A Study on College Students' Intention to Participate in Online Courses

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Abstract

Based on 533 valid sample data collected from college Students of 20 universities / colleges in Guangdong, Guangxi, Macau, Sichuan and Shanghai, an online courses (OLC) acceptance model was established through empirical study. It's found that the sense of pleasure, interactivity and perceived ease of use can significantly affect the intention to participate in OLCs, and students' trust in OLCs plays a full intermediary inside; The sense of presence can directly affect students' intention to participate OLCs without trust as an intermediary; Students' perceived usefulness of OLCs has no significant affect trust and intention to participate OLCs. Based on the findings, some suggestions were put forward for OLCs' design and organization.

Keywords:online courses, intention to participate, trust, empirical study

1.INTRODUCTION

Under the context of the COVID-19 epidemic, in China, colleges and universities have generally set up a large number of online courses since March 2020. The specific organizational forms include live broadcast, recording, online discussion, virtual Simulation, and other hybrids. The teaching platforms that are used on include not only specialized network teaching platforms such as Rain Classroom and Tencent Classroom, but also online meeting systems such as Tencent Meeting, Dingding, ZOOM, etc., as well as Bilibili and "Long Video of Ticket Circle", or self-built network teaching platform of each university / college. The selection of the teaching organization form, teaching platform of the online courses and the specific teaching design, the same aim is to improve teaching effect. Good teaching effect depends on the cooperation and efforts of teachers and students and ultimately depends on the students' learning behavior. According to the rational behavior theory (TRA) [1]

and the planned behavior theory (TPB) [2], human behavior is determined by behavioral intention. Based on TRA, scholars have established student acceptance models of some teaching methods such as large-scale online courses (MOOC) and electronic sandbox teaching that based on modern information technology via empirical study [3,4,5]. At that time, the research was only directed to specific curriculum forms. But now online teaching is widely adopted by most teaching subjects in colleges and universities. Teachers and students not only generally have more abundant experience in the various forms of network classrooms or the application of various network platforms, but also they will face more choices in the future. Therefore, it is very necessary to establish a model for students to accept online courses through empirical research.

2.RESEARCH HYPOTHESES AND FRAMEWORK MODEL

Online courses need to rely on one or more network information platforms. These platforms are actually information systems. Based on TRA, the most famous model of influencing factors of users' intention to use information systems is the Technology Acceptance Model (TAM). TAM points out that users' intention to use the system is ultimately determined by their perceived usefulness (*PU*) and perceived ease of use (*PE*) [6]. Among them, perceived usefulness refers to the degree to which users think that using a certain technology or system can improve their work efficiency. Perceived ease of use refers to the degree to which users think that a certain technology or system is easy to use, such as easy to learn, easy to operate, or the operation process is clear and easy to understand. Starting from TAM, many empirical studies on students' intention to participate in teaching methods based on modern information technology have shown that students' perceived usefulness and perceived ease of use for online teaching will affect their intention to participate [7,8,9].

Chu R. *et al*. (2014) introduced the factors of playfulness and trust into TAM in order to study the intention of college students to participate in MOOC [3]. This empirical study found that the playfulness of the courses and students' ease of use of MOOC affected students' trust in MOOC, which in turn affected their intention to participate through trust. Chu R. *et al*. (2015) [4] and Dong X. F. *et al*. (2017) [5] have also found the same findings in the study of electronic sand table courses. One of the common points of the above three studies is that trust plays an important intermediary role between the influencing factors of behavioral intention and behavioral intention. Specifically, the meaning of trust stems from the definition by Hoffman *et al*. (2006) which widely adopted in the IT field, that is, "the expectation that a service will be provided or a commitment will be fulfilled" [10]. It can be understood as the user's confidence that one system will provide stable, reliable and continuous high-quality services. The above three studies regard the playfulness of the course, that is, whether the course itself is interesting, as one of the influencing factors of students' intention to participate. It may be appropriate for some specific courses, but it does not necessarily apply to the current online courses that are relatively diverse in terms of organizational form and subject category. Actually, learning is not entertainment, in other words, not all courses are interesting. Some courses are even very boring, but students may also gain the pleasure of a sense of accomplishment after overcoming difficulties and frustrations [11]. Therefore, replacing playfulness with "pleasure" will make the model more universal.

