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Validation of LMS Development Instrument Based on Google Sites in Geography Subjects in High School

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ABSTRACT: This study aims to validate the development instrument of a Google Sites-based Learning Management System (LMS) in Geography subjects at the high school level. The development of this LMS aims to improve the effectiveness of online learning with various advantages, such as time flexibility, integration with various Google applications, and a user-friendly interface. The research method used is Research and Development (R&D) with the Plomp model, with instrument validation carried out using the expert judgment approach and feasibility testing through Focus Group Discussion (FGD). The construct validity of the instrument was analyzed using Aiken's V, with a V value of 0.82, which indicates that a V value of 0.82 > 0.600 falls into the valid category, meaning that the developed instrument has a high level of validity and is feasible for use. The results of this study are expected to contribute to the development of a Google Sites-based LMS as a more interactive and easily accessible learning tool for students.

KEYWORDS: LMS, Google Sites, Instrument Validation, Plomp, Geography

I. INTRODUCTION

The government has implemented various policies to improve the quality of educators, such as providing opportunities for continuing education, training, seminars, research, and awards for outstanding teachers. In accordance with Law No. 14 of 2005 concerning Teachers and Lecturers, teachers are required to plan, implement, and evaluate quality learning, and continue to improve their academic qualifications and competencies. The results of observations at high schools in Pariaman showed that more than 50% of students had difficulty understanding the material presented online. To overcome this, the proposed solution is the development of a Google Sites-based LMS that allows teachers to compile materials that are more interesting, interactive, and easily accessible to students anytime and anywhere. By using a *Googlesites -based LMS/Learning Platform* , teachers can easily manage and develop their own online learning. The Google sites features are very easy to learn and teachers can arrange the Google site display page as attractively as possible so that it attracts students' attention. *Google sites* is an easy-to-use site (*User friendly*) Kadafi (2021) . *Google Sites* has *tools* for creating sites, for *e-learning* , and an easy-to-understand *dashboard* (Azis, 2019). Teachers carry out learning activities via WFH (*Work From Home)* , and archived on *Google Drive* (Jubaidah & Zulkarnain: 2020) . *Google sites* are combined with *Gmail, Google Groups, Youtube, Google Drive (Google Docs) and other Google* products (Harsanto 2017) . LMS integrated with Google Sites has many benefits for students according to (Muhardi et al., 2020) . The Learning Management System emerged as a solution to many problems that arise due to limited time, place and number of teacher and student meetings. The Learning Management System as a tool in the learning process offers several advantages so that it can solve problems that often arise in the learning process. According to Gautreau (2011) Facebook Groups have the potential to be used as an LMS. It has pedagogical, social and technological capabilities, which allow posting announcements, sharing ideas and resources, and conducting online discussions. According to Pilli (2014) Social Networks can act as a learning management system . The development of a Google Sites-based LMS is expected to increase the effectiveness of online learning with various advantages, such as time flexibility, integration with various Google applications, and a user-friendly appearance. This study aims to test the validity that produces a validation instrument for the development of a Google Sites-based LMS that can be used to collect information about the validation of the Google Sites-based LMS Development instrument for Geography Subjects in High School.

II. MATERIAL AND METHODS

The types of research used in this research are two types of research, namely: (1) research and development (research *and development*) LMS based on Google sites, (2) Experimental research referring to student learning outcomes in geography learning. According to Sugiyono (2012) stated that the research and development method or in English *research and development* is a research method used to produce certain products, and test the effectiveness of the product. Activities that will be carried out to produce certain products and test the effectiveness of the product in question. Things that are carried out in the research and development process are a process or steps to develop a new product or improve an existing product, which can be accounted for. Furthermore, research and development is research that is deliberate, systematic, aimed/directed to find findings, formulate, improve, develop, produce, test the effectiveness of products, models, methods/strategies/ways, services, certain procedures that are superior, new, effective, efficient, productive and meaningful. Learning through LMS based on Google Sites is a form of product that will be produced.

