Measuring Construct Validy of Instrument for Invesigating Teachers in using LMS

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Abstract. This research is aimed at measuring experts' validation on the use of LMS by Senior High School and Vocational High School teachers in West Sumatera in online learning. The researchers used two validators as the experts in e learning who had done many researches in e learning. Indicators of construct validity were adopted from Gendon Barus, with 16 aspects of instrument quality. The aspects were used to asses each item in the instrument. Data were collected through questionnaire. Then they were analyzed quantitatively by using Aiken's V. Result showed that the construct validity of the instrument is .712 with the V is .712 > .600. Based on the result, the researchers conclude that instrument is valid so that it can be used in investigating the use of LMS by the teachers.

Keywords: construct validity; LMS, teachers; online learning

1 Introduction

Information and Communication Technology (ICT) has become human necessity in this era and become globalized which can cover all aspects of life. Global advances in technology have dominated all aspects of life in the fields of economy, politics, culture, art and even education. In the field of education, ICT has many roles. Replacing the function of books and teaching systems that were previously conventional into online learning systems.

Online learning significantly improves students' ability to understand and solve problems and increase initiative in learning [1].

LMS is software functioning as an educational technology resource that supports online teaching and learning activities. LMS can help educational units manage learning and organize content by engaging students to support the learning process [2] . Based on the statistics of the Kruskal-Wallis test, online learning platforms have a significant effect on knowledge transfer at the .05 level so that they can be a component of the effective teaching behavior [3].

The impact of the recent pandemic requires teachers to be better prepared to carry out online learning activities. Online learning is a challenge for teachers in improving their skills and utilizing LMS. In designing online learning with various platforms, teachers need special skills, so that they do not find difficulties in managing LMS.

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2 Research Methodology

2.1 Research methods

The terms of method and instrument are usually used in data collection. The two terms have relationship one and another and sometimes they are overlap. According to [4] naturally data collection is the technique used by researcher (s) to gather the data. In this research, the method used is quantitative survey. On the other hand, the instrument used to collect the data in this research was questionnaire which will be used to measure the teachers' skill in using LMS. The quality of questionnaire was validated by 2 e learning experts to find out the construct validity of the instrument.

2.1 Data Analysis

As sated above, the construct validity was measured through expert evaluation toward the questionnaire [5], followed by focus group discussion (FGD) techniques. Validity is an integrated evaluative assessment of the extent to which empirical evidence and theoretical reasons support the adequacy and appropriateness of conclusions and actions based on test scores or other forms of assessment [6].
Construct validity is the validity that shows the extent to which the instrument reveals a theoretical construct of the instrument to evaluate [6]. In this study, construct validity was measured based on the aspects of construct quality as determined by [7]. Before designing the quality of the construct, the researchers had determined some aspects of construct, followed by writing each item. Moreover, the items were organized by considering the indicators of the construct. There were 16 aspects of the instrument quality had been measured with the score rate "Very Poor (Score 1) , Poor (Score 2), Doubtful (Score 3), Good (Score 4) and Very Good (Score 5)." The indicators formulated by Gendon Barus (2011) can be seen in table 1 below:

Table 1. Indicators of instrument construct quality aspects.

No	Aspects of Instrument Construct Quality
1	Clarity of instrument filling instructions
2	The scope coverage of the instrument construct
3	Clarity of indicators for each aspect
4	Clarity of item formulation
5	Matched indicator with item
6	Proportion and adequacy of the number of items
7	The simplicity of the item formulation
8	Ease of meaning/understanding items
9	Readability / Ease of reading
10	Standard notation/font format and layout
11	Easy way to answer
12	No multiple interpretations of sentences
13	Efficiency of time/energy in doing
14	Grammar and spelling are accepted by Indonesian rules
15	Avoiding the directed, forced, embarrassed respondents when answering
16	Creativity in writing instruments to obtain objectivity of respondents' answers, avoid becoming bias, and motivating respondents to answer each item.

The construct validation was carried out by 2 experts in the field of e-learning to make sure whether the instrument was valuable to distribute to teachers who were respondents in this study. Previous research was done to measure the construct validity of human relations with environment to find out whether a recreation area in Sweden was feasible [8]

The instrument items used in this research was validated by the two experts using Likert scale and analyzed by using Aiken's V formula (1985). In this case, the measurement of construct of each item was relevant to the teachers' behavior in using LMS, because the indicators are the operational attributes of an instrument. The assessment was done by giving a range from 1 (that is, very unrepresentative or very irrelevant) to 5 (that is, very representative or very relevant). Aiken's V Statistics according to [9] can be formulated as follows:

$$V= s / [n(c-1)] \quad (1)$$

Note: s = r – lo
lo = The lowest value of the validity assessment (in this case = 1)
c = The highest validity rating score (in this case = 5)
r = number given by an evaluator The results of Aiken's calculation range from 0 to 1 and the number .6 can be interpreted as having a fairly high coefficient. V value of .6 and above is declared in the valid category.

3 Results and Discussion

3.1 Test Validity

The validity test is a test to determine whether the instruments in the questionnaire are valid. The instrument in the questionnaire is said to be valid if the instrument can be used to measure what should be measured in this study. If the instrument on the questionnaire is said to be less valid if it has low validation. The level of validation of the items in the questionnaire shows the extent of the data in question [10]. The validity test used in this study is construct validity which refers to the consistency of all conceptual components and it is seen that the measurement method measures the construct to be tested. If the value of V is .712 > .600 then the instrument on the research questionnaire can be declared valid. Validation of the instrument construct can be seen on table 1 below.

Table 2. Validation Evaluation Construct Instrument

No.	Aspect which Rated	Evaluation Validator		s	Aiken's V	Note:
		V	V			
		1	2			
1	Item 1	4	4	6	.750	Valid
2	Item 2	3	5	6	.750	Valid
3	Item 3	3	4	5	.625	Valid
4	Item 4	4	3	5	.625	Valid

No.	Aspect which Rated	Evaluation Validator		s	Aiken's V	Note:
		V 1	V 2			
5	Item 5	4	4	6	.750	Valid
6	Item 6	5	5	8	.000	Valid
7	Item 7	4	4	6	.750	Valid
8	Item 8	5	3	6	.750	Valid
9	Item 9	3	4	5	.625	Valid
10	Item 10	4	4	6	.750	Valid
11	Item 11	3	5	6	.750	Valid
12	Item 12	3	4	5	.625	Valid
13	Item 13	4	4	6	.750	Valid
14	Item 14	3	4	5	.625	Valid
15	Item 15	3	4	5	.625	Valid
16	Item 16	3	4	5	.625	Valid
	Jumlah	58	65	91	.712	Valid

The table shows that the average score of the expert's assessment of the construct quality of the instrument. The use of LMS by teachers is relatively high. The validation was useful because the experts' assessment was carried out on the initial draft of the instrument (not yet revised) and done more accurately and carefully and followed by FGDs. The result of test validity calculation was found that V value is .712. It can be interpreted that .712 > .600, so that the construct validity of the instrument is categorized valid. The validators had given some suggestion to revise some items. Then, after the revision is carried out, the instrument is decided valid and is worth to use.

4 Conclusion

From the background and discussion, the result shows that the validity of the construct instrument is .712 with a V value of .712 > .0600. The average value of the validity is quite high. Thus, it can be concluded that the construct validity of the instrument about the use of LMS by teachers is valid. Thus, the instrument is feasible to use in conducting a survey on the use of LMS by teachers at SMA and SMK throughout West Sumatra.

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