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Validity and reliability of the discrepancy evaluation instrument for measuring inequality in the online learning

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ABSTRACT

This study aimed to demonstrate a valid and reliable discrepancy evaluation instrument. It was for measuring inequality in the online learning process for mathematics education research subjects. The approach to this research was instrument development, which focuses on several stages, including defining variables, describing variables into more detailed indicators, compiling instrument items, conducting instrument trials, and analyzing the results of instrument trials. The subjects involved in the content validity test were two experts, while the reliability test was 40 students. The result analysis of the content validity test used the Gregory formula. The result analysis of the reliability test results used the Cronbach alpha formula. It indicated that the results of the instrument content validity were very good, and the reliability test results were in the moderate category. The resulting impact of this study on educational evaluation development was new knowledge, especially for evaluators of mathematics education, about the importance of content validity and reliability of the discrepancy evaluation instrument used to measure inequality in the online learning process in mathematics education research subjects.

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1. INTRODUCTION

The implementation process determines the quality of good online learning. The online learning process can run optimally when human resources and infrastructure support adequately [1]–[3]. It is not only for core scientific courses that require an optimal online learning process but also for all scientific supporting courses and theses.

One of the core subjects in the field of mathematics education that requires optimal online learning strategies and processes is mathematics education research. Mathematics education research is an important subject/course to be known and understood by students in the mathematics education study program [4]–[6]. This course is a foundation that will make it easier for students in a thesis. The importance of this course requires students to study seriously on it. However, the reality shows that many students are not serious about participating in online learning on it. The phenomenon that marks it is the number of students who get low marks in this course and have difficulty preparing their thesis. Based on this fact, it is necessary to carry out a comprehensive evaluation to measure the inequality in the online learning process for these courses. It can use

one evaluation model to measure ruggedness in the online learning process for mathematics education research courses. It is the discrepancy model. The discrepancy is an evaluation model consisting of four evaluation components. It includes design/definition components, installation, processes, and products [7]. Discrepancy is an evaluation model used to determine comparisons between actual's performance that occurs with predetermined standards in evaluation [8].

A valid and reliable evaluation instrument is a tool that must exist to be able to use the discrepancy evaluation model properly. Therefore, it is necessary to prepare a valid and reliable discrepancy evaluation instrument to measure inequality in the online learning process for mathematics education research courses. Instruments are tools or facilities used by researchers in collecting data to make their work easier and the results better, in the sense that it is more accurate, complete, and systematic so that it is easier to process [9]. The instrument is also a researcher's tool for data collection. The instrument quality will determine the quality of the data collected, so it is appropriate to say that the relationship between the instrument and the data is at the heart of interrelated research [10]. An instrument is a tool for measuring the variable value to be studied [11].

Referring to reality and offering solutions to overcome it, the research question was "What is the form of a discrepancy evaluation instrument to measure inequality in the online learning process for mathematics education research courses?" The specific objective of this study was to show the appropriate discrepancy evaluation instrument for measuring inequality that occurs in the online learning process for mathematics education research courses. The urgency of this research: obtaining a valid and reliable discrepancy evaluation instrument for measuring inequality in the online learning process for mathematics education research courses.

Some of the previous research results that underlie the emergence of this research were Cakranegara and Santoso [12]. It showed the use of the discrepancy evaluation model to know the inequality in the independent campus learning program. The limitation of Cakranegara and Santoso research is that they have not explained a valid and reliable evaluation instrument to measure the effectiveness of the independent campus learning program. Research by Supriyadi *et al*. [13] showed the development of a discrepancy evaluation model to optimize online learning. However, the limitation of Supriyadi *et al*. [13] is not shown yet in the discrepancy evaluation instrument used to measure the optimality of online learning. Research by Ardiansah *et al*. [14] demonstrated the use of the discrepancy evaluation model to measure the effectiveness of the library management program as a learning resource. The limitation of research by Ardiansah *et al.* [14] is not showing the complete instruments used to evaluate the library management program. The study by Rahman *et al*. [15] showed an evaluation framework that utilizes the discrepancy evaluation model, but what is not yet visible is the evaluation instrument used in conducting the evaluation using the discrepancy model. Sudarwati and Rukminigsih [16] showed evaluation activities on e-learning by utilizing the discrepancy evaluation model. Its limitation is that it has not shown the form of the instrument used to evaluate e-learning. Research by Al-Fraihat *et al*. [17] found evaluation activities on e-learning. It was not clear that a valid and reliable form of instrument to evaluate e-learning was not clear.

