

Design and Development of Innovative Education in the Internet Era

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Abstract: Innovative education is an education with the basic value orientation of cultivating innovative talents. Its core pursuit should change from "knowledge" to "development" and from "inheritance" to "innovation". With the rapid development of information technology, the Internet is gradually becoming an important factor to change people's lives. "Internet" is not only a major turning point in traditional industries, but also a new opportunity for the development of schools. In the Internet era, the combination of education and network technology has become the trend of the times. With the help of network technology and resources, students' educational content, means, space and mode have been further optimized and developed. Based on these understandings, this paper will deeply explore the basic status and related characteristics of innovative education. This paper analyzes the current situation of College Students' Education under the Internet environment. It analyzes the reasons and explores the path of innovation in order to promote the combination of traditional educational advantages and modern information technology. It improves the timeliness and appeal of education. Through the questionnaire survey and analysis of University A, this paper finds that 84.6% and 82.5% of college students believe that the Internet era agrees with enhancing the flexibility and innovation of thinking and enriching after-school life. It shows that most people still believe that the Internet age is beneficial to study and life. In today's Internet environment, it can truly realize students' educational innovation and their free and all-round development.

1. Introduction

In the Internet era, the interactivity, openness, time and space of information exchange, as well as the virtuality, complexity and dispersion of the network environment, make students' learning,

consumption, entertainment and lifestyle imperceptibly infiltrated and affected. Many new problems and situations in the ideological field often come from the network. This is bound to have a great impact on education and culture. While providing "new carriers", "new platforms" and "new fields" for students' education, it also puts forward "new topics" and "new challenges" for them. Therefore, the innovative research on student education in the Internet era has important practical significance. In the current new situation, facing new opportunities and challenges, we can eliminate its negative impact by making use of the advantages of the network. It ensures the combination of "online" and "offline", and uses the Internet to improve the effectiveness of student education. It is a major issue to be solved urgently in school education.

At present, social, political and economic changes have led to new ways of operating public sector educational institutions. Among many innovations, reforms, trends and directions, the marketing concept in education has found its own position, as well as all technologies, methods and principles, one of which is the application of benchmarks. It refers to the concept of learning from leaders in specific business fields. The preparation and openness of schools to promote innovation in their daily work is the prerequisite for the successful implementation of benchmarking management in education. Dragojlovi V introduced the basic steps of the benchmarking process related to the field of education. In addition, this paper also advocates the need to establish a unique benchmarking information system. It provides practical communication channels between educational institutions that need training and competent institutions that can provide training in the benchmarking process [1]. Serdyukov P analyzed and commented on the field of educational innovation in the United States. He outlined the classification of innovation, discussed obstacles to innovation, and provided ways to increase the scale and speed of innovation based change in the education system. He was based on literature research and author research. American education urgently needs effective large-scale innovation to help produce the required high-quality learning results in the whole system. The main focus of educational innovation should be teaching theory and practice, as well as learners, parents, community, society and culture. Educational innovation and educational system are regarded as part of the social super system, which shows their mutual relationship and interdependence at all levels. Improving the quality and scale of educational innovation will have a positive impact on education itself and benefit the whole society [2]. With the continuous change of medical care, nurses must continue to learn to promote evidence-based practice. Under the limitation of time and space, e-learning plays an increasingly prominent role in obtaining information and strengthening learning. Innovations inside and outside e-learning, such as Gamification, have also aroused people's interest to improve participation in the learning process. Dahlke S discussed the usefulness of innovation, such as the Gamification of continuing education for acute care nurses through an electronic platform. Although innovative methods using electronic platforms may meet nurses' desire for flexible and continuing education suitable for their work, more research is needed to understand its effectiveness in emergency nursing nurses [3]. Over time, economic growth, productivity and national well-being have been promoted through various innovation strategies. The purpose of education is to shape people's personality and teachers' mobility through the dynamic integration of people and society according to human characteristics and social dynamics. In Mihai M's study, with the help of regression analysis applied based on the indicators provided by the National Bureau of statistics, the number of students, computers, laboratories and workshops in each county of Romania (2010-2017) tested the impact of technology on the number of school registered students. The main conclusion of the study emphasizes that the greater the number of school children in a county, it is related to the level of technology. Therefore, the number of new equipment will increase to ensure that both teachers and students have the possibility of development [4]. The research on innovative education is not a few, but it is not comprehensive.

