

# *Current Situation Dissection and Ability Cultivation Strategies of Online Autonomous Learning for College Students*

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**Abstract:** With the progress of society, college students have a strong demand for new media technologies such as the internet, digitization and information resources, which has led to the formation of autonomous learning models in the internet environment. This article aimed to study the cultivation strategies of online autonomous learning ability for college students. Through the investigation of the online learning platform, the problems existing in the current situation and their influencing factors could be understood. Then the hypothesis was verified based on the theoretical model, constructing the model for practical application effectiveness testing. Finally, based on the data results, a preliminary summary was made that the participation rate of college students in online extracurricular expansion classes was not very high, basically maintaining between 73% and 78%. However, due to the rich and diverse online courses, most students were able to actively communicate and exchange with teachers. What they need to do was how to access the internet and use online platforms to acquire and internalize knowledge. This indicated that most students have mastered the ways to acquire knowledge on online platforms and had a high level of understanding of them.

## 1. Introduction

With the continuous development of higher education, the scale of college students has gradually expanded and their learning abilities have also been greatly improved. However, due to factors such as traditional education models and exam oriented systems, students' lack of comprehensive understanding of their majors and unreasonable school curriculum, there are many problems in online autonomous teaching in universities that need to be addressed. This article aims to provide effective suggestions to help improve the quality and efficiency of online classroom learning and enhance its application value, which can help solve the current difficulties faced by college students in online autonomous development and thus promote the healthy and sustainable development of higher education [1-2].

However, some scholars' research on online learning ability of college students started relatively

late, mainly focusing on the theories, models and strategies of autonomous learning in the online environment, drawing on foreign research results. Some scholars believe that university teachers should establish correct values and outlook on life. Only by actively and healthily conducting online independent education can students' lifelong development awareness and innovative spirit be cultivated, strengthening the combination of self-construction and professional growth and improving teaching quality. Meanwhile, strengthening the ideological and political education work of college students is also necessary, so that they can obtain good qualities, form noble moral character and comprehensively improve behavioral habits in practice [3-4]. Some scholars have pointed out that there are drawbacks such as teacher led teaching and weak student subjectivity in the existing education model. Therefore, it is necessary to fully leverage the advantages of school resources and social environment to guide students to actively participate in classroom learning activities [5-6]. Besides, it is necessary to strengthen the construction and improvement of online courses to leverage the role and influence of online platforms and improve the mechanism for cultivating college students' online autonomous learning ability.

In the university stage, with the development of the internet, the forms of learning have undergone significant changes and more and more online autonomous classroom platforms of different types and levels that are in line with the characteristics of contemporary students are gradually emerging. However, currently most universities are still in the initial stage of exploring online autonomous learning and research is needed on it. This paper mainly studies the background recommendation algorithm of online learning applet, discusses the problems, capabilities and other factors of current college students in the process of participating in online autonomous learning and their performance characteristics and puts forward corresponding strategies and suggestions according to the relevant data results, providing a theoretical basis for improving the quality and efficiency of online education in colleges and universities.

## **2. Discussion on the Current Situation Dissection and Ability Cultivation Strategies of Online Autonomous Learning for College Students**

### **2.1 Online Autonomous Learning**

Autonomous learning for college students mainly refers to the use of internet platforms (such as QQ, WeChat, etc.) and various teaching resources (such as forums, WeChat video playback websites and various course competitions) for online education and training. Through online learning, students can obtain more information about the school's internal environment and gain a comprehensive and systematic understanding of their own abilities. Meanwhile, this can also improve teachers' flexible application of knowledge when navigating the online environment in the classroom and enhance their team spirit level. In addition, it can also cultivate students' independent problem-solving and innovative awareness and stimulate creative thinking and other comprehensive qualities. In the lives of college students, the most important thing is the various information and resources around them. These materials are also effective ways for them to independently build their own knowledge system, acquire new knowledge and form assimilation and adaptation of the learned content [7-8]. Therefore, it is necessary to create a positive, energetic, relaxed and harmonious classroom teaching situation with comfortable and rich learning atmosphere, so that every student can participate in learning activities and gain knowledge and experience from them. These are all important factors to improve the efficiency and effect of online learning of college students. Self-improvement can be achieved through learning knowledge, skills and other aspects through school classroom teaching activities and social practice. College students' autonomous learning needs to set corresponding goals based on their actual situation. They start to think independently and take action from theoretical courses and internship work. There are many subjects of study in university, but these subjects are presented

mainly through textbooks, making it difficult for students to truly integrate them into practice. Among the autonomous online platforms for college students, they are the most important, active and influential. Figure 1 shows the relationship between the autonomous learning dimensions of college students.

