

An Evaluation of MOOC Learning Based on Students' Perception

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Abstract—The expansion of MOOC has brought a new paradigm shift especially in our education field. As reported until end of 2016, nearly 7000 MOOC courses being offered and enrolled by more than 58 million students all over the world. To measure the effectiveness and efficiency of the MOOC implementation in supporting the teaching and learning process, the learners' perception must be evaluated. Therefore, in this paper we examine students' preferences on learning in MOOC by identifying the relationship between students' perception and MOOC. We employed a quantitative methodology and used online questionnaire as a method of data collection. Statistical based analysis approaches are used to analyze the data. This paper presents a model of students' perception on MOOC learning categorize into six variables which are learning design (LD), learning outcome (LO), content design (CD), learning attitude (LA), or enhancement in teaching and learning (EN), and student perception (SP). The results revealed that all variables contribute positive relationship with students' perception which reflects that students possess a positive perception when learning through MOOC. The proposed model explained as much as 60.6 per cent of the variance, which reflect a good model fit as well as statistical significant and LO construct is the best predictor of SP as it holds the largest beta coefficient value.

Keywords—MOOC learning; students' perception; relationship; multiple regression

I. INTRODUCTION (*Heading 1*)

Online learning has become one of the fastest growing trends in educational fields. Massive Open Online Courses or MOOC is one of the most rapidly growing online educational based learning. Basically, the main purpose of online learning is to offer its learners an access to education materials at their own pace and time, as well as lowering the average educational learning cost [1]. MOOC, as stated by Hew (2015) is a tuition-free course taught over the internet which allows virtually anyone to attend the course. As reported by Class Central, until end of 2016, nearly 7000 MOOC courses being offered, which enrolled by more than 58 million students and adopted by more than 700 universities from all over the world [2]. The courses offered cover all the fields which can be categorize into technical courses; technical and

business courses; and non-technical courses; humanities and social science courses.

Recent trends in MOOCs have led to the explosion of researches in MOOC which discuss about their framework, pedagogy, and course structure which the key factor is to promote online learning effectiveness and able to engage the learners with the learning process [1], [3],[4]. Apart from this, few questions have been raised up: How do students perceive online learning; and what factors can influence the student's perception?

Recent research [5] which study the students' perception using online language learning materials to support the teaching and learning activities. Results revealed that as much as 62.9% respondents find that the online learning is very helpful, 14.4% rated as very interesting, 12.4% found online learning as not interesting at all and remaining 10.3% found online learning as not helpful. This reflect that majority of the students holds a positive perception about online learning. In addition, Singh and Khan [6] surveyed 78 students in online courses over four semesters at Miami University to determine the students' perception of the effectiveness, usefulness and quality of the exercise/activities of the online learning. The results of the survey shown that majority of the students agreed that online learning activities able to improve their understanding of the processes approaches related to the learning content, improve their skills in using computational tools, strengthen their interest in the content of the learning and promote learning and can easily apply new computational and experimental concepts. This study also replicated a positive students' experiences from using the online module.

In another study, by Chen, Phang, Zhang and Cai [7] reported that online forum activities are among one of the factors which can influence towards the positive learners' perception in MOOC and this can also address the high dropout issues in MOOC. The study summarized that online forum indeed plays an important role in motivating learner continuance, where they found that those who visited the forum completed more assignments. Besides, among the different types of forum activities, including visiting, posting, interaction with peers, and interaction with instructors, learners find that interaction with instructors emerge as an important factor contributing to more assignment completions in addition to forum posting [7].

Besides forum, another interesting study in MOOC is related to the video production. Video is one of the most important resources for online learning either it serves as a lecture video or non-lecture video in

engaging and influencing positive students' perception with learning [8]- [9]. Further explored on the impact of video production in online learning, Guo, Kim and Rubin [9] had further investigated using data from 6.9 million video watching sessions across four MOOC courses offered by edX MOOC platform, which is the largest-scale study of video production and learning engagement. Their findings provide us with a number of important video production elements which are shorter videos, informal talking-head videos and Khan-style tablet drawings videos able to motivate and engage students more with the learning thus able to create a positive perception among the students with the online learning [9].

Based on the presented researches above, studies repeatedly highlight that student perceptions are an important determinant towards motivating and engaging students with the learning process. Thus, an understanding of these perceptions can be contributed towards the student growth and achievement, provide a reflection on the effectiveness of teaching and learning process and can promote further improvement towards the successful implementation of online learning. Therefore, the scope of this study is to identify the students' perception on MOOC implementation in one of public technical university in Malaysia. In this study, we only interested to highlight the relationship between students' perception based on five rudiments of MOOC model categorized as learning design (LD), learning outcome (LO), content design (CD), learning attitude (LA), and enhancement in teaching and learning (EN). Correlation analysis and multiple regression analysis approaches are used to analyze the gathered data.

A. Research Objective

The main objective of this study is to evaluate the students' perception on learning through MOOC. In addition, the evaluation criteria are focusing on identifying the relationship, prediction and the best predictor between students' perception and MOOC elements.

