

Analysis of the Influence of Network Classroom on College Students by Fuzzy Evaluation Matrix Method

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Abstract

The study takes college students as the research object, through online questionnaire survey, combined with literature research method, correlation coefficient analysis method, quantitative analysis and other methods to analyze the impact of online network classroom on various aspects of college students, and establishes model analysis through mathematical modeling. Through analysis, the impact of online classrooms on college students is divided into three aspects: learning, life and social aspects. Among the three aspects, the influence of online classrooms on the learning of college students is the most significant. In addition, the depth and breadth of online classrooms in college students is not high, and the time and energy invested by students are insufficient. These will become the obstacles to the development of online network classrooms. Therefore, in order to improve the impact of online classrooms on college students, it is necessary to optimize the online classroom system and improve the attractiveness of students in online classrooms.

Keywords

Online course, Fuzzy matrix, Evaluation.

1. Introduction

With the continuous improvement of the level of social science and technology, all walks of life have begun to appear in the form of networks, and education is without exception. This type of education, dating back to 1969, has undergone major changes with the changing times. In recent years, with the vigorous publicity of the media and the rapid development of technology, online classes have become familiar and used. The use of network communication equipment is more frequently, and college students with needs naturally become the backbone of the use of online network classrooms.

Having consulted a lot of references and learned about the status quo of previous research on this topic. The existing surveys on online classrooms are mainly in the following two forms. The first is to investigate the current use of online classrooms; the second is to investigate the impact of online classrooms on a specific single aspect of the network, such as "The impact of online classrooms on the learning style of college students", "Analysis of the influencing factors of college students' online learning in the network environment" and so on.

2. Survey Results and Analysis

This study examines the impact of online courses on college students in five areas, including: awareness of online online courses, frequency of use of online courses, preferences for using online courses, gender and grades, and professional relevance to online classrooms. The purpose of the future online network classroom is to study the influence of online classroom on the learning, life and social aspects of college students, and to analyze its causes.

The survey adopted an online survey method. Based on the grades, majors, genders, etc., in the face of all college students, due to the establishment of college and postgraduate options in the grade level, the proportion of these two types of students in the questionnaire is very small. Therefore, all the analysis in this paper focuses on undergraduate students. A total of 305 questionnaires were collected in this survey, including 127 and 178 male and female students. The questionnaires are all multiple-choice questions, two of which are screening questions, namely "Do you know online classes" and "are you interested in using online classes". Because 9 students in the questionnaire chose "Don't know" in the question of whether they knew about online online classes. In the subsequent question of whether or not they were interested in using online classes, 17 people chose "no interest". Based on this, the main survey analysis is based on 91.5% of all questionnaires (305 questionnaires), which is based on the online classroom and interested students. All conclusions are mainly based on this analysis.

The survey results are summarized into three aspects, learning, life and social aspects.

2.1. Learning Aspect

Among the questions of use, 194 people chose the option of "as an offline supplement", and 102 people chose to "pass some professional exams", indicating that online classrooms enrich the learning style of college students and diversify their learning. Among the questions, 159 people chose "more types of learning", and 136 people chose "more resources", indicating that online classroom types can meet the needs of today's college students' online learning, providing multiple resources for their learning, meeting the needs of students in various majors, and providing more learning selection.

In terms of improving the ability to learn, most students believe that using online classes can improve their learning ability, and there are also a few that can be improved. It is considered that it is not very good and only accounts for a very small proportion, and the number of people who think that it cannot be improved is zero. To a certain extent, although the use of online classrooms has a certain negative impact on the study of college students, in general, the use of online classrooms will have a positive impact on the learning of college students and improve their learning ability.

2.2. Life Aspects

104 people chose the option of "rich life" in the purpose of use. This is because today's online classroom is not limited to the main aspects of professional learning, and there are also some courses to cultivate amateur hobbies, which will make The life of the students who watched this kind of course became rich and colorful, adding color to their free life. In addition, 143 people chose "convenient and fast" in the cause of question, 95 people chose "price concession", and the two options reflected the use of online online classroom. It will bring convenience to the life of college students, with the effect of saving money. All of the above are the impact of using online classes on the life of college students.

2.3. Social Aspects

The social aspects involved in the questionnaire are only the option of "knowing like-minded friends" in the purpose of the question. The reason for designing this option is that the online classrooms now basically have dialogue functions, and they need to like friends who are like-minded to learn to cheer or discuss. This feature can be used when the problem occurs. The results of this survey show that only a very small number of students choose this option. It seems that the use of online classrooms has little effect on the social aspects of college students and needs to be improved. However, the learning aspect of the above three aspects is the most important, and online classrooms are mainly based on learning.