2. RESEARCH METHOD

2.1. Approach and type of research

The approach used in this research was instrument development, which tends to focus more on quantitative research types [18]–[25]. The steps in developing discrepancy evaluation instruments to measure inequality in the online learning process for mathematics education research subjects, included: defining variables, describing variables into more detailed indicators, compiling items, conducting trials, and analyzing validity and reliability. A complete explanation of these steps can be explained as: i) defining variables; ii) describing variables into more detailed indicators; iii) compiling items; iv) conducting trials; and v) analyzing validity and reliability.

2.1.1. Defining variables

In developing discrepancy evaluation instruments, the variable definition stage is intended to show the evaluation components of the discrepancy model. The evaluation components are used as a basis for determining indicators. Determination of evaluation components refers to the evaluation model used in an evaluation activity.

2.1.2. Describing variables into more detailed indicators

In developing the discrepancy evaluation instruments, the stage of describing variables into more detailed indicators is intended to determine the evaluation aspects. The evaluation aspects are made based on the evaluation components that have been obtained in the previous stage. The evaluation aspects are used to measure the inequality in the online learning process of the mathematics education research course.

2.1.3. Compiling items

In developing discrepancy evaluation instruments, the stage of compiling instrument items is intended to create instrument items. The instrument items created must be well-structured. Good instrument items can be used to measure inequality in the online learning process of mathematics education research courses. The compilation of instrument items is based on the evaluation aspects that have been obtained in the previous stage.

2.1.4. Conducting trials

In the development of the discrepancy evaluation instruments, the trial implementation stage is intended to conduct a content validation trial of the instrument that has been formed by involving experts. In addition to the content validation test, a reliability test of the instruments that have been formed also needs to be carried out. The instruments trial was carried out by involving all students who were taking the online learning process for the mathematics education research course.

2.1.5. Analyzing validity and reliability

In developing the discrepancy evaluation instrument, the stage of carrying out the analysis of the instrument content validity was to analyze the data from the content validation test results for each instrument item from two experts. It was to obtain the valid instrument items, and invalid instruments will drop. In addition to conducting the instrument content validity, there was also an analysis of the instrument item validity by involving all students who carry out the online learning process for mathematics education research courses. As with the content validity and item validity analysis, the implementation of instrument reliability analysis was to analyze data on the reliability test results for each instrument item from all students who carry out the online learning process for mathematics education research courses. It was to obtain truly reliable instrument items, and unreliable instruments will drop.

2.2. Research subject

The research subjects involved in conducting the content validity test of the instrument were two experts (one expert in field of mathematics education and one expert in field of educational evaluation). The research subjects involved in conducting the instrument reliability test were 40 students at state universities in Bali (especially North Bali) who carried out the online learning process for mathematics education research courses. The selection of 40 students as research subjects was adequate because it was carried out using a purposive sampling technique. Through a purposive sampling technique, the subjects selected are subjects who truly have the aim of understanding in depth the object being studied [26]–[28].

2.3. Research object and location

The object of this study was a discrepancy evaluation instrument to measure inequality in the online learning process for mathematics education research courses at state universities in Bali (especially North Bali), Indonesia. The researchers conducted this research at several public universities in Bali Province, especially in North Bali. Even though the COVID-19 pandemic is over, all data collection activities at research locations at several universities were online and offline while still following health protocols.

2.4. Data collection instruments

This study used questionnaires and photo documentation as research instruments to obtain some data. This questionnaire contains items about the discrepancy model evaluation instrument that ran a testing process. Photo documentation was authentic evidence of research implementation.

