Strategy Studies on Constructing Domestic Online Open Courses in the Era of “Internet +” Based on SWOT Quantitative Analysis Model

Meng-Ting CHEN¹,a, Zi-Jun CUI², Chang-Bin JIANG³, Qian-Wen YU⁴
School of Management, Wuhan University of Technology, Wuhan, Hubei, China

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Abstract. The advent of the "Internet +" era has greatly promoted the evolution of the learning society of Innovation 2.0. This article firstly uses the analogy analysis to introduce studies of online open courses at home and abroad in the era of "Internet +", and summarizes the developing trend of online open courses. Next, it uses SWOT analysis to construct SWOT model of online open courses construction in China's colleges and universities, and uses quantitative analysis to discuss the strategy of online open courses used in China. Finally, it summarizes and analyzes, and actively seeks new ideas for the development of online open courses in China.

Introduction

When Internet technology penetrates into every aspect of people's lives with impressive speed, a huge digital wave sweeps over the global education.

Under the trend of education informatization, in 2015, the Ministry of Education of China promoted the participation of colleges and universities in the setting of MOOCs, the construction of service platforms, and related service innovations[1]. In 2017, the "13th Five-Year Plan for National Education Development" [2] was issued, which clearly pointed out that one of the general objectives of the education reform and development during the “13th Five-Year Plan” period was that significant progress was made in education modernization, and the overall strength and international influence of education were significantly enhanced. With the trend of MOOC, how to select a strategy suitable for the construction of domestic online open courses construction has been becoming the focus research.

The Current Situation of Domestic and Foreign Researches on Online Open Courses

Foreign Status

In 2008, Dave Cormier of the University of Prince Edward Island in Canada and Brian Alexander of the Institute of Humanities Education presented the “MOOC” in the innovation of practical teaching, then George Simmons of Athabasca University and Stephen Downes of Canadian National Research Council led the design of the MOOC. Kwok Wai Jing (2013) summarized how students take initiatives in online open courses to strengthen their activity-based learning skills and online open courses construction [3]. J Broadbent (2015) pointed out that teachers and online students get together to modify and improve the use of SRL strategies can result in greater academic achievements [4]. Anna Grabowska (2017) proposed to use MOOCs in the SP4CE project to carry out the educational modernization in an attractive and inspiring way [5].

Domestic Status

The era of MOOC firstly came in 2013. Gu Xiaoqing (2013) et al. explained the demand and possibility of the development of MOOC in China, and summarized various challenges and countermeasures in the process of localization [6]. Based on the analysis of seven typical foreign MOOC projects, Wang Ying et al. (2014) provided inspiration for the further development of Chinese MOOC from four aspects: operation mechanism, course development, student participation and learning evaluation [7]. Qian Yupeng (2017) et al. proposed to strengthen thematic study,
change education concept, focus on students, stick to teaching reform and highlight course features, and realize resource sharing online open course construction method by combining the basic situation of course construction of crushing engineering [8].

SWOT Analysis of the Construction of Online Open Courses in Chinese Universities

Strengths of Online Open Courses Construction in Colleges and Universities of China

Realization of the Sharing of High-quality Education Resource. The core goal of this "MOOC craze" coming from Europe and America is to "spread the world's best education resources to the most remote corners of the earth". Taking "MOOC of Chinese Universities" as an example, it contains 10235 courses (as of October 2018) of 203 first-class universities in China (including the MOOC construction committee of vocational education, Microsoft, the organizing committee of national college students mathematical contest in modeling and other 9 enterprises and education organizations). In addition, its teaching teams are formed by all famous teachers in various fields, and the teaching content is authoritative.

Breaking of the Learning Space-time Boundaries. The emergence of open online courses is an innovation of education model. This way of learning improves learners' learning efficiency. Traditional education locations are confined to classrooms, but online open courses make classrooms ubiquitous.

In the traditional 45-minute class, students need to focus their attention all the time to catch the key and difficult points. But the 10-15 minutes teaching of video concentrates the essence of the whole course. Learners can complete the learning at any time and any place by using fragmented time, and build the learning system and knowledge framework independently.

