Exploring Factors Influencing MOOC Continuous Learning Willingness Based on Self-efficacy

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Abstract. High dropout rate is one of the primary problems confront MOOC teaching in current service process of MOOC. This paper investigated the factors influencing continuous learning willingness in MOOCs based on self-efficacy theory, and builds the model of factors influencing continuous learning willingness via ECM-IT. The results identified that the sense of competence, sense of performance and sense of control of MOOC learners have a significant impact on self-efficacy. Moreover, the sense of identification, sense of performance and the sense of control have a significant impact on learning satisfaction degree. In addition, the sense of performance and satisfaction degree have a significant impact on continuous learning willingness. In the end of the paper, proposals regarding to the future construction and service of MOOCs platform will be offered based on the analysis of research results.

Introduction

Massive Open Online Courses (MOOC) has gained its popularity globally owing to its convenience, considerable public attention and diverse learning resources in recent years. However, whilst the covenant-lite courses overcame the limitation of number of learners, it induced the high dropout rate. The statistics indicates that the majority of participants were driven by intrinsic motivations, and a great many of registrants never showed up after course started [1]. While many learners also expressed their concern about the limited interaction of MOOCs learning and the quality of automatic scoring system [2]. Thus whether the empresas iansa of MOOCs can reach its goal remained to be confirmed.

Continuous learning willingness is one of the factors directly influencing teaching outcomes, hence its improvement has become an inevitable issue. The existing literature showed that factors influencing learners’ continuous learning willingness can be complicated and varied while the research angles are rather subtle. This paper will place emphasis on self-efficacy, and build theory model based on Post-acceptance Model of IS Continuance, ultimately explore the relation between multidimensional self-efficacy and MOOCs continuous learning willingness.

Foundation

Self-efficacy

The concept “Self-efficacy” came up by famous American psychologist Albert Bandura in 1970s. Its definition is an individual's presumption in his or her innate ability to achieve goals, namely the confident level of utilizing one’s own skill to accomplish certain aims [3]. Bandura’s study indicated that self-efficacy affects people’s choice of activities and persistence of it. American scholar Jinks and Morgan demonstrated in their research aiming at different types of students from urban, suburb and rural areas that there exists significant correlation between self-efficacy and academic performance[4]. While self-efficacy is relevant to the identification and persistence of MOOCs learning under network-based teaching environment [5].

Self-efficacy is multidimensional and encompasses individual and social cognitive components simultaneously [6]. In 2003, Bian Yufang stated that “sense of competence”, “sense of devotion”,...
“sense of environment” and “sense of control” composed four dimensions of self-efficacy of MOOCs learners [7]. Based on the predecessors' research and summary, combining the characteristics of the MOOC teaching methods, this paper puts forward four dimensions of self-efficacy in MOOC learning, which including:

(1) Sense of competence: MOOC learner’s cognition about self-learning ability including initiative, concentration and efficiency.

(2) Sense of identification: The satisfaction level of curriculum design and course contents of MOOCs platform.

(3) Sense of performance: MOOC learner’s cognition about learning outcomes including the acquirement of curriculum knowledge and the improvement of comprehensive ability.

(4) Sense of control: Level of effective utilization and acquirement of knowledge and MOOC learner’s cognition about rationality, friendliness and usability of platform environment.

**Expectation Confirmation Model-information Technology**

Technology Acceptance Model was put forward by Davis in 1989, and it explained and predicted the acceptance of information technology considering factors like inner belief, subjective attitude, behavioral intention and external variable [8]. In 2001, Bhattacherjee stated that the success of IS not merely depended on initial use, the key was the continuous use [9]. He also put forward the concept of Expectation Confirmation Model-Information Technology basing on ECT [10], as is shown in Fig. 1. Perceived usefulness is defined as the degree to which a person believes that using a particular system would enhance his or her job performance [11], and expected confirmation refers to the comparison of expectation and perceived performance.

