



# Combining Big Data Analysis to Study the Autonomous Learning Ability of Higher Vocational Colleges

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## Abstract

Nowadays, driven by the rapid development of China's economy, the level of science and technology has also been significantly improved. Big data has begun to develop in a new direction and entered the era of big data. It is also a trend to combine the development of big data with education. At present, the study diversification, the colleges and universities for class, class, flip the incoming class, autonomous learning and their own development needs of higher vocational students, but the lack of traditional learning to cultivate students' autonomous learning ability, therefore, in the big data environment, how to improve the teaching in colleges and universities management strategies to improve their autonomous learning ability and improve the students' learning efficiency is imminent. On the basis of the research status at home and abroad, this study on the development of big data and study of the influence of the higher education teaching reform, and based on some universities in Zhejiang, 100 students and 4 teachers through the way of questionnaire survey and in-depth interviews, to understand the status quo of students' autonomous learning and the era of big data problems, Finally, management strategies are proposed from learners, learning guides and schools to further optimize the current management strategies of independent learning for vocational students in colleges and universities, and improve the learning efficiency of vocational students in network independent learning.

**Keywords:** *Big data, Higher vocational students, Autonomous learning, Management strategy*

## 1. INTRODUCTION

With the rapid development of information technology, education informatization has entered a new stage of development -- wisdom education. Researchers put forward a series of new education concepts with smart education as the core: smart campus, smart classroom, smart teaching, smart learning, smart learning environment, smart learning resources, educational robot, etc. From the current development of education and the focus of researchers, it can be seen that the current education is developing towards the direction of intelligence, individuality, precision and ubiquity. Behind all the "wisdom" concepts, are inseparable from the support of "intelligent" technology. Without "intelligence", there is no so-called "wisdom". It can be said that artificial intelligence technology is the core force of the development of intelligent education era.

The development of artificial intelligence technology, since it was proposed in 1956, has gone through several stages of ups and downs, including blind pursuit at the

beginning, development bottleneck and neglect in the 1970s and 1980s, and slow development in the 1990s. In recent years, it has attracted people's attention again. In particular, Google's AlphaGo, based on deep learning, defeated the World champion of Go in 2016, which once again ignited people's enthusiasm for artificial intelligence. artificial intelligence is now regarded as one of the main core technological forces driving the progress of modern society [4].

At present, artificial intelligence has begun to serve industry, economy, agriculture, environment, medical care, education and many other fields, effectively promoting social progress. People have predicted that although the universal intelligent system is not yet. It will be hard to surpass human intelligence in the next decade, but in a growing number of specific domains, intelligent systems can match or exceed human intelligence in problem solving.

## 2. LITERATURE REVIEW

The study of autonomous learning can be traced back to the ancient Greek period, such as educator

Socrates and philosopher Plato have put forward the idea of autonomous learning. In modern times, The famous French educator Jean-Jacques Rousseau and the Famous German educator Johann Friedrich Herbart Comenius, Johann Amos also proposed the idea of independent learning in his works, but at this stage, most of the independent learning remained at the ideological level, but did not form a systematic theoretical knowledge. After the 1960s, the western theory gradually developed significantly. Respectively, the American educationalist Karl. Rogers' (C. R., Rogers') humanistic autonomous learning theory and Piaget's (Bartlett 1932; Led by Piaget 1970's cognitive constructivist theory of autonomous learning, both of them put forward the theoretical idea of student-centered learning. Burrhus Frederic Skinner, an American educationalist, proposed the operativism theory of autonomous learning based on reinforcement theory. The school of information processing theory represented by S. H. Winner (1995), a Canadian psychologist. The social cognitive theory of autonomous learning proposed by American psychology class Tura (Bandura, 1977, 1986) and his disciples. German psychologist Kohl (j. Kuhl, 1984) and American psychologist Kono (L. Como, 1986, 2001) proposed the will theory of autonomous learning.