The era of Internet has come. With the rapid development of network technology such as data processing and analysis, the energy field has made higher development in recent years, and the concept of energy Internet came into being. At present, people have conducted various studies on the concept, mechanism, construction and connotation of energy Internet. However, how to realize the transition from traditional power system to energy Internet is still a difficult problem for researchers. There is little research on how to solve the current energy industry problems through the construction of energy Internet. Starting from reality, Sun K introduced the framework of provincial regional energy Internet. It includes demand peak shaving, reliability and market mechanism. On this basis, he put forward the development direction, key points and corresponding key technologies of regional energy Internet. The framework provides a reference for the construction of regional energy Internet [5]. The ongoing Internet broadband plan will promote economic growth. In low-income and middle-income countries, the broadband penetration rate is 10%, the economic growth rate is 1.38%, and that in high-income countries is 1.12%. By 2050, China's economic growth rate will exceed the world average, while Indonesia's economic growth rate will reach 8.4 times. Through literature survey, Wahab R used qualitative method to compare the broadband Internet development of digital economy between China and Indonesia in order to understand the economic status of the two countries in 2050. It can be concluded that Indonesia's broadband infrastructure and digital telecommunications infrastructure are more ancient than China's. However, Indonesia is currently very active in developing e-commerce [6]. The participants in the development of developing countries are governments and society. In order to achieve development goals, their synergy is needed. Fardiah D used qualitative methods and single case study methods to explore the synergy between government and society in the development of community-based Internet. The subjects were Internet administrators in 12 regions of West Java. The results show that the use of community-based Internet still faces obstacles in terms of infrastructure, budget and lack of human resources in the village. The government plays the role of mediator and project promoter, especially in infrastructure procurement, training and human resource development. This role is mainly performed by district and village governments, while the best role of streets is less. In terms of community, participation is divided into two categories: responsive community and non responsive community [7]. The Internet has affected all aspects of human life, but there is not much research on innovative education.

Internet communication has become one of the main means in current social life. In the research on the design and development of innovative education, this paper introduces the concept of the combination of innovative education and the Internet. Taking a university as an example, this paper believes that the Internet has a positive and negative impact on students' life, learning and social activities. Although 15.4% and 17.5% of college students think that the Internet age does not agree with enhancing the flexibility and innovation of thinking and enriching after-school life, most people still think that the Internet age is beneficial to study and life. At the same time, the most obvious is that 95.6% of college students believe that the current state is too dependent on the Internet and alienated from practical communication. When exploring the new network innovative education mode, for college students of different grades, 58% of students are most concerned about improving the Mu class teaching mode. However, 71% of people believe that the quality of courses still needs to be improved under the existing teaching form.

2. Design and Development Methods of the Current Situation of Innovative Education in the Internet Era

Innovative education is put forward in view of the advent of the era of knowledge economy and the shortcomings of reflective education. Its purpose is to carry forward people's subjectivity,

promote people's harmonious development and tap people's creativity under the impact of knowledge economy. On this basis, we develop and discard the traditional education, and explore it, so as to construct a new educational theory and model [8]. The innovative education idea is different from the traditional education and teaching idea, which is to comply with the development of the times. It strives for the goal of talent training in the new era. Creative thinking and practicality are the basic qualities that creative talents must possess [9]. When implementing creative education, we should adhere to the following basic principles:

(1) Ability based principle

Innovation needs inheritance. Innovation education does not exclude the dissemination of knowledge. Any new invention is based on knowledge accumulation. Different from traditional education methods, innovative education does not take acquiring and accumulating knowledge as the first priority, but takes cultivating students' creativity and creativity as the first priority [10]. It not only teaches what it is, but also teaches students how to accept knowledge, how to use what they have learned, how to use what they have learned, and how to explore and create new results [11].