2.5. Data analysis techniques

The instrument validity testing in this study was by analyzing the instrument content validity. The degree of item representativeness determined the content validity. The content validity analysis technique of the discrepancy model evaluation instrument was through an expert test with the Gregory formula. The Gregory formula [29], [30] is as (1).

$$Content\ Validity = \frac{D}{A+B+C+D} \quad (1)$$

Notes:
A = cell indicating disagreement between the two raters
B and C = cells showing differences in views between raters
D = cell indicating valid agreement between the two raters

It was to determine the category of the results of the content validation of the instrument to use the Guilford classification [31], [32]. The categories of instrument validity which referred to the Guilford classification are as:

$0.80 < r_{xy} \leq 1.00$ = very high validity (very good)
$0.60 < r_{xy} \leq 0.80$ = high validity (good)
$0.40 < r_{xy} \leq 0.60$ = moderate validity (enough)
$0.20 < r_{xy} \leq 0.40$ = low validity (less)
$0.00 < r_{xy} \leq 0.20$ = very low validity (bad)
$r_{xy} \leq 0.00$ = invalid

Testing the reliability of the discrepancy model instrument in this study was to use the Cronbach alpha coefficient. This test determines the consistency of respondents' answers to a research instrument. To calculate reliability using the alpha formula [33], [34] as (2).

$$\alpha = \frac{n}{n-1} \times \left\{1 - \frac{\sum \sigma_i^2}{\sigma_t^2}\right\} \quad (2)$$

Notes:
α = The instrument reliability coefficient is in the form of a questionnaire
$\sum \sigma_i^2$ = Total variance of each item's score
σ_t^2 = Total variance
n = Number of items

There were 40 respondents assessed the instrument to produce instrument reliability. Determination of the category of instrument reliability results referred to the range of Guilford reliability scores. The categorization of it is as [35], [36].

$0.80 < \alpha \leq 1.00$: very high reliability
$0.60 < \alpha \leq 0.80$: high reliability
$0.40 < \alpha \leq 0.60$: moderate reliability
$0.20 < \alpha \leq 0.40$: low reliability
$0.00 < \alpha \leq 0.20$: very low reliability
$\alpha \leq 0.00$: not reliable

3. RESULTS AND DISCUSSION

The researchers obtained components of the discrepancy evaluation model at the variable definition stage. Its purpose was to measure inequality in the online learning process for mathematics education research courses. The complete discrepancy model evaluation components are shown in Table 1.

Table 1. Components of the discrepancy evaluation model to measure inequality in the online learning process for mathematics education research courses

Components' code	Evaluation components
C1	Definition
C2	Installation
C3	Process
C4	Product

At the stage of elaborating variables into more detailed indicators, the evaluation aspects and indicators are determined based on the evaluation components. The complete discrepancy evaluation model aspects can be seen in Table 2. The evaluation indicators are presented in Table 3 (see Appendix).

The preparation of the instrument items was to make the instrument items well structured. The instrument according to the evaluation components, the aspect codes, and the indicator codes, so that it makes it easier later to test the content validity and reliability of the instrument. The items are shown in Table 4.

Several tests were conducted on the discrepancy model evaluation instrument, including validating the instrument contents and testing the instrument's reliability. The results of the content validation test of the Discrepancy model evaluation instrument were carried out by two experts. The results of the content validation test for the discrepancy model evaluation instrument by two experts are shown in Table 5. The trial results from the two experts were then entered into a cross-tabulation which can be seen in Table 6.

Table 2. Components and evaluation aspects of the discrepancy model for measuring inequality in the online learning process for mathematics education research courses

Evaluation components	Aspects' code	Evaluation aspects
Definition	A1	Vision, mission, and objectives of implementing online learning in mathematics education research courses.
	A2	Support from the academic community at each state university in Bali for online learning implementation on mathematics education research courses.
	A3	The implementation of online learning in mathematics education research courses was legal. It was at state universities in Bali.
	A4	Students and lecturers in online learning implementation for mathematics education research courses were ready.
Installation	A5	Facilities and infrastructure to support the online learning implementation for mathematics education research courses were ready.
	A6	The readiness of the system/platform management team used to support the online learning implementation for mathematics education research courses.
Process	A7	Students got the procedures for lecturers in making teaching materials in digital format.
	A8	Procedures for creating accounts for lecturers and students so they can access the platform used for the online learning process for mathematics education research courses.
	A9	Procedures for implementing online learning for mathematics education research courses ran effectively.
Product	A10	Students and lecturers are satisfied with the ease of operating the platform for online learning of mathematics education research courses.
	A11	Students and lecturers are satisfied with the speed of access to platforms used in online learning in mathematics education research courses.
	A12	Lecturers distribute teaching materials in digital format with good security to students.
	A13	Satisfaction of students and lecturers in communicating and interacting through online learning support platforms for mathematics education research courses.
	A14	There was an imbalance in scores in the online learning implementation in mathematics education research courses.

