Influence of Transactional Distance of Online Education on Efficiency Management Under the Perspective of "Internet +"
——Based on the Mediating Role of Learning Viscosity

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ABSTRACT

In the era of "Internet +", online education has flourished, and the recent COVID-19 epidemic has further brought it into the public eye. Despite the high expectations placed on online education, there are still many people in society who are skeptical and worried about its quality. At present, there are few related researches about the efficiency management of online education, so it is important to explore the factors influencing the efficiency management of online education. In this paper, the S-O-R environmental psychology paradigm was used to investigate the influence of transactional distance on efficiency management. It is found through study that the transactional distance has a positive effect on efficiency management, and learning viscosity plays a part of the mediating effect, that is, transactional distance acts on efficiency management by affecting learning viscosity. Based on the conclusion above, some suggestions were put forward on how to optimize the efficiency management of online education.

Keywords: Online education, Transactional distance, Learning viscosity, Efficiency management

1. INTRODUCTION

In the era of "Internet +", school efficiency management is the process in which schools adopt management measures for students, faculty and various functional departments in order to improve education efficiency[1]. In accordance with previous research, Chiara et al. believe that school efficiency is reflected in the output (examination results, etc.) obtained by inputting resources. In recent years, in terms of technology, the technology means with computer as the medium have increasingly been used in educational platforms, and various forms of e-learning have been used in the education fields from the distribution and test of online education to synchronized teacher-led courses[3]; in terms of public choice, an increasing number of people choose the way of online learning, and online learning has become an inevitable trend in the development of education. Recently, the back-to-school season has been severely affected by the raging novel coronavirus COVID-19. Online education has been placed great expectation in order to keep children's learning up to date [4]. It not only completes the deficiencies of traditional teaching, but also becomes the mainstream teaching mode at this stage because of its convenience, low costs and other characteristics [5]. However, online education still has problems such as low efficiency, difficult supervision and low access threshold, among which, the efficiency problem is particularly prominent. Simply applying Internet technology instead of improving efficiency management accordingly will not only waste resources, but also put the incidental before the fundamental [1]. Therefore, it is of great significance to explore the factors influencing the efficiency management of online education in order to solve the problem of low efficiency.

By dividing the proportion of teaching content published online, Sloan Consortium defined online education as a form of education in which at least 80% of the content is delivered online. Kayode et al. believe that the core of online education is the transactional distance (TD) theory, and it supports teacher-student interaction [6]. The famous scholar Moore defined transactional distance as a psychological and communication distance in online education [7]. For the further development of online education, Sushita proposed that the transactional distance theory should be studied more extensively [8]. In the field of marketing, Jessie et al. proposed that customers' perception of power distance will affect user viscosity [3], and the discussion of this issue is also applicable to online education. Lakshmi et al. pointed out that when the subjective views of a large number of learners can be quantified into a meaningful pattern, it can supplement our objective understanding of the transactional distance [9]. On the other hand, Niva believes that changes in educational technology in the 21st century should be carried out around teachers, and the teaching effect should be optimized by improving teachers' skills [10]. Therefore, in this paper, a theoretical model of teacher-student transactional distance acting on efficiency management is constructed from the perspective of students' perception to provide management suggestions for optimizing teachers' teaching effects.

According to the existing literature, foreign scholars have no consensus on the factors influencing transactional distance, and there are few studies on the efficiency management of schools. There are even less domestic studies on these two aspects, and no scholar has linked transactional distance with efficiency management at present. Therefore, this paper attempts to use the S-O-R theoretical framework as the medium of learning viscosity to explore the mechanism of action between transactional distance and efficiency management of online education, in order to optimize the efficiency of school management.

2. LITERATURE REVIEW

2.1. Transactional Distance

Transactional distance is the psychological and communication distance existing in online education, which is different from physical distance [7]. Giossos et al. supplemented the transactional distance from the perspective of realistic epistemology. They believe that the transactional distance originates from teaching, and it is the understanding bias between teachers and students, and the lack of common perception of knowledge, thoughts, methods and emotions between teachers and students [11]. Studying the important research object in online education – transactional education, and applying it into practice will help students to obtain better learning results. Michael et al. found through further study that the smaller the transactional distance between teachers and students, the higher the efficiency of online education [12].