(2) Individualization principle

The principle of individuation is to reform the traditional teaching methods and take improving students' personality development as the most fundamental requirement. It adapts the specific teaching methods to the basic characteristics of teachers and students, and creates favorable conditions for the development of students' personality. Teachers should recognize students' personal differences and respect their interests. Teachers have a comprehensive understanding of their personality characteristics, interests and specialties, and carry out personalized teaching accordingly [12]. However, there are differences in the use of Internet platforms between teachers and students. Students are in an important part of growth and learning. Influenced by the Internet, they have a strong curiosity about the latest reports in the Internet information platform. Therefore, students can soon apply the Internet to the study of innovative education [13]. Compared with students, educators are relatively conservative, and older teachers are not good at carrying out innovative education and practical activities through the Internet information platform (as shown in Figure 1). Therefore, at present, many educators are still unable to flexibly use the Internet information platform, and teachers are unable to understand and answer questions and doubts in time in the face of new ideas put forward by students [14].

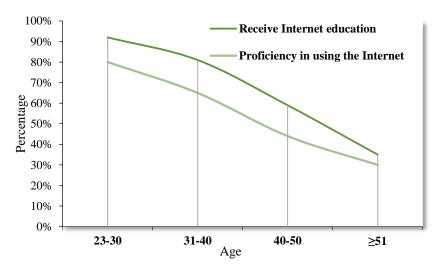


Figure 1. Acceptance and use of the Internet in Education

(3) Principle of openness

Traditional education has serious closure in many aspects. The reasons are: the teaching content is backward and can not adapt to the new development and changes. Teachers' closed mind, backward concept and unable to understand the changes of the outside world in time have a great impact on students' creativity [15]. The open teaching idea requires students to have an open attitude and an open mind in teaching content and teaching methods.

(4) Democratic principle

The democratization principle of innovative education is to create a democratic atmosphere conducive to innovation, that is, the equal and harmonious relationship between teachers and students, the beautiful teaching environment and the independent development of students [16]. In the traditional view of teaching subject, it emphasizes "teacher-centered" and "classroom oriented", while in the concept of "student-centered" teaching quality, "knowledge mastery is the center". Innovative education is an education with the fundamental value of cultivating innovative talents. Creative education talents are talents with comprehensive coordinated development of knowledge and skills, science and humanities, morality and wisdom [17].

Before the advent of the Internet, radio, television, newspapers and magazines were the main means of communication and the main source of information. Reading newspapers, listening to radio and watching TV are compulsory courses for people every day, and they will arrive on time every day. If they miss it, they will not be easy to get it again, so the time limit is very strong [18]. However, the emergence of the Internet has broken this barrier, because people can access it anytime and anywhere, they are no longer limited by time and space, and the Internet makes it easier for people to collect information. The Internet has also brought further development and opportunities to the field of Education [19]. Education is spread through the Internet. Teachers and students can more quickly obtain and update information, cover a wider range of disciplines, and more accurately understand the information changes generated by educational activities [20-21].

The Internet era is characterized by digitization, intelligence and computerization. In this environment, tools such as audio, video and software provide teachers and students with a more open and free form of communication. "Internet +" refers to creating an Internet-based organization and creatively using Internet tools to promote effective teaching and learning in innovative education. To understand the definition of "Internet +", two preconditions need to be clarified: first, "Internet +" describes the business model in the Internet environment as simply and clearly as possible. Second, the key to "Internet +" is not the tools of the Internet, but the people who use the Internet. The innovative development of education is closely related to the Internet. With the current dependence on the Internet, many citizens have more opportunities. Its use and dissemination of information are also more diversified, including the use of app, the promotion of service platform and so on.

Innovative education in the Internet era has greater flexibility and diversity. It takes students as the center and teachers as the assistance to stimulate students' enthusiasm for learning. It enables teachers to continuously improve their ability and develop innovative education. The scientization of school education goal management in the Internet era requires us to establish Internet thinking on the basis of following the laws of network and information work, school education and management, the deep integration of Internet and school education management, and the deep integration of Internet and school education management. It uses the Internet platform to achieve the establishment, implementation and evaluation of school education objectives.

