Summer 6-19-2015

Exploring Users' Adoption of MOOCs from the Perspective of the Institutional theory

Shang Gao
School of Business Administration, Zhongnan University of Economics and Law, Wuhan, China

Yuhao Yang
Department of Computer and Information Science, Norwegian University of Science and Technology, Norway,
vincentyoo@msn.cn

Exploring Users' Adoption of MOOCs from the Perspective of the Institutional theory

Shang Gao[1, 2], *Yuhao Yang*[1*]
[1]School of Business Administration, Zhongnan University of Economics and Law, Wuhan, China
[2]Department of Computer and Information Science, Norwegian University of Science and Technology, Norway

Abstract: MOOCs, which stands for Massive Open Online Courses, have attracted millions of users around the world and it has a promise to be a very important part of future education. However, there is little research on users' adoption of MOOCs. This paper aims to improve the understanding of users' behavior intention to use MOOCs. The proposed research model is an extension of technology acceptance model with three factors from the institutional theory. And an empirical study with 247 subjects was conducted to test this model. The results indicate that both perceived usefulness and perceived ease of use directly affect users' behavior intention to use MOOCs significantly. Another interesting finding is that mimetic pressures also have a significant positive influence on users' behavior intention to use MOOCs.

Keywords: MOOCs, Users' adoption, technology acceptance model, institutional theory.

1. INTRODUCTION

In the past two years, MOOC, as a new kind of e-learning forms, has attracted numerous users all over the world to participate in it. As this education form is not limited to time and space, MOOC provides people a chance to acquire the best educational resources and learning experiences. Another reason why MOOC is prevalent can be attributing to that it is free for everyone. Except for an optional paid signature certification, people don't need to pay any fee to take a course. As of October 2014, Coursera, one of the biggest MOOCs providers, has 10 million users in 839 courses from 114 institutions**. The adoption of this course format by prestigious universities worldwide has sparked discussion about the future of education, or at the minimum, the future of academia's role in it [1].

In China, many universities have shown great interest in MOOCs. Chinese top universities like Peking University produce their own Chinese MOOCs and upload them to Coursera, while other universities, like Tsinghua University, jointly launch a Chinese MOOC platform XuetangX.com. These attempts not only lower the language barrier for Chinese users of MOOCs, but also make it easier for other instructors to produce MOOCs. Now some universities even begin to allowing students take electives in MOOCs and admitting the credit they achieved. It reveals that MOOCs will become an important part of educational programs in the future.

However, according the previous research [2], the dropout rate for MOOCs is very high (around 90 percent). Hew and Cheung [3] studied reasons why students sign up for MOOCs and why students drop the courses. They indicated that lack of incentive, failure to understand the content material and having no one to turn to for help, and having other priorities to fulfill were the main causes of drop out. In addition, Dagmar [1] explored the impact of individuals learning style on the MOOCs learning performance and suggested that variability and interactivity were inevitable part of MOOCs courses designing which will consequently result higher quality of learning.

* Corresponding author. Email: vincentyoo@msn.cn (Yuhao Yang)

** http://en.wikipedia.org/wiki/Coursera

Current research on MOOCs tended to focus on pedagogical part. However, there is little research on users' adoption of MOOCs. This research intends to investigate users' adoption of MOOCs from the perspective of institutional theory. The rest of this paper is organized as follows: Section 2 discusses the theoretical background of this study. The research model and hypotheses are presented in Section 3. The research method and results are described in Section 4. This is followed by a discussion of the findings in Section 5. Section 6 concludes this research.

2. THEORETICAL BACKGROUND

2.1 Research on Technology adoption

Adoption of innovations has been intensively investigated by researchers and practitioners of many disciplines [4], in which the technology acceptance model (TAM) is one of the most widely accepted and applied models [5]. Technology acceptance model focus on the perceived usefulness (PU) and perceived ease of use (PEOU) of a system, and these two indicators have been proved to be valid to predict user acceptance of some new information technologies, such as smartphone [6], online shopping [7], and mobile services [8; 9; 10]. However, TAM's limitations relative to extensibility and explanation power have been noted [11]. Many researchers have suggested that TAM needs to be extended with additional variables to provide a stronger model [12; 13].

