience and thinking in a targeted manner according to the setting of the educational purpose, so that the educational results will develop towards the predetermined purpose. Due to the lack of correct guidance, college students will have negative, pessimistic, conceited, conceited and other psychological states, and in severe cases will have dissatisfaction with others, classes, schools, and society, and even have a negative impact on the party's beliefs and socialist beliefs. Therefore, in the process of implementing self-learning, it should be guided by rational purposes and guided by correct values.

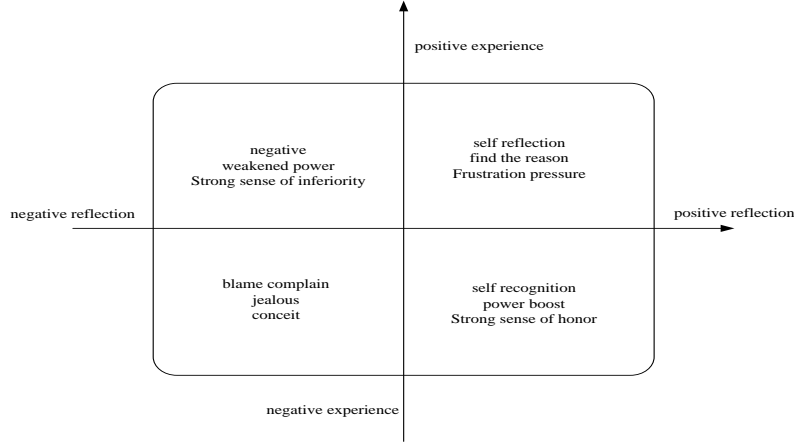


Figure 2: The four-quadrant guiding principle of self-directed learning education

It is assumed that V is a specific set of objects called the universe of discourse, which can be continuous or discontinuous; v is the V element, denoted by $V = \{v\}$. In the domain of discourse V , the fuzzy subset can be expressed in terms of the order couple of the unit and its membership function $\mathcal{G}_F(v)$, and it can be expressed as:

$$F = \{(v, \mathcal{G}_F(v)) | v \in V\} \quad (1)$$

If V is continuous, the fuzzy set F can be written as:

$$F = \int_V \mathcal{G}_F(v) / v \quad (2)$$

If V is discrete, the fuzzy set F can be written as:

$$F = \mathcal{G}_F(v_1) / v_1 + \mathcal{G}_F(v_2) / v_2 + \dots + \mathcal{G}_F(v_n) / v_n \quad (3)$$

$$F = \sum \mathcal{G}_F(v_i) / v_i, i = 1, 2, \dots, n \quad (4)$$

X and Y are set as two fuzzy sets in the universe U , and their membership functions are \mathcal{G}_X and \mathcal{G}_Y , respectively, then for all $v \in V$, there are the following operations: $X \cup Y$, and its membership function is defined as:

$$\mathcal{G}_{X \cup Y}(v) = \mathcal{G}_X(v) \vee \mathcal{G}_Y(v) = \text{MAX}\{\mathcal{G}_X(v), \mathcal{G}_Y(v)\} \quad (5)$$

$X \cap Y$, it is defined as:

$$\mathcal{G}_{X \cap Y}(v) = \mathcal{G}_X(v) \wedge \mathcal{G}_Y(v) = \text{MIN}\{\mathcal{G}_X(v), \mathcal{G}_Y(v)\} \quad (6)$$