Moore and Kearsley pointed out that the success of online education depends on the quantity and quality of dialogue between teachers and learners, the degree to which the curriculum structure offered by schools fits students, and the degree of learner autonomy. Among them, dialogue refers to the communication between teachers and students; structure refers to elements of curriculum design, such as learning goals, assignments, plans of interaction and evaluation [13]; autonomy is the degree of initiative of learners to control and manager their own learning [14]. Subsequently, some scholars have dug into the dimensional division of transactional distance. For example, Chen uses students' computer skills, the degree and scope of teacher-student interaction and other dimensions to measure transactional distance [15]; Niva considers teaching goals, teaching style and autonomy are important factors that make up transactional distances [10].

From the research progress of transactional distance theory, Moore's transactional distance theory has laid the foundation for other scholars' research. Later, Moore and Kearsley proposed three dimensions, namely dialogue, structure and autonomy, to divide the transactional distance. As a result, these three dimensions are adopted in this paper to make an attempt to explore the influence of transactional distance on efficiency management in online education.

2.2. Learning Viscosity

According to Rong, viscosity of network users is the continuous participation behavior of users due to the psychological dependence [16]. By summing up the definition of "viscosity " by different scholars in the field of commerce, virtual community and so forth, Chen Chen [17] believes that the user viscosity of MOOC platform is mainly reflected in the ability of the platform to attract and retain students, that is, learners' prolonged learning time, low bounce rate, high repeat visit rate, loyalty and dependence on MOOC platform. Therefore, it is considered in this paper that the learning viscosity in online education is expressed as uninterrupted continuous visits in terms of emotion, but as continuous learning and long-term stay in terms of behaviors.

Jin Yun divided learning viscosity into three dimensions: expected confirmation, flow experience and learning motivation when comparing the artificial intelligence library with the traditional library. Yan Xiaotian argues that factors such as users' flow experience, expected confirmation, using motivation and cost will affect user viscosity, and the influence is ranked as expected confirmation, flow experience, using motivation, and using cost in descending order. Among them, the flow experience was proposed by Csikszentmihalyi, which refers to the psychological state of people when they are fully engaged in the situation and immersed in it [20].

Considering the different influences of the above factors on learning viscosity, the factors with less influence are not discussed in this paper, and finally three dimensions: expected confirmation, flow experience and learning motivation, are finally chosen as the dimension of learning viscosity.

2.3. Efficiency Management

Zhao Liang proposed that in the era of "Internet +", the advantages and disadvantages of education efficiency management are mainly measured by the contribution of new technologies to individual and national development [1]. As a means to promote students' development, efficiency management is closely related to the quality of education, which has been fully verified in the existing literature. Wang Yan proved through DEA analysis that strengthening efficiency management is helpful to improve education quality [21]. Chapman concluded by studying the success of education management in Asia that improving the quality of education is strong evidence for the success of school efficiency management [22].

Kayode et al. use student satisfaction and student performance to measure the influence of interaction of online education on students' development, and believe that media, interaction methods and individual difference have a moderating effect on students' learning effects [6]. In view of the weak role of regulation, this paper adopts two dimensions of learning satisfaction and learning performance to measure efficiency management.

2.4. Research Hypothesis

2.4.1. Transactional distance and efficiency management

A lot of studies have shown that during online education, reducing the transactional distance between teachers and students is conducive to promoting personal development and then optimizing efficiency management. Tsinghua University has conducted a survey entitled "Factors Affecting the Effect of Online Learning", and the results show that "interactivity" has the greatest impact on students' learning quality [23]. According to Barrett, transactional distance has become a more and more significant barrier to online education efficiency [24]. Chen and Willits found by studying online video meeting that the frequency of curriculum conversation not only directly affects students' perceived level of learning, but also influences the learning effect by influencing the transactional distance between students and teachers [25]. Jon carried out case study based on the transactional distance theory, and he argues that students' poor experience of the relevant courses can be attributed to the increase in the transactional distance due to the lack of dialogue [26]. Sandoe developed a tool called SCET to evaluate the structure of online courses and proved with this tool that the flexible structure of online courses can have a positive impact on educational efficiency [27]. Williams discussed the issue of medical students' educational efficiency, and pointed out that autonomy can promote students' enthusiasm in learning, so that students' understanding ability and the learning effect are better [28]. Therefore, the following hypotheses and sub-hypotheses are proposed in this paper:

H1: Transactional distance has a positive impact on efficiency management.

H1a: The dialogue of transactional distance has a positive impact on efficiency management.

H1b: The structure of transactional distance has a positive impact on efficiency management.

H1c: The autonomy of transactional distance has a positive impact on efficiency management.

