Evaluation of Two-way Interaction Mode of “Internet + Animation” Online Education Based on Stackelberg Game

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Abstract. The development of online education is an inevitable outcome of the development of higher education in the new era. The “two-way interaction mode” of regional sharing is an essential choice for online education development. Mathematical demonstration shows that the participation rate of “two-way interaction” is negatively correlated with the sum of the marginal income of the whole sharing platform, and positively correlated with the marginal income of “two-way interaction”, the higher the participation rate of “two-way interaction”, the more the overall resources invested in the platform. Platform participants invest resources according to the proportion of marginal income, and the general participants prefer to participate in cooperation rather than working alone.

Keywords: “Internet + Animation”, Development of Online Education, Two-way Interaction Mode, Stackelberg Game

1. Introduction
“Internet + Animation” online education has undergone a torturous process. Firstly, it is a unified way of “national training”[1]. It employs famous experts and unified teaching and brings relevant knowledge and skills to teachers. Teachers are passive receivers and dedicated listeners [2-3]. They learn external, fragmented knowledge and experience, and such training is difficult for them to take the initiative to integrate their own professional practice problems. It is also difficult to improve their own teaching practice ability. After that, the learning mode of teachers has changed from passive to active participation in the teaching process [4-5]. Through interaction and communication between teaching and learning, teachers can actively participate in the teaching process. At present, teachers put forward the idea of independent learning for the development of teaching [6]. In the aspect of research approach, teachers begin to integrate the practice, thoughts and professional life of teaching subjects, achieve emotional recognition, and implement the integration From knowledge-based to literacy oriented “humanization” development. Teachers perform teacher-centered autonomous...
learning through active interaction, critical inquiry, reflective construction, practical test, and continuous correction among multiple learning subjects. The evaluation of independent learning is not completed through external control, nor is its purpose the evaluation result itself, it chooses the self-reflection of the evaluation subject. We should attach importance to the self-identification of the evaluation results, focus on the exploration of the formation mechanism of the evaluation results, pay attention to the renewal of teaching ideas, emotional identification and action changes based on evaluation, so as to promote the sustainable and independent development of “Internet plus animation” online education. The key to the construction of “double first-class” is the construction of teachers' team, which is based on the team-building of high-quality teachers, the key is the construction of high-level tutors' team, the key is to build a first-class discipline team, and the development of “double first-class” requires colleges and universities to give full play to the role of pacesetter and model in the front of higher education. It is proposed to take “four regressions” as the development of higher education in the new era. They are required to concentrate their work on undergraduate education, love teaching, devote themselves to teaching, research teaching and devote themselves to teaching and educating people.

It is not difficult to see that these requirements all point to the requirements of the quality of university teachers. They point out the way forward for speeding up the modernization of education, building a powerful country in teaching and providing a satisfactory education for the people, and providing an essential principle. As General Secretary Xi Jinping advocated in the speech of the national education conference, we should emphasize the construction of teaching staff in the primary position of higher education reform. Without high-quality teachers, all the reform goals of higher education will be lost. In the reform of colleges and universities, the development of online education should be given priority. The development of online education is the inevitable basis for the reform and development of higher education in the new era.

2. “Two-way Interaction Mode” of Regional Sharing is an Important Choice for Online Education Development

Under the background of information technology, the teaching development of teachers in regional colleges and universities takes the network sharing platform as the “medium”, under the leadership of the dominant “two-way interaction” in local colleges and universities, a way of autonomous development alliance of local online education has been formed, which is called “two-way interaction mode” in this paper. By building a multilateral platform for local online education development and sharing, idle resources can be shared, and the platform is combined with multi-body teachers' participation to allocate teaching development resources efficiently based on the value of resource use. The supply and demand sides, network platform, third-party payment, evaluation, credit investigation, regulatory mechanism, etc. form the platform structure together. Based on the regional sharing platform, a new relationship is built between people, and the platform is the center to achieve co-creation, symbiosis and sharing of multilateral participants, win-win, so as to improve the utilization efficiency of regional online education development resources.

After landing on the learning platform, the learner enters the learner feature analysis module. Through the analysis of the learner's answer information to the relevant questions, the learner can analyze the learner's memory, thinking, what kind of knowledge can be more effectively understood.
and memorized, the learning style preferences, etc., and can effectively collect the learner's characteristic information such as learning style, psychological state, learning habits, etc. The analysis of learning characteristics not only enables learners to have a preliminary understanding of their own learning style and learning capabilities but also lays a foundation for the implementation of "personalized learning" and "personalized guidance". The survey content of learner characteristics analysis is shown in Figure 1.