B. Research Question

The research questions that guided this study are as follow: (1) What is the relationship between students' perception (SP) with five variables of MOOC learning? (2) How well do the five variables of MOOC elements predict students' perception on MOOC? How much variance in perception can be explained by scores on these five variables? (3) What is the best predictor of students' perception: learning design (LD), learning outcome (LO), content design (CD), learning attitude (LA), or enhancement in teaching and learning (EN)?

II. RESEARCH METHODOLOGY

The quantitative based method was used in collecting, analyzing and interpreting the data. This section explains about the method, data collection and instrument used in this study.

A. Method and Data Collection

The method used for this study was descriptive analysis approach. We conducted a case study research method to assess the students' perceptions based on the MOOC courses offered to them. A case study method is one of the research method that can be used when we want to narrow down from a very broad research field into a very specific and easily researchable scope. Moreover, case study method also suitable for trying to test theoretical models by applying it in real situation. Online questionnaires were used to collect quantitative data for the study and multiple regression analysis is used to further analyze the data collected.

The data collection involved three major phases. First, the respondents were asked to experience the use of Open Learning platform (MOOC) by the respective lecturer during the lecture hours. Seconds, they were asked to enroll into required MOOC course and participate in it by watching videos, answering online quizzes, posting responses to forums and communicating with other members throughout the whole semester. Third, the respondents were asked to critically evaluate the MOOC course based on specific criteria being set using the online questionnaire platform. If the student was unable to complete the questionnaire, he/she is considered as not complete the MOOC course yet.

B. Instrument

There is few MOOC models and frameworks which can be used to evaluate MOOC effectiveness as per proposed by [10]-[12]. However, in this study we adopted and improvised a framework as per suggested by [10] which originally consist of four main dimensions. The same framework also has been used by other researches in finding the MOOC effectiveness of MOOC pilot testing in Malaysia [10]. The final version of students' perception in MOOC used in this study was consist of five independent variables (DV) which are learning design (LD), learning outcome (LO), content design (CD), learning attitude (LA), enhancement in teaching and learning (EN), and one dependent variable (IV) which is student perception(SP). Online based questionnaire was used as the main data collection method that students filled in at the end of the course. The questionnaire consists of 39 items that formed six variables and each of the items scored from 1 (completely disagree); 2 (strongly disagree); 3 (somewhat agree); 4 (strongly agree); to 5 (completely agree) options.

III. RESULT AND FINDING

This section presents all the results and findings gathered from the data analysis. The data was analyzed using SPSS. In this study, the analyses of the data are based on reliability test results, correlation analysis results, and multiple regression analysis results.

A. Demographic Result

The study included six different MOOC courses which managed by one of public technical university in Malaysia. There is a total of 1726 valid respondents (n=1726) which took part in this survey. Among them, 52% (905) are female and remaining 48% (821) are male respondents. Table 1 below summarized the MOOC courses with its respective number of respondents.

TABLE I. LIST OF MOOC COURSES DISTRIBUTION

| MOOC Course | No. of Respondent |
|-----------------------------------|-------------------|
| Multimedia System | 124 |
| Introduction to Database | 143 |
| Critical & Creative Thinking MOOC | 237 |
| Programming Technique | 254 |
| Mandarin | 257 |
| Technology Entrepreneurship | 711 |
| Total | 1726 |

B. Reliability Result

To ensure the reliability of the constructs used to measure the students' perception on MOOC learning used in this study, reliability test has been conducted. Finding from the Cronbach's Alpha value reflected that all variables are acceptable (values above .70). Table 2 presents the Cronbach Alpha value for each of the variable and total number of items per each variable (total items is 39).

TABLE II. CRONBACH'S ALPHA VALUE FOR EACH VARIABLES

| Components | Cronbach's Alpha | Items |
|---------------------------|------------------|-------|
| Learning design (LD) | 0.870 | 4 |
| Learning outcome (LO) | 0.854 | 3 |
| Content design (CD) | 0.929 | 13 |
| Learning attitude (LA) | 0.918 | 8 |
| Enhancement in T&L (EN) | 0.949 | 8 |
| Students' perception (SP) | 0.765 | 3 |

C. Correlation Analysis Result

The first research question that we want to answer is to discover the relationships between variables. There are several statistical analyses that can be used in exploring relationship among variables such as correlation analysis, regression analysis and factor analysis. However, the one that best suits this study is correlation analysis. Correlation analysis is used to explain the strength and the direction of the linear relationship between the variables [11]. Therefore, in this study, we want to identify the positive or negative relationship between five variables of MOOC learning with the students' perception variable.

The correlation analysis revealed that all five variables of MOOC learning draw a positive direction of the relationship with students' perception variable. Besides, there is a large correlation between LD, LO, CD, LA, and EN variables (where the r value above .50) [12] with SP. This reflect that all MOOC variables possess strong (positive) relationship with SP with the values of .694, .709, .624, .589, and .552 respectively.