The TAM was conceived at the individual level when it was originally developed, and research into the influence of subjective norms is considered to be one the major directions for enhancement of TAM[14]. Thus, social factor draws researchers' attention to investigate in technology diffusion research. Hossain and de Slva [15] explored user acceptance of technology by considering social ties in social networking system. Their findings suggested that influence of social ties played an important role in determining the acceptance and usage behavior of new adopters of new information technologies. As the significance of MOOCs in high education increases, people may use MOOCs actively or passively under social influence from others. The effect of social factors' influence cannot be ignored.

2.2 Adoption research of E-learning

Many research works have also been carried out on the adoption of e-learning in the past few years. [14; 16; 17]. Ronnie and Doug [14] extended TAM to explore user acceptance of collaborative learning technology, and they found that the determinants of TAM and the ability to share information are the major factors influencing the adoption of collaborative technology. Pedrotti and Nistor [17] investigated online lecture videos technology adoption in high education and found that social influence from peers and faculty member had an impact on users' adoption. Except for those studies focused on educational institutions, the adoption of E-learning in organization context was also carried out. Lee et al. [18]explored employees' intention to use E-learning systems by extending TAM with additional factors from Innovation diffusion theory. Their findings suggested that relative advantage, compatibility, complexity, and trialability and observability directly or indirectly had a significant influence on users' adoption. To date there has seldom adoption research in MOOCs. This study aims to investigate users' adoption of MOOCs with TAM and some additional factors.

2.3 Institutional theory

Although most of the technology acceptance models consider various social influence factors, such as subjective norms in the theory of reasoned action (TRA), the theory of planned behavior (TPB), social influence in the unified theory of acceptance and use of technology (UTAUT), and images in innovation diffusion theory (IDT), the discussion is generally fragmented and there is lack of specific focus on social issues[19]. Jan et al [19] make their attempts to investigate social factors' influence in users' adoption of E-learning from an institutional theory perspective.

The institutional theory was first proposed by Weber in 1946 [20]. And Teo et al. [21] used the institutional

theory to investigate the adoption of information technology. The institutional theory considers that social actors are typified as systems of rationally ordered rules and behaviors in modern societies [21], thus there are general social conceptions of appropriate structures, beliefs, attitudes and behaviors [19]. Related research in the institutional theory identified that three mechanisms would lead to institutional changes occur that promoted similarities in structures and processes, which were coercive force, normative force and mimetic force [22; 23]. These three mechanisms moved 'from the conscious to the unconscious, from the legally enforced to the taken for granted' [24]. It provided a new perspective to research on technology diffusion. Consequently, we would like to extend TAM with three factors form the institutional theory for further understanding users' adoption of MOOCs.

3. RESEARCH MODEL AND HYPOTHESES

This study examines the acceptance of MOOCs in China, and the proposed research model (see Figure 1) is an extension of TAM. In addition to perceived ease of use and perceived usefulness from TAM, the model includes social influence related elements as additional factors to study users' adoption of MOOCs.

TAM has been widely used in the technologies adoption research, and perceived usefulness and perceived ease of use are major determinants to predict the adoption of a new innovation technology. In this study, *perceived usefulness* is defined as the degree to which the user believes that using MOOCs would enhance his/her study performance, and *perceived ease of use* refers to the degree to which the user believes that using MOOCs would be free of effort [25]. The TAM posits that perceived ease of use and perceived usefulness have a direct effect on the attitude toward the use of a technology, and perceived ease of use has a positive effect on perceived usefulness. Therefore, the following three hypotheses are proposed.

H1: Perceived usefulness has a positive effect on behavioral intention to use MOOCs.

H2: Perceived ease of use has a positive effect on behavioral intention to use MOOCs.

H3: Perceived ease of use of MOOCs has a positive effect on perceived usefulness of MOOCs.