3. Establishing Model

Through the analysis above, online classrooms have a certain impact on the three aspects of college students' learning, life and social. The following is mainly based on the impact of these three aspects of modeling analysis. Through the membership degree processing, the fuzzy evaluation matrix is obtained, and the weight coefficient is obtained according to the entropy weight assignment method. The final comprehensive evaluation is obtained by solving the problem, so that the online network classroom has a general impact on the learning, life and social aspects of the college students.

3.1. Learning Aspect

Firstly, assume that the choice of college students participating in the questionnaire is a true portrayal of the impact of online classrooms on college students. In the process of data processing, abnormal data has been eliminated;

Secondly, assuming that the boundaries of the evaluation are reasonable, the error in the results can be ignored;

Thirdly, exclude the influence of other uncontrollable factors;

Lastly, regarding the test of the dependence of the online network classroom carrier, it is assumed that the scores are in a normal distribution.

3.2. Symbol Description

X:(coefficient 1, 2, 3, 4, 5): learning indicators

Y:(coefficient 1, 2, 3): indicators of life

V: Evaluation set

v:(coefficient 1, 2, 3, 4, 5): evaluation criteria

S: membership function

W: weight coefficient

B: Final comprehensive evaluation

G_{ij} : Fuzzy Matrix

X_{ij} : Feature weight

e_j : Entropy value

g_j : Difference coefficient

3.3. Analysis and Establishment of Models

3.3.1. Model Analysis

The problem of using mathematical methods to evaluate the impact of online classrooms on college students' learning life and social interaction is due to the individual differences in the influence of online classrooms on different people, and there are too many influencing factors for college students. Therefore, according to the results of the questionnaire, the impact is divided into three categories. Since online classrooms have less influence on the social aspects of college students, after they are included in the impact of life, they are more important and common in the two categories of life. The indicators are established in some aspects, and these indicators are not clear evaluation criteria, so the fuzzy comprehensive evaluation model is adopted.

The main learning indicators of this model X :

The influence of online network classroom on college students' learning style;

The influence of online online classroom on the attraction of college students;

The psychological impact of online online classroom on college students;

The influence of online online classroom on college students' learning preference;

The influence of online network classroom on offline education of college students.

The main indicators of life in this model Y:

The influence of online online classroom on the lifestyle of college students;

The influence of online online classroom on the attraction of college students;

The influence of online network classroom on college students' interpersonal communication.

The evaluation set established by this model V:

V1: Has a good impact

V2: Has a good impact

V3: General impact

V4: Poor impact

V5: Very poor impact

3.3.2. Create A Model

The data of the collected questionnaires are collated, and the different options are converted into corresponding scores according to the selection of the college students surveyed, and the same influencing factors are used to add the summation and summation statistical methods to obtain Tables 1 and 2.

Table 1. Learning indicator collection values

(unit)	X1	X2	X3	X4	X5
V1	466	206	70	75	127
V2	218	434	206	279	206
V3	248	29	210	215	219
V4	538	538	146	354	437
V5	64	90	355	18	10

Table 2. Collection of life indicators

(unit)	Y1	Y2	Y3
V1	308	206	4
V2	154	281	124
V3	288	29	0
V4	364	538	0
V5	64	90	0

The membership function can be obtained by fuzzy statistical method:

The membership function and other X's membership functions of online classrooms that affect the learning style of college students are

$$S(1,2,3,4,5) = X' / X(\max) \quad (1)$$

The membership function and other Y's membership functions of the online network classroom for the excellent influence of college students' lifestyle

$$S(1,2,3) = Y' / Y(\max) \quad (2)$$

We consider the entropy weighting method. The basic idea of the entropy weight method is to determine the objective weight according to the magnitude of the index variability. Generally

speaking, if the information entropy of an indicator is smaller, it indicates that the index is more variability, and the more information is provided, the greater the role that can be played in the comprehensive evaluation, and the greater the weight. On the contrary, the greater the information entropy of an indicator, the smaller the degree of variability of the indicator, and the less information it provides. The smaller the role played in the comprehensive evaluation, the smaller the weight. The specific steps are:

Firstly, Normalization processing. For the fuzzy matrix X, calculate the characteristic weight of the first indicator of the first evaluation factor:

$$p_{ij} = \frac{x_{ij}}{\sum_{i=1}^n x_{ij}} \tag{3}$$

Calculated Table 3 and Table 4.

Table 3. Characteristics of learning indicators

X1	X2	X3	X4	X5
0.303780965	0.158828065	0.070921986	0.079702444	0.127127127
0.142112125	0.33461835	0.208713273	0.296493092	0.206206206
0.16166884	0.022359291	0.212765957	0.22848034	0.219219219
0.35071708	0.414803392	0.147922999	0.376195537	0.437437437
0.041720991	0.069390902	0.359675785	0.019128587	0.01001001

Table 4. Characteristics of learning indicators

Y1	Y2	Y3
0.261460102	0.18006993	0.03125
0.130730051	0.245629371	0.96875
0.244482173	0.02534965	0
0.308998302	0.47027972	0
0.054329372	0.078671329	0

Secondly, Calculation of the entropy value of the first i

$$e_j = -\frac{1}{\ln n} \sum_{i=1}^n p_{ij} \ln p_{ij} \tag{4}$$

Where is the sample content.