![Figure 1. Expectation Confirmation Model-Information Technology.](image)

ECM-IT has been widely applied to information system after its birth. For instance, Li Qian [12] built mobile social network continuous usage model basing on ECM-IT and DM. Yang Genfu [13] explored the factors influencing satisfaction degree and continuous use willingness of mobile reading users on the strength of ECM-IT and DM. Thus, ECM-IT laid a sound foundation for the investigation of this paper.

**Research Model and Hypothesis**

![Figure 2. Model of Factors Influencing MOOC Continuous Learning Willingness on the Basis of Self-efficacy.](image)

This paper takes sense of competence, sense of identification, sense of performance and sense of control as four dimensions measuring self-efficacy based on ECM-IT and self-efficacy theory, builds model of factors influencing MOOC continuous learning willingness on the basis of
self-efficacy, as is shown in Fig. 2.

After the establishment of research model, this paper will pose eleven hypotheses in all for the investigation of the relations between variables.

**Four Dimensions of Self-efficacy and Self-efficacy**

Bandura stated that types of needed skills vary with different fields, hence self-efficacy of exactly the same individual is different regarding to different fields [14]. Researcher takes sense of competence, sense of identification, sense of performance and sense of control as four dimensions of self-efficacy in MOOC learning. Moreover, sense of power and sense of performance highlight the cognitive level of self-ability and the improvement of it, while sense of identification and sense of control place emphasis on the experience users gained in external environment, namely MOOCs. This paper supposes that all four variables have a direct impact on self-efficacy and puts forward hypothesis as follows:

Hypothesis 1: Learner’s sense of competence produces an effect on self-efficacy.

Hypothesis 2: Learner’s sense of identification produces an effect on self-efficacy.

Hypothesis 3: Learner’s sense of performance produces an effect on self-efficacy.

Hypothesis 4: Learner’s sense of control produces an effect on self-efficacy.

**Four Dimensions of Self-efficacy and Satisfaction Degree**

Satisfaction degree refers to a subjective evaluation of MOOCs teaching pattern including satisfaction degree of learning processes and outcomes. Researcher presumed that four dimensions of self-efficacy have a direct impact on the satisfaction degree such as the evaluation of internet-based learning ability, the gap between teaching outcomes and initial expectations, the estimation of learning outcomes, the estimation of the convenience of MOOCs platform, and puts forward hypothesis as follows:

Hypothesis 5: Learner’s sense of competence produces an effect on satisfaction degree.

Hypothesis 6: Learner’s sense of identification produces an effect on satisfaction degree.

Hypothesis 7: Learner’s sense of performance produces an effect on satisfaction degree.

Hypothesis 8: Learner’s sense of control produces an effect on satisfaction degree.

**Self-efficacy and Satisfaction Degree**

Learners with high self-efficacy incline to set high goals for themselves, and those with high psychological thresholds are more satisfied when achieving their goals while those with low psychological thresholds are not quite satisfied even after achieving their aims. Therefore, the author puts forward hypothesis as follows:

Hypothesis 9: Learner’s self-efficacy produces an effect on satisfaction.

**Self-efficacy and Continuous Learning Willingness**

Learner’s confidence of learning is in proportional to the level of self-efficacy, and high level of self-efficacy can be conducive to the enhancement of learning motivation and behavior, for example increasing enthusiasm of MOOCs learning, seeking solutions actively when confronted with difficulties, consequently makes for the learner’s persistence of MOOCs learning and contributes to the increase of continuous learning willingness. Therefore the author puts forward hypothesis as follows:

Hypothesis 10: Learner’s self-efficacy produces an effect on continuous learning willingness.

**Satisfaction Degree and Continuous Learning Willingness**

Learner’s satisfaction degree of MOOCs learning directly affects continuous learning willingness, that is, learners are more satisfied with MOOCs teaching when the learning outcomes is in accordance with their initial learning motivation, the high level of satisfaction, accordingly, can encourage learners to study persistently to enhance the learning outcomes, consequently there is a higher likelihood of meeting demands and vice versa. Therefore the author puts forward hypothesis as follows:
Hypothesis 11: Learner’s satisfaction degree produces an effect on continuous learning willingness.