In the 1930s, Vygotsky, a Soviet psychologist, put forward the theory of speech self-guidance, which mainly produced seven schools. These seven schools mainly focus on self-awareness and self-reaction, motivation to motivate individual autonomous learning, factors affecting autonomous learning, self-goal and self-planning, and acquisition of autonomous learning ability. However, they all have one thing in common: they all believe that autonomous learning is based on "student-centered".

From above can be found in the study, from the journal study of autonomous learning to search, although the research on autonomous learning theme is convenient, the present research on this topic are maturing, but about the management of the Internet + autonomous learning research and no complete system and further reading through the literature research can also be found, Some studies rely on experience and lack big data support [5].

Although some scholars study the influence of environment on independent learning, in the Internet era, it is not only reflected in the change of environment, but also has a great influence on all aspects of independent learning. And college students' autonomous learning conforms to the trend in today's society, the need of The Times, in the rapid development of information society, information into exponential growth, traditional classroom education cannot accomplish a comprehensive knowledge of education, which requires college students' autonomous learning, therefore, the in-

depth study of the college students' autonomous learning to accelerate the reform of college education and improve the quality of education is of great significance.

### **3. THE STATUS QUO OF COLLEGE STUDENTS' AUTONOMOUS LEARNING IN THE ERA OF BIG DATA**

#### ***3.1. Research Purpose***

Understanding of contemporary college students based on a large data model under the teaching of the current situation of autonomous learning, analyze the problems affect the learning efficiency, and according to the problems are put forward to sex strategy, for the teachers and students in the next big data in the process of teaching and Internet learning can provide beneficial reference and also for education management offer valuable management strategy.

#### ***3.2. Questionnaire Design***

In this questionnaire design process, students (learning subject), teachers (learning guide), network learning resources, network learning environment four aspects. Among them, 7 questions in the questionnaire are based on the environmental dimension, 5 questions are based on the teacher dimension, 11 questions are based on the student dimension, and 2 questions are based on the teacher dimension.

#### ***3.3. Basic Information of Questionnaire***

Whether students can carry out independent learning well, the learning provided by the school is very important. As is known to all, college students' autonomous learning requires mutual network era with the help of some software and hardware facilities, hardware or software infrastructure provides a basis for the college students' autonomous learning, the students through certain hardware and software facilities to obtain the required information resources, form their own cognitive, in order to achieve the purpose of autonomous learning.

Based on this, the lack of hardware and software facilities will directly affect or reduce the efficiency of students' autonomous learning. Therefore, the variable of independent learning environment mainly includes hardware environment factor and software environment factor. Among them, the hardware mainly refers to the students' contact degree to the Internet, the situation of the campus network is used, the situation of the students' independent learning tools, the school can provide learning sites four aspects of the analysis; The software environment factors discussed and analyzed the influence of the network environment on students' independent learning from two aspects: the frequency of

data update and the communication convenience of the network teaching platform [3].

### 3.3.1. Internet Exposure

As for whether you have access to the Internet at school, see Table 1. Among the 100 students surveyed, 98 students have access to the Internet, accounting for 98 percent. Only 2 students choose not to access the Internet, accounting for only 2%. The results show that the current college students, basically the students can access the Internet.

Table 1: Internet Contact survey

frequency	The percentage
Can	98%
Can not	2%

### 3.3.2. Campus Network Utilization

Table 2: Campus Network Utilization

frequency	The percentage
Can	95%
Can not	5%

In the survey of the campus network, as shown in Table 2, 5 students indicated that the school network speed could not meet their needs, and they needed to go to the Internet bar off campus frequently to meet their needs for the network in life and study. 95 students, or 95%, think the school network can meet the needs of life and study. The results show that the school's current network can meet the life and learning needs of most students.

### 3.3.3. Learning Tool

Out of the 100 samples surveyed, 78 students said they had a personal laptop, while cell phones were one for each student, 16 students had an iPad, which was not just needed, and 3 students had a TV. The results show that more than nine out of ten students own both a personal laptop and a mobile phone, and nearly three out of ten own more advanced electronic devices than a laptop or a mobile phone. Therefore, in the era of mobile Internet, almost every student can participate in online autonomous learning.