Table 4. Arrangement of discrepancy model evaluation instrument items for measuring inequality in the online learning process for mathematics education research courses

Evaluation components	Aspects' code	Indicators' code	Evaluation components	Aspects' code	Indicators' code
Definition	A1	I1.1	Installation	A6	I6.1
		I1.2			I6.2
		I1.3			I6.3
	A2	I2.1			I6.4
		I2.2	Process	A7	I7.1
		I2.3			I7.2
		I2.4		A8	I8.1
		I2.5			I8.2
		I2.6		A9	I9.1
		I2.7			I9.2
	A3	I3.1	Product	A10	I10.1
		I3.2			I10.2
		I3.3		A11	I11.1
		I3.4			I11.2
	A4	I4.1		A12	I12.1
		I4.2			I12.2
		I4.3		A13	I13.1
		I4.4			I13.2
		I4.5		A14	I14.1
		I4.6			I14.2
Installation	A5	I5.1			
		I5.2			
		I5.3			
		I5.4			

Table 5. Results of the content validity test of the discrepancy model evaluation instrument

Expert-I		Expert -II	
Less relevant (Score 1 - 2)	Very relevant (Score 3 - 4)	Less relevant (Score 1 - 2)	Very relevant (Score 3 - 4)
I2.6, I3.3, I3.4, I4.2, I4.5, I5.4, I6.1	I1.1, I1.2, I1.3, I2.1, I2.2, I2.3, I2.4, I2.5, I2.7, I3.1, I3.2, I4.1, I4.3, I4.4, I4.6, I5.1, I5.2, I5.3, I6.2, I6.3, I6.4, I7.1, I7.2, I8.1, I8.2, I9.1, I9.2, I10.1, I10.2, I11.1, I11.2, I12.1, I12.2, I13.1, I13.2, I14.1, I14.2	I2.6, I3.3, I3.4, I4.2, I4.5, I5.4, I6.1	I1.1, I1.2, I1.3, I2.1, I2.2, I2.3, I2.4, I2.5, I2.7, I3.1, I3.2, I4.1, I4.3, I4.4, I4.6, I5.1, I5.2, I5.3, I6.2, I6.3, I6.4, I7.1, I7.2, I8.1, I8.2, I9.1, I9.2, I10.1, I10.2, I11.1, I11.2, I12.1, I12.2, I13.1, I13.2, I14.1, I14.2

Table 6. Cross-tabulation of trial results against the discrepancy model evaluation instrument

		Expert -I	
		Less relevant (Score 1-2)	Very relevant (Score 3-4)
		A	B
Expert -II	Less relevant (Score 1-2)	I2.6, I3.3, I3.4, I4.2, I4.5, I5.4, I6.1 (7)	- (0)
	Very relevant (Score 3-4)	C - (0)	D I1.1, I1.2, I1.3, I2.1, I2.2, I2.3, I2.4, I2.5, I2.7, I3.1, I3.2, I4.1, I4.3, I4.4, I4.6, I5.1, I5.2, I5.3, I6.2, I6.3, I6.4, I7.1, I7.2, I8.1, I8.2, I9.1, I9.2, I10.1, I10.2, I11.1, I11.2, I12.1, I12.2, I13.1, I13.2, I14.1, I14.2 (37)

Based on the results shown in Table 6 and (1), next was the calculation of content validity using the Gregory formula. The complete computation was as.

$$Content\ Validity = \frac{D}{A+B+C+D}$$
$$Content\ Validity = \frac{37}{7+0+0+37}$$
$$Content\ Validity = 0.841$$

After obtaining the results of content validity, next were the results of the item reliability test for the discrepancy model evaluation instrument. It was in full in Table 7.