Weaknesses of Online Open Courses Construction in Colleges and Universities of China

Poor Interactivity. Online open courses are an education called flipped classroom, but with little learning atmosphere in class. Different from the real-time feedback in a traditional classroom, the problems the learners encounter during the listening process can only be asked and answered via message boards, and the opportunities for cooperation and exchange within learners are also reduced. Sparks ideas collision between the creative learner and the knowledgeable teacher is delayed and is in a lower extent.

Depressed Continuous Learning Willingness of Learners. The high dropout rate has become a tough resistance to the development of online open courses at home and abroad. According to the research data from the University of Pennsylvania in 2013, the MOOC dropout rate abroad reached 96%. In 2017, Lu Xiaohang and other four scholars of Peking University predicted a MOOC dropout rate of more than 94% based on the Sliding Window Model [9]. Such a high dropout rate has called into question the results of the free development of online open courses, and has hindered the sustainable development of online open courses.

Opportunities of Online Open Courses Construction in Colleges and Universities of China

Policy Support from the Ministry of Education of China. In 2015, the Ministry of Education proposed that we should "construct a batch of high-quality online open courses such as MOOCs, fusing courses applications with teaching services". The top-level design of education modernization is inseparable from the construction of online open courses in the era of Internet+. For this imprint of success in the education, the policy research, macro guidance and condition support provided by the state all make a contribution.

China's Quality Universities and Abundant Curriculum Resources. In September 2017, Notice of Ministry of Education, Ministry of Finance and National Development and Reform Commission on Publishing the List of World-class Universities and First-class Discipline Construction Colleges and Disciplines [10] published the list of universities and disciplines for the construction of "double first class" in China. Among the list, 42 are for the construction of first-class universities and 95 are for the construction of first-class disciplines. Besides, there are
five Chinese universities in the top 100 in The Times world university rankings 2019 (updated on September 27, 2018). Additionally, Yu Zhongwei, President of New York University in Shanghai, said in his speech at the annual conference of education international BBS held on November 3-4, 2018, "the focus of current development of education in China has shifted to high-quality education, high-level universities and distinctive schools, which need the courage of reform and proper path".

Challenges of Online Open Courses Construction in Colleges and Universities of China

**High Course Construction Cost.** In 2014, Li Ling, chairman of Tsinghua Ziguang Education, at the Beijing fair's "education summit in the e-era", revealed that the average MOOC budget of the online school of Tsinghua University is 300,000 yuan, with many more than one million yuan. The average construction period of online open courses is around one year. Moreover, the informatization level and technology level of some colleges and universities is not high enough to produce the online course video. Because of that, their video production needs the support of external companies, which increases more cost of time and money and hinders the further development of online open courses.

**Imperfect Evaluation System of Learning Results.** The background of online open courses is equipped with a monitoring function for users' learning, where teachers can use this information to record and track students' learning process through big data analysis. However, learners' learning results still cannot be reflected directly. An excellent evaluation system of learning results has a strong incentive effect on learners. Therefore, its construction problem needs to be solved urgently.

Quantitative Analysis Model

**Building of Construction Strategy Analysis Model**

As of November 6, 2018, 183 questionnaires were sent out, 183 valid questionnaires were taken back. The strategy analysis model of domestic online open courses construction (see Fig. 1) is built referring to the Quantitative Model of China’s Athletic Tennis [11].

![Diagram](image)

Figure 1. Strategy Analysis Model of Domestic Online Open Courses Construction.

**Calculation of Factors Intensity**

We calculate the arithmetic mean of the frequency of a chosen factor (respondents' opinions are equally weighted) to get an average value of intensity of every factor:

- **Strengths Intensity of Factor A**: \( S_a = \frac{\text{Frequency of A}}{\text{Population of respondents}} \)
- **Weaknesses Intensity of Factor B**: \( W_b = \frac{\text{Frequency of B}}{\text{Population of respondents}} \)
- **Opportunities Intensity of Factor C**: \( O_c = \frac{\text{Frequency of C}}{\text{Population of respondents}} \)
Threats Intensity of Factor D: $T_d = \text{Frequency of } D/\text{Population of respondents}$ (4)

And get intensity values of every presented factors (see Table 1).