Students' intention to participate in online courses may also be related to whether they can feel a sense of presence in the classroom. To be specific, Huang L. Q. (2016) believes that the lack of "face-to-face presence" in traditional classroom teaching will make it difficult for students to concentrate on learning for a long time. He considers that improving the sense of presence of online classrooms can weaken students' psychological distance and greatly increase student participation [12]. Xu X. Q.*et al*. (2017) pointed out through empirical research that good interaction between teachers and students can conducive to increase students' satisfaction with online courses [13].

Therefore, this study will try to determine through empirical studies in college and university students the usefulness and ease of use of online courses, the sense of pleasure in online courses, the impact of presence on their intention to participate, and the intermediary role of trust Situation. To facilitate empirical analysis, the following research hypothesizes are made out.

Hypothesis 1: Perceived usefulness of online courses has a direct positive influence on students' trust in the courses.

Hypothesis 2: Perceived usefulness of online courses has a direct positive influence on students' intention to participate in the course.

Hypothesis 3: Pleasure in online courses has a direct positive influence on students' trust in the course.

Hypothesis 4: Pleasure in the online course has a direct positive effect on students' intention to participate in the course.

Hypothesis 5: Perceived ease of use of the online courses has a direct positive effect on students' trust towards the courses.

Hypothesis 6: Perceived ease of use of online courses has a direct positive effect on students' intention to participate in the courses;

Hypothesis 7: Sense of presence of the online course has a direct positive influence on students' trust towards the course.

Hypothesis 8: Sense of presence of the online course has a direct positive influence on students' intention to participate in the courses.

Hypothesis 9: Students' trust towards online courses directly influences on intention to participate in the courses.

According to the research hypothesis, a research framework model can be established as shown in Figure 1.
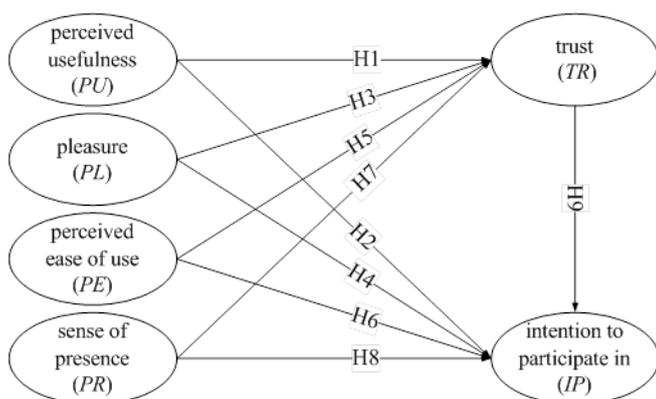

Figure 1. Research Framework Model

This study obtained first-hand information by questionnaire survey. The target population of the questionnaire survey is junior college students and undergraduates. The questionnaire is divided into three parts. Part I is used to determine whether the interviewee is a junior college student/undergraduate, whether they have participated in an online course in the last 30 days, and what is the subject recently participated in an online course. Among the three questions, if one of the interviewee' first two answers is "No", the survey will be ended directly. Part II is composed of 22 items in 6 groups (the specific contents of each item are shown in Table 2). The Licot 7-point scaleswere used to measure the 6 constructs (latent variables) in the research model. For the 22 measurement variables, the interviewees were asked to select their degree of agreement with the content expressed in the topic based on their feelings about the online course, and 7 stands for "very agree" meanwhile 1 stands for "very disagree". Part III involves the basic personal information of interviewees.