The complement of X is \bar{X} , and its transfer function is defined as:

$$\mathcal{G}_{\bar{X}}(v) = 1 - \mathcal{G}_X(v) \quad (7)$$

If X_1, X_2, \dots, X_n is a fuzzy set of V_1, V_2, \dots, V_n , then their direct product is a fuzzy set of $V_1 \times V_2 \times \dots \times V_n$, and its membership function is as follows:

$$\mathcal{G}_{X_1 \times \dots \times X_n}(v_1, v_2, \dots, v_n) = \min\{\mathcal{G}_{X_1}(v_1), \dots, \mathcal{G}_{X_n}(v_n)\} \quad (8)$$

$$U \times V = \{(v, u), \mathcal{G}_T(v, u) \mid v \in V, u \in U\} \quad (9)$$

If T and E are a fuzzy relationship between $U \times V$ and $U \times M$, then the composite operating system of T and E is a fuzzy relationship from U to M, expressed as follows:

$$ROS = \left\{ \left[(u, m); \sup_{v \in V} (\mathcal{G}_T(u, v) * \mathcal{G}_E(v, m)) \mid u \in U, v \in V, m \in M \right] \right\} \quad (10)$$

Its membership function is:

$$\mathcal{G}_{ROS}(u, m) = \bigvee_{v \in V} \mathcal{G}_T(u, v) \wedge \mathcal{G}_E(v, m), (u, m) \in (U, M) \quad (11)$$

The * sign can be any of a triangle normal form, including fuzzy product, algebraic product, bounded product, direct product, etc. The membership function of the fuzzy set F satisfies the following conditions:

$$\text{MAX}_{a \in T} \mathcal{G}_F(a) = 1 \quad (12)$$

Then F is a normal fuzzy set; if for any real number $a, x < a < y$, there is:

$$\mathcal{G}_F(a) \geq \min\{\mathcal{G}_F(x), \mathcal{G}_F(y)\} \quad (13)$$

If F is positive and convex, then F is a fuzzy number. A linguistic variable can be defined as a multivariate group of $(a, R(a), U, G, M)$. Combining fuzzy concepts with exact values enables qualitative concepts to be quantified.

2.2 Fuzzy Comprehensive Evaluation

Fuzzy comprehensive evaluation refers to a fair and reasonable comprehensive evaluation of all aspects of a thing or object. Such as product quality assessment, scientific and technological achievement appraisal, teacher teaching achievement assessment, etc., all belong to comprehensive evaluation problems. To obtain an objective, fair and reasonable evaluation result, the key lies in constructing a reasonable evaluation model. A well-known evaluation model is a linear-weighted average comprehensive evaluation model. The model is simple in calculation and convenient in modeling, but because there are many attributes of the evaluation object, and the characteristics reflected by the attributes are ambiguity, the evaluation effect is often unsatisfactory. In real life, such evaluation objects occupy the majority, therefore, the evaluation by fuzzy mathematics and fuzzy comprehensive evaluation will often lead to more realistic conclusions.

The mode of fuzzy comprehensive evaluation can be divided into multiple levels, among which, the fuzzy comprehensive evaluation mode of the first level is a typical example, and its establishment process can generally be summarized into the following steps:

The set of evaluation objects is established:

$$V = \{v_1, v_2, \dots, v_m\} \quad (14)$$

Elements are various characteristics or performances of objects, also known as “parameter index” or “quality index”, which can comprehensively reflect the quality of the measured object, so that these elements can be used to evaluate the target.

In autonomous learning, the main ways to guide students to learn autonomously are: question guidance, situation guidance, experience guidance, sharing guidance, and value clarification. The five teaching methods are systematically applied in autonomous learning and oriented education, and there is a certain logical sequence relationship between them, as shown in Figure 3.

Under the guidance of autonomous learning, five specific methods play an irreplaceable role in the five aspects of creation, introduction, experience, reflection, and improvement, thus forming the orientation of autonomous learning to education. Each specific teaching method is relatively independent, but it is interconnected and infiltrated with other teaching methods, and uses activities as the carrier to promote the purpose of ideological and political education for college students.