**Calculation of Intensities of Total Strengths, Total Weaknesses, Total Opportunities and Total Threats**

Intensity of total Strengths: $S = \sum S_i / i, i = 1, 2...n_s$ (5)

Intensity of total Weaknesses: $W = \sum W_i / i, i = 1, 2...n_w$ (6)

Intensity of total Opportunities: $O = \sum O_i / i, i = 1, 2...n_o$ (7)

Intensity of total Threats: $T = \sum T_i / i, i = 1, 2...n_t$ (8)

$n_s \cdot n_w \cdot n_o \cdot n_t$ represents the amount of related presented factor.

And get values of intensity of every aggregate factors (see Table 2).

| Factors | Frequency | Intensity |
|---------|-----------|-----------|
| S: Sharing of high-quality education resources | 151 | 0.83 |
| S: Overcome of space-time limit | 153 | 0.84 |
| W: Poor interactivity | 94 | 0.51 |
| W: Depressed continuous learning willingness of learners | 143 | 0.78 |
| O: Policy support from MOE | 108 | 0.59 |
| O: High-quality universities and courses resources in China | 158 | 0.86 |
| T: Higher cost of curriculum construction | 78 | 0.43 |
| T: Deficient assessing system | 151 | 0.83 |

| Intensity of Total | Intensity of Total | Intensity of Total | Intensity of Total |
| Total Strengths | Weaknesses | Opportunities | Threats |
|------------------|-----------|-------------|--------|
| 1.25             | 0.9       | 1.02        | 0.845  |

**Building of Construction Strategy Quadrilateral Model**

We find intensity value of aggregate SWOT factors $S_1$, $W_1$, $O_1$ and $T_1$ in 4 unidirectional axis S, W, O and T of a coordinate system, then connect 4 points to get a quadrilaterals of construction strategy $S_1O_1W_1T_1$ (See Fig. 2).

![Figure 2. Quadrilaterals of Construction Strategy of Domestic Online Open Courses.](image)

**Calculation of Azimuths of Construction Strategy Types $\theta$**

The quadrilaterals $S_1O_1W_1T_1$ is the result of the comprehensive effect of strengths, weaknesses, opportunities and threats. It is also the basis for the choice of domestic online open courses construction strategy. After the fuzzy synthetic evaluation, SWOT factors are dimensionless. We regard the center of gravity of the strategic quadrilateral as the index reflecting of the comprehensive effect.

We calculate by the SWOT Model to get:

$\sum x_i / 4 = 0.0875, \sum y_i / 4 = 0.04375, \tan \theta = y / x = 0.5, \theta = 26.565^\circ$ (9)

And the center of gravity of the strategic quadrilateral $P(0.0875, 0.04375)$ is in the first quadrant.
Calculation of Construction Strategy Intensity

Definition: In the four semi dimensional coordinate system, strategy intensity of Q(x, y) is defined as \( x^*y \) (numerically equal to the rectangle area enclosed by the two half axes and the perpendicular to the two half axes going through the point). All the coordinate \((x, y)\) that satisfy \( C=x^*y \) (\(C>0\), \(C\) is constant) form orbit \(L\), which is called Strategy Intensity Curve.

1. Strategy Positive Intensity

Strategy positive intensity \( U \) represents the combining results of strengths and opportunities of domestic online open courses contribution:

\[
U = S*O = 1.25*0.9 = 1.125
\]

(10)

Strengths and opportunities are interchangeable under certain conditions. And the curve consists of all combinations of strengths and opportunities which have the same value of strategy positive intensity is called strategy positive intensity curve. Different strategy positive intensity curves gather together into a cluster of strategy positive intensity gradient.

2. Strategy Negative Intensity

Strategy negative intensity \( V \) represents the combining results of weaknesses and threats of domestic online open courses contribution:

\[
V = W*T = 1.02*0.845 = 0.8619
\]

(11)

Weaknesses and threats are interchangeable under certain conditions. And the curve consists of all combinations of weaknesses and threats which have the same value of strategy negative intensity is called strategy negative intensity Curve. Different strategy negative intensity curves gather together into a cluster of strategy negative intensity gradient.