2.4.2. Transactional distance and learning viscosity

At present, there are few researches on the introduction of learning viscosity into online education, but the positive effect of transactional distance on learning viscosity can be inferred from the existing literature. Chen Li et al. divided the learners in distance education into participants, lookers-on and avoiders [29] from high to low according to the utilization degree of transactional function. The learning viscosity of these three types of learners is in descending order. On the basis of Xiong Wei and others' study that interactivity has significant positive impact on the flow experience, Zhou Mei proved that the flow experience can

promote user viscosity [30], thus further realizing the positive impact of interactivity on user viscosity. Chen Yanjun found through the empirical analysis that transactional distance has a positive impact on learning viscosity in online education environment [31]. For this reason, the following hypotheses are proposed in this paper:

H2: Transactional distance has a positive effect on learning viscosity.

H2a: The dialogue of transactional distance has a positive effect on learning viscosity.

H2b: The structure of transactional distance has a positive effect on learning viscosity.

H2c: The autonomy of transactional distance has a positive effect on learning viscosity.

2.4.3. Learning viscosity and efficiency management

The learning viscosity explored in this paper is expressed emotionally as the students' loyalty and dependence on the school and online education, which affects the school's teaching efficiency and efficiency management. Gabriel et al. found through study that student loyalty is critical to the success of school management in the field of higher education (HELs) [32]. Heffernan et al. believe that student loyalty positively affects the management of school enrollment in the context of inter-university cooperation, which is specifically manifested in the form of recommendation, word of mouth from students to others [33]. In addition, some studies in other fields can also prove the theory. For example, Catarina found in the study of employee attendance in spite of illness that employee attendance in spite of illness will affect customer viscosity, and then damage the company's performance management and hinder the company's successful development [34]. Based on the above research results, the following hypothesis is proposed in this paper:

H3: Learning viscosity has a positive effect on efficiency management.

2.4.4. The mediating effect of learning viscosity

It can be known from the foregoing discussion that the transactional distance between teachers and students will positively affect students' learning viscosity, which is closely related to school efficiency management. At present, most scholars at home and abroad take user viscosity as the dependent variable when studying online education, and few literatures use it as a mediating variable to build models. However, we can learn from some studies in other fields, such as Wu Meiling once used employee loyalty as an intermediary variable to explore the impact of employee loyalty on employee performance [35]; Qiang et al. proposed the mechanism that social media posts affect product sales by influencing user viscosity, thereby promoting the effectiveness of green product customer relationship management (CRM) [36]; Fatih et al. believe

that in the crisis situation of the restaurant industry, the industry strategy will influence the user viscosity strategy, and user viscosity strategy will further affect price strategy [37]. Based on this, the following hypotheses are proposed:

H4: Learning viscosity mediates the relationship between transactional distance and efficiency management.

H4a: Learning viscosity mediates the relationship between the dialogue of transactional distance and efficiency management.

H4b: Learning viscosity mediates the relationship between the structure of transactional distance and efficiency management.

H4c: Learning viscosity mediates the relationship between the autonomy of transactional distance and efficiency management.

Based on the theory of literature research at home and abroad, the conceptual model of "transactional distance of online education for efficiency management" in accordance with the above hypotheses and S-O-R paradigm (as shown in Figure 1).
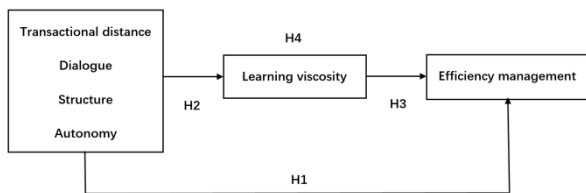

Figure 1: The theoretical model of this study

3. RESEARCH DESIGN

3.1. Variable Design

In this paper, the questionnaire survey method is adopted to collect data. The content of the questionnaire consists of three parts, namely, preface, measurement variables and control variables.

3.1.1. Preface

This part is to explain to the participants that the questionnaire is about online education, and gives examples and explanations to avoid unnecessary misunderstandings to ensure the authenticity and reliability of the data.

3.1.2. Measurement variables

In this paper, independent variables, intermediary variables and dependent variables are measured by subdividing the dimensions. For the measurement of independent transactional distance, the corresponding modification were made by integrating Cheng, Wang Xian, Chen Yanjun and other authors' scales, and it is divided into three dimensions, namely, dialogue, structure and autonomy. For the measurement of the learning viscosity of the intermediary variables, the scale developed by Yan Xiaotian [19] was adopted to measure the learning viscosity from the perspective of flow experience, using motivation and expected confirmation. For the measurement of dependent variable school efficiency management, Kayode [6] and other authors' scales are adopted to measure learners' satisfaction and performance. The option design of this part adopts Likert five-point scale, in which "1" means " strongly disagree" and "5" means "strongly agree".