3.RESULTS AND ANALYSIS

The questionnaire was distributed online via the WeChat group and QQ group to current college students from 20 universities in Guangdong, Guangxi, Macau, Sichuan and Shanghai. In order to prevent repeated filling and submission by the same interviewee, the electronic questionnaire is set to be able to submit the answer sheet only once on the same Mac address.

3.1 Sample Characteristies

The questionnaire survey was conducted on March 27 and 28, 2020, and a total of 603 answer sheets were recovered. Among them, all of the items in Part II of 70 questionnaire sheets were chosen the same option, so they were eliminated. Then 533 effective answer sheets were obtained, with an effective rate of 88.39%. According to the statistics of the effective answers, there were 436 undergraduates (81.8%), 97 junior college students (18.2%), and 360 female students (67.5%), 165 male students (31.0%), 8 other students(1.5%) refused to disclose gender, and 174 courses are involved, of which 144 people

(27.0%) are involved in the top 5 courses with the   highest concentration of respondents.

Table 1. Sample Characteristics

		frequency	proportion (%)	cxumulativeproportion (%)
gender	Female	360	67.5	67.5
	Male	165	31.0	98.5
	unknown	8	1.5	100.0
educational level	junior college	97	18.2	18.2
	undergraduate college	436	81.8	100.0
grade	1	196	36.8	36.8
	2	227	42.6	79.4
	3	103	19.3	98.7
	4	7	1.3	100.0
subject	Comprehensive English	51	9.6	9.6
	Web Design	28	5.3	14.8
	Fundamentals of Programming	24	4.5	19.3
	Advanced Mathematics	22	4.1	23.5
	Marketing	19	3.6	27.0
	others	389	73.0	100.0
main forms of the course	live broadcast	310	58.2	58.2
	live broadcast +recorded broadcast	143	26.8	85.0
	recorded broadcast	54	10.1	95.1
	online discussion	10	1.9	97.0
	uebung	10	1.9	98.9
	others	6	1.1	100.0
	total	533	100.0	100.0

3.2 Reliability and Validity Assessment

As shown in Table 2, using IBM SPSS 19 to perform reliability analysis on the sample data, the overall Cronbach's α value is 0.934, and the lowest Cronbach's α value in each construct is *TR* (0.873). According to the recommendations of Hair *et al*. (2010), in order to ensure acceptable internal reliability, Cronbach's α value is 0.6 or more. Therefore, Cronbach's α value of this sample data is far superior to this standard.

Bartlett's sphericity test showed that $\chi^2 \approx 13355.792$, $df = 231$, *Sig.* ≈ 0.000; Kaiser-Meyer-Olkin test showed *KMO* $\approx$ 0.966. The above indicators demonstrate that the sample data is suitable for factor analysis. Table 3 shows the results of the exploratory factor analysis of sample data using the maximum variance method in IBM SPSS 19. It can be seen that the overall structural validity of the initial research model is not ideal. In particular, after deep analysis of the latent variable *PR*, which the corresponding measured variables are *pr*2 and *pr*3, both from the distribution of the factor load value or the semantics of the measured variable, the 2 measured variables should be isolated to form new latent variables for analysis.