Thirdly, According to the calculation formula of information entropy, the information entropy of each index and the weight of each indicator is calculated by information entropy:

$$w_i = \frac{g_i}{\sum_{i=1}^m g_i} \tag{5}$$

Forth,the calculation of the difference coefficient of the indicator:

$$g_i = 1 - e_i \tag{6}$$

Lastly, Bring the formula (6) into the formula (5) to determine the weight coefficient of the indicator:

$$w_i = \frac{1 - e_i}{k - \sum e_i} (i = 1, 2, \dots, k), \tag{7}$$

4. Model Solving

The data is processed by membership degree to obtain a fuzzy evaluation matrix. According to the entropy weight assignment method, the weight coefficients of five learning indicators and three life indicators are solved:

$$W(x) = (0.62185, 0.20391, 0.98586, 0.98890, 0.03932)$$
$$W(y) = (0.29506, 0.30764, 0.38857)$$

The final comprehensive evaluation of the solution is:

$$B(x) = (1.0309, 0.7741, 0.4524, 0.1905, 0.1809)$$
$$B(y) = (0.3799, 0.6740, 0.2500, 0.6027, 0.1030)$$

It can be seen that the impact score of learning shows a decreasing trend, indicating that the influence of online classrooms on college students' learning is mostly excellent, although the negative impact is not significant;

As can be seen from the life aspect, the better influence is similar to the proportion of the poor influence. So you can get the following conclusions:

The analysis of the data we surveyed reflects that the influence of online classrooms on college students' learning has a favorable influence under the above five indicators. The impact on students in life is the basic balance between advantages and disadvantages.

Here, the indicators of each factor are compared, and the above comprehensive evaluation value is obtained. This value reflects the absolute value of the online network classroom affecting college students, but relatively speaking, it is used to compare with each other to reflect the online network classroom. The impact on college students is good or bad.

5. Conclusion

The last question of the questionnaire is for all the students who participated in the questionnaire. Through the development of college students' online online classrooms, the trend of the impact of online classrooms on college students is analyzed. The statistical results show that 22.3% think online online classrooms. It will not become the mainstream of future education methods, and 77.7% of students think it will become the mainstream way. This shows that most of the students recognize the influence of online online classes.

Based on all the above analysis, the following conclusions are drawn: Firstly, the online network classroom has a certain impact on all aspects of college students through its many years of development and improvement. This effect is both positive and negative. In general, the impact

of online classrooms on college students is still deep, and the impact is mostly positive. Secondly, online classrooms have an impact on the learning, life and social aspects of college students, especially in terms of learning. The impact is more significant. Thirdly, the online classroom has not fundamentally shaken the traditional classroom, and some changes only remain on the surface. However, the speed of its development has also produced some warnings about the classic teaching model.

Based on all the above analysis, I would like to sincerely propose some practical countermeasures and suggestions. Firstly, in order to improve the awareness of online classrooms, we must make good use of all available resources and use teachers and student resources. Open up the road, open up new propaganda concepts, improve the overall service level, and enrich the curriculum resources. Secondly, to improve the depth of influence, we must understand the needs of students of all majors, do what they want, optimize the teaching mode, and enable college students to use the online classroom process. Increased ability and satisfaction. Thirdly, not only in terms of learning, but also in other aspects, it is a combination of college students' work and rest to experience and fun, and enrich other knowledge. But mainly based on learning.

With the development of the times, science and technology can only be improved. Online classrooms will surely emerge in the education style and become the leader among them. Grasping the main use of people, and constantly increasing the depth and breadth of influence, the future of online classrooms must be bright.

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References

- [1] Geng Xuehua, sang xinmin. MOOCs experience of learners, teachers and researchers -- study and reflection on online courses of Santa fe institute in the United States [J]. Higher education research in China, 2014(07):3-4.
- [2] Ye Weijian. Empirical research on college students' online course learning behavior and influencing factors [J]. Education academic monthly, 2014(06):1-3.
- [3] Chen jianwei, huan chenglin. Investigation and research on the construction of quality online education courses -- a case study of the national quality online education courses selected in 2010 [J]. China education technology equipment, 2012(18):01-18.
- [4] Liang Linmei. Learning experience and reflection of transnational online courses in Europe -- a case study of "ict-based collaborative communication" course of Stockholm university, Sweden [J]. Modern distance education research, 2012(04):01-04.
- [5] Zhang Zijing. Survey and analysis on the use of online courses for college students [J]. Education academic monthly, 2016(12):7-9.
- [6] Li Liping. Research on factors influencing college students' online learning [J]. Journal of technology entrepreneurship, 2015(5):1-4.