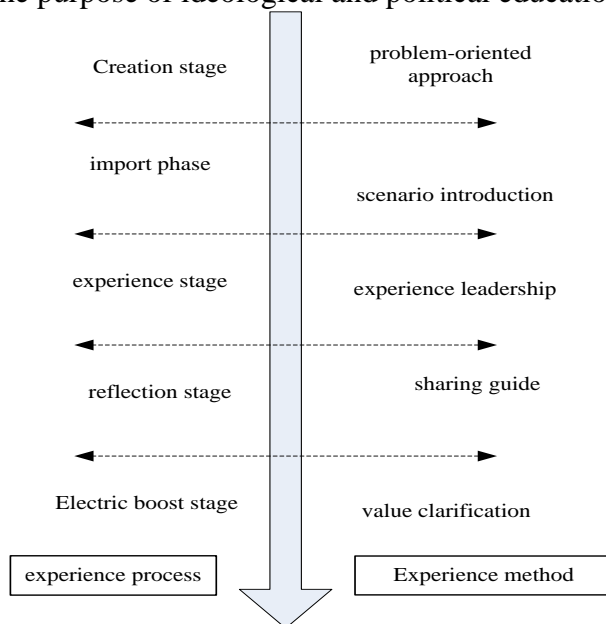


Figure 3: Self-directed learning teaching method system

An effective matching strategy is based on fully learning, borrowing and absorbing the theory of “password lock”, combining the needs of self-directed learning to guide education reform and the development idea of self-directed learning to guide education reform. This is the basic theory that under the guidance of autonomous learning, various factors can be reasonably combined according to a certain procedure, structure and quantity to form a teaching situational activity oriented by autonomous learning, as shown in Figure 4.

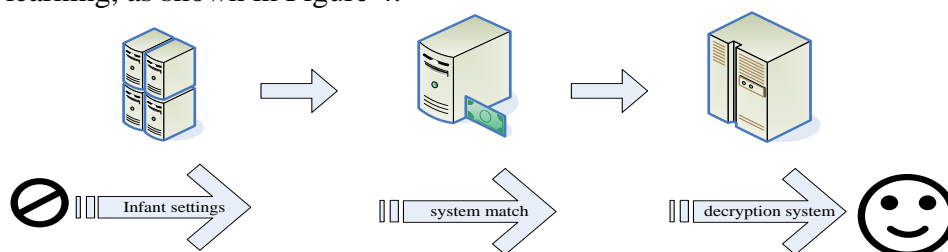


Figure 4: Self-directed education effectiveness matching

This theory can make autonomous learning more intuitively express its guiding role in educational innovation design. Self-directed learning-oriented innovative research is presented in a personalized and targeted manner. Therefore, effective cooperation strategies are characterized by compositional, cooperative, relational and systematic.

The weight matrix X of the evaluation factors is determined. Because the preference degrees of each factor in V are different, different weights must be assigned to each factor, and it can be

expressed as a set of fuzzy sets $X = (x_1, x_2, \dots, x_m)$ on V , and stipulates:

$$\sum_{i=1}^m x_i = 1 \quad (15)$$

A set of comments is built:

$$U = \{u_1, u_2, \dots, u_m\} \quad (16)$$

The combination of comment sets is more flexible, generally “very good”, “good”, “average”, “poor”, but it will also vary according to different indicators. The generalized scoring method can also be determined by membership function, which can be quantified and synthesized.

A one-factor evaluation is established, that is, a fuzzy mapping from V to $F(U)$:

$$f : V \rightarrow F(U), \forall v_1 \in U \quad (17)$$

$$v_1 \mapsto f(v_1) = \frac{t_{i1}}{u_1} + \frac{t_{i2}}{u_2} + \dots + \frac{t_{in}}{u_n} \quad (18)$$

$$0 \leq t_{ij} \leq 1, 1 \leq i \leq m, 1 \leq j \leq n \quad (19)$$

The fuzzy matrix is:

$$T = \begin{bmatrix} t_{11} & t_{12} & \dots & t_{1n} \\ t_{21} & t_{22} & \dots & t_{2n} \\ \dots & \dots & \dots & \dots \\ t_{m1} & t_{m2} & \dots & t_{mn} \end{bmatrix} \quad (20)$$

T is called the evaluation matrix of a single factor, and (V, U, T) constitutes a comprehensive evaluation model.