Based on the findings from the previous literature [19; 21; 22], we believe that social factors from the institutional theory are significant determinant of behavioral intention to use MOOCs. *Coercive pressures* are defined as both formal and informal pressures exerted on social actors to adopt the same attitudes, behaviors and practices, because they feel pressured to do so by more powerful actors [19; 22]. *Normative pressures* occur when social actors voluntarily, but unconsciously, replicate other actors' same beliefs, attitudes, behaviors and practices. The institutional theory proposes that social actors are more likely to copy a certain action if that action has been taken by a large number of other actors [19]. And individuals may be afraid that they will be deemed 'old fashioned' if they do not follow the current trend. *Mimetic pressures* force social actors to seek examples of established behaviors and practices to follow through voluntarily and consciously copying the same behaviors and practices of other high-status and successful actors [22], due to the belief that actions taken by successful actors will be more likely to get positive outcomes [19]. In our study, we assume these three pressures have impacts on users' adoption of MOOCs. Accordingly, we propose the following three hypotheses.

H4: Coercive pressures have a positive effect on behavioral intention to use MOOCs.

H5: Normative pressures have a positive effect on behavioral intention to use MOOCs.

H6: Mimetic pressures have a positive effect on behavioral intention to use MOOCs.

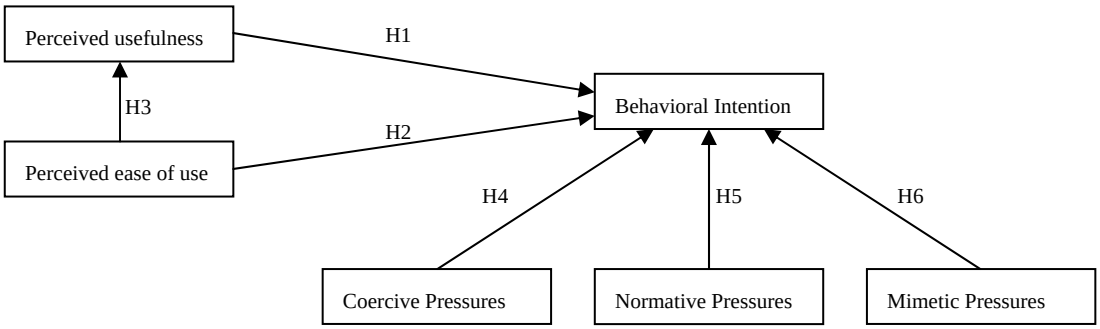

Figure 1. Research model

4. An empirical study in China

To investigate users' adoption of MOOCs in China, the proposed research model and hypotheses were empirically tested using the structural equation modeling approach.

4.1 Instrument Development

The validated instrument measures from previous researches [16; 19; 21; 25] were used as the foundation to create the instrument for this study. In order to ensure the scales better fit the MOOCs use experiment, some words had been changed to ensure easy interpretation and comprehension of the questions. For instance, wording was modified to fit the context of use of MOOCs in China. As a result, 19 measurement items were retained to be included in the instrument survey. A seven-point Likert scale, with 1 being the negative end of the scale (strongly disagree) and 7 being the positive end of the scale (strongly agree) was used to examine participant' responses to all items in the survey.

4.2 Samples

The data for this study was collected through self-administered questionnaires in an online MOOC community, where had already gathered numerous MOOCs users. The survey was distributed in term of Internet-based questionnaire individually from December 15 2014 to January 20 2015. 286 completed questionnaires were collected, among which 247 of them were valid questionnaires (i.e., valid respondent rate 86.4%). Among the participants, 38.5% of the participants were the first time using MOOCs and the rest part had used MOOCs more than once, but only 6.9% of the participants had acquired at least one certification before. 57.9% of the participants were male, and 42.1% were female. Moreover, 68% of the participants were employed, and 28.3% were students, rest 3.6% was unemployed.

4.3 Measurement Model

For the purposes of testing the research hypotheses, data were analyzed using the structural equation modeling (SEM).

In this study, we examined goodness-of-fit of the measurement model by using six widely-used fit indices: the chi-square/degrees of freedom (x2/df), the goodness-of-fit index (GFI), the adjusted goodness-of-fit index (AGFI), the comparative fit index (CFI), the normed fit index (NFI), and the root mean square error of approximation (RMSEA). The fitness measures are shown in Table 1. Table 1 shows that all the fitness measures are within acceptable range.

