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Measurement of MOOCsSEAMOLEC Effectiveness Using Lostness Metric

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Abstract:

Massive Open Online Courses have contributed to spreading knowledge without limited space and time and very little costs. MOOCs users have diverse cultural backgrounds, therefore the effectiveness of the MOOCs platform is very important. Lostness testing is one way to measure the effectiveness of the MOOCs platform. Of the 85 instructors and 150 students with varied age ranges randomly selected to complete several tasks at MOOCs SEAMOLEC to decide the effect of gender, role, and age on the level of lostness. The results of the tests show that the role influenced the level of lostness, where the role of the teacher has a lower level of lostness. The conclusion is even though age and gender are often considered to affect the mastery of technology, but with a role that has more responsibility, a person will be more serious and thorough, thus impacting on the low-level of lostness.

Keywords —**lostness metric, MOOCs, SEAMOLEC, cursor distance, website navigation**

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I. INTRODUCTION

Information technology development leads to the progress of learning media by the presence of Massive Open Online Courses (MOOCs). MOOCs is a large-scale open access class taught by university faculties through the internet using various techniques such as the delivery of learning materials with video courses, online assessments, discussion forums, and direct communication by utilizing video conferences to help the learning process [1] [2][3].

Technology supports a continuous learning process development [4][5], challenges educational institutions to motivate and support effective student interaction [6]. This requires planning, coördination, curriculum implementation, pedagogy [7], and optimal use of technology [8].

The effectiveness of massive online courses as a solution to existing educational problems depends on the portal updates [9]. Where a good online education portal is one that is able to effectively adapt to each need of each student with proper tutoring combinations [10].

Large and complicated website navigation [11] often makes it difficult for users to search for content [12]. Users can become confused [13] when there are multiple cross-references between pages, and cause repeated access to the same page [14].

Previous research explained that the level of completion of learning by students ranged from 5% to 15% [15]. Therefore various studies were conducted to improve web accessibility [16], understanding of student needs [17] and proper technical support and the most ideal learning methods on the MOOCs website [18] with

applicable international standards and guidelines [19].

Evaluation the using of the MOOCs portal has done by making a learning model [1] to predict [20] the misunderstanding in using MOOCs through the number of "clicks" made by participants to reach the "intended link". Participants with a low-level of prior knowledge tend to have a higher level of confusion in using MOOCs [21]. But the measurement of effectiveness which is a central issue in the academic world [22] is still not clearly defined by only measuring the cursor distance [23] and completion rate [19]. Besides that, it has not provided an overview of age, sex, and the role influences of participants' level of incomprehension [12].

This research intended to find out how effective the arrangement of each learning feature is so that it is able to accommodate the needs of users with different roles and demographics.

II. LITERATUR REVIEW

Online courses have reduced the difficulty of teachers facing, such as student profiles diversity and huge students in the class [25].

SEAMOLEC is a Southeast Asian Massive Open Online Courses (MOOCs) learning portal that provides free or very low-cost courses that can accommodate thousands of students to get formal certificates [26], where SEAMOLEC traffic 81.7% comes from Indonesia [27]. MOOCs is the latest innovation online learning [28] with a learning environment that uses technology [29] that is able to support educational equity.

MOOCs online learning site must able to adapt to the needs of each participant with various types of learning and diverse technological support.

Almost every website has several forms of portal navigation [12] therefore poorly managed websites often cause user disorientation leading to confusion in cyberspace [30]. User confusion causes navigation patterns that are not effective in completing a task.

Calculation user level of confusion in cyberspace can use the lostness metric through the pages visited, the number of unique pages visited and the least number of pages access to complete the task [12].

The use of the lostness formula is as follows:

$$L = (N / S - 1)^2 + (R / N - 1)^2$$

Where:

R = the number of links to complete the task successfully on the optimal path;

S = the total number of pages visited by users;

N = the number of unique pages visited by users.

RESEARCH METHOD

A. Steps to Work and Data Collection

Hypotheses involving multiplication interactions of variables evaluated by testing two or more independent variables significances to one dependent variable destination [31].

Calculation of correlation between multi independent variables to 1 dependent variable can be done by multiple linear regression [32].The effect of variable gender, age, and nature of the task on the level of confusion of participants was analyzed using multiple linear regression analysis in fig.1.

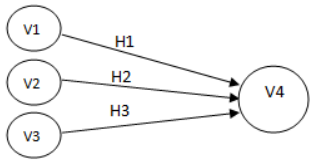

Fig. 1. Hipotesa pengujian Lostness

After building the hypothesis, the next step is mapping the navigation pattern from the SEAMOLEC portal. The effectiveness test will use this navigation pattern as seen in fig.2.