### 3.3.4. Learning Place

Among the 100 samples investigated, 48 students will conduct online autonomous learning in the classroom, 2 in the canteen, 20 in the library and 30 in the dormitory. The results also show that most students still choose online autonomous learning in libraries and dormitories, but online autonomous learning may take place in canteens and classrooms, and mobile learning

can be seen everywhere, unlike the traditional teaching mode, which can only be fixed in the classroom.

### 3.3.5. Network Teaching Platform Communication Convenience

In the investigation of the communication convenience of online learning platform, there are five options: 1 is not convenient at all, 2 is not convenient, 3 is general, 4 is convenient, 5 is very convenient. The higher the score is, the more satisfied with the communication convenience of online learning platform. According to the survey results, 41% think it is not convenient at all, 29.5% think it is not convenient at all, 45.0% think it is fair, 16.4% think it is convenient and 2.1% think it is very convenient. The mean value of the five options is 2.78, which is between 2 less convenient and 3 average, indicating that students think the communication of online learning platform is still between 2 less convenient and 3 average.

### 3.4. Interview Survey

In the interview process of teachers, the focus of the investigation is to understand the construction of teachers in network teaching, the school's investment in teachers' funds, network teaching training services and reward mechanism.

As for interview question 1, teacher A and teacher C think that in network teaching, teachers' professional background is too low to match the courses taught, and the construction of school teachers is far from perfect, which affects the teaching quality. Teacher b thinks that the school should let more teachers with high professional titles join the network teaching team. Ding believes that there are too many part-time teachers and too few full-time teachers in the online teaching team, and that more full-time teachers like him should be allowed to teach online courses. There are few full-time teachers in the network teaching faculty in colleges and universities, the courses taught are not symmetrical with the subject background, and there are few teachers with high professional titles.

For question 2, if a teaching assistant takes an online class, it only costs 16.58 yuan, while a teacher needs to prepare, attend class, answer questions, correct homework and so on for each class, which is completely out of proportion to the effort and gain, which will dampen the enthusiasm of the teacher in class. Teacher C and teacher ding two teachers are very consistent, both think that the extreme need to improve the teacher's remuneration, the school should invest more money in network teaching, encourage the enthusiasm of teachers, to participate in the network teaching team. It can be seen that, there are insufficient investment in network teaching funds, too little remuneration for teachers, and teachers' enthusiasm in class.

For question 3,

Teacher A: The school will organize a training in each semester, notice will be hanged on the school website, do not force teachers to participate in, but there are not many teachers to participate in, more is the follow-up will be professional and technical personnel in the QQ group answers. There are no clear training objectives and plans.

Teacher B: At present, the school seldom organizes large-scale and high-grade training related to network teaching. Usually, the relevant management personnel will set up a network QQ group before the school starts. Teachers can ask questions in the group, and there will be technical platform personnel to help answer the questions.

Teacher C: I am not satisfied with the school's network teaching and training, so I have to explore the knowledge of network teaching by myself or ask technical personnel in the later stage. But the technical personnel are outsourcing companies, the efficiency of the solution is greatly compromised, and there is no service in place.

Teacher D: At present, the network teaching training notified by the school is generally formalistic, the training content is simple, and the time is still short, so teachers can not flexibly master the network teaching technology. However, the technical support and guidance reflected in the training are limited to simple and preliminary use, and generally do not participate in the training.

For question 4, the four teachers agree that there are corresponding incentive measures in the construction of the corresponding online course system, but due to their limited ability, there is still a certain distance from the excellent level. There is no reward system for students, only grades and final exams.

## 4. CONCLUSIONS

In the future era of artificial intelligence, higher requirements are put forward for human literacy. Education is an effective way to cultivate students' scientific literacy and meet the development of the future era. At present, STEM education has attracted extensive attention from educators around the world, and has been highly valued at the national level, and national STEM education development strategies have been formulated. Chinese educational researchers are also actively exploring how to better develop STEM education and how to integrate STEM education concepts with maker education and teaching of various disciplines.