Table 7. Results of the reliability test of the discrepancy model evaluation instrument items

Content validity	σ_i^2	Content validity	σ_i^2
I1.1	0.249	I5.3	0.250
I1.2	0.247	I5.4	0.828
I1.3	0.247	I6.1	0.778
I2.1	0.247	I6.2	0.247
I2.2	0.250	I6.3	0.249
I2.3	0.249	I6.4	0.219
I2.4	0.249	I7.1	0.244
I2.5	0.244	I7.2	0.247
I2.6	0.569	I8.1	0.247
I2.7	0.290	I8.2	0.234
I3.1	0.297	I9.1	0.240
I3.2	0.247	I9.2	0.247
I3.3	0.794	I10.1	0.249
I3.4	0.824	I10.2	0.244
I4.1	0.234	I11.1	0.244
I4.2	0.794	I11.2	0.210
I4.3	0.249	I12.1	0.228
I4.4	0.199	I12.2	0.247
I4.5	0.897	I13.1	0.240
I4.6	0.249	I13.2	0.244
I5.1	0.247	I14.1	0.247
I5.2	0.249	I14.2	0.219
		$\sum\sigma_i^2$	14.536
		σ_t^2	23.910

Based on the results shown in Table 7, the following data were n = 44; $\sum\sigma_i^2$= 14.536; σ_t^2= 23.910. The results of calculating the reliability coefficient of the instrument in the form of a questionnaire were:

$$\alpha = \frac{n}{n-1} \times \left\{1 - \frac{\sum \sigma_i^2}{\sigma_t^2}\right\}$$
$$\alpha = \frac{44}{44-1} \times \left\{1 - \frac{14.536}{23.910}\right\}$$
$$\alpha = \frac{44}{43} \times \left\{1 - \frac{14.536}{23.910}\right\}$$
$$\alpha = 1.02 \times 0.392$$
$$\alpha = 0.401$$

After obtaining the results of the content validity test and the instrument reliability test, the researcher can determine the final instrument items as a discrepancy evaluation instrument to measure inequality in the online learning process for mathematics education research courses. The final instrument items include: item-I1.1, item-I1.2, item-I1.3, item-I2.1, item-I2.2, item-I2.3, item-I2.4, item-I2.5, item-I2.7, item-I3.1, item-I3.2, item-I4.1, item-I4.3, item-I4.4, item-I4.6, item-I5.1, item-I5.2, item-I5.3, item-I6.2, item-I6.3, item-I6.4, item-I7.1, item-I7.2, item-I8.1, item-I8.2, item-I9.1, item-I9.2, item-I10.1, item-I10.2, item-I11.1, item-I11.2, item-I12.1, item-I12.2, item-I13.1, item-I13.2, item-I14.1, dan item-I14.2.

Besides showing the final instrument items, this research also shows the user interface design of the discrepancy evaluation instrument. It was the basis for facilitating the physical formation of discrepancy evaluation instruments in digital format. The intended form of user interface design is in Figure 1.

Figure 1 shows the user interface design of the discrepancy evaluation instrument consisting of 44 instrument items based on the four evaluation components of the discrepancy model. There were 44 textboxes to display evaluation instrument items in the user interface design. There were 44 combo boxes to make it easy for respondents to provide an assessment of the instrument items. There is a "process" button as a facility for processing decision-making and a "save" button as a facility for storing the results of the decision-making process and providing recommendations.

The level of validity of the discrepancy model evaluation instrument for measuring inequality in the online learning process for this mathematics education research subject was very high. It was because the score of the instrument validity test as 0.841. It was included in the score range 0.80 to 1.00 when viewed from Guilford's categorization of validity. Even so, several instrument items had to be dropped because they received less relevant assessments from the two experts. Seven instrument items dropped, including I2.6, I3.3, I3.4, I4.2, I4.5, I5.4, and I6.1. The level of reliability of the discrepancy model evaluation instrument for measuring inequality in the online learning process for this mathematics education research subject was moderate. It was because of the instrument reliability test score of 0.401. It was included in the score range 0.40 to 0.60 when viewed from Guilford's reliability categorization.