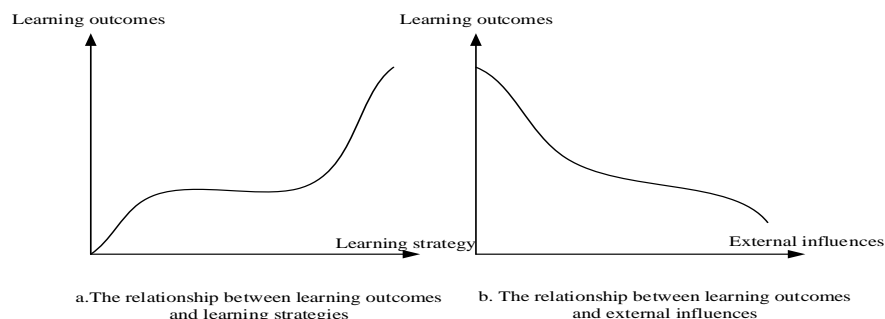


Figure 1: The dimensional relationship of college students' autonomous learning

Through online learning, students can choose courses according to their own needs and obtain various resources from different perspectives. On the one hand, it is beneficial to improve one's own knowledge level and on the other hand, it can mobilize their enthusiasm and initiative, inject fresh blood into school management and promote their own development and progress (such as improving teaching quality and learning ability). In college students' autonomous learning, they can evaluate and recognize the school from different perspectives based on their own needs. Meanwhile, it is also essential to learn to communicate, discuss and participate in the online interactive learning process with teachers and classmates [9-10]. This is not only limited to the knowledge points learned in class or new skills learned online through the network platform, but also should be able to combine theory and practice for practical ability training. Therefore, the mutual cooperative learning model among the members of the strategy research group is also very important.

## 2.2 Ways to Cultivate the Learning Ability of College Students

In the learning process of students, classroom teaching is the main learning venue. On campus, students can feel a good and positive learning atmosphere. They can choose topics that are suitable for their own development characteristics and needs, as well as for their future development needs, based on their mastery of knowledge and theory. Therefore, to meet the needs of students, it is necessary to filter and organize the content learned in class into easy to understand video materials for them to download and use. Meanwhile, to promote communication and inspiration among classmates, opportunities are also provided to participate in learning and communication activities, allowing students to actively express their own views, help each other and progress together during the discussion process [11-12]. In the classroom, teachers can allow students to independently choose courses they are interested in and group them appropriately to cultivate their interest in the software and its application projects used in online platforms, enhancing their enthusiasm for participation by holding themed class meetings and other forms. Meanwhile, attention should also be paid to improving the training intensity of computer operation skills for college students, as well as strengthening the organic combination of theoretical knowledge, professional technology learning and practical ability training.

In the process of cultivating the learning ability of college students, the first step is to start from the students themselves and improve their awareness of autonomous learning, providing guidance through various channels such as between teachers, classmates and internal professional organizations. Secondly, strengthening internal and external training is essential. On the one hand, excellent teaching staff can be hired to share experiences with the existing educational resources of

the school. On the other hand, well-known scholars or experts can also be invited to the school to hold lectures, seminars, exchange meetings or hold experience speech competitions on campus, so that college students can improve their learning abilities from multiple perspectives. College students mainly engage in autonomous learning processes. Therefore, cultivating and improving students' knowledge, abilities, emotional attitudes and values are of great significance. The learning ability of college students not only includes knowledge, skills and attitudes, but also encompasses values [13-14]. Cultivating students' awareness of autonomous learning during their college years is essential. It is necessary to address the issue of students' cognitive biases towards the online learning education model from an ideological perspective, provide correct guidance and correction, actively transform traditional teaching concepts and update and innovate online classroom models. More importantly, it is important to strengthen cooperation within and outside the school, jointly promote the construction of a "dual teacher" teaching team and establish and improve incentive mechanisms to enhance the autonomous learning ability of college students, so that they can better realize their self-worth development in the school. Experienced, theoretically knowledgeable, responsible and up-to-date talents are required to serve as mentors. Teachers are required to possess high professional literacy and practical experience to be competent in their respective job tasks. Besides, this also requires college students to have a strong sense of innovation and be able to fully mobilize their own enthusiasm and initiative, continuously improving their comprehensive quality and ability level during the learning process.

