Influence of Students' MOOC Learning Effectiveness: Adjust industry 4.0 & 107 curriculum reform

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Abstract. This study aims to analyze the correlation (N=636) among tertiary students' perceived e-learning acceptance, self-regulation, and MOOC learning effectiveness in Taiwan. Students' perceived e-learning acceptance includes four factors, namely, convenience learning, useful learning, interesting learning, and technology learning. Self-regulated learning includes four factors, namely, goal-setting, self-efficacy, effectiveness, and self-evaluation. MOOC learning effectiveness includes four factors, namely, perceived enjoyment, perceived usefulness, perceived satisfaction, and perceived openness. Analysis was conducted using the structural equation modeling (SEM), and a good model fit was found for both the measurement and structural models. Research findings demonstrate that tertiary students' e-learning acceptance significantly and directly influences MOOC learning effectiveness. E-learning acceptance significantly and indirectly influences MOOC learning effectiveness by self-regulation. Tertiary school students' e-learning acceptance and self-regulated learning fit the influence model and empirical data of MOOC learning effectiveness.

1. Introduction

Massive open online courses (MOOCs) offer an exciting range of opportunities to widen access and participation in education. Over the last 5 years, massive open online courses (MOOCs) have increasingly provided learning opportunities across the world in a variety of domains. In Taiwan, this continuing expansion of Internet technologies, multiple interact ions within the internet community, use of the Internet as a knowledge sharing tool, and popularity of creative commons are pushing for a change in the traditional information education [1]. Massive Open Online Courses (MOOCs) offer automated assessment tools and some form of interaction with course staff have gained increasing popularity and become one of the very recent trends in e-learning[1] [2].

Some studies have suggested that students' perceived e-learning acceptance will affect MOOC learning effectiveness. From the social cognitive perspective, student acceptance of e-learning is affected by factors such as perceived openness and perceived enjoyment, which in turn affect students' motivation, attitude, and the adoption of MOOC learning[3] [4]. A number of schools have established Coursera, edX, Udacity, and Udemy are the most popular MOOC platforms in the hopes of effectively promoting student learning effectiveness. Student perceptions of the usage of e-learning not only improve actual learning performance, but also increase the information and feedback from student learning accomplishments. In addition, the perceived usage of student MOOC learning systems can be used to promote learning effectiveness[4] [5] [6]. The purposes of this study as follow:

(1) What are the relationships between tertiary students' perceived e-learning acceptance, self-regulation, and MOOC learning effectiveness?

(2) Can we identify a suitable model that relates these factors and helps to identify important implications for using e-learning to improve the MOOC learning effectiveness of students?

2. Methodology

2.1 Participants

This study treated tertiary students as the population, and adopted random sampling and cluster sampling for a survey. A total of 636 valid samples were collected.

2.2 Measures

A 46-item survey questionnaire was developed to measure participants' e-learning acceptance, self-regulation, and MOOC learning effectiveness. The items reflected in the questionnaire could allow participants to take reference from their personal experiences when responding. Each item was measured on a five-point Likert scale of 1=strongly disagree to 5=strongly agree. These items are listed in the table 1.

Table 1:Factors, number of items, validity and reliability of tertiary students' perceived e-learning acceptance and self-regulated learning on scale for students' MOOC learning effectiveness .

Factor	Composition of scales	No of items	Factor loading	Cronbach α	Accumulated explained variance	Kmo	Total reliability Cronbach α
e-learning acceptance	Convenience learning	4	23.62	.91	63.53	.896	.91
	Useful learning	4	14.31	.84			
	Interesting learning	4	13.48	.83			
	Technology learning	4	12.22	.92			
self-regulated learning	Goal-setting	4	28.12	.89	63.30	.893	90
	Self-efficacy	3	20.53	.90			
	Effectiveness	4	13.48	.92			
	Self-evaluation	3	11.17	.91			
MOOC learning effectiveness	Perceived enjoyment	4	21.56	.92	64.41	.879	.90
	Perceived usefulness	4	19.13	.89			
	Perceived satisfaction	4	13.14	.89			
	Perceived openness	4	11.59	.87			

2.3 Data analysis

Regarding data processing of formal survey, the returned questionnaires were coded. Linear Structural Relations (LISREL) was used to validate the correlation and influences among students' e-learning acceptance, self-regulation, and MOOC learning effectiveness by Statistical Package for Social Science. Statistical test criterion of this study is $\alpha=0.05$.

3. Results

3.1 Fit test of influence model of MOOC learning effectiveness materials

This study validated the model by LISERL 8.52. The estimation method was determined after examining the samples, and model estimation was carried out by software. Parameters after software estimation are shown in Table 2. Before the model fit test, whether the estimation coefficient is over

the defined scope was verified. Only when parameter coefficients estimated do not violate the estimation can the fit test be conducted.

Table 2 Normalized coefficients of path analysis of influence model of technological and tertiary school students' MOOC learning effectiveness .