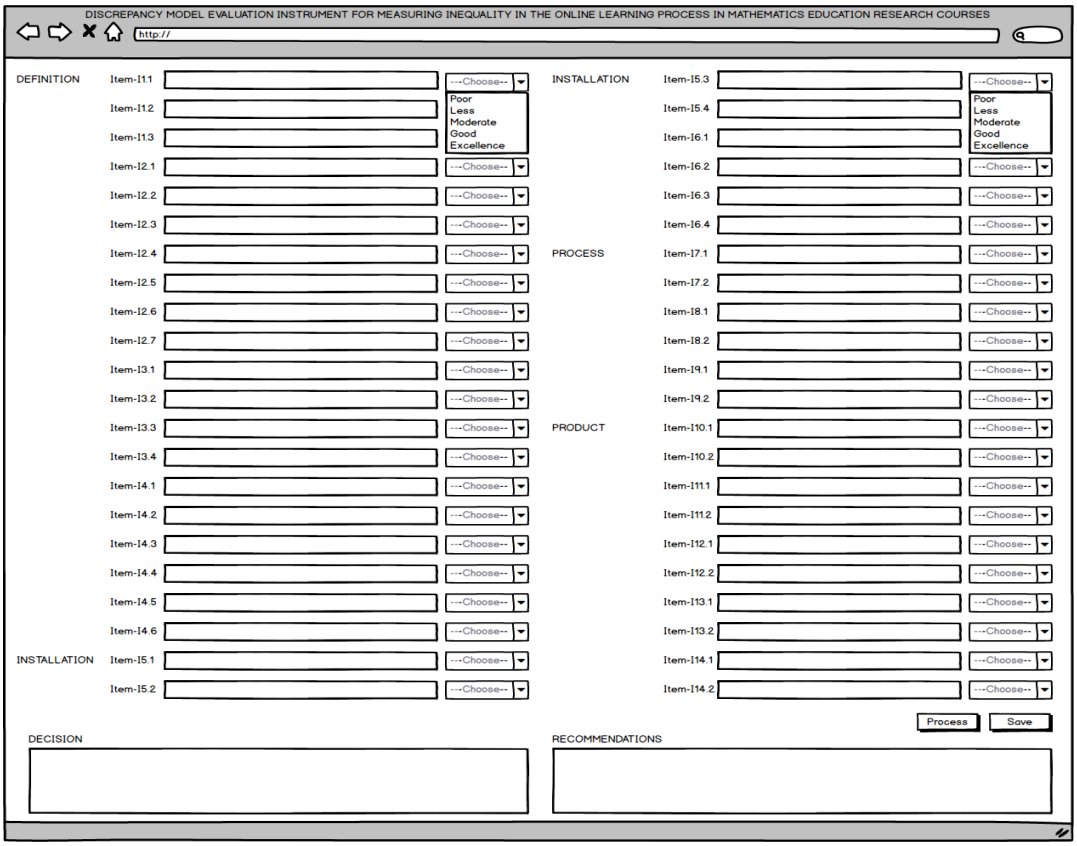

Figure 1. User interface design discrepancy evaluation instrument for measuring inequality in the online learning process for mathematics education research courses

In general, the results have been able to answer the constraints of several studies [12]–[17], by demonstrating a valid and reliable discrepancy evaluation instrument used to measure inequality in the online learning process in mathematics education research courses. The novelty of this study is that there is a gradual calculation process in determining the content validity and reliability of the instrument. Besides that, this research also showed a user interface design of the discrepancy evaluation instrument as a basis for later making a discrepancy evaluation instrument in digital format.

The results of this study have similarities with previous researches [37]–[46], related to the test of content validity and instrument reliability, but the difference lies in the results of the study. The results of this study indicate that there was a detailed calculation process to determine the results of the validity and reliability test of the instrument. Other studies have not yet fully demonstrated the process and calculation stages in determining the instrument content validity and reliability. The obstacle of this research was still a difference between the results of the instrument content validity and the reliability. The difference was that the instrument content validity was classified as very high, while the reliability was moderate.

4. CONCLUSION

In general, the results of this study have been able to answer research questions by demonstrating a valid and reliable form of discrepancy evaluation instrument for measuring inequality in the online learning process for mathematics education research courses. The results also showed the user interface design of the discrepancy evaluation instrument to make it easier later when creating discrepancy evaluation instruments in digital format. Adding the number of respondents to conduct an instrument reliability test so that the results of content validity and reliability are not unequal is something that needs in the future to solve the constraints in this study. The theoretical impact of this research results on developments in the field of educational evaluation is the impact of new knowledge, especially for evaluators in the field of mathematics education regarding the importance of content validity and reliability of evaluation instruments. The real impact of this research results on educational practice and policy is the existence of a valid and reliable discrepancy evaluation instrument used to measure inequality in the online learning process of mathematics education research subjects.