Table 2. Reliability Analysis

latent Var.	measurement Var.	mean	St.	Cronbach's

				Dev.	α
perceived usefulness (*PU*)	*pu*1	I learned a lot from this online course.	4.87	1.452	.941
	*pu*2	This online course can bring me a lot of thinking.	4.71	1.407	
	*pu*3	This online course helps me to study hard.	4.57	1.468	
	*pu*4	This online course enables me to break through the limitation of space to keep learning.	4.62	1.431	
pleasure (*PL*)	*pl*1	This online course is interesting	4.58	1.245	.889
	*pl*2	I won't pass a day as if it were a year in this online course.	4.44	1.297	
	*pl*3	I feel relaxed and happy in this online course.	4.37	1.237	
perceived ease of use (*PE*)	*pe*1	This online course can be easily accessed through the Internet without barriers.	5.11	1.454	.874
	*pe*2	The platform that this online teaching relies on is easy to use.	5.29	1.348	
	*pe*3	The operations required to participate in this online course are quite simple.	5.30	1.358	
sense of presence (*PR*)	*pr*1	This online teaching can make me feel like I am in the classroom.	4.56	1.650	.924
	*pr*2	In this online course, I can interact with the teacher very well.	4.68	1.576	
	*pr*3	In this online course, I can interact well with my classmates.	4.45	1.567	
	*pr*4	This online course has a sense of ritual which is the same as attending class in the classroom.	3.88	1.678	
	*pr*5	This online course has a class atmosphere.	4.23	1.664	
trust (*TR*)	*tr*1	Online teaching is an advanced teaching method and technology.	5.14	1.450	.873
	*tr*2	Online teaching would become an increasingly important teaching method and technology	4.73	1.606	
	*tr*3	The teaching effect of this online course is good.	4.84	1.497	
intention to participate (*IP*)	*ip*1	I'm very happy to take online courses like this one.	4.57	1.650	.973
	*ip*2	I am very happy to actively participate in more online courses like this one.	4.50	1.663	
	*ip*3	I will gladly continue to participate in online courses like this one if I have the opportunity.	4.45	1.671	
	*ip*4	Compared to traditional classrooms, I will be equally happy to participate in such online courses again.	4.48	1.683	
overall					.934

Table 3. Exploratory Factor Analysis (EFA)

	factor

	1	2	3	4	5	6
*pe*1	.217	.214	.167	***.826***	.161	-.037
*pe*2	.219	.295	.127	***.777***	.200	.247
*pe*3	.191	.304	.143	***.729***	.072	.346
*pu*1	.222	***.772***	.206	.342	.150	.202
*pu*2	.249	***.811***	.178	.224	.238	.119
*pu*3	.302	***.738***	.323	.269	.220	.138
*pu*4	.374	***.648***	.356	.330	.143	.156
*pr*1	.379	.294	***.740***	.140	.150	.093
*pr*2	.312	.304	.307	.231	***.722***	.180
*pr*3	.308	.243	.323	.197	***.766***	.155
*pr*4	.332	.218	***.757***	.156	.296	.128
*pr*5	.319	.306	***.621***	.206	.411	.195
*pl*1	.347	.358	.514	.249	.315	.304
*pl*2	.471	.266	.427	.212	.082	.528
*pl*3	***.539***	.295	.325	.292	.130	.461
*tr*1	.421	.188	.106	.296	.302	.642
*tr*2	***.635***	.222	.185	.121	.257	.419
*tr*3	.479	.421	.326	.250	.251	.406
*ip*1	***.789***	.265	.277	.248	.226	.202
*ip*2	***.824***	.249	.308	.214	.180	.144
*ip*3	***.827***	.247	.298	.203	.200	.146
*ip*4	***.810***	.231	.249	.202	.202	.164

Table 4 shows the results of the exploratory factor analysis after optimization adjustments (*pl*1, *pe*1 and *tr*3 with lower factor loads have been deleted). According to the standard proposed by Hair *et al*. (2010), that is the load value of each factor variable should greater than or equal to 0.5 [14], it can be seen the adjusted scale has good structural validity. Based on the adjusted scale, *pr*2 and *pr*3 are separated from *PR* to form a new latent variable, named "interactivity" (IT). Then, the following research assumptions are added:

Hypothesis H7-1: The interactive of online courses has a direct positive effect on students' trust toward the online course;

Hypothesis H8-1: The interactive of online course has a direct positive effect on students' intention to participate in the online course.