3.1.3. Control variables

This part is mainly a survey of basic personal information, including the gender, education, computer skills and hard learning requirements of the sample.

3.2. Descriptive Statistics

The respondents of the questionnaire survey are students who have received online education (such as China University MOOC, Xuexitong, etc.) in Shandong Province and throughout the country. A total of 348 participants submitted questionnaires online. After removing all invalid questionnaires with the same options, too short filling time and obvious "Z"-type answers, that is, the test items were mostly extremely values 1 or 5. Finally, the number of valid questionnaires was 315, with the effective sample rate of 90.52%. This paper plans to use SPSS 26.0 software to carry on statistical analysis. The demographics characteristics of the samples are shown in Table 1.

From the statistical results, it can be seen that the gender distribution of men and women is relatively even, which is in line with the actual situation. It is also true that education degrees are concentrated in university degree and graduate degree. As the channel of spreading the questionnaire is mainly through Wechat, QQ and other online ways, the primary andsecondary school students have no sufficient channel to contact the questionnaire due to their limited time in using smartphones.

Table 1 Demographic characteristics of the sample

Name	Category	Sample size	Percentage
Gender	Male	154	48.89%
	Female	161	51.11%

Education	Primary School or Below	11	3.49%
	Middle school	20	6.35%
	College	145	46.03%
	Postgraduate or above	113	35.87%
	Others	26	8.25%
Computer skills	Very good	139	44.13%
	Good	121	38.41%
	General	51	16.19%
	Poor	4	1.27%
	Very poor	0	0%
Hard learning requirements	Yes	246	78.10%
	No	69	21.90%

4. DATA ANALYSIS AND HYPOTHESIS TESTING

4.1. Scale Reliability Analysis

In this paper, the Cronbach's alpha coefficient was used to measure the reliability of the whole questionnaire and each variable. The results show that the overall Cronbach's alpha coefficient of the scale is as high as 0.920, which has very high internal consistency and reliability. The measurement value of each measurement variable is also above 0.60, which means the reliability of the scale is acceptable. The measurements are shown in Table 2.

Table 2 Reliability test results

Variable		Number	Cronbach's alpha coefficient
Transactional distance	Dialogue	3	0.625
	Structure	4	0.686
	Autonomy	3	0.688
Learning viscosity	Flow experience	2	0.796
	Motivation	3	
	Expected confirmation	2	
Efficiency management	Learning satisfaction	3	0.756
	Learning performance	1	
Total variable		21	0.920

4.2. Scale Validity Analysis

The KMO test and Bartlett test of sphericity were conducted to scale in this study in order to examine its validity. After testing, the KMO values of all variables were greater than 0.60, and their Sig values were 0.000, which indicates that Bartlett's sphericity test was significant and the scale was valid. The factor load of each item is greater than 0.60, indicating that the data of the questionnaire is suitable for factor analysis. The specific analysis results are shown in Table 3 below.

Table 3 Validity test results

Variable		Item	Factor load	KMO
Transactional distance	Dialogue	D1	0.792	0.635
		D2	0.770	
		D3	0.704	
	Structure	S1	0.620	0.700

		S2	0.766	
		S3	0.733	
		S4	0.747	
	Autonomy	A1	0.737	0.643
		A2	0.837	
		A3	0.778	
Learning viscosity	Flow experience	FE1	0.736	0.849
		FE2	0.661	
	Motivation	M1	0.606	
		M2	0.611	
		M3	0.687	
	Expected confirmation	E1	0.641	
		E2	0.747	
Efficiency management	Learning satisfaction	S1	0.746	0.748
		S2	0.761	
		S3	0.732	
	Learning performance	P1	0.800	

4.3. Correlation analysis

In this study, the Pearson correlation analysis was mainly used to investigate the validity of the hypotheses.

The correlation analysis of independent variables and dependent variables: the Pearson correlation coefficients between dialogue, structure, autonomy and efficiency management were 0.585, 0.624 and 0.609 respectively, which all showed significant positive correlation at the level of 0.01.