### 2.3 Recommended algorithm for E-learning

The application of recommended learning techniques aims to help college students quickly and accurately find like-minded peers with similar interests and hobbies and provide them with corresponding course resources to enable them to obtain more learning resources within a limited time. Learning recommendation algorithm is a method of organizing and analyzing existing online resources of college students' networks to identify features related or similar to current students and convert them into corresponding information [15-16]. In this process, auxiliary methods such as "matrix" and "contingency table (including text)" can be used to describe each row, item ID (Identification) and item feature vector in  $R$  for each user input in the automatic encoder. Each row in  $R$ , that is, the rating of each item by each user, is used as its vector. The recommended algorithm data is:

$$\tilde{R}^{(u)} = \left( \tilde{R}_{u1}, \dots, \tilde{R}_{um} \right) \in \tilde{R}^n \quad (1)$$

The output formula of the automatic encoder for training the user rating matrix is:

$$\hat{R}^{(u)} = f \left( w' g \left( wR + b \right) + b \right) \quad (2)$$

Among them,  $W$  is the weight matrix from the input layer to the hidden layer in the automatic encoder that trains the user rating matrix. The minimum loss function of automatic encoder for training user scoring matrix is:

$$E_u = \frac{1}{2m} \sum_{u=1}^m \left\| R^{(u)} - \hat{R}^{(u)} \right\|^2 + \frac{\lambda}{2} \|w_1\|^2 + \frac{\lambda}{2} \|w\|^2 \quad (3)$$

These methods can help find more learning resources with the same or similar characteristics for college students to refer to, compare and analyze. When college students obtain a large amount of

useful information on online autonomous platforms, they can choose different methods for personalized education based on their own situation. For example, recommendation algorithms or neural networks are based on learners' attitudes towards the learning content itself to determine whether they are interested, like or dislike it. According to the different learning content, online course recommendation algorithms also vary. Knowledge based recommendation methods refer to college students primarily obtaining resources from websites to support and analyze all relevant issues they need to learn when obtaining information. During the learning process, college students have a high degree of dependence on teachers and classmates, so they need to use online resources for autonomous learning. Students obtain relevant information and knowledge through the internet and teachers recommend teaching materials they like or dislike to students based on the given course content and provide corresponding evaluation opinions (such as "which class would they most like to take?"). Afterwards, the instructor transmits this information to the next classroom, allowing students to have a preliminary plan and goals for learning before class [17-18].

The recommendation algorithm draws conclusions or viewpoints based on students' comparative analysis of the same problem. This approach is based on the theory of "knowledge tree", rulebase model and object-oriented modeling to achieve resource allocation for all projects in a complex system, forming a collection of projects. Through this process, it is transformed into a single specific information content for analysis and processing. On online learning platforms, users can choose information that suits their needs and then transmit it to others. Therefore, an algorithm is needed to help them better engage in autonomous learning. Figure 2 shows the workflow of the recommendation algorithm.

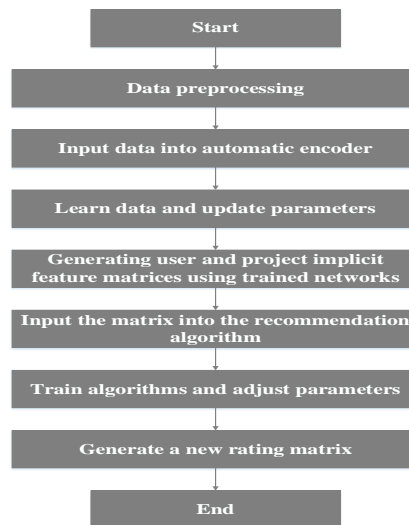


Figure 2: Workflow of the recommendation algorithm

Content based recommendation is a process of selecting the most relevant or meaningful objects that are most likely to contain keywords from a vast amount of online resources as the target group and presenting and providing personalized information to these potential users through a certain program. Then, it is recommended to other people or organizations to achieve the ability training process of the project. During the learning process, the teacher observes and analyzes the questions raised by students about their surrounding environment and summarizes them into individual knowledge points. Then, based on this information, it is recommended to students, searching for teaching videos posted by teachers who have studied this lesson on the internet for students to download and watch, to better understand the knowledge points [19-20].