**Empirical Research**

Researcher tested out the research models and hypotheses by using questionnaire method after their establishments. Research process is divided into two stages: Compiling, issuing and collecting the questionnaires and analyzing sample data.

**Compiling, Distribution and Collection of the Questionnaires**

**Compiling Part.** The questionnaire encompassed two sections, the first part was the personal basic information including gender, grade, major and condition of MOOCs learning. Second part measured each dimension in research model hence the core. There were four items measuring sense of competence, sense of identification, sense of performance and sense of control, and three items with regard to self-efficacy, satisfaction degree and MOOCs continuous learning willingness. The evaluation of each item was conducted in the form of 5-point Likert scale. The options were strongly disagree (1 point), disagree (2 points), not sure (3 points), agree (4 points) and strongly agree (5 points).

**Distribution and Collection of the Questionnaires.** The vast majority of respondents were undergraduates who participated in MOOCs learning. The questionnaires were handed out both online and offline. The offline distribution of questionnaires was concentrated in the dining halls and classrooms whilst the online distribution was conducted through QQ and WeChat platform. The birthplaces of respondents involved Jiang Su, Fu Jian and other 19 provinces, and it ensured the randomness of samples. The total number of the questionnaires was 264. Screening out 48 undesirable ones, there were 216 effective questionnaires and the effective rate was 81.8%.

**Statistics and Analysis**

**Descriptive Statistics of Samples.** Descriptive statistics of the questionnaires revealed that in the aspect of gender, the number of male respondents was 114, accounting for 52.8%, the number of female was 102, accounting for 47.2%; in the aspect of major, the number of respondents who major in literature, history and economy was 89, accounting for 41.2%, the number of those who major in engineering, agriculture and medical science was 127, accounting for 58.8%; in the aspect of grade, the number of juniors was 89, accounting for 41.2%, the number of sophomores was 69, accounting for 31.9%, the number of freshmen and seniors were 28 and 30, respectively accounting for 13% and 13.9%; in the aspect of performance in MOOCs, the number of respondents who completed a small part of the courses was 80, accounting for 37%, the number of respondents who never completed any course was 51, accounting for 27.3%, the number of respondents who completed most of the courses was 59, accounting for 27.3%, the number of respondents who completed all courses was 26, accounting for merely 12%. The statistics manifested the high dropout rate.

**Examination of Testing Model.** This paper evaluates the reliability and viability of the testing model from three aspects: (1) The reliability of testing model; (2) The convergent viability of testing model; (3) The discriminant viability of testing model.

The analysis of viability performed test on testing model by using Cronbach’s $\alpha$ and Composite Reliability. In general, the reliability of testing model is good when the value of $\alpha$ is no less than 0.8. Table 1 shows that the values of $\alpha$ of seven variables in the testing model are all greater than 0.7, six of which are greater than 0.8, so the model exhibits good reliability. Composite reliability is another way to measure the reliability of testing model apart from Cronbach’s $\alpha$, and it manifests the consistency between each variable. It is manifested that the items exhibit good internal consistency if the value of composite reliability is greater than 0.7. As is shown in table 1, the values of composite reliability of the testing model are all greater than 0.7, six of which are greater than 0.8. The statistics indicates that the items exhibit good internal consistency.
Validity test reflects the degree of consistent between measurable indicators and abstract concepts at a theoretical level, including tests on convergent validity and discriminant validity. Good convergent validity requires the Average Variance Extracted of variables to be greater than 0.5. As is shown in Table 1, the AVE of each variable in the testing model is greater than 0.5, which indicates that the testing model exhibits good convergent validity.

Table 1. The Value of Reliability and Validity of Testing Model.