3. College Students' Learning Autonomy in Ideological and Political Courses

3.1 Data Preparation before Experiment

The intellectual education of college students is a general and lengthy activity in the age including all channels. This paper is conducted by way of questionnaire survey, a total of 220 copies, 200 valid questionnaires, and the effective recovery rate is 90.9%. Among the students who participated in the survey, 90 were boys and 110 were girls. In terms of grade distribution, there were 38 freshmen, 72 sophomores, 36 juniors, and 54 seniors. The composition of the questionnaire is reasonable in terms of gender and grade, and is generally balanced and representative.

3.2 Ideological and Political Courses from the Perspective of Attitude and Value

Schools and colleges have a significant role in the political and philosophical work that college students do. Every collegiate student must take the philosophical and political theory course because it is fundamental knowledge for all schools of higher education. In addition to following current trends, computer intelligence's function in students' political and political education is crucial for enhancing its efficacy.

It has been discovered with analysis on how ideologies and political theory is taught in colleges and universities that there are issues with the way that these courses are now taught, including comprehending issues and a lack of a strong sense of accomplishment. It is challenging to modify, and both ideological and political education must be carried out correctly and be appropriate for their own lives if they are to actually benefit. Figure 5 displays the test outcomes.

In the questionnaire on “views on problems in the study of ideological and political theory”, as shown in Figure 5(a), 150 students chose “knowledge point memory disorder”, accounting for 75%. There were 114 students who chose “the content is difficult to understand”, accounting for 57%. Among the students surveyed, 110 students chose “review difficulty”, which was 55%. Among the students surveyed, 70 students chose “course resource imbalance”, which was 35%. When 80 students were surveyed, 40% of them chose “lack of gain”. As a result, the issue of knowing base remember is prevalent in the recent work being done in terms of ideology and politics in college and universities, and has nothing to do with gender, education, or professional background. Through investigation, it is found that the main problems of current college students are mainly in the mastery of course content, knowledge points and examinations, followed by thinking about education fairness and lack of their own sense of acquisition.

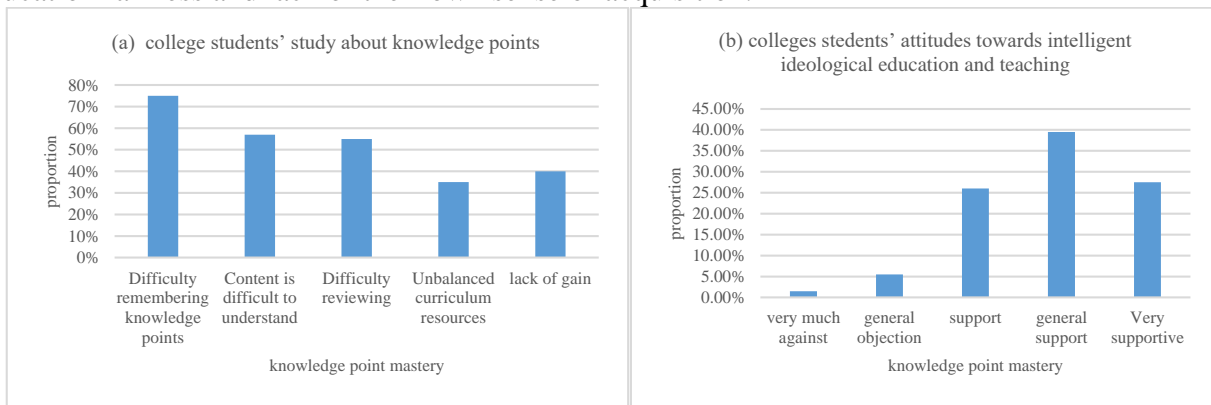


Figure 5: University students' attitudes towards ideological and political science courses and smart classrooms

As demonstrated in Figure 5 (b), when questioned about the extent to which “machine learning” is supported in ideology and politics learning in universities and college, 55 students expressed great support for it, accounting for 27.5% of all respondents; 79 students expressed general agreement with this, accounting for 39.5%; 52 students held a favorable attitude, accounting for 26%; 11 students generally held a disapproval point of view, 5.5% of the students surveyed; three students expressed strong disagreement, 1.5% of the students surveyed. After this lofty perch, it is clear that the majority of students have a favorable outlook on the use of intelligent machines in the ideology and politics instruction of students.