The correlation analysis of independent variables and intermediate variables: the Pearson correlation coefficients between dialogue, structure, autonomy and learning viscosity were 0.657, 0.710 and 0.661 respectively, which all showed significant positive correlation at the level of 0.01.

The correlation analysis of mediating variables and dependent variable: the Pearson correlation coefficient between learning viscosity and efficiency management was 0.747, which showed significant positive correlation at the level of 0.01.

Table 4 Correlation analysis results

	Average value	standard deviation	Gender	Education	Computer skills	Learning requirements	Dialogue	Structure	Autonomy	Learning viscosity	Efficiency management
Gender	1.51	0.501	1								
Education	3.39	0.861	-.154**	1							
Computer skills	1.75	0.769	.115*	-0.052	1						
Learning requirements	1.22	0.414	0.073	-0.062	.215**	1					
Dialogue	3.46	0.64	-0.142*	0.05	-0.180**	-.212**	1				
Structure	3.62	0.57	0.018	-0.055	-0.168**	-0.184**	.633**	1			
Autonomy	3.66	0.59	0.038	-0.08	-0.109	-0.098	.553**	.624**	1		

| Learning viscosity | 3.6 | 0.53 | 0.025 | -0.029 | -0.071 | -0.087 | .657** | .710** | .661** | 1 | |
| Efficiency management | 3.56 | 0.61 | -0.001 | -0.033 | -0.066 | -.140* | .585** | .624** | .609** | .747** | 1 |

**. At level 0.01 (double tail), the correlation is significant; *. At level 0.05 (double tail), the correlation was significant.

4.4. Regression analysis

In this paper, the regression analysis method was adopted to hypothesize whether the test is valid, and four models were established. The results are shown in Table 5. Model I, II and III directly test H1, H2 and H3. For the verification of H4, the step-by-step test method proposed by Baron and Kenny was adopted, and the steps correspond to the settings of Model I, II, III and IV.

Table 5 Regression analysis results

	Model 1 Efficiency management	Model 2 Learning viscosity	Model 3 Efficiency management	Model 4 Efficiency management
Control variable				
Gender	0.023	0.055	-0.017	-0.005
Education	-0.001	0.013	-0.019	-0.008
Computer skills	0.061	0.057	0.004	0.032
Hard learning requirements	-0.020	0.055	-0.076	-0.048
Independent variable				
Dialogue	0.250***	0.300***		0.098*
Structure	0.290***	0.370***		0.103*
Autonomy	0.294***	0.275***		0.154**
Learning viscosity			0.741***	0.505***
R²	0.504	0.634	0.564	0.598
Adjusted R²	0.493	0.626	0.557	0.587
F	44.642***	75.988***	79.977***	56.870***

Model I uses dialogue, structure and autonomy as independent variables, and efficiency management as the dependent variables for regression. The β values obtained are 0.250, 0.290 and 0.294 respectively, which indicates that dialogue, structure and autonomy has significant positive effects on efficiency management, that is, H1a, H1b and H1c hold.

Model II uses dialogue, structure and autonomy as independent variables, and learning viscosity as the dependent variables for regression. The β values obtained are 0.300, 0.370 and 0.275 respectively, which indicates that dialogue, structure and autonomy has significant positive effects on learning viscosity, that is, H2a, H2b and H2c hold.

Model III uses learning viscosity as independent variable and efficiency management as dependent variable for regression. The β value obtained is 0.741, indicating that learning viscosity has significant positive effect to efficiency management, that is, H3 holds.

On the basis of the significant positive impact conclusions obtained by Model I, II and III, Model IV uses dialogue, structure, autonomy and learning viscosity as independent variables and efficiency management as the dependent variables for regression. The β values obtained are 0.098, 0.103 ,0.154 and 0.505 respectively. Compared with Model I, the positive effect of three dimensions of transactional distance on efficiency management is weakened to some extent, but still significant. This indicates that learning viscosity has a significant partial mediating effect between dialogue, structure, autonomy and efficiency management, that is, H4a,H4b,H4c holds.

5. RESEARCH CONCLUSIONS AND IMPLICATIONS

5.1. Research Conclusions

In this study, the relationship between teacher-student transactional distance and school efficiency management in online education is mainly explored. By sorting out the relevant literature and combining the S-O-R model, a theoretical model of the influence factors of transactional distance on efficiency management is established. The conclusions are as follows.