Table 4. EFA after Optimizing the Measurement Variables

	factor						
	1	2	3	4	5	6	7
*pr*2	.298	.314	.242	.198	***.760***	.164	.146
*pr*3	.285	.257	.282	.163	***.784***	.106	.188
*pr*1	.349	.318	***.758***	.102	.151	.121	.161
*pr*4	.311	.230	***.751***	.145	.325	.172	.112
*pr*5	.319	.306	***.574***	.220	.456	.203	.095
*pe*2	.226	.318	.128	***.797***	.215	.083	.168
*pe*3	.210	.298	.131	***.832***	.110	.175	.129
*pu*1	.224	***.773***	.169	.347	.174	.155	.100
*pu*2	.226	***.825***	.166	.184	.235	.092	.152
*pu*3	.273	***.757***	.313	.221	.224	.131	.164
*pu*4	.352	***.664***	.306	.286	.188	.259	.078
*ip*1	***.772***	.277	.249	.229	.240	.187	.216
*ip*2	***.811***	.259	.283	.190	.199	.177	.164
*ip*3	***.816***	.254	.274	.187	.221	.172	.160
*ip*4	***.798***	.238	.212	.186	.227	.196	.162
*pl*2	.409	.263	.294	.214	.190	***.684***	.214
*pl*3	.482	.308	.197	.250	.222	***.602***	.226
*tr*1	.551	.235	.247	.123	.187	.129	***.591***
*tr*2	.332	.202	.140	.332	.243	.238	***.702***

3.3 Analysis of Variance

Generally, one of the important purposes of online courses in living broadcast mode is to improve interactivity and presence. In order to understand whether there is a difference in the students' intention to participate, presence, interactivity in different forms of online courses, the different forms of the teaching as factors via SPSS19, the variables *pr*1, *pr*4, *pr*5, *pr*2, *pr*3, *ip*1, *ip*2, *ip*3 in sample data were measured in one-way analysis of variance (ANOVA). The results showed that except for *pr*1, the average scores of the other 7 measured variables of different teaching forms were significantly different fromeach other.

Table 5 ANVOA (only items with significant mean difference were shown)

Meas.Var.	(*I*) form	(*J*) form	mean Diff .(*I-J*)	Std. Err.	*P*
pr4	live + recorded	discussion	1.637*	.542	.032
	live		1.619*	.533	.030
pr5	recorded	live	-.822**	.240	.009
	live + recorded	discussion	2.173**	.532	.001
	live		2.277**	.522	.000
pr2	recorded	live +recorded	-.766*	.246	.024
		live	-1.020**	.227	.000
	live +recorded	discussion	1.536*	.504	.029
	live		1.790*	.495	.004
pr3	recorded	live +recorded	-.944**	.245	.002
		live	-.928**	.226	.001
	live +recorded	discussion	1.673*	.502	.012
	live		1.658*	.493	.011
ip1	recorded		1.690*	.527	.018
ip3	live		1.574*	.535	.040
ip4			1.587*	.538	.039