In addition, as shown in Table 1, due to the subject background, 8 students hold different views, accounting for 53.33%; among the science students, 4 expressed disagreements, accounting for 26.66%; three engineering students disagreed, accounting for 20 percent of all disapproval attitudes, and strong disapproval attitudes were averaged across the three majors.

Table 1: Effects of advanced degree on political training of students using AI (artificial intelligence)

	Very Good Approval	Normal Level of Approval	Favorable	Usually oppose	Strongly oppose	Summary
Inferential	30(29%)	41(40%)	24(23%)	6(6%)	2(2%)	103

statistics and crafts						
Science	21(30%)	23(33%)	22(31%)	3(4%)	1(2%)	70
Engineering	7(35%)	4(20%)	6(30%)	2(10%)	1(5%)	20

The results of the survey show that most students experience some kinds of trouble in ideological and political education, such as comprehension problems. Memory, and taking the initiative to solve difficulties. Judging from the educational background and major of the research subjects, among the students surveyed, the students majoring in humanities and social sciences are the most. This indicates that the view of AI varies from students with different specialized profiles and degrees, but the vast majority of students have an attitude of optimism.

3.3 Ideological and Political Courses from the Perspective of Change and Service

Compared with the pure network environment and big data environment, the services and changes brought by artificial intelligence will be more intelligent. The research on the change of ideas, the provision of services, and the change of teaching places, etc., are shown in Figure 6.