5.1.1. Transactional distance has a significant positive impact on efficiency management

In other words, narrowing the transactional distance between teachers and students is conducive to optimizing the school's efficiency management. From the results of statistical analysis, it can be seen that the influence of dialogue, structure and autonomy on efficiency management is roughly the same. Dialogue comes from the communication between teachers and students, structure comes from the school management's design of curriculum, and autonomy comes from the students' self-control. The subjects of these three dimensions are different, which are teachers, schools and students. However, achieving good efficiency management requires school organization, teacher execution and student cooperation, which are all indispensable. Therefore, dialogue, structure and autonomy have almost the same impact on efficiency management.

5.1.2. Transactional distance has significant positive impact on learning viscosity

Compared with dialogue and structure, autonomy has a weak role of promotion. This is because contemporary students have long been accustomed to "heteronomy" or even "Khorium self-discipline" from schools or teachers. They are easily tempted by external things (such as games and novels), so they have less self-control. And autonomy is the control of students over themselves. It is difficult for most students to form the learning viscosity only by this kind of "self-discipline".

5.1.3. Learning viscosity has a significant positive impact on efficiency management

It is not difficult to understand that when students devote themselves to their studies and become attached and loyal to online education, their learning effect will be better than before. Good learning results can help students master more knowledge, find a better job and promote their own development. If more and more students in society can rely on this path to achieve their own development, then the whole society can be greatly improved. Based on this, online education promotes students' personal development and social development, and realizes the school efficiency management at the sociological level.

5.1.4. Learning viscosity mediates the relationship between transactional distance and efficiency management

Compared with face-to-face courses, the biggest characteristic of online courses is the separation of time and space between teachers and students, so students are prone to generate negative psychological emotions such as loneliness and boredom. Transactional distance is the distance between teachers and students in terms of psychology and communication, and is the student's perception of the teacher. Therefore, when students perceive the presence of teachers, their inner negative emotions will be relieved and produce positive emotions such as pleasure. This kind of positive emotion can make students have a long-lasting sense of loyalty and dependence on online education, and then form learning viscosity and promote their learning behavior. Through such an intermediary role, it finally impacts on human and social development.

5.2. Significance of Management

5.2.1. Attach importance to process management and strengthen the dialogue between teachers and students

In the era of "Internet +", cloud classrooms have become the norm. Most of the past school education management work only focuses on goal management and pursues the concept of goal first and performance first. This kind of management has caused a lot of disadvantages, and "high score and low performance" is a more common problem. Therefore, schools should strengthen their attention to student learning process and implement process management.

The idea of process management originates from the manufacturing industry, but it can also be applied to education. The implementation of process management requires schools not only to pay attention to students' grades and rankings, but also to students' growth process. The online education has weak environmental monitoring for students, so students are prone to small deviations. In order to improve this situation, schools should emphasize the role of teachers and provide teachers with full-time training. Through training, teachers can acquire more communication skills and enhance their ability to communicate with students. In specific teaching activities, teachers should not only guide students to complete the course with their own professional knowledge, teaching

experience and teaching methods, but also pay full attention to students' learning progress in the process of students' learning, communicate with students, so that students can feel the presence of teachers.

5.2.2. Improve learning support services and highlight the flexibility of the curriculum design structure

Educational management in the digital era no longer focuses only on command and obedience, but on student participation and creativity. In terms of curriculum structure, schools should shift from rigid, static structure to flexible, dynamic structure, and put more emphasis on comfort, motivation and coordination instead of mandatory measures. An optional path is to improve learning support services to help students become familiar with the characteristics of online education and adapt to the environment of online education. Specifically, it uses big data to instantly control the learning status of students, and provides targeted guidance, in order to help students overcome difficulties, build confidence to prevent students from losing interest in learning, and solve the problem of "high drop-out rate".

Good learning support services can greatly improve the quality of online education. At present, schools often only pay attention to the construction of professional teacher teams, but ignore the team of counselor or head teacher. To this end, schools should pay attention to the construction of a team of counselor or head teachers, hire a group of talents of psychology and management, make full use of their full-time and professional advantages, take students' learning experience as core and give students an all-round and all-process attention. On the one hand, a counselor or head teacher team can help students solve the difficulties in online education, thus improving the fit between students and curriculum and solving personality problems. On the other hand, the team can fully collect and feedback the students' opinions in time, and feedback the common problems to the school management, then adjust the design of the curriculum structure at the school level to meet students' needs.

5.2.3. Emphasize the subjectification of students' role and focus on fostering student autonomy

People-oriented is the trend of the times. In the process of online education management, more emphasis is put on attaching importance to the human factor, respecting students' personality, meeting students' needs and reflecting students' participation, that is, student role subjectification. However, student role subjectification does not mean wanton indulgence, but requires students to participate independently to achieve better results. Therefore, it is very important to cultivate students' autonomy.