In the development and implementation stage of objectives, objectives can be decomposed according to their internal institutional settings and organizational levels. Educational management organizations at all levels carry out communication and opinion communication through the Internet anytime and anywhere around the objectives at all levels, so as to clarify their respective objectives and responsibilities. In order to make the target implementation process orderly, it also needs to

supervise, inspect and adjust it. The school can conduct real-time supervision and inspection on the implementation of the goal in the form of questionnaire on the network platform, praise and publicize good models and timely point out and correct the deviation from the goal, so as to ensure the smooth implementation of the goal. Finally, in the evaluation stage of target results, schools should make use of the Internet to unblock information feedback channels. By timely collecting feedback information from organizations at all levels on target implementation status and completion progress, it integrates and analyzes these information by using big data technology. The evaluation results are in line with the reality. Big data technology should also include the technical means and thinking mode of processing, storage and analysis of big data technology, and further extend to talents, organizations, institutions, governments and enterprises dealing with big data, as shown in Figure 2.

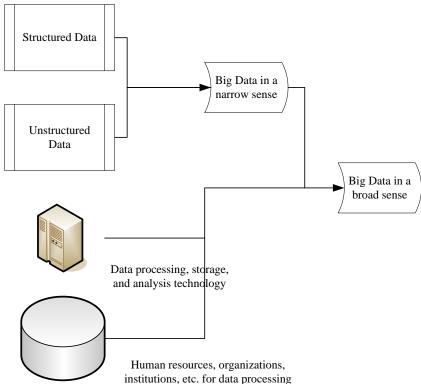


Figure 2. Concept diagram of big data

Big data analysis not only reflects the characteristics of huge amount of data, but also aims to obtain intelligent, rich and valuable information behind the data. Numerous examples confirm the possibility of grabbing deep value from data. In response to the characteristics of rich data, complex structure and fast update speed in the big data environment, appropriate data analysis methods are particularly important. As shown in Figure 3, it is data analysis and classification.

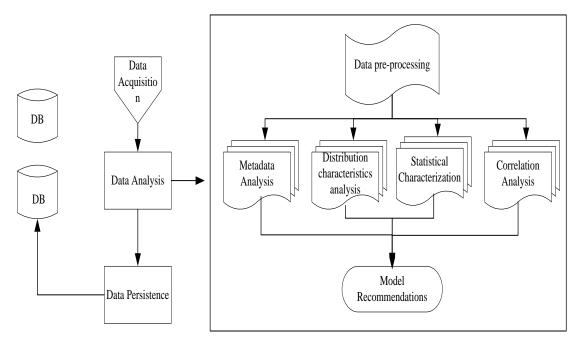


Figure 3. Classification of data analysis

Analysis method is the core factor to determine whether information can be obtained effectively. At present, the commonly used analysis methods include visual analysis, data mining algorithm, predictive analysis, semantic engine, data quality and data management, as shown in Figure 4.

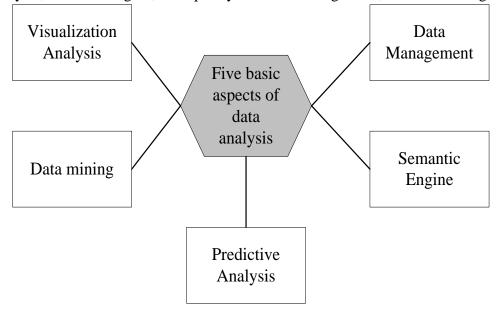


Figure 4. Five basic aspects of data analysis

Data mining is an important part of knowledge discovery. It uses computer to analyze data and extract useful information from database, but it is not included in data collection, processing and so on. In actual processing, data mining objects can be divided into structured data and semi-structured data. The specific process is shown in Figure 5.

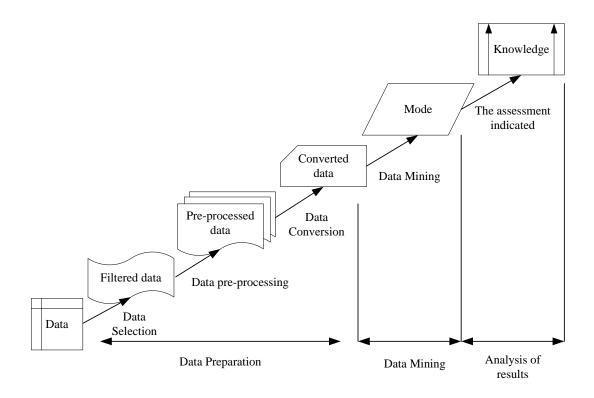


Figure 5. Simple process of data mining

C4. 5 algorithm is an improvement of ID3 algorithm. It takes the information entropy theory as the theoretical basis and takes the attribute with the maximum information gain rate in the test sample as the test attribute. And it constantly judges the sample set until it forms a complete decision tree. The advantage of this algorithm is that the classification rules are easy to understand and have high accuracy. It can process both discrete data and continuous data. Tree pruning technology is introduced to improve the accuracy of classification.