The development of the intelligent age requires students to have the corresponding information awareness and computational thinking ability. At

present, information awareness and computational thinking have been regarded as one of the core qualities of the subject in China's information technology curriculum standards so as to cultivate students' information awareness and computational thinking with the help of information technology courses.

Visual programming is an effective way to train students' computational thinking, especially their computational thinking ability. Different from traditional code programming, visual programming can replace manual code by dragging and dropping, which is not only easy to operate, but also eliminates the defects such as high threshold and strict grammar requirements in traditional code programming languages, making students focus more on thinking about programming ideas rather than learning and correcting programming grammar. In recent two years, Chinese researchers are exploring the APP Inventor based on MIT to train students' computational thinking ability, and have achieved good results. At the same time, we should realize that computational thinking, as a way of thinking, can not only be cultivated through computer programming, but also be integrated with other disciplines to promote the development of computational thinking while completing the study of relevant disciplines (Geiger, Uzsoy & Aytug, 2006).

As a result, college students bid farewell to the middle school stage of intense learning and enter the special learning stage with relatively light learning tasks and flexible autonomous time. Autonomous learning is the law of learning and life in college. Therefore, it is very important for college students to develop good study habits-independent study for their future development in the society.

### 4.1. Optimize Autonomous Learning Habits

The role of learning objectives in learning activities is obvious. In schools, learning activities are generally goal-oriented. As far as teachers are concerned, teaching by objectives enables teachers to define their teaching objectives and know exactly what students can learn. The standard that learners are expected to achieve is the learning objective, which plays a role in guiding, promoting and coordinating. It can provide guidance for learners in confused learning and mobilize their enthusiasm. It is necessary for college students to study independently in the network environment. Based on learners' knowledge, knowledge background, knowledge relevance, teachers' requirements for students and students' requirements for knowledge, it is necessary to establish learning objectives. In addition, learners' learning objectives also need long-term moderate elevation. Only by setting up good learning objectives can college students master the dominant position in the process of independent learning and carry out learning activities with the interest of learning knowledge.

## 4.2. *Select Learning Resources*

In the process of network autonomous learning, the selection of network resources is completely controlled by the learners themselves. In order to enable learners to find their own learning resources, on the one hand, teachers need to provide learning resources that match the curriculum. According to the content of the curriculum, teachers need to provide the requirements of the curriculum, teaching plans, independent inquiry, exercises and extension modules (Angelov,2012).

Provide courseware, multimedia materials, cases, literature and learning tools based on digital learning resources. On the other hand, learners should make clear the materials needed in their study and master the ability of resource indexing. This ability includes the ability to search on the learning platform and the supplementary search ability outside the platform. It is necessary to find the learning resources that can effectively learn by yourself or the resources that you are interested in from the ocean of resources through various network search platforms or professional search platforms to help you master new knowledge.

## 4.3. *Accurate Positioning of Teachers*

In the Internet era, network teaching is the trend of The Times, every teacher should keep pace with The Times, clear understanding, and strengthen learning, flexible movement of teaching theory and related new theories, and constantly deepen and learn network knowledge and operational skills, multimedia teaching skills, better theory and network teaching combined. In practice teaching, teachers should create humanistic education and learning environment for learners to create a relaxed and harmonious teaching and learning atmosphere between teachers and students, so that teachers become reliable learning partners of students. Teachers can teach students in accordance with their aptitude. Through the characteristics of learners' styles, they can be divided into groups to learn and explore students' ability to help each other and cooperate with each other in groups to complete the tasks of learning cycle.

## APPENDIX

### Outline of interview

1. How is the teaching staff of the school in network teaching at present?
2. What is the current situation regarding the investment of network teaching funds?
3. What is the current situation regarding the training service of network teaching system?
4. Does the school have a matching reward system for teachers and students who are outstanding in online

teaching and outstanding students in online autonomous learning?

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