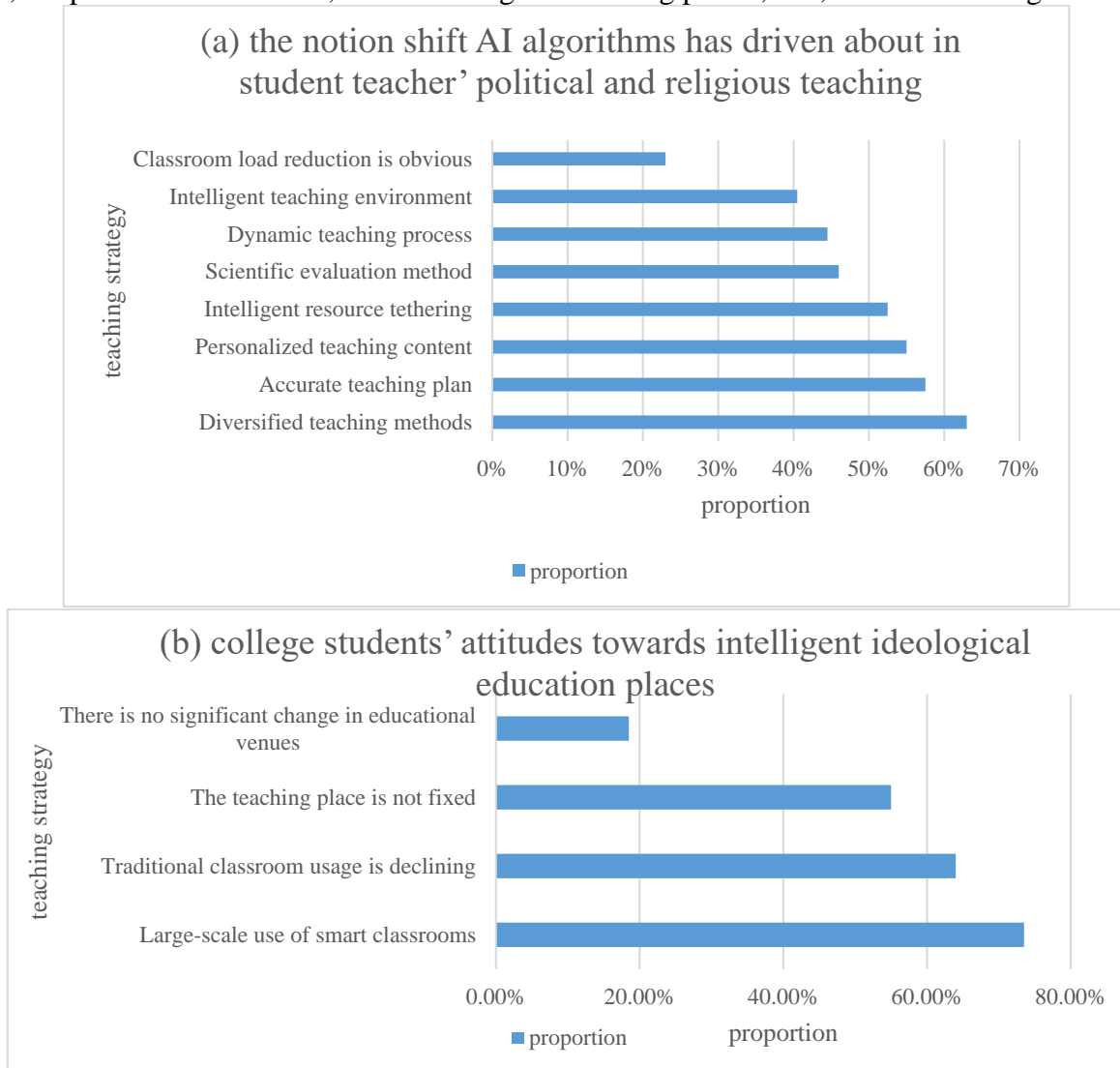


Figure 6: Developments in venue and opinions toward the ideological and political education of undergrads

Among the college students who were asked, in Figure 6(a), there were 126 students who chose different education modes, which was 63%. 115 students chose precise courses in the acceptance questionnaire, accounting for 57.6%. 110 students opted for personalized teaching content, which was 55%. Among the 105 students, 52.5% chose intelligent resource retrieval. There were 92 students who chose the scientific evaluation method, accounting for 46%. 44.5% of the students participated in the experiment, of which 89 adopted the dynamic teaching method. 81 students chose “intelligent teaching” in the questionnaire, which was 40.5%. When being surveyed, 46 students chose “obviously reduced classroom burden”, about 23%. From the research, it is found that the vast proportion of college students, when talking about the change of the ideas of ideological and political training of college students by “AI”, put forward the words of “variety”, “accurate” and “individualized”. The three words are the ultimate goal of the ideological and practical training of college students by “AI”. Only a few students believe that the emergence of AI does not relieve them of the stress of learning and the issues they face at the examination level, such as the problem of knowledge recall.

In the questionnaire survey, as shown in Figure 6(b), 147 students chose to “use a lot” of smart classrooms, and the proportion was 73.5%. Of the 128 students, 64% chose traditional classrooms. 110 students, 55%, could be unsure when choosing a teaching location. Of the students surveyed, only 37 students, or 18.5%, did not see much change in their views on teaching locations. In terms of current college students’ views on the change of ideological and political education venues in the AI context, the vast majority of college students are optimistic and believe that it will change the teaching environment.

According to Figure 7(a), 133 pupils (66.5% of those surveyed) believed that AI could assist them in planning erudite studying and in guiding and reminding humans to fulfill the matched instructional activities when went to ask what services they should receive in the procedures of teenage boys’ philosophical and political academic achievement. 112 students (56% of those polled) believed that AI may intelligently suggest pertinent teaching aids based on their unique education circumstances and demands. Ninety-nine students, or 49.5% of those surveyed, thought that AI could provide intelligent, accurate and personalized learning tutoring. Additionally, the majority devote more time to services like attentive attendance, question-answering, planning classes and classes, and identifying learning issues.