In this algorithm, the training data set D is divided into n categories: $D_1, D_2, ..., D_n$. If the total number of observations T and T_i in the data set are the observations in D_i , the probability that the sample belongs to class I:

$$p_i = \frac{T_i}{T} (i = 1, 2, ..., n)$$
 (1)

Information expectations for dataset classification:

$$I = -\sum_{i=1}^{k} p_i \log_2 p_i \tag{2}$$

Let C be an attribute of the data set, and the value is $c_1, c_2, ..., c_m$. The information of each value is expected to be $I(C = c_j, j = 1, 2, ..., m)$:

$$I(C = c_j) = -\sum_{i=1}^{n} p_{ij} \log_2 p_{ij}$$
(3)

 T_i is the number of observations of $C = c_i$. Calculating the information entropy of attribute C:

$$E(C): p_i = \frac{T_j}{T} \tag{4}$$

$$E(C) = \sum_{j=1}^{m} p_j * I(C = c_j)$$
 (5)

Information gain Gain(C) of attribute C:

$$Gain(C) = E(C) - I \tag{6}$$

The larger the Gain(C), the greater the amount of classification information occupied by attribute C in the classification process. If we take the maximum information gain as the standard, we prefer to select more classified attributes, so we use the information gain rate as the standard to select nodes. The information gain rate of attribute C is

$$Gain(C) - Ratio(C) = \frac{Gain(C)}{I(C=c_i)}$$
 (7)

- C4.5 algorithm can deal with continuous attribute data, which compensates the weakness that ID3 algorithm can only deal with discrete data. However, C4.5 algorithm also has disadvantages, that is, when discretizing continuous attributes, it needs to calculate the information entropy of each segmentation point and pick the optimal segmentation threshold. When there are many attribute values, the algorithm is relatively time-consuming.
- (1) Let S be the set of class labels corresponding to the training sample set. Generally, each training sample set is represented as:

$$X = \{x_1, x_2, \dots, x_n\}$$
 (8)

(2) Supposing there are k classes $d_1, d_2, ..., d_n$, the classification algorithm takes the highest a posteriori probability as the evaluation index, and the pre judgment training sample set X belongs to this category. That is, if it is determined whether sample x belongs to d_i , it only needs to determine the probability $P(d_i|X)$ if and only if

$$P(d_i|X) > P(d_j|X), 1 \le j \le m, j \ne i$$
(9)

Setting the value of probability $P(d_i|X)$ to the maximum and belonging to the largest class d_i in $P(d_i|X)$ is called the maximum a posteriori hypothesis. According to Bayes theorem

$$P(d_i|X) = \frac{P(X|d_i)p(d_i)}{p(x)}$$
(10)

The main statistics used in centralized trend measurement are data mean, median and mode, as well as the weighted average of data obtained by analysts through independent weight adjustment. The following formula is used to calculate the arithmetic average and weighted average respectively:

$$\overline{X} = \frac{\sum_{i=1}^{n} x_i}{n} \tag{11}$$

$$\overline{X} = \frac{\sum_{i=1}^{n} k_i x_i}{\sum_{i=1}^{n} k_i}$$
 (12)

The deviation trend measurement of data reflects the dispersion degree of data, which is generally described by parameters such as standard deviation, coefficient of variation and quartile. The general calculation formula of each calculation quantity is as follows:

$$\delta = \sqrt{\frac{\sum_{i=1}^{n} (x_i - \bar{x})^2}{n}} \tag{13}$$

$$D_{x} = \frac{\delta}{\bar{x}} \tag{14}$$

The distribution situation of data is mainly investigated through skewness and kurtosis. Based on the standard Zhengtai distribution, the distribution situation of data can be defined as right skew distribution, left skew distribution, flat distribution, peak distribution and other types. The system not only calculates the skewness coefficient and kurtosis coefficient of the data, but also draws the intuitive distribution combined with the graph. The formula used in the calculation is as follows:

$$SK = \frac{n\sum_{i=1}^{n} (x_i - \bar{x})^3}{(n-1)(n-2)\delta^3}$$
 (15)

$$K = \frac{n(n+1)\sum_{i=1}^{n} (x_i - \bar{x})^4 - 3(\sum_{i=1}^{n} (x_i - \bar{x})^2)^2 (n-1)}{(n-1)(n-2)(n-3)\delta^4}$$
(16)