$0.01 \leq {}^{*}P < 0.05$，${}^{**}P < 0.01$

3.4 Structural Equation Modeling Analysis

Figure 2 shows the results of the Structural Equation Modeling(SEM) analysis of sample data using Amos 17. Chi-square test showed that $\chi^2 \approx 459.699$, degree of freedom $df = 136$, $\chi^2/df \approx 3.380$. According to the recommendations of Bagozzi& Yi (1988), χ^2/df should be less than 3.0 [15] when the model fits well. But considering the number of samples in this study is relatively large, and χ^2 is greatly affected by the scale of the sample. Therefore, the chi-square degree of freedom ratio should be used with caution as the main indicator of the test model fitting situation, and other indicators should be referenced as much as possible.[16,17]. In this sample, approximate root mean square error $RMSEA \approx 0.067$, and Browne &Cudeck (1993) pointed out that $0.05 <RMSEA<0.08$ means that the model fits acceptable [18]. Simultaneously, the comparative fit index $CFI \approx 0.972$, and Bentler (1990) pointed out that $CFI> 0.9$ shows that the model's fitting situation is good [19]. Based on the above analysis, this study believes that the overall fitting situation of the model is acceptable.
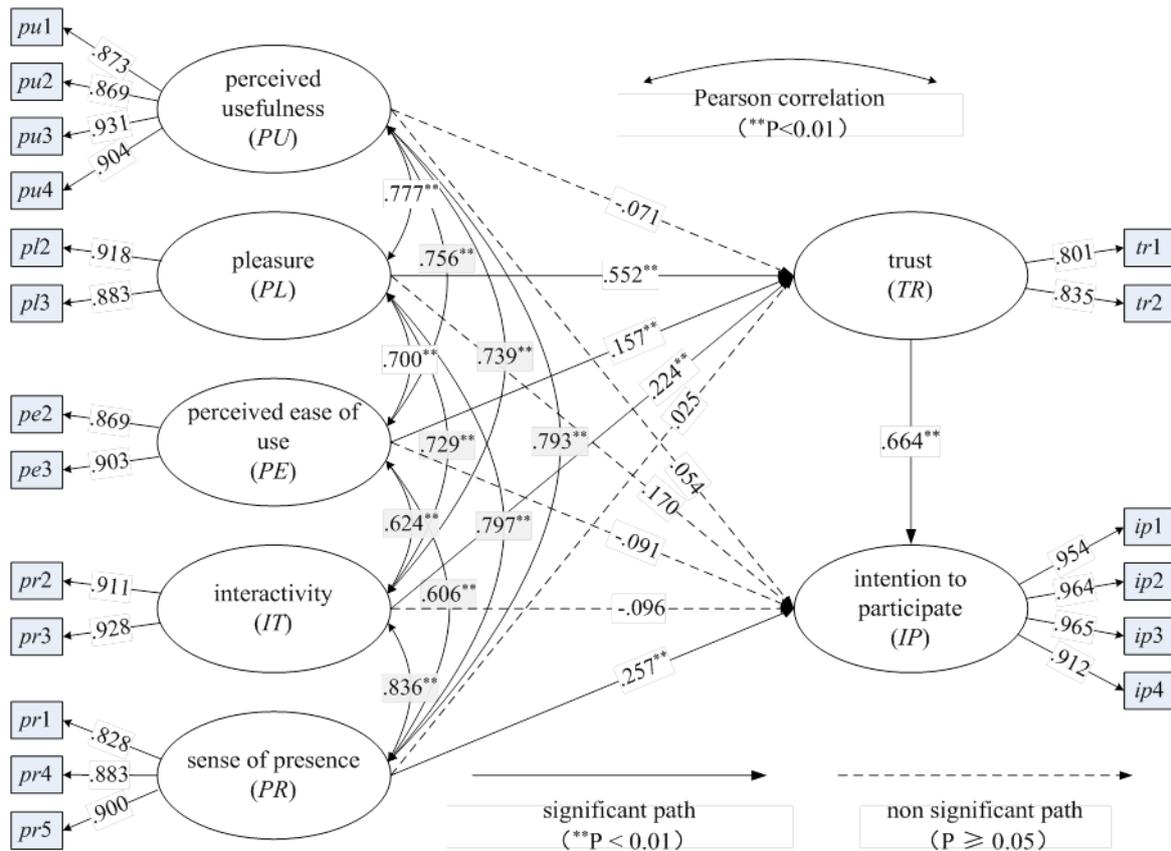
Figure 2. SEM Results

In the SEM, the latent variables *US*, *PL*, *EU*, *PR*, and *IT* only appear as independent variables. The Pearson correlation coefficients among the 5 independent variables are all less than 0.8 except *PR-IT*. According to the criteria proposed by Moore (2007)[20], except for *PR-IT*, the discrimination between latent variables is clear, and the risk of multicollinearity is low. For *PR* and *IT*, in the initial research hypothesis, they belong to the same latent variable, so it is not surprising that there is a high correlation between them. According to comprehensive considerations including previous exploratory factor analysis, this study believes that *IT* is independent of *PR* is still appropriate. Based on the results of SEM analysis, Hypothesis 3, 5, 7, 8-1 and 9 are supported.