From Figure 7(b), it can be seen that in “Smart Education”, 45 students can make their own preview, 105 make a study plan by accident, and 50 never plan, which shows that their study plan is insufficient; only 59 had regular checks on their studies, 96 checked occasionally, and 45 never checked on their studies; from the research results, it can be found that the vast majority of college students have problems of self-supervision and unconsciousness in the learning process.

Undergraduate university schools usually truly think that AI systems can offer them intelligent tutoring facilities, such as preparation and direct teaching, instructional courses, and thoughtfully advising learning resources, evolving the learning atmosphere. This belief is confirmed by the results of this portion of the survey. The “strength” of “machine learning” for political and ideological education, that is also the worth promotion of “AI” in ideology and political in the colleges and universities, should highlight “ability” for teenage boys’ ideas.

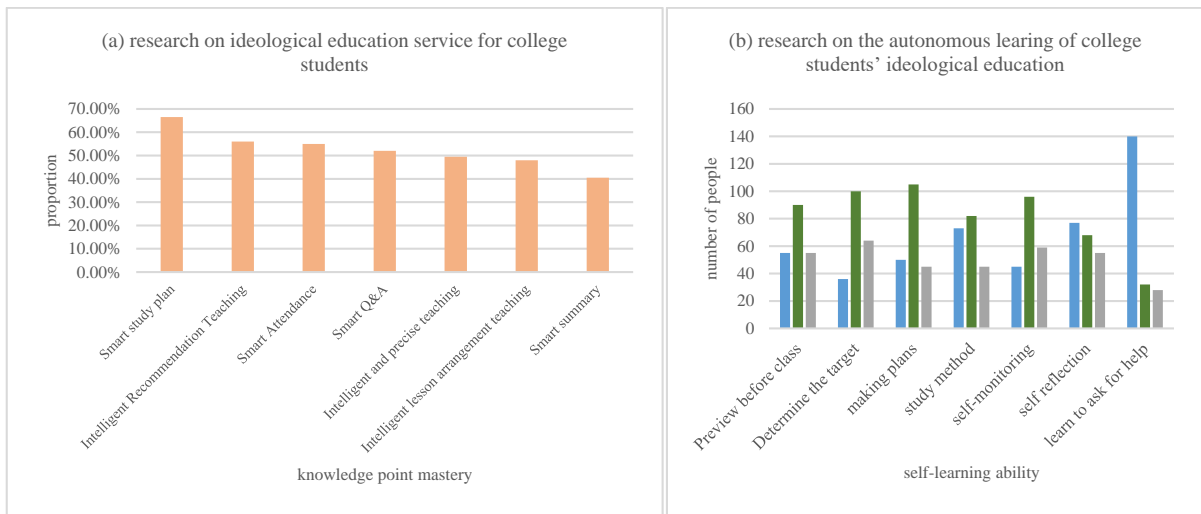


Figure 7: The service of intelligent ideological and political education and the learning autonomy of college students

4. Conclusions

With the further deepening of the reform in China, the competition in the talent market has become increasingly fierce, and the society has put forward higher requirements for the quality of talents. Self-study is the process of the formation of talent quality, and talent quality is achieved by individuals through self-training in the process of self-training. College students' ability and quality should have not only high professional quality, but also strong social competitiveness and ability to adapt to the future. College ideological education is the main channel for the formation of college students' political quality. The training goal of college students, the fierce competition in society and the career direction of graduates all require them to have a high degree of autonomy. Therefore, how to establish the learning method of independent learning and promote students to exercise and cultivate their awareness of independent learning in the process of ideological and political theory learning is particularly important.

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