The positive and negative of SK indicates the skewness of the data. When SK is positive, the data presents a right skew distribution, and when SK is negative, the data presents a left skew distribution. The K value reflects the flatness of the data. When k is positive, the data is sharper than the standard positive too distribution, and when k is negative, the data is more flat.

3. Investigation and Experimental Data Source of the Current Situation of Innovative Education

By summarizing and analyzing the current development status of innovative education in Colleges and universities, the development of innovative education in Colleges and universities mainly focuses on five main aspects, as shown in Figure 6. These five aspects are student innovation, innovative education teachers, innovative education curriculum, innovative space and innovative education activities. It summarizes these five aspects as five elements of the development of innovative education in Colleges and universities. The development of innovative education in Colleges and universities is inseparable from these five internal elements.

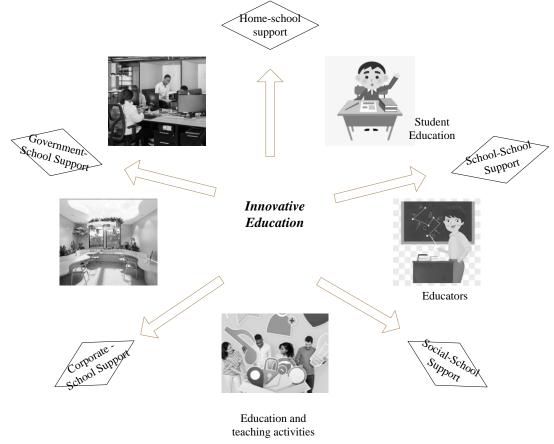


Figure 6. Five aspects of educational innovation

This study takes a university as an example to carry out field investigation. In the field

investigation, the main investigation aspects include the following parts. Firstly, it understands the cognition and attention of students and teachers to the implementation of innovative education. Secondly, it understands the construction of supporting facilities for innovative education in the University. Finally, according to the basic situation investigated, this paper analyzes the main problems and reasons in the implementation of innovative education, and puts forward targeted and feasible improvement measures and suggestions. This survey adopts the method of anonymous questionnaire. The number of student questionnaires was 2000 and 1954 were recovered, with a recovery rate of 97.70%. After the validity analysis of the questionnaire, there are 1948 valid questionnaires, and the effective rate is 98.19%. This student questionnaire adopts the stratified sampling method. The survey objects and their awareness of the Internet and innovative education are shown in Table 1 and Table 2.

Table 1. Basic information questionnaire of College Students

Test Items		Number of people	Proportion
Gender	Male	862	56.71%
	Female	1138	56.9%
Grade	Freshman year	495	24.75%
	Sophomore year	502	25.1%
	Junior year	488	25.75%
	Senior Year	515	21.65%

Table 2. College Students' cognition of Internet and innovative education

	Self-perceived level of understanding of the Internet	Level of knowledge about innovative education
No knowledge	1%	11%
Not really willing to understand	3%	15%
Basic Understanding	73%	68%
Very well understood	23%	6%

4. Data of the Current Situation of Innovative Education in the Internet Era

The survey results of changing the direction of College Students' life and way of thinking in the Internet era are shown in Figure 7. The main content of the survey is the positive impact on College Students' life, learning and social activities.