4.CONCLUSION AND SUGGESTIONS

4.1 Discussion

According to the results of SEM analysis, the paths *PL→TR*, *EU→TR*, *IT→TR*, *TR→IA* are significant, and the paths *PL→IA*, *EU→IA*, *IT→IA* is not significant. It means that pleasure, interactivity, and ease of use have significant positive impacts on the intention to participate in online courses, and students' trust in online courses plays a full intermediary role.

The path *PR→TR* is not significant, and *PR→IA* is significant. It means that the sense of presence can directly affect students' intention to participate in online courses without the need for trust as an intermediary role.

The paths *US→TR* and *US→IT* are not significant, which means that students' perceived usefulness of online courses has no significant impact on trust and intention to participate. This situation is not common in empirical research based on TAM. One possible

reason is that online courses have almost become the only way to ensure that teaching activities can continue during the epidemic. Its important role is beyond doubt.Therefore, students no longer need to make judgments about the usefulness of courses when considering their level of participation in online courses.

Variance analysis shows that in the discussion teaching method, students feel a sense of ritual, teaching atmosphere and interactivity that are weaker than those teaching forms which are live broadcast or living broadcast & recording, and the intention to participate in online courses is also weaker than that of living broadcast group and recording group. Actually, the discussion teaching method is interactive design. There are two possible reasons for this result. The first is that the size of the discussion group is small (10 people), and there may be small sample deviations. Secondly, compared with the traditional methods, the discussion teaching methods have set new and higher requirements for teaching and learning. If participants cannot adapt to this change and the lecturing role of the teacher is weakened, an active discussion will be difficult to continue.

In terms of the teaching atmosphere, the living broadcast group has more positive feelings than the recording group. In terms of interactivity, the living broadcast & recording group has stronger feelings than the recording group. In terms of the sense of presence and interactivity, there is no significant difference between the living broadcast & recording group and the living broadcast group. About course participation intention, there is also no significant difference between the three groups, which are the recording group, living broadcast group, living broadcast & recording group.

4.2 Apply Recommendations

1) Pleasure is the most important factor that influences students' trust towards online courses, which continues to effects students' intention to participate. The sense of pleasure can not be simply understood as interesting courses (the measurement variable pl1 "online courses are very interesting" is eliminated in the exploratory factor analysis and optimization process that also can reflect this to a certain extent). To be specific, Pleasure comes from the charm of the course content and instructional design. Whether it is a traditional classroom or an online course, the most important thing is to guide students to pay attention to the course content itself.

2) Interactivity is another important factor that influences students' trust towards online courses so it should be given full attention in instructional design. As analyzed in the previous content, online courses are more beneficial to teacher-student interactions than in the traditional classroom, simultaneously this form has higher requirements for network bandwidth. In addition, the real-time interaction of recording and broadcasting teaching is weak, but the advantages are also very obvious. First, teaching by recording lessons has relatively low network requirements. Second, teachers can edit the content before the class to improve teaching efficiency. Third, when students watch recording videos, they can repeat to play it if they encounter an incomprehensible knowledge, that is conducive to students to improve the ability to learn independently. Therefore, online teaching can form a combination of live broadcasting teaching and recording teaching, and adjust the teaching content and proportion of the two according to the characteristics of different courses. This way can have the advantages of both and the students' interaction needs and satisfaction will not be reduced.

3) There is a close relationship between the sense of presence and the interactivity, but they are not synonymous. PR is a classroom atmosphere and ritual similar to the traditional face-to-face classroom. It can directly affect the enthusiasm of students to participate. In the online course, the living broadcast teaching can be used to improve students' sense of presence in some parts like

checking attendance, the introduction and summary of the course content, and answering questions.