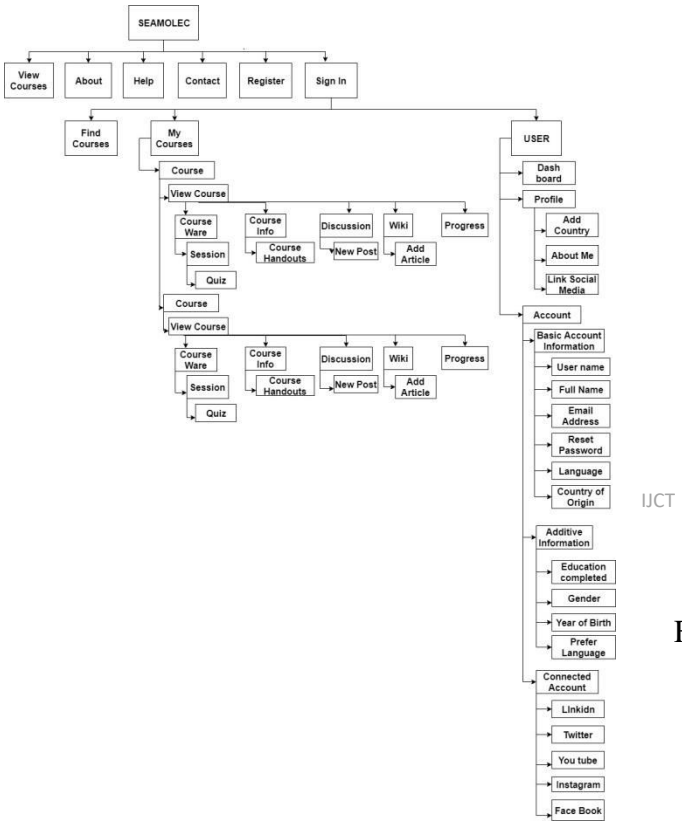

Fig.2 Navigation Pattern SEAMOLEC

Next is to take respondents randomly, consisting of 85 teaching respondents and 150 student respondents.

The tasks undertaken by each respondent consist of:

TASK 1: Obtain information on the class of tourists who have registered in the account
TASK 2: Answering Quiz
TASK 3: Search for discussion space
TASK 4: Return to the Dashboard
TASK 5: Look for cooking classes that have not been registered in the account
TASK 6: Change the course language

B. Data Processing

After the data from 85 teacher respondents and 150 student respondents obtained, it processed using hypotheses such as in fig. 1. Distribusi demografi responden ditunjukkan pada fig. 3.

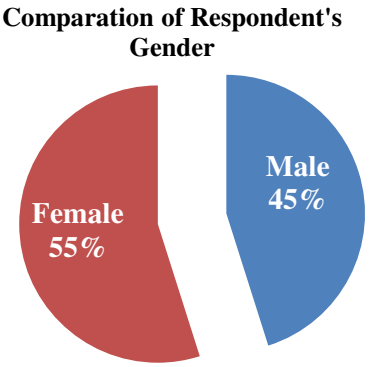

Fig. 3 Graph Comparation of Respondent's Gender

Age distribution of respondents can be seen in Fig. 4 below.

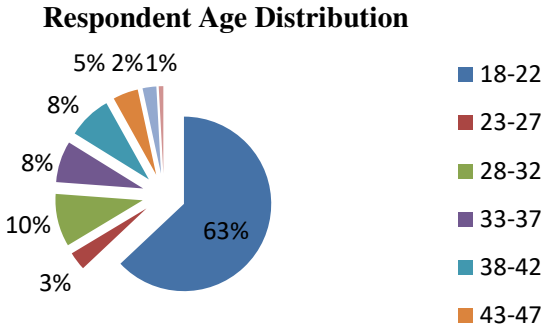

Fig. 4. Graph Respondent Age Disttibution

Distribusi nilai lostness responden dapat dilihat pada Fig.5 dan tabel 1 berikut ini.

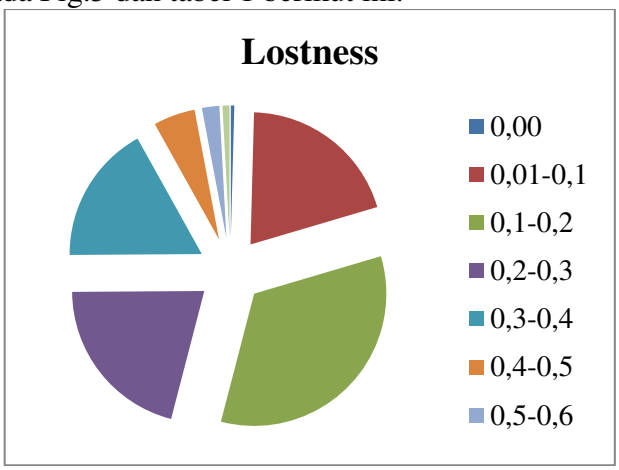

Fig. 5. Graph Respondents Lostness

Table 1. Respondents Lostness Distribution

Lostness Value	Total Respondent
0,00	1
0,01-0,1	47
0,1-0,2	79
0,2-0,3	49
0,3-0,4	40
0,4-0,5	12
0,5-0,6	5
0,6-0,7	0
0,7-0,8	2

The time used by each respondent in completing each task shows that almost all users need a longer time than the target time for the task as shown in Fig. 6.