The type of research that will be carried out in the research is development research (R&D) and experimental research using development steps based on the *Plomp model Plomp, T., & Nieveen, N. (Eds.). (2013). The Plomp* model consists of three stages, namely:

1. **Problem Identification and Needs Analysis**, This initial stage aims to identify existing problems and analyze user needs for the product to be developed. This process includes literature studies, interviews, observations, and analysis of existing conditions. The result of this stage is a deep understanding of the development objectives and specific needs that must be met by the product.
2. **Product Development and Implementation,** At this stage, product design and manufacturing are carried out based on the results of the previous needs analysis. The product developed can be an initial prototype which is then tested and refined iteratively. Implementation is carried out by testing the product in real situations to ensure the effectiveness, efficiency, and usability of the product in the targeted environment.
3. **Evaluation** . The evaluation stage aims to assess the extent to which the product being developed can meet the objectives that have been set. Evaluation can be done through limited trials, field trials, and analysis of user feedback. The results of this evaluation are used to make improvements and refinements to the product before it is widely implemented. This research will be conducted in high school. The instrument designed in the research sheet to measure the validity and invalidity of an LMS construct instrument based on Google Sites in Geography subjects. This research validation sheet needs to distinguish between valid research findings and valid measurements . Valid research findings exist when there is a match between the data collected and the data that actually occurs in the object being studied. Valid instrumentation means that the measuring instrument used to collect data is valid . Valid means that the instrument can measure what it wants to measure. Therefore, a valid instrument is an absolute prerequisite for achieving valid research results (Hidayati, 2009) . However, this depends on the condition of the object being surveyed and the skills of the person using the equipment. The following is a questionnaire grid for validating the quality of the construction and development of a Google Sites-based LMS for the Geography subject in high school :

Table 1. Construct quality validation grid

No	Aspects of Instrument Construct Quality
1.	Clarity of instrument filling instructions
2.	The breadth of coverage of the instrument's construction aspects
3.	Clarity of indicators for each aspect
4.	Clarity of item formulation
5.	Matching of indicators with items
6.	Proportion and adequacy of the number of grains
7.	Simplicity of item formulation
8.	Ease of interpretation/understanding of the points
9.	Readability/ Ease of reading
10.	Standard notation/letter format and layout
11.	Ease of answering
12.	Sentences do not give rise to multiple interpretations
13.	Time/energy efficiency in working
14.	Grammar and spelling are in accordance with Indonesian language rules

15.	Prevent respondents from hidden directions, pressure, embarrassment in answering
16.	Creativity in compiling instruments to obtain objectivity in respondent answers, avoid bias and motivate respondents to answer.

Table 2. LMS development quality validation grid

No	Aspect	Indicator
1.	Usability	LMS is very helpful in learning activities
		LMS has an attractive appearance
		LMS is effective in improving the quality of the learning process
		LMS can improve the quality of interaction and communication with teachers.
		LMS is easy to use for Geography subjects
		LMS makes it easier for students to understand Geography subjects
		LMS gives the impression of attracting interest and attention.
		LMS helps visualize Geography subject concepts
2.	**Information Quality**	LMS presents information that is easy to understand
		The information presented in the LMS is relevant to the learning material.
		LMS presents up-to-date information according to scientific developments .
		LMS presents information that is clear and not confusing
		LMS presents information with attractive visuals and supports understanding.
3.	**Interaction quality**	LMS enhances understanding of geographic concepts visually.
		LMS provides a deeper exploration experience into geospheric phenomena and planetary dynamics.
		LMS makes students more active in learning and more involved in exploring various geographical phenomena.
		LMS increases students' curiosity and activeness in learning.

Haynes et al. said that the meaning of content validity is the extent to which the elements in a measuring instrument are truly relevant and are a representation of the construct that is in accordance with the measurement objectives (Haynes, Richard, & Kubany, 1995). To validate the instrument developed in this study, an *expert judgment strategy was used* (Linstone & Turoff, 2002) which was continued with an exploration of the feasibility test by users through the *focus group discussion (FGD) technique.* The instrument construct that has been designed, each item of the instrument is arranged based on the indicators constructed in each aspect of the results according to Gendon Barus (2011). The quality of the research instrument construct is validated by experts. Procedure One of the statistics that shows popular logical validity is the validity of the test content based on the validity of the item content. One of the statistics that shows the validity of the item content is as proposed by Aiken (1985). Aiken has formulated the Aiken's V formula to calculate *the Content Validity Coefficient* which is based on the results of research from a panel of experts of n people on an item of mobile-based LMS development in terms of the extent to which the item represents the measured construct. In this case, representing the measured construct means that the item in question is relevant to its behavioral indicators, because the behavioral indicators are operational translations of the attributes being measured. The assessment is carried out by giving a number between 1 (i.e. very unrepresentative or very irrelevant) to 5 (i.e. very representative or very relevant). According to Azwar (2014:113), Aiken's V statistics can be formulated as follows:

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

Note:

$s = r - lo$

lo = The lowest validity assessment number (in this case = 1)

c = The highest validity assessment number (in this case = 5)

r = number given by an appraiser

III. RESULT

Validation of the research instrument was carried out by three experts or validators who aimed to assess the feasibility and reliability of the instrument used. One of the main aspects that was validated was the construct aspect, which includes the suitability of each indicator with the concept being measured, the integration between instrument items, and the clarity and relevance of each item in supporting the research objectives. Through this validation process, the validators provided input and improvements needed so that the research instrument had high validity and could be used effectively in data collection.
For scoring of the construct quality validation questionnaire, see the following table:

Table 3. Validation questionnaire scoring rules

Information	Score
Very Poor (SK)	1
Less (KR)	2
Doubt (RG)	3
Good (BK)	4
Very Good (SB)	5

The results of the validator's assessment of this instrument can be seen in the table below:

Table 4. Validation Instrument Assessment

No	Assessed aspects	Validators			s1	s2	s3	∑s	n(c-1)	Aiken's V	Information
		V1	V2	V3							
1	Item 1	4	4	4	3	3	3	9	12	0.75	Valid
2	Item 2	5	4	4	4	3	3	10	12	0.83	Valid
3	Item 3	4	3	4	3	4	3	10	12	0.83	Valid
4	Item 4	4	4	4	3	3	3	9	12	0.75	Valid
5	Item 5	4	4	5	3	3	4	10	12	0.83	Valid
6	Item 6	4	4	4	3	3	3	9	12	0.75	Valid
7	Item 7	4	4	4	3	3	3	9	12	0.75	Valid
8	Item 8	4	4	4	3	4	4	11	12	0.92	Valid
9	Item 9	4	4	4	4	3	3	10	12	0.83	Valid
10	Item 10	4	4	4	3	3	3	9	12	0.75	Valid
11	Item 11	5	4	4	4	3	3	10	12	0.83	Valid
12	Item 12	4	4	4	3	4	4	11	12	0.92	Valid
13	Item 13	4	3	5	4	4	4	12	12	1.00	Valid
14	Item 14	3	4	4	2	3	3	8	12	0.67	Valid
15	Item 15	4	4	5	5	3	4	12	12	1.00	Valid
16	Item 16	4	4	4	3	3	3	9	12	0.75	Valid
Amount		**65**	**62**	**67**	**53**	**52**	**53**	**158**	**192**	**0.82**	**Valid**

From Table 4 results test validity Instrument study from validator on aspect Construction is Valid with mark Aiken's V as big as 0.8. The results of Aiken's calculations range from 0 to 1 and the number 0.600 can be interpreted as having a fairly high coefficient. The value of V 0.8 2 > 0.600 is stated in the valid category , so that a valid research instrument is obtained and is worthy of being tested.

IV. CONCLUSIONS

This study has successfully validated the measurement instrument for the Google Sites-based Learning Management System (LMS) in Geography subjects at the high school level. The validation results using Aiken's V show that the instrument developed has a high level of validity with a V value of 0.82, which exceeds the validity threshold of 0.600. This shows that the instrument used is feasible and reliable for measuring the effectiveness of LMS in online learning. So the use of Google Sites as an LMS platform provides various advantages, such as flexibility of time and place, ease of access, and integration with various Google

applications that support student interaction and involvement in learning. Thus, the results of this study are expected to contribute to improving the quality of online learning and provide references for the development of Google Sites-based LMS in Geography subjects at the high school level.

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