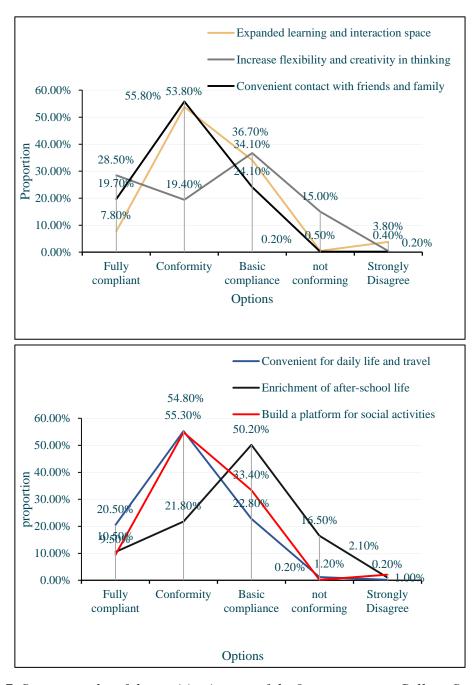


Figure 7. Survey results of the positive impact of the Internet age on College Students

As can be seen from Figure 7, college students are widely recognized and accepted for the Internet. It has brought a lot of convenience and benefits to our study and life. Although 15.4% and 17.5% of college students think that the Internet age does not agree with enhancing the flexibility and innovation of thinking and enriching after-school life, most people still think that the Internet age is beneficial to study and life. Students believe that the Internet era has made their living space larger and stimulated their innovation and creativity. It makes their daily life, travel and shopping more convenient. It provides them with more platforms to learn, communicate and display.

The Internet has a great impact on College Students' thought and behavior. Figure 8 is a survey of College Students' attitudes towards the Internet in terms of interpersonal communication, social morality, beliefs and values.

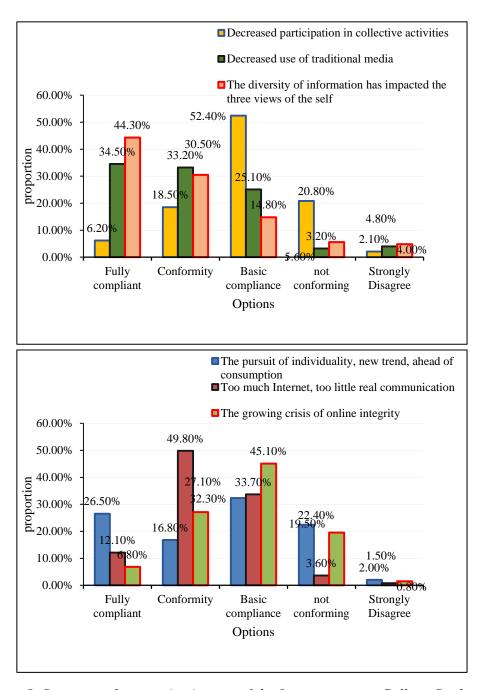


Figure 8. Survey on the negative impact of the Internet age on College Students

As can be seen from Figure 8, since the Internet has given more platforms and media, 92.8% of students believe that their use of traditional media has been significantly reduced. The most obvious is that 95.6% of college students believe that the current state is too dependent on the Internet and alienated the real communication. In the Internet era, all sectors of society are actively carrying out reform and innovation, and strive to seek a new breakthrough and development in the Internet. For the special group of college students, their thoughts and behavior, learning and life style and values have been slightly affected. It has both positive and negative effects. Facing this situation, what we need to do is to face the development and changes of the social times, think about the current countermeasures for the development of innovative education and effectively solve the puzzles and problems brought by the Internet to students. It actively integrates and innovates with the Internet

and strives to find a new educational innovation model.

When exploring the new network innovation education mode, it summarizes the hot direction of college students' improvement in combination with the Internet, as shown in Figure 9.