4) Ease of use is one of the factors that significantly affect students' trust towards online courses. Therefore, for the development or selection of online teaching platforms, it should be pursued simple and practical functions so that both sides of the teaching can quickly focus on the course content itself.

5) Overall, the teaching method of live broadcast combined with recording has the advantages of the two and overcomes their respective weaknesses, that is an ideal form of online courses.

REFERENCES

1. Ajzen I., Fishbein M. Understanding Attitudes and Predicting Social Behavior. Prentice Hall, 1980, pp. 217-242.
2. Ajzen I. The Theory of Planned Behavior. Organizational Behavior and Human Decision Processes, 1991, 50(2), pp. 179-211.
3. Chu R., Li Y., Lai I. K. W. et al. Factors Influencing Trust and Acceptance of Electronic Sand Tables for Higher Business Education. Lecture Notes in Computer Science, 2014, 8595, pp. 164-172.
4. Chu R., Ma E. D., Feng Y., et al. Understanding Learners' Intension toward Massive Open Online Courses. Lecture Notes in Computer Science, 2015, 9167, pp. 302-312.
5. Dong X. F., Zhang G. Y., Chu R. Student Acceptance of Business Process-Experience-based Sand Tables. Hong Kong: ISET 2017.
6. Davis F. D., Bagozzi, R. P., Warshaw P. R. User Acceptance of Computer Technology: A Comparison of Two Theoretical Models. Management Science, 1989(8), pp. 982-1003.
7. Chen X., Zhou J., Luo L. Influencing Factors of Users' Acceptance towards MOOCs in China. Beijing: Computer Education, 2016(4), pp. 63-67.
8. Yuan Y. C., Zhou B., Nie B. L. A TAM based Study on Acceptance of Online Teaching Platforms in Colleges and Universities. Beijing: Electronics World, 2017(22), pp. 10-11, 14.
9. Research on the Acceptance of University Online Course System — Taking the Geographical Science Major of Wuhan University of Technology as an Example. Lanzhou: Higher Education of Sciences, 2018(6), pp. 54-59.
10. Hofman L. J., Jenkins L. K., Blum J. Trust beyond Security: An Expanded Trust Model. Communications of the ACM, 2006(7), pp. 95-101.
11. Pei C. G., Song N. Q., Liu Q. H., et al. Constructing and Verifying a Evaluation Index System of Mathematics Learning Interest [J]. Tianjin: Journal of Mathematics Education, 2018, 27(02), pp. 70-73.
12. Huang L. Q. The Value and Realization of the Sense of Presence in Online Ueaching — Taking MOOC as an Example [J]. Beijing: The Chinese Journal of ICT in Education, 2016(1), pp. 77-80.
13. Xu X. Q., Zhao W., Liu H. X. Factors Influencing College Students' Satisfaction in Online Learning [J]. Beijing: Distance Education in China, 2017(5), pp. 43-50, 79-80.
14. Hair J. F., Jr. Anderson R. E., Tatham R. L., et al. Multivariate Data Analysis, 7th ed. Prentice Hall, 2010.
15. Bagozzi R. P., Yi Y.: On the Evaluation of Structural Equation Models. Berlin, Germany: Journal of the Academy of Marketing Science, 1988, 16(1), pp. 74-94.
16. Qiu H. Z., Lin B. F. Principle and Application of Structural Equation Model. Beijing: China Light Industry Press, 2009.
17. Chen X. P., Xu S. Y., Fan J. L. Research Methods of Organization and Management. Beijing: Peking University Press, 2008.
18. Browne M. W., Cudeck R. Alternative Ways of Assessing Model Fit. Bollen K., Long J. Testing Structural Equation Models. Sage, 1993: pp. 136-162.
19. Bantler P. M. Comparative Fit Indexes in Structural Models. Psychological Bulletin. 1990, 107(2), pp. 238-246.
20. Moore D. S. The Basic Practice of Statistics, 4th ed. NY., US: W. H. Freeman and Company, 2007.