To test the reliability and validity of each construct in the MOOCs users' adoption model, the Internal Consistency of Reliability (ICR) of each construct was tested with Cronbach's Alpha coefficient. Convergent validity was assessed through composite reliability (CR) and the average variance extracted (AVE). Bagozzi and Yi [26] proposed the following three measurement criteria: factor loadings for all items should exceed 0.5, the CR should exceed 0.7, and the AVE of each construct should exceed 0.5. As shown in Table 2, all constructs are in

acceptable ranges. Further, the Cronbach's Alpha values range from 0.80 to 0.89. All the constructs are above 0.70. Consequently, the scales are deemed acceptable to continue. As for discriminant validity, the square roots of average variances extracted by the constructs are more than correlations among variables, seen in Table 3.

Table 1. Fit indices for the measurement model

Measures	Recommended criteria	Measurement model	Suggested by authors
Chi-square/d.f.	< 3.0	2.784	Hayduk (1988)
GFI	> 0.9	0.870	Scott (1995)
AGFI	> 0.8	0.827	Scott (1995)
NFI	> 0.9	0.869	Bagozzi and Yi (1988)
CFI	> 0.9	0.911	Bentler (1990)
RMSEA	< 0.08	0.085	Bagozzi and Yi (1988)

Table 2. Factor loadings, composite reliability, and AVE for each construct

Construct	Item Number	Factor Loading	Composite Reliability	AVE	Cronbach's Alpha
PU	3	0.83-0.85	0.88	0.71	0.80
PEOU	4	0.81-0.83	0.89	0.67	0.84
CP	3	0.88-0.92	0.93	0.82	0.89
NP	3	0.82-0.89	0.89	0.73	0.81
MP	3	0.85-0.90	0.90	0.77	0.85
BI	3	0.82-0.90	0.89	0.73	0.82

Table 3. Discriminant validity

Variables	PU	PEOU	CP	NP	MP	BI
PU	0.84					
PEOU	0.64	0.82				
CP	0.42	0.40	0.91			
NP	0.50	0.47	0.64	0.85		
MP	0.57	0.42	0.65	0.72	0.88	
BI	0.71	0.73	0.43	0.51	0.56	0.86

Note: Diagonals represent the square root of average variance extracted, while the other matrix entries represent the correlations.

4.4 Structural Model and Hypotheses Testing

The structural model was tested using Amos 22.0. The results of structural model are shown in Figure 2. The R^2 (R square) in Figure 2 denotes to coefficient of determination. It provides a measure of how well future outcomes are likely to be predicted by the model, the amount of variability of a given construct. In our analysis, the R^2 coefficient of determination is a statistical measure of how well the regression coefficients approximate the real data point. According to the result, 66% of the variance of behavior intention can be explained by the research model. The standardized path coefficients between constructs are also presented in Figure 2, while the dotted lines stand for the non-significant paths. As a result, four (H1, H2, H3, H6) of the proposed six hypotheses were supported.

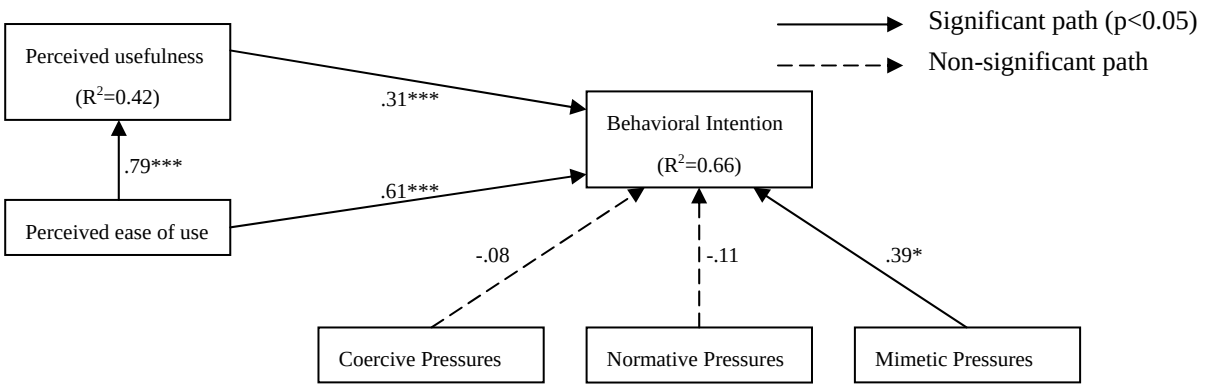

Figure 2. MOOCs users' adoption model -- Results

5. DISCUSSION

In this research, we studied the users' adoption of MOOCs in China from the perspective of the institutional theory. The research was considered to be beneficial for academic research, since it provided a new perspective to understand users' adoption of this new e-learning form. As for pratical implications, the findings could help practitioners better promote their MOOCs to appropriate users.