Figure 1. Structure of learner feature analysis module

3. Behavior Analysis of “Two-way Interaction Mode” Based on Stackelberg Game

Based on the Stackelberg game resource sharing decision-making model, a theoretical model of the online education development sharing platform is established. The Stackelberg game is divided into two continuous processes. First, the dominant university teaching development center determines its participation rate. Secondly, the participation rate determined by other participants is taken as the dominant internet education. With reference to the study of Samaddar Kadilyala, it is assumed that the performance function of “Internet + Animation” online education development sharing platform is as follows:

\[ P(C) = M - C^{-e} + \varepsilon \], the expected return is: 
\[ E[P(C)] = M - C^{-e} \]  \hspace{1cm} (1)

The expected revenue of the dominant “Internet + Animation” online education development center for the sharing platform of “Internet + Animation” online education development is as follows:

\[ \pi_g = MR_g (M - C^{-e}) + Cr_g, 0 \leq r_g \leq 1 \]  \hspace{1cm} (2)

The expected revenue of the other “Internet + Animation” education centers from participating in the teaching development and sharing platform is as follows:

\[ \pi_i = MR_i (M - C^{-e}) - Cr_i, 0 \leq r_i \leq 1, i = 1, 2, \cdots, n \]  \hspace{1cm} (3)

The overall expected revenue of the teaching development sharing platform is as follows:

\[ \pi = \left( MR_g + \sum_{i=1}^{n} MR_i \right) (M - C^{-e}) - C, r_g + \sum_{i=1}^{n} r_i = 1 \]  \hspace{1cm} (4)
Where the dominant participation rate RG is determined, all other participants play the Cournot game to determine the total input C and their participation rate RI. According to the above analysis, the objective function of other participants and the corresponding optimization problems are established as follows:

$$\max_{C,R_i} \pi_i = MR_i \left( M - C^{r_i} \right) - C \cdot r_i, r = 1, 2, \cdots, n$$

(5)

Hence, the overall optimal input of the regional sharing platform is the increasing function of the participation rate of the “Internet plus animation” online education development center, which is the dominant force.

4. Practice of the “Two-way Interaction Mode”
During the platform development, MVC multi-layer structure is adopted, each layer has its own tasks and problems. In the multi-layer structure, three layers are generally used, namely, presentation layer, business logic layer, and data access layer. The platform adopts a J2EE Lightweight component model, JSF in the presentation layer, and hibernate in the spring data access layer in the business logic layer, which makes the page design more flexible, improves efficiency and reduces cost and disaster. The platform architecture pattern is shown in Figure 2.

![Figure 2. architecture of e-learning platform](image)

The practice of the “two-way interaction mode” in local colleges requires the administrative departments to choose the “two-way interaction” of local colleges, such as considering the choice of “Internet plus animation” online education development center in the region, which has high professional status, abundant resources of teaching development, “Internet + Animation”, advanced online education concept, perfect administrative operation mechanism, and large scale in the region. The center of influence and appeal is “two-way interaction”. At the same time, we should rationally plan the “two-way interaction” investment mechanism and reasonable interest mechanism, keep the “two-way interaction” participation rate increasing and maintain the sustainability of its development. Secondly, the regional education administration department should formulate policies according to the national “Internet + Animation” online education development policy. Training objectives and action plans, to promote regional university system to build teaching development system, teaching activity system and Internet + Animation online education development support system, plan the development path of “Internet + Animation” online education, build a network-based regional online education and development sharing platform. In addition, the competent departments should supervise and guide the universities in the region at the operational level. “Internet + Animation” online education development center should guide teachers to realize “standard” development under the framework of the system. In teaching observation and reflection, teachers are guided to explore and research the development of educational practice problems. Based on the collaborative and cooperative
development of the teaching community, general teachers in the local colleges can grow into intelligent teaching experts.

5. Conclusions
The “Internet + Animation” online education sharing platform with the participants of local colleges should assume the corresponding cost. The cost of developing Internet education based on “Internet + Animation” sharing platform is mainly composed of two parts: one is the fixed cost, i.e., the basic cost of platform operation that colleges and universities should maintain without service development, which can be equally shared by colleges and universities. The other part is the variable cost, which should be shared by colleges and universities according to the number of teachers who use the platform services. The higher the number of teachers who use the platform services and resources, the higher the cost that the colleges should assume. The variable cost part can be used to pay for the innovation and development of “Internet + Animation” online education development resources for college teachers as their innovation gains.

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References:
[1] Wang, Z. Q. , Wan, X. Y. , & Fan, Z. F. . (2017). Fair power control algorithm in cognitive radio networks based on stackelberg game. IEICE Transactions on Fundamentals of Electronics Communications and Computer Sciences, E100.A(8), 1738-1741.
[2] Chenhui, D. U. , Mei, S. , Li, W. , & Yue, M. A. . (2014). Improved physical layer security with cooperative jamming based on stackelberg game. Journal of Beijing University of Posts & Telecommunications, 37(5), 11-15.
[3] Xu, P. , Fang, X. , Chen, M. , & Xu, Y. . (2013). A stackelberg game-based spectrum allocation scheme in macro/femtocell hierarchical networks. Computer Communications, 36(14), 1552-1558.
[4] Wei, W. , Fan, X. , Song, H. , Fan, X. , & Yang, J. . (2016). Imperfect information dynamic stackelberg game based resource allocation using hidden markov for cloud computing. IEEE Transactions on Services Computing, PP(99), 1-1.
[5] Ahmadi, B. , Nariman-Zadeh, N. , & Jamali, A. . (2016). Path synthesis of four-bar mechanisms using synergy of polynomial neural network and stackelberg game theory. Engineering Optimization, 49(6), 1-16.
[6] Pourmina, M. A. , & Moradikia, M. . (2015). Stackelberg game on space and frequency heterogeneity analysis in an ofdma-based cognitive spectrum leasing. Wireless Personal Communications, 84(1), 341-359.