<table>
<thead>
<tr>
<th>Variable</th>
<th>AVG</th>
<th>Standard Deviation</th>
<th>Cronbach’s α</th>
<th>CR</th>
<th>AVE</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sense of competence</td>
<td>3.463</td>
<td>0.745</td>
<td>0.807</td>
<td>0.812</td>
<td>0.519</td>
</tr>
<tr>
<td>Sense of identification</td>
<td>3.359</td>
<td>0.770</td>
<td>0.835</td>
<td>0.836</td>
<td>0.560</td>
</tr>
<tr>
<td>Sense of performance</td>
<td>3.635</td>
<td>0.767</td>
<td>0.850</td>
<td>0.855</td>
<td>0.598</td>
</tr>
<tr>
<td>Sense of control</td>
<td>3.549</td>
<td>0.763</td>
<td>0.841</td>
<td>0.841</td>
<td>0.586</td>
</tr>
<tr>
<td>Self-efficacy</td>
<td>3.466</td>
<td>0.824</td>
<td>0.803</td>
<td>0.805</td>
<td>0.580</td>
</tr>
<tr>
<td>Satisfaction degree</td>
<td>3.443</td>
<td>0.752</td>
<td>0.781</td>
<td>0.787</td>
<td>0.562</td>
</tr>
<tr>
<td>Continuous learning</td>
<td>3.434</td>
<td>0.742</td>
<td>0.806</td>
<td>0.808</td>
<td>0.585</td>
</tr>
</tbody>
</table>

The testing on discriminant validity in testing model is shown in Table 2. The values on the main diagonal are obtained by taking the square root of the AVE of variables. The other values are the Pearson correlations of the variable and other variables. Given that the values on the diagonal are all greater than the numerical values in its same line and row. Thus it is believed that the testing model exhibits good discriminant validity [15].

Table 2. The Value of Discriminant Validity in Testing Model.

<table>
<thead>
<tr>
<th>Variable</th>
<th>Sense of competence</th>
<th>Sense of identification</th>
<th>Sense of performance</th>
<th>Sense of control</th>
<th>Self-efficacy</th>
<th>Satisfaction degree</th>
<th>Continuous learning willingness</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sense of competence</td>
<td>0.720</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sense of identification</td>
<td>0.603</td>
<td>0.748</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sense of performance</td>
<td>0.657</td>
<td>0.666</td>
<td>0.773</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sense of control</td>
<td>0.585</td>
<td>0.738</td>
<td>0.734</td>
<td>0.767</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Self-efficacy</td>
<td>0.150</td>
<td>0.699</td>
<td>0.759</td>
<td>0.754</td>
<td>0.762</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Satisfaction degree</td>
<td>0.666</td>
<td>0.704</td>
<td>0.680</td>
<td>0.712</td>
<td>0.698</td>
<td>0.750</td>
<td></td>
</tr>
<tr>
<td>Continuous learning</td>
<td>0.659</td>
<td>0.664</td>
<td>0.711</td>
<td>0.732</td>
<td>0.742</td>
<td>0.692</td>
<td>0.765</td>
</tr>
</tbody>
</table>

**Hypothesis Testing.** The questionnaire and response samples are manifested to be worth of further analysis after the test of reliability and validity. The validating of each hypothesis is shown in Fig. 3 and Table 3.

Figure 3. The Validating of Hypotheses.

Note: The values on the wires represent path coefficients, and the imaginary line means insignificant relations.
### Table 3. Hypothesis Testing Result.