From this correlation results, it can be concluded that proper learning design, achievable learning outcome, an attractive content design, with positive learning attitude, and the ability to enhance the teaching and learning process do influence positive perception of students in learning MOOC. Table 3 presents the inter-correlations values between variables in students' perception on MOOC learning model. Figure 1 illustrates the final correlation model examining the relationship between MOOC learning elements and students' perception.

TABLE III. INTER-CORRELATION VALUE BETWEEN VARIABLES

| Variable | LD | LO | CD | LA | EN |
|----------------------------------|--------|--------|--------|--------|--------|
| Students' perception (SP) | .694** | .709** | .624** | .589** | .552* |
| <i>Independent variable (IV)</i> | | | | | |
| Learning design (LD) | - | .622** | .768** | .723** | .689** |
| Learning outcome (LO) | | - | .683** | .669** | .632** |
| Content design (CD) | | | - | .808** | .765** |
| Learning attitude (LA) | | | | - | .848** |
| Enhancement in T&L (EN) | | | | | - |
| ** p < .001 (2-tailed). | | | | | |

D. Multiple Regression Analysis Result

In the second research question, we want to identify the variance (in percentage value) of SP that can be explained by the independent variables and among the five independent variables, which one is the best predictor of SP. For this purpose, we further analyze the data using multiple regression. After conducted the correlation analysis between five independent variables which are LD, LO, CD, LA, and EN; and one dependent variable which is SP.

Two variables (LA and EN) has been deleted due to the high correlation value between the independences variables (more than .8) which is .808 and .848 respectively [12]. High in multicollinearity can increase the variance of the coefficient value of a variable and make the value very sensitive to minor changes of our model. The result is that the coefficient value is unstable and difficult to interpret especially when conducting multiple regression analysis [11]. The other variables; LD with SP, LO with SP, and CD with SP are correlated substantially and has been retained. Tolerance value and variance inflation factor (VIF) value are also other important factors in checking the multicollinearity. In this study, the tolerance value for

each of the remaining independent variables LD, LO, and CD are above the commonly used cut-off points of .10, with .392, .510, and .341 respectively. Next the VIF values for each of the independent variables LD, LO, and CD are below the commonly used cut-off points (above 10), which are 2.550, 1.960, and 2.935 respectively. Thus, the remaining three variables have been retained for next analysis.

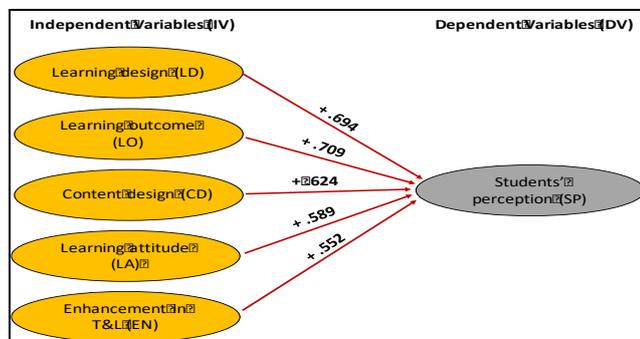


Fig. 1. Correlation model examining the relationship between MOOC learning elements and students' perception

In addition, in the second research question, we also want to explore how much variance in SP can be explained by the remaining three variables which are LD, LO, and CD. For this, we refer on the adjustable R square value. This value is used to explain how much of the variance in the intended perception variable can be explained by the model (which includes the variables of LD, LO, and CD). In the study, the model (which includes the variables of LD, LO, and CD) explained as much as 60.6 per cent of the variance based on the adjusted value in students' perception, which reflect a good model fit, as well as statistical significant (.000; $p < .0005$).

To answer third research question, we refer to the beta coefficient value. The variable LO holds the largest beta coefficient value of .454 which makes the strongest unique contribution in explaining the dependent variable. The second largest beta value .415 holds by LD and followed by variable CD with -.005, indicating that these variables made less contribution in explaining the students' perception. Thus, LO is the best predictor of students' perception. Moreover, from the analysis all variables made a unique and statistically significant contribution to the prediction of students' perception scores (sig. value less than .05) [12].

IV. CONCLUSION

This paper presents the relationship of students' perception when learning through MOOC. The correlation analysis results revealed that all five variables contribute positive relationship with students' perception, which reflect that students possess a positive perception when learning through MOOC. Next, from multiple regression analysis the results discovered that the final model (which includes the variables of LD, LO and CD) explained as much as 60.6 per cent of the variance based on the adjusted value with SP, which reflect a good model fit, as well

as statistical significant (.000; $p < .0005$). In addition, the last analysis also highlighted that Learning outcome (LO) variable is the best predictor of students' perception as it holds the largest beta coefficient value of .454 which makes the strongest unique contribution in explaining the dependent variable. Based on the findings, it can be concluded that proper learning design, achievable learning outcome, an attractive content design, with positive learning attitude, and the ability to enhance the teaching and learning process do influence positive perception of students in learning MOOC

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