	Question 1				Target time: 2 second
Respondent Role	Respondent Time Higher Than Target	Average (Second)	Max (Second)	Min (Second)	Stdev
Student	150 Respondent	24,81	72	4	15,84
Teacher	84 Respondent	23,69	60	2	11,08

	Question 2				Target time: 2 second
Respondent Role	Respondent Time Higher Than Target	Average (Second)	Max (Second)	Min (Second)	Stdev
Student	150 Respondent	55,97	420	9	60,24
Teacher	85 Respondent	53,96	255	23	34,03

	Question 3				Target time: 3 second
Respondent Role	Respondent Time Higher Than Target	Average (Second)	Max (Second)	Min (Second)	Stdev
Student	146 Respondent	29,57	92	3	18,60
Teacher	84 Respondent	38,71	75	3	13,10

	Question 4				Target time: 2 second
Respondent Role	Respondent Time Higher Than Target	Average (Second)	Max (Second)	Min (Second)	Stdev
Student	145 Respondent	4,67	60	2	5,58
Teacher	85 Respondent	3,56	15	3	1,64

	Question 5				Target time: 5 second
Respondent Role	Respondent Time Higher Than Target	Average (Second)	Max (Second)	Min (Second)	Stdev
Student	150 Respondent	100,32	365	15	72,33
Teacher	85 Respondent	79,72	240	29	31,38

	Question 6				Target time : 5 second
Respondent Role	Respondent Time Higher Than Target	Average (Second)	Max (Second)	Min (Second)	Stdev
Student	150 Respondent	37,70	101	10	17,67
Teacher	85 Respondent	58,41	303	25	38,38

Fig.6 Recapitulation Respondents Time

The results of the regression statistical test from the variables of age, sex, and the role of lostness variables are as shown in Table 2. In addition, this table also shows the value of colinearity between independent variables.

Table 2. Regression correlation result

Coefficients[a]

Model		Unstandardized Coefficients B	Unstandardized Coefficients Std. Error	Standardized Coefficients Beta	t	Sig.	Collinearity Statistics Tolerance	Collinearity Statistics VIF
1	(Constant)	-,091	,111		-,815	,416		
	Umur	,002	,002	,168	1,219	,224	,198	5,061
	1 ="Pria" 0 ="Wanita"	,022	,017	,079	1,290	,198	,996	1,004
	1 ="Pengajar" 0 =" Pelajar"	,142	,039	,498	3,619	,000	,197	5,068

a. Dependent Variable: Lostness

C. Result and Discussion

The navigation pattern of MOOCs SEAMOLEC is less understood by respondents, as shown in table 1 where only 1 respondent has a lostness value of 0. Approximately 20% of respondents have a mild lostness level of 0.01 to 0.1. About 54% of respondents have moderate lostness values and 25% of respondents have high lostness values.

From the results of the colinearity test, it is known that there are no independent variables that are interconnected, the age variable has a VIF value of 5.061, the sex variable has a VIF value of 1.004, the role variable has a VIF value of 5.068. All independent variables have values between 0.1 to 10 which means they are free of colinearity.

Based on the regression test results, it shows that the role variable influences the lostness variable with the Sig. , 000, while the age and gender variables were not proven to affect the lostness variable.

Students are more easily lost in searching on the SEAMOLEC web, as shown in table 2. Partial testing produces a value of t count 3,619 with t table = 1,969, which means that starting from 1,969 to 3,619 there is no area of influence, while the area above 3,619 is an area of positive influence. The area below 1,969 is an area with negative influences.

Even though 74% of respondents have tolerated lostness levels but the time of completion of tasks by respondents far exceeds the target time set for each task as seen in Fig.6. This indicates that the navigation patterns of the SEAMOLEC MOOCs website are difficult for participants to understand.

III. CONCLUSIONS

The conclusion is, MOOCs SEAMOLEC has not an understandable navigation pattern and the higher the role of a person, the lower the level of lostness. Age Variables and Gender variables have no effect separately on Variable Lostness.

This calculation ignored the time variable, where there were some respondents who had a low lostness value but the time to complete each task was quite long. This requires further research using the MOOCs portal logs.

Besides research using machine learning MOOCs participant opinion, both educators and students will be able to further clarify the picture of the effectiveness of MOOCs.

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This research is original and has never been published in any journal. Respondents came from teachers, lecturers, students, and students in Jakarta who were taken randomly.

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