Autonomy is students' self-control, and school cannot play a direct role in this respect, but can take some guiding measures to play an indirect role. For example, schools can encourage students' autonomy by organizing various online practice projects and soliciting opinions online, so that students can express their ideas, participate in school management, enhance students' sense of ownership, and enhance students' autonomy.

5.2.4. Cultivate learning habit imperceptibly and lead students to develop learning viscosity

The results of this study show that learning viscosity plays a mediating role in efficiency management. Therefore, schools should pay attention to guiding students to develop learning viscosity. A feasible way is to guide students to develop learning viscosity by cultivating good learning habits. The habit of learning is not developed overnight, and it needs to be developed slowly. To cultivate learning habits imperceptibly is to integrate the work of cultivating students' learning habit into daily teaching activities, and permeate it into the whole process of online education management.

There are many ways to develop learning habits. For example, schools should pay attention to increasing the interest of the curriculum while pursuing the academic content of the curriculum, and designing a convenient curriculum interface to enhance the user experience and guiding students to immerse themselves in it. In addition, schools can also urge students to develop good learning habits through early wake-ups and other forms according to the 21-day habit formation theory. Over time, students will form good learning habits, produce a sense of dependence on online education, thus improving their learning efficiency.

6.CONCLUSION

This paper studied the influence of transactional distance of online education on efficiency management. After making 348 questionnaires, analyzing reliability, validity of the scales and conducting correlation and regression analysis by SPSS. It is concluded that the transactional distance between teachers and students in online education has a significant positive impact on efficiency management, and learning viscosity plays a part of the mediating role between the two. In the last, several suggestions are put forward from management perspective, such as strengthening dialogue, improving learning support services and fostering student autonomy.

REFERENCES

[1] Zhao Liang. To Change or Not to Change: the Construction and Realization Approaches of Efficiency Management System of School in "Internet +" Era, 2019(11): 34-40.

[2] Chiara Masci, Kristof De Witte, Tommaso Agasisti. The influence of school size, principal characteristics and school management practices on educational performance: An efficiency analysis of Italian students attending middle schools[J]. Socio-Economic Planning Sciences, 2018,61: 52-69.

[3] Lakshmi Goel, Pingying Zhang, Marjory Templeton. Transactional distance revisited: Bridging face and empirical validity[J]. Computers in Human Behavior, 2012,28(4): 1122-1129.

[4] China Youth Daily: (2020-02-18) [2020-02-18].https://baijiahao.baidu.com/s?id=1658840769516004513&wfr=spider&for=pc.html

[5] Wang Xian. Research on the influence of teacher-student interaction on learner satisfaction in online courses [D]. Central China normal university,2019.

[6] Kayode C.V., Ekwunife-Orakwue, Tian-Lih Teng. The impact of transactional distance dialogic interactions on student learning outcomes in online and blended environments[J]. Computers & Education, 2014,78: 414-427.

[7] Moore, M.G. Towards a theory of independent learning and teaching[J]. Journal of Higher Education,1973,44 (9): 661–679.

[8] Sushita Gokool-Ramdoo. Beyond the Theoretical Impasse: Extending the applications of Transactional Distance Theory[J]. International Review of Research in Open and Distance Learning,2008,9.

[9] Jessie J. Wang, Ashok K. Lalwani. The distinct influence of power distance perception and power distance values on customer satisfaction in response to loyalty programs[J].International Journal of Research in Marketing, 2019,36（4）：580-596.

[10] Wengrowicz, N. Teachers' pedagogical change mechanism – Pattern of structural relations between teachers' pedagogical characteristics and teachers' perceptions of transactional distance (TTD) in different teaching environments[J]. Computers & Education,2014,76: 190-198.

[11] Yiannis Giossos ,Maria Koutsouba, Antonis Lionarakis. Reconsidering Moore's Transactional Distance Theory [J]. European Journal of Open, Distance and E-learning, 2009, 12(2).

[12] Michael Moore, Greg Kearsley. Distance education system [M]. Wang Yibing, trans. Shanghai: Shanghai higher education electronic audio and video publishing house, 2008.

[13] Moore, M. G. , G. Kearsley. Distance education: A systems view. 1996, Belmont, CA: Wadsworth.