The empirical results of this research demonstrated both perceived usefulness and perceived ease of use had significant positive influences on users' behavioral intention to use MOOCs, while perceived ease of use also positively influenced perceived usefulness significantly. These findings were consistent with previous research on TAM [4]. It revealed that users adopting MOOCs was a utilitarian behavior, and high quality and useful courses as well as convenient and enjoyable usage experiment would attract more users. This result was in line with previous technology adoption studies [8; 14; 16]. People would like to adopt new technology which they can get benefits.

Three social factors from the institutional theory were integrated into the model, but only mimetic pressures was found to be a significant factor which had a positive influence on users' intention. The results seemed that people would perform a herd behavior in the terms of using MOOCs. People are more likely to use MOOCs when most of their fellows start using MOOCs. Practitioners could take advantage of this finding to promote their products. However, both coercive pressures and normative pressures did not have significant positive influence on users' intention to use MOOCs. As MOOC is a new kind of E-learning technology, the adoption of MOOCs in the current users were mainly voluntary rather than mandatory, thus the influences of coercive pressures and normative pressures are limited.

However, we were also aware of some limitations. Firstly, we only tested the research model and hypotheses with general MOOCs users in China. We didn't differentiate users to the group of academic MOOCs (e.g., Coursera, edX) users or the group commercial MOOCs (e.g., language, programing training) users. There may exist some differences in the users' purpose of attending MOOCs. Secondly, all the data were collected using self-reported scales in the research and our samples size was not big. This sample may not be fully representative of the entire population in China.

6. CONCLUSIONS

This research was designed to study the adoption of MOOCs in China. To our best knowledge, only few studies were concerned with the adoption of MOOCs in China. This study examined users' adoption of MOOCs by extending TAM with three factors from the institutional theory. A research model with six research

hypotheses was proposed in the study. The results indicated that both perceived ease of use and perceived usefulness directly affected the users' behavior intention to use MOOCs significantly, and mimetic pressures also had a significant positive impact on users' behavior intention to use. Future research with large subjects is needed to empirically verify the research model. Furthermore, the impacts of some facilitating conditions (e.g., language barriers, virtual learning community) are also needed to be considered in the future research.

REFERENCES

[1] El-Hmoudova D. (2014). MOOCs Motivation and Communication in the Cyber Learning Environment. Procedia-Social and Behavioral Sciences, 131, 29-34.

[2] Rivard R. (2013). Measuring the MOOC dropout rate. Inside Higher Ed, 8.

[3] Hew K.F., Cheung W.S. (2014). Students' and Instructors' Use of Massive Open Online Courses (MOOCs): Motivations and Challenges. Educational Research Review.

[4] Jeyaraj A.,Rottman J.W., Lacity M.C. (2006). A review of the predictors, linkages, and biases in IT innovation adoption research. Journal of information technology, 21, 1-23.

[5] Liu Y.,Han S., Li H. (2010). Understanding the factors driving m-learning adoption: a literature review. Campus-Wide Information Systems, 27, 210-226.

[6] Kim S.H. (2008). Moderating effects of job relevance and experience on mobile wireless technology acceptance: Adoption of a smartphone by individuals. Information & Management, 45, 387-393.

[7] Gefen D.,Karahanna E., Straub D.W. (2003). Trust and TAM in Online Shopping: An Integrated Model. MIS quarterly, 27, 51-90.

[8] Gao S., Yang Y. (2014). The Role of Trust towards the Adoption of Mobile Services in China: An Empirical Study. Digital Services and Information Intelligence: Springer. 46-57.

[9] Gao S.,Krogstie J., Siau K. (2014). Adoption of mobile information services: An empirical study. Mobile Information Systems, 10, 147-171.