<table>
<thead>
<tr>
<th></th>
<th>Unstandardized Coefficients</th>
<th>S.E.</th>
<th>C.R.</th>
<th>P</th>
<th>Standardized Coefficients</th>
</tr>
</thead>
<tbody>
<tr>
<td>Self-efficacy &lt;--- Sense of competence</td>
<td>0.384</td>
<td>0.037</td>
<td>10.255 **</td>
<td>0.476</td>
<td></td>
</tr>
<tr>
<td>Self-efficacy &lt;--- Sense of identification</td>
<td>0.095</td>
<td>0.036</td>
<td>2.616</td>
<td>0.009</td>
<td>0.121</td>
</tr>
<tr>
<td>Self-efficacy &lt;--- Sense of performance</td>
<td>0.32</td>
<td>0.036</td>
<td>8.793 **</td>
<td>0.408</td>
<td></td>
</tr>
<tr>
<td>Self-efficacy &lt;--- Sense of control</td>
<td>0.285</td>
<td>0.037</td>
<td>7.794 **</td>
<td>0.361</td>
<td></td>
</tr>
<tr>
<td>Satisfaction degree &lt;--- Sense of competence</td>
<td>0.048</td>
<td>0.037</td>
<td>1.292</td>
<td>0.196</td>
<td>0.068</td>
</tr>
<tr>
<td>Satisfaction degree &lt;--- Sense of identification</td>
<td>0.303</td>
<td>0.03</td>
<td>10.062 **</td>
<td>0.441</td>
<td></td>
</tr>
<tr>
<td>Satisfaction degree &lt;--- Sense of performance</td>
<td>0.235</td>
<td>0.035</td>
<td>6.766 **</td>
<td>0.34</td>
<td></td>
</tr>
<tr>
<td>Satisfaction degree &lt;--- Sense of control</td>
<td>0.233</td>
<td>0.034</td>
<td>6.869 **</td>
<td>0.336</td>
<td></td>
</tr>
<tr>
<td>Satisfaction degree &lt;--- Self-efficacy</td>
<td>0.171</td>
<td>0.056</td>
<td>3.061</td>
<td>0.002</td>
<td>0.194</td>
</tr>
<tr>
<td>Continuous learning willingness &lt;--- Self-efficacy</td>
<td>0.521</td>
<td>0.05</td>
<td>10.393 **</td>
<td>0.551</td>
<td></td>
</tr>
<tr>
<td>Continuous learning willingness &lt;--- Satisfaction degree</td>
<td>0.323</td>
<td>0.057</td>
<td>5.668 **</td>
<td>0.3</td>
<td></td>
</tr>
</tbody>
</table>

According to the testing result, sense of competence ($\beta=0.476$, $P<0.001$) exerts influence on self-efficacy most significantly among four variables measured in the research which may affect self-efficacy. Sense of performance ($\beta=0.408$, $P<0.001$) and sense of control ($\beta=0.361$, $P<0.001$) have relatively significant effect on self-efficacy as well. However, sense of identification produces a negligible effect on self-efficacy, which is a contradiction to the initial assumption. Among the measured variables directly influencing satisfaction degree, sense of competence ($\beta=0.068$, $P=0.196$) and self-efficacy ($\beta=0.194$, $P=0.002$) don’t have apparent association with satisfaction degree. While the other variable all have direct positive impacts on the satisfaction degree, and the impact of sense of identification ($\beta=0.441$, $P<0.001$) is most significant, followed by the sense of performance and sense of control. Moreover, two hypotheses about two factors directly influencing continuous learning willingness are all verified to be tenable. The significant level of the impact of self-efficacy ($\beta=0.551$, $P<0.001$) is highest, followed by satisfaction degree ($\beta=0.3$, $P<0.001$).

In conclusion, the positive factors influencing self-efficacy encompass the sense of competence, sense of identification and sense of control of MOOCs learner, whilst the positive factors influencing satisfaction degree include the sense of identification, sense of performance and sense of control of MOOC learn. Additionally, MOOC continuous learning willingness is affected by self-efficacy and satisfaction degree positively and significantly, and the influence of self-efficacy is greater than satisfaction.

**Conclusion**

Based on the empirical research on influence factor mode of MOOCs continuous learning willingness, the results are summarized as follows:

1. The sense of competence, sense of performance and sense of control of MOOCs learners have a significant positive impact on self-efficacy.
2. The sense of identification, sense of performance and sense of control of MOOCs learners have a significant positive impact on their satisfaction degree.
Self-efficacy and satisfaction degree of MOOCs learners have a significant positive impact on their continuous learning willingness.

In conclusion, this paper built the model of factors influencing continuous learning willingness, shed light on the influence of learners’ self-efficacy exerted on their MOOCs continuous learning willingness, and discovered the significant impacts of self-efficacy and satisfaction degree exerted on continuous learning willingness. However there still exists some gaps: The vast majority of research subjects are undergraduates in China. The enlargement of simple range should be taken into account in further research to ensure the representativeness of sample data.

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