### 3. Experimental Process of Current Situation Dissection and Ability Cultivation Strategies of Online Autonomous Learning for College Students

#### 3.1 Dissection Procedure for the Current Situation of Online Autonomous Learning for College Students

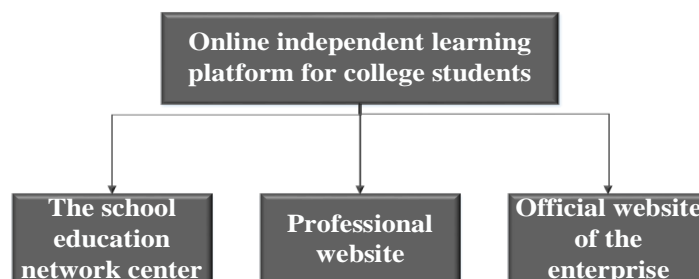


Figure 3: Online autonomous learning platform for college students

As shown in Figure 3, the composition of online self-directed learning platforms for college students mainly includes school education network centers, professional websites, official corporate websites and others. Conducting online autonomous education in the entire online environment requires a gradual stage, as autonomous learning is the most important aspect of online learning for college students. The school education network center provides a platform for acquiring knowledge and skills through the internet. On professional websites, students can choose online or offline learning activities according to their own needs, take courses they have learned and use forums and Weibo to learn the latest information and express opinions and suggestions to improve their overall quality level and ability development goals. The online learning platform for college students refers to the construction of an online interactive exchange and sharing between the school and students, based on the university network, to achieve effective communication between teachers and students in terms of information, teaching resources, knowledge and experience. This study divides the analysis of offline autonomous learning websites into three steps. The first part mainly analyzes from two subjects: teacher users and university classroom managers. The second part further describes the existing online training models. “Online education” refers to a new management system and activity method that uses university networks as a platform to establish a virtual campus. It includes elements such as schools, students and online teaching resources. College students are mainly self-centered in the learning process, so they need to fully think and practice. Through the analysis of questionnaire data, it can be seen that most students hope to actively obtain relevant information to assist them in achieving the deeper level of content acceptance ability cultivation goals beyond the theoretical courses involved in the classroom. However, a small number of students also believe that autonomous learning platforms in the online environment are a relatively novel, interesting, easy to operate and able to learn knowledge and skills in a short period of time. The online learning platform for college students, with the support of internet technology and remote education resources, provides students with an autonomous and personalized learning environment to satisfy the needs of online teaching activities. It includes the construction of online course websites, university English classroom learning forums and themed class meetings. The construction of online course websites is beneficial for improving teachers’ professional quality and ability development quality. At present, online platforms are mainly based on technical support and resource sharing to build a virtualized and open platform. The current situation analysis of online autonomous learning for college students mainly focuses on the perspectives of teachers and students. In the classroom, the counselor is responsible for designing the teaching outline, content and methods and completing the corresponding knowledge

points based on the course characteristics and target tasks. The instructor also focuses on introducing the conceptual theoretical foundations to be learned or understood in this lesson, as well as how to apply them to practical situations to solve learning problems and other related requirements. College students may encounter some difficulties and confusion in the process of online autonomous learning and they need to actively seek help or provide relevant suggestions in the classroom to solve the problems.

### 3.2 Online Autonomous Learning Status Dissection Program Running Inspection

By testing the operation of the autonomous learning platform for college students, it can be understood whether the knowledge and abilities learned by students in daily classrooms have been effectively improved. After testing, the online autonomous learning platform is mainly divided into two modules. The first module has a certain degree of advantage in terms of time and location. The second module is more comprehensive, including multiple dimensions such as resource library construction and evaluation that need to be improved. By running the platform, students can publish their interested online courses online and discuss them on different types such as school websites and campus forums. In addition, this article believes that the current online autonomous pattern recognition ability of college students is poor. There is a tendency of dependence and blindness in students' online learning. A single way of teacher guidance, lack of targeted research and practical experience summary and other issues need to be improved and perfected. Therefore, it is very important for students to design and test an online autonomous learning ability detection system for college students. If the test results do not meet the requirements, the function can be reset or adjusted. If incomplete or uncontrollable factors are found to cause inaccurate data or missing information, they can be promptly modified and re verified.

## 4. Experiments on Current Situation Dissection and Ability Cultivation Strategies of Online Autonomous Learning for College Students

Table 1: Analysis of online autonomous learning programs for college students

Test object	Online use time (h)	Frequency of use in a day	Online class engagement (%)
Freshman	3	25	63
Sophomore	2	21	69
Junior	2	26	73
Senior	4	23	68

In the process of autonomous learning for college students, it is necessary to set targeted teaching content and objectives based on their personal conditions and characteristics. There are economic differences and other factors among different schools, which can affect the differences in the level of demand and ability development models for college students in online courses. Meanwhile, the limited level of teachers can also lead to the limited number of educational technology professionals and the constraints of outdated teaching equipment. Therefore, when selecting online learning resources, full consideration should be given to these limitations and requirements and adjustments and designs should be made based on the actual situation of students. This study tested the process, effectiveness and ability of online learning for college students, analyzing data, verifying strategies and determining that all aspects meet the requirements. The performance testing program for detecting the efficiency of online autonomous learning for students was consistent with the expected values. Based on the calculation results, it could be determined whether the current online mode

selection was correct and whether the influencing factors were reasonable. Table 1 is a survey of online autonomous learning models among college students in this article.