[10] Gao S.,Moe S.P., Krogstie J. (2010). An empirical test of the mobile services acceptance model. Mobile Business and 2010 Ninth Global Mobility Roundtable (ICMB-GMR), 2010 Ninth International Conference on. 168-175.

[11] Benbasat I., Barki H. (2007). Quo vadis TAM? Journal of the association for information systems, 8, 7.

[12] Legris P.,Ingham J., Collerette P. (2003). Why do people use information technology? A critical review of the technology acceptance model. Information & Management, 40, 191-204.

[13] Gao S.,Krogstie J., Siau K. (2011). Developing an instrument to measure the adoption of mobile services. Mobile Information Systems, 7, 45-67.

[14] Cheung R., Vogel D. (2013). Predicting user acceptance of collaborative technologies: An extension of the technology acceptance model for e-learning. Computers & Education, 63, 160-175.

[15] Hossain L., de Silva A. (2009). Exploring user acceptance of technology using social networks. The Journal of High Technology Management Research, 20, 1-18.

[16] Park S.Y. (2009). An Analysis of the Technology Acceptance Model in Understanding University Students' Behavioral Intention to Use e-Learning. Educational Technology & Society, 12, 150-162.

[17] Pedrotti M., Nistor N. (2014). Online Lecture Videos in Higher Education: Acceptance and Motivation Effects on Students' System Use. 2014 IEEE 14th International Conference on Advanced Learning Technologies (ICALT). 477-479.

[18] Lee Y.-H.,Hsieh Y.-C., Hsu C.-N. (2011). Adding Innovation Diffusion Theory to the Technology Acceptance Model: Supporting Employees' Intentions to use E-Learning Systems. Educational Technology & Society, 14, 124-137.

[19] Jan P.-T.,Lu H.-P., Chou T.-C. (2012). The Adoption of e-Learning: An Institutional Theory Perspective. Turkish Online Journal of Educational Technology-TOJET, 11, 326-343.

[20] Weber M. (1946). From Max Weber: Essays in Sociology, ed. HH Gerth and CW Mills. New York: Oxford University

Press.

[21] Teo H.-H.,Wei K.K., Benbasat I. (2003). Predicting intention to adopt interorganizational linkages: an institutional perspective. MIS quarterly, 19-49.

[22] DiMaggio P.J., Powell W.W. (1983). The iron cage revisited: Institutional isomorphism and collective rationality in organizational fields. American sociological review, 147-160.

[23] Scott W.R. (1995). Institutions and organizations.

[24] Hoffman A. (1997). From Heresy to Dogma: an institutional history of corporate environmentalism, 1997. New Lexington Press, San Francisco.

[25] Davis F.D. (1989). Perceived usefulness, perceived ease of use, and user acceptance of information technology. MIS quarterly, 319-340.

[26] Bagozzi R.P., Yi Y. (2012). Specification, evaluation, and interpretation of structural equation models. Journal of the Academy of Marketing Science, 40, 8-34.

Appendix

Perceived Usefulness [16; 25]
Learning on MOOCs would improve my learning performance.
Learning on MOOCs would increase academic productivity.
Learning on MOOCs could make it easier to study course content.
Perceived Ease of Use [16; 25]
I find MOOCs easy to use.
Learning how to use a MOOC platform is easy for me.
It is easy to become skillful at using a MOOC platform.
My interaction with a MOOC platform is clear and understandable.
Coercive Pressures [19; 21]
Many of my college courses (or company training courses) require me to use MOOCs.
Many college courses (or company training courses) can be accomplished only when using MOOCs.
My learning interactions with my teachers, friends and other classmates (workmates) force me to use MOOCs.
Normative Pressures [19; 21]
I have seen what others do using MOOCs.
Many people in my social network (friends, family, workmates, and classmates) use MOOCs.
MOOCs are very visible in my social network (friends, family, workmates, and classmates)
Mimetic Pressures [19; 21]
People around me who use MOOCs have more prestige than those who do not.
People around me who use MOOCs have a high profile
Using MOOCs is a status symbol for people around me
Behavioral Intention [16; 19; 25]
I would continue to use MOOCs for my learning needs.
Continuing to use MOOCs for acquiring knowledge is something I would do in the future.
I intend to be a heavy user of MOOCs.