Calculation of Construction Strategy Intensity Coefficient \( \rho \)

Strategy Positive Intensity \( U = 1.125 \),
Strategy Negative Intensity \( V = 0.8619 \),
Strategy Intensity Coefficient \( \rho = \frac{U}{U+V} = 0.629 \)

According to the formula of Strategy Intensity Coefficient, we get a comparison Table:

| \( \rho \) | Conserved Region | Unfixed Point | Development Section |
|----------|-----------------|---------------|---------------------|
| \([0,0.5]\) |                 |               |                     |
| \(0.5\)   |                 |               |                     |
| \((0.5,1]\) |                 |               |                     |

Since \( \rho > 0.5 \), according to Table 3, domestic online open courses construction strategy should be located in the development section, suitable for adopting a positive development strategy.

Vectors Analysis of strategy and the Strategy Choices

The vector of domestic online open courses construction strategy is \((25.565^\circ, 0.629)\). Of which the Azimuths of strategy \( \theta = 25.565^\circ \)is used to identify the type of strategy, and the Strategy Intensity Coefficient \( \rho = 0.629 \) is used to judge the intensity of construction strategy. In the four semi dimensional coordinate system, \( P(\theta, \rho) \) is the strategy vector of online open courses. Correspondence of strategy coordinate system and type of strategy is shown is Fig. 4:
Figure 4. Correspondence of Strategy Coordinate System and Type of Strategy.

P's position corresponds to the following strategies:

Table 4. The Correspondence between P's Position and Strategies.

| First quadrant | Second quadrant | Third quadrant | Fourth quadrant |
|----------------|-----------------|----------------|-----------------|
| Strengths and opportunities are significant, therefore an active pioneering strategy should be chosen. | Weaknesses of the construction is obvious, but with great opportunities, it deserves a try. A strategy of trying is recommended, and action should be taken to transition to the first quadrant. | Both weaknesses and threats make the construction be caught in a dilemma. A conservative strategy is better at this time, and timely interrupt or back-off would be adjudged wise. | High risk together with outstanding advantages makes a strategy of contend a suitable one, and also, taking advantages to transition to the first quadrant is important. |

According to the result of quantitative analysis, during the construction of domestic online pen courses, the strengths and opportunities take a significant role, and therefore the construction should enhance its advantages and grasp the opportunities, choosing a strategy of strength-based pioneering type.

Conclusion

This study uses SWOT analysis to summarize the strengths, weaknesses, opportunities and threats of eight domestic online open courses. A strategy analysis model is established in this study, and corresponding strength and suggested strategies are obtained after quantitative analysis of eight factors.

The main conclusions of this study are as follows: the development status of domestic online open courses is strengths, weaknesses, opportunities and threats coexist. The combination of internal strengths and external opportunities is more significant. Therefore, it is suggested to adopt a practical and pioneering active strategy.

Based on the above conclusions, the following suggestions are proposed for the construction of online open courses in China:

1. Strengthen strengths, avoid weaknesses, firm the development pace.

According to incomplete statistics, the number of learners on domestic "MOOC" platforms was 1.5 million in 2014, 5.75 million in 2015, up 283 percent year-on-year, and 11.05 million in 2016, up 92 percent year-on-year. Online open courses have grown from "imported goods" to "localized goods with Chinese characteristics" in China, and have been widely recognized.

Therefore, it is necessary to build up sufficient confidence in future development and continue to leverage the strengths accumulated in the past. To deepen the reform of education and to promote the construction of lifelong learning society, we need to, in this era of Internet, make the full use of the characteristics of network information globalization.
2. Accelerate the establishment of credit transferring and learning evaluation system
Each university or ministry of education can issue relevant documents of credit conversion policy according to local conditions and clarify the responsibility of each stakeholder and the process of credit conversion. And the relevant departments can set up one or more assessment teams for scientific assessment of learners' online learning results. According to the evaluation system of different course construction standards, the students' achievements are evaluated from different aspects [12].

3. Integrate high-quality teaching resources and optimize the course construction structure
There are numerous successful cases of online open courses construction. Therefore, in the course of curriculum construction, universities should take the initiative to communicate with experienced schools, summarize experience and avoid detours. In the construction of course structure, we should be good at optimizing the top-level design and expanding diversified, multi-level and complementary financing channels.

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