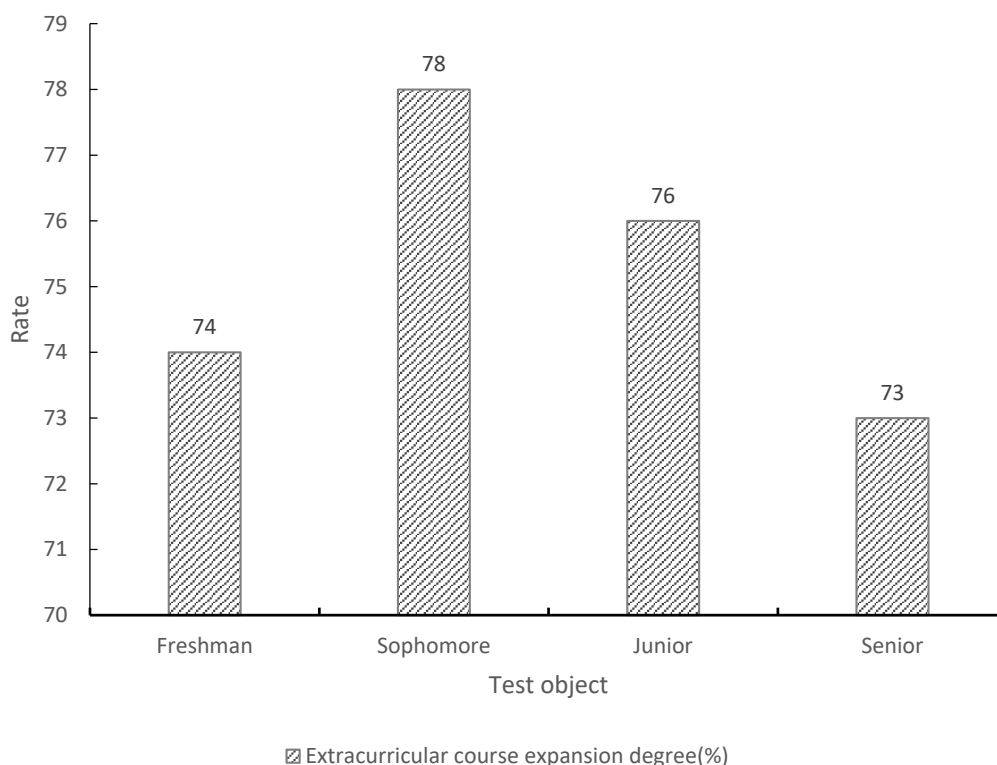


Figure 4: Expansion degree of extracurricular courses for college students

From a qualitative perspective, at the individual level, self-evaluation scores were generally above average and college students had organic consistency in online classroom and social practice processes, but they have not met effective standards. Whether there are any issues was verified and the direction and expected effects of improvement was determined through collected data and information obtained from personal communication and interaction among students. Then, based on the feedback, the learning progress plan was adjusted, developing corresponding measures to improve efficiency. The survey results, as shown in Figure 4, show that college students' participation in online extracurricular expansion classes was not high, basically maintaining between 73% and 78%. However, due to the rich and diverse online courses, most students were able to actively communicate and exchange with teachers. What they need to do was how to access the internet and use online platforms for knowledge acquisition and internalization. This indicates that most students have mastered the ways to acquire knowledge on online platforms and had a high level of understanding of them. They used existing school libraries to search for relevant materials and publish online information channels to achieve autonomous classroom teaching.

## 5. Conclusions

With the popularization of the internet and the arrival of the information age, online learning has become an irreversible topic. It is an important issue that cannot be changed, which is difficult to replace and transcend. In the field of education, internet technology has been widely applied. As one of the essential skills for cultivating high-quality talents, the autonomous learning ability of college students is receiving increasing attention from universities. This study mainly analyzed the current situation of online autonomous participation among college students through surveys and designed an



online classroom platform to help improve students' efficiency and initiative in online learning. This can provide a basis for schools to build efficient and scientific online guidance teaching models.

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