[14] Moore, M. G. Independent study. In Redefining the discipline of adult education, eds. R. D. Boyd and J. W. Apps, 1980:16–31.

[15] Chen Y J. Transactional distance in World Wide Web learning environments[J]. Innovations in Education and Teaching International, 2001, 38(4): 327-338.

[16] Ke Rong, Fei Xiao, Xiaoyu Zhang, Jingjing Wang. Platform strategies and user stickiness in the online video industry[J]. Technological Forecasting and Social Change, 2019,143:249-259.

[17] Chen Chen. On the adhesion of MOOC learners in the horizon of "Internet +" [J]. Journal of Yangzhou University (higher education research edition),2019,23(02):108-114.

[18] Jin yun. A brief analysis on the enhancement of learning loyalty by artificial intelligence university library - - starting from the co-construction of artificial intelligence library by Baidu and Wuhan university library [J]. Knowledge economy,2018(10):143-144.

[19] Yan Xiaotian. Research on the influence factors of mobile learning APP user stickiness [D]. Liaoning normal university,2016.

[20] Csikszentmihalyi, m. Creativity: Creativity flow and innovation psychology: Flow and the Psychology of Discovery and Invention [M]. Huang Jue apple, eds. Hangzhou: Zhejiang people's publishing house, 2015:106-109.

[21] Wang Yan. DEA analysis on the effectiveness of higher education management [J]. Theory monthly,2010(11):101-103.

[22] Chapman D W. Management and efficiency in education: Goals and strategies[M]. Hong Kong: Asian Development Bank, 2002.

[23] Dai Xinlai, Chen Qirong. Research on teaching interaction and design of online courses [J]. Research on audio-visual education,2005(09):69-72.

[24] Barrett S. Overcoming transactional distance as a barrier to effective communication over the internet[J]. International Education Journal, 2002, 3(4): 34-42.

[25] Chen Y J, Willits F K. A path analysis of the concepts in Moore's theory of transactional distance in a videoconferencing learning environment[J]. Journal of distance education, 1998, 13(2): 51-65.

[26] Dron J, Seidel C, Litten G. Transactional distance in a blended learning environment[J]. ALT-J, 2004, 12(2): 163-174.

[27] Sandoe C. Measuring transactional distance in online courses: The structure component[J]. 2005.

[28] Williams G C, Deci E L. The importance of supporting autonomy in medical education[J]. Annals of internal medicine, 1998, 129(4): 303-308.

[29] Cao Liangliang, Chen Li. Behavior mode and characteristics of asynchronous interaction of distance learners [J]. China distance education,2006(01):15-19+78.

[30] Zhou Mei. A study on the willingness of mobile payment users to use mobile payment based on flow theory —— a case study of Apple Pay users [J]. Management observation,2017(02):91-94.

[31] Chen Yanjun. Empirical research on the influence of social interaction on the stickiness of MOOC learners [D]. Liaoning normal university,2018.

[32] Gabriel Cachón Rodríguez, Camilo Prado Román, José Ángel Zúñiga-Vicente. The relationship between identification and loyalty in a public university: Are there differences between (the perceptions) professors and graduates? [J]. European Research on Management and Business Economics, 2019,25(3):122-128.

[33] Heffernan T, Wilkins S, Butt M M. Transnational higher education: The importance of institutional reputation, trust and student-university[J].

[34] Catarina Correia Leal, Aristides I. Ferreira. Should I book another hotel? The effects of sickness and ethnicity on customer brand loyalty and positive word of mouth[J]. International Journal of Hospitality Management,2019,102410.

[35] Wu Meiling. Research on the relationship between employee knowledge sharing behavior and job performance -- the mediating effect based on employee loyalty [J]. Shang,2016(21):38-39.

[36] Qiang Steven Lu, Rohan Miller. How Social Media Communications Combine with Customer Loyalty Management to Boost Green Retail Sales[J]. Journal of Interactive Marketing,2019,46:87-100.

[37] Fatih Semerciöz, Çağlar Pehlivan, Aytuğ Sözüer, Aslı Mert. Crisis Management Practices and Strategic Responses Through Customer Loyalty and Price Strategy in Hard Times: Evidence from Fine-dining Restaurants[J]. Procedia - Social and Behavioral Sciences ,2015, 207: 149-156.

[38] Cheng S F, Kuo C L, Lin K C, et al. Development and preliminary testing of a self-rating instrument to measure self-directed learning ability of nursing students[J]. International journal of nursing studies, 2010, 47(9): 1152-1158.