Parameter	Standard deviation	t value	Normalized coefficient	Parameter	Standard deviation	t value
λ1	0.64	18.39*	0.35	ε1	0.34	17.21*
λ2	0.65	17.14*	0.36	ε2	0.29	15.13*
λ3	0.72	18.25*	0.22	ε3	0.44	13.54*
λ4	0.69	10.09*	0.36	ε4	0.33	14.04*
λ5	0.57	13.46*	0.38	ε5	0.22	14.64*
λ6	0.64	17.20*	0.33	ε6	0.31	13.64*
λ7	0.65	16.89*	0.46	ε7	0.39	15.15*
λ8	0.66	15.59*	0.35	ε8	0.28	13.68*
λ9	0.52	14.38*	0.39	ε9	0.37	14.47*
λ10	0.68	16.49*	0.37	ε10	0.29	15.59*
λ11	0.71	19.23*	0.39	ε11	0.38	13.23*
λ12	0.61	15.56*	0.31	ε12	0.29	13.69*

Note: Those without standard deviations are criterion indicators of *p<.05

3.2 Structural fit

Regarding the structural fit test, according to the structural parameters of the influence model of students' MOOC learning effectiveness , which meet the evaluation standards; therefore, the structural model fit of this study is good. Correlation coefficients of the latent variables in Table 6 are further tested. The coefficients of the three latent variables are 0.73~0.92. The correlation coefficient of MOOC learning effectiveness on e-learning acceptance is higher than 0.90, while the remaining are lower than 0.90. Thus, the three latent variables may affect the structural model fit due to overly high correlations.

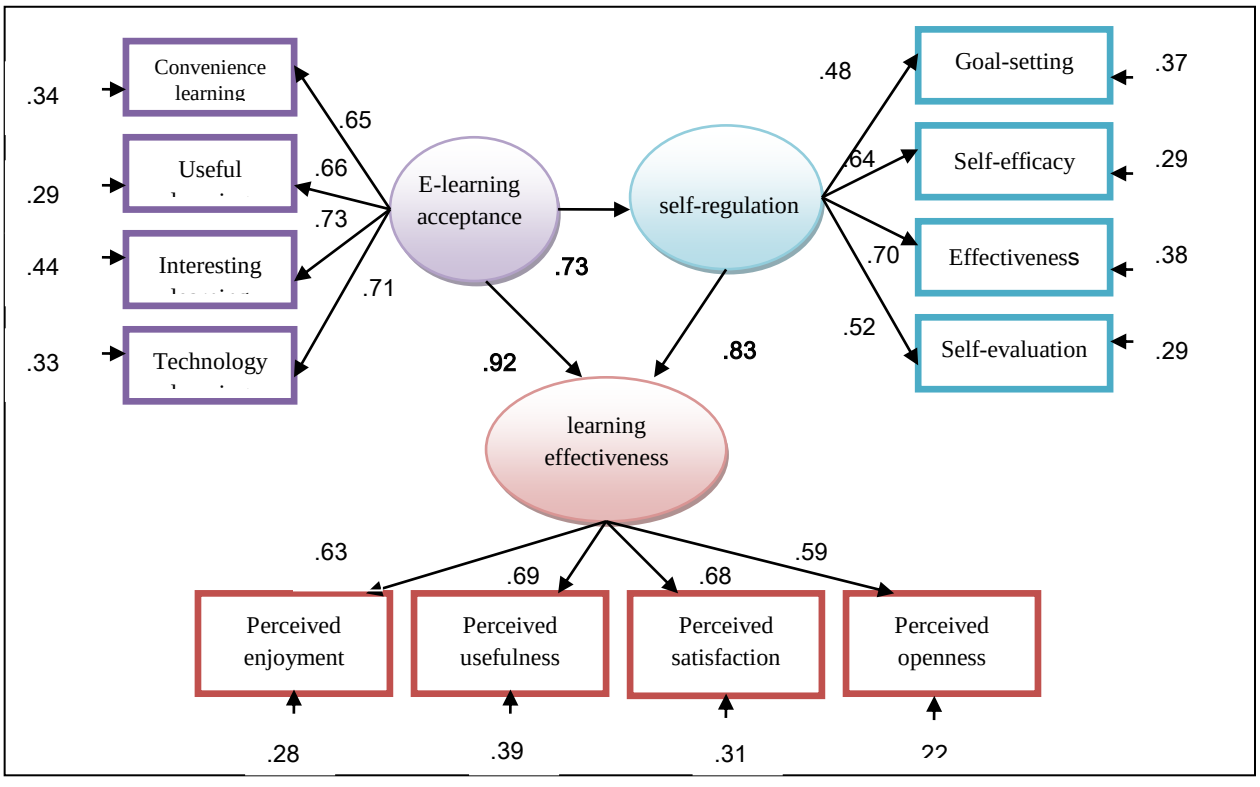

Figure 1: Path of tertiary students' MOOC learning effectiveness.

4. Discussion

This study aims to analyze the correlations among tertiary students' perceived e-learning acceptances, self-regulation, and MOOC learning effectiveness in Taiwan. Tertiary students' e-learning acceptance, interesting learning, and technology learning show significant influence on perceived enjoyment and perceived usefulness in teacher's MOOC learning effectiveness. Through interesting learning and rewards by schools, teachers can fulfill their creativity and further develop courses and e-learning design. This will allow them to accomplish school objectives and perceived usefulness in order to meet environmental changes [7] [8].

Tertiary students' e-learning acceptance significantly and directly influences MOOC learning effectiveness. E-learning acceptance significantly and indirectly influences MOOC learning effectiveness through self-regulation. Tertiary students' e-learning acceptance and self-regulated learning fit influence model and empirical data of MOOC learning effectiveness . Therefore, schools should respect and support instructional technology learning. Through cognition of e-learning and evaluation contents, teachers can constantly ponder on e-learning training and information technology. They will enhance perceived usefulness and perceived satisfaction. Teachers' active promotion of web-based portfolios ideas in e-learning and practical use of e-instruction will encourage student learning. They identify with interesting learning through e-learning acceptance in order to develop students' e-learning plan, and constantly adopt and implement MOOC. Thus, they will result in useful e-learning and perceived satisfaction [8] [9] .

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