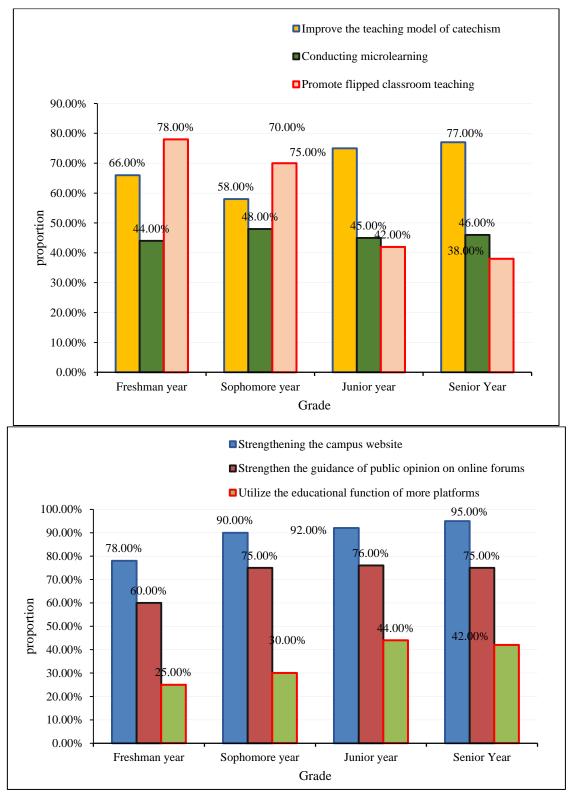


Figure 9. Survey results of improvement direction of innovative education model

As can be seen from Figure 9, for college students of different grades, the number of people who are most concerned about improving the Mu class teaching mode is generally more than 58%. Although the other two improvement directions are not so prominent, the number of people who are concerned is also more than 38%. In making full use of the network carrier to build a new teaching model, the more prominent thing is to strengthen the construction of campus website. More than 78% of college students in each grade agree. In terms of giving full play to the educational functions of more platforms, the number of college students who agree has decreased significantly, and the number of college students who agree in each grade is basically stable between 25% - 44%.

In order to better understand the impact of Mu class platform on education mode, this paper collects the evaluation results of Mu class courses, as shown in Figure 10. From the evaluation given by the interviewed college students, it can be seen that the college curriculum under the mode of Mu class has achieved certain results, whether in curriculum construction or mode innovation.

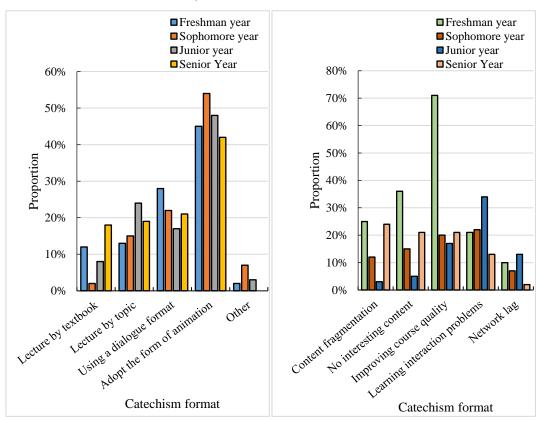


Figure 10. College Students' tendency and evaluation of after class curriculum form

As can be seen from Figure 10, for the students interviewed in different grades, more than 40% of college students believe that animation should be adopted. About 20% of the students interviewed believed that they should "teach in the form of dialogue", and a small proportion chose "other". 71% of people believe that the quality of courses needs to be improved under the existing teaching form.

The content of Figure 10 is mainly the objective problems faced on the Mu class platform. For learners themselves, there are also many problems, as shown in Table 3. Compared with traditional courses, Mu course has the characteristics of large-scale, networking and openness. Therefore, the educational theory course in colleges and universities should absorb the existing advantages to a certain extent and improve it.

Freshman Sophomore year Junior year Senior Year year Lack of perseverance in 35% 22% 23% 44% the learning process Not used to online learning 36% 35% 65% 41% and assessment Want to study problems can not 56% 50% 27% 11% be solved in time

Table 3. Difficulties faced by learners after class

5. Conclusion

The rapid development of the Internet has spread all over the world, accelerating the socialization and development of all walks of life. Internet technology plays a core role in student education innovation in the Internet era, and it has gradually become a power and source of continuous innovation. This paper shows that the application of Internet technology in student education is not only conducive to the emergence of new forms of education, but also conducive to the correct development of students. However, the curriculum, interpersonal communication and interaction still need to be improved. Student education must keep pace with the times and adapt to the new development of reality by constantly updating concepts, contents and methods and improving the timeliness and speed of work. In order to effectively improve the teaching methods, educators should first emphasize the importance of innovative teaching and explore the teaching mode according to the development needs of individual students. Only when we consider the development of education in the era of innovation, can we make education more equitable.

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Data Availability

Data sharing is not applicable to this article as no new data were created or analysed in this study.

Conflict of Interest

The author states that this article has no conflict of interest.

Reference

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