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APPENDIX

Table 3. Discrepancy model evaluation indicators for measuring inequality in the online learning process for mathematics education research courses

Aspects' code	Indicators' code	Evaluation indicators
A1	I1.1	It is the vision of online learning implementation on mathematics education research courses at state universities in Bali.
	I1.2	It is the mission of online learning implementation on mathematics education research courses at state universities in Bali.
	I1.3	It is the purpose of online learning implementation on mathematics education research courses at state universities in Bali.
A2	I2.1	Each chancellor's support at the state university in Bali of online learning implementation on mathematics education research courses.
	I2.2	Each Dean's support at state university in Bali of online learning implementation on mathematics education research courses.
	I2.3	Support from the Head of Department at each state university in Bali of online learning implementation on mathematics education research courses.
	I2.4	Support from the Chair of the Study Program at each state university in Bali of online learning implementation on mathematics education research courses.
	I2.5	Support from lecturers at each state university in Bali of online learning implementation on mathematics education research courses.
	I2.6	It was student parents' support of online learning implementation in mathematics education research courses.
	I2.7	All students support the state university in Bali of online learning implementation on mathematics education research courses.

Table 3. Discrepancy model evaluation indicators for measuring inequality in the online learning process for mathematics education research courses (*continued*)

Aspects' code	Indicators' code	Evaluation indicators
A3	I3.1	It was Chancellor's regulations at the state university in Bali regarding the online learning implementation on mathematics education research courses.
	I3.2	It was Dean's regulations at the state university in Bali regarding the online learning implementation on mathematics education research courses.
	I3.3	It was the regulation of the department chair at the state university in Bali regarding the online learning implementation on mathematics education research courses.
	I3.4	It was the regulation of the study program head at the state university in Bali regarding the online learning implementation on mathematics education research courses.
A4	I4.1	It was the readiness of students to use hardware to support the online learning implementation of mathematics education research courses.
	I4.2	It was the readiness of students to create a platform to support the online learning implementation of mathematics education research courses.
	I4.3	It was the readiness of students to operate software supporting the online learning implementation on mathematics education research courses.
	I4.4	It was the readiness of lecturers to use hardware to support the online learning implementation of mathematics education research courses.
	I4.5	It was the readiness of lecturers to create a platform to support the online learning implementation of mathematics education research courses.
	I4.6	It was the readiness of lecturers to operate software supporting the online learning implementation of mathematics education research courses.
A5	I5.1	It was the readiness of hardware support for the online learning implementation on mathematics education research courses.
	I5.2	It was the readiness of software supporting the online learning implementation on mathematics education research courses.
	I5.3	It was the readiness of internet access to support the online learning implementation on mathematics education research courses.
	I5.4	It was the readiness of study rooms to support the online learning implementation of mathematics education research courses.
A6	I6.1	It was the readiness of the management team to create a platform that supports the online learning implementation of mathematics education research courses.
	I6.2	It was the readiness of the management team to set up the hardware that supports the online learning implementation on mathematics education research courses.
	I6.3	It was the readiness of the management team to set up the software that supports the online learning implementation on mathematics education research courses.
	I6.4	It was the readiness of the management team to maintain stable internet access to support the online learning implementation of mathematics education research courses.
A7	I7.1	It was the procedure for lecturers to make teaching materials in digital format.
	I7.2	It was the lecturer's procedure to disseminate teaching materials in digital format to students.
A8	I8.1	It was the procedure for creating an account for lecturers to access the platform during online learning implementation on mathematics education research courses.
	I8.2	It was the procedure to create a platform account for students to access the platform during the synchronous learning process.
A9	I9.1	It was procedures of the online learning implementation on mathematics education research courses for lecturers so that the process runs effectively.
	I9.2	It was procedures of the online learning implementation on mathematics education research courses for students so that the process runs effectively.
A10	I10.1	It was student satisfaction with the platform operating ease during online learning implementation on mathematics education research courses.
	I10.2	It was the lecturer satisfied with the platform's operating ease during online learning implementation on mathematics education research courses.
A11	I11.1	It was student satisfaction with the speed of access.
A11	I11.2	It is the vision of online learning implementation on mathematics education research courses at state universities in Bali.
A12	I12.1	It is the mission of online learning implementation on mathematics education research courses at state universities in Bali.
	I12.2	It is the purpose of online learning implementation on mathematics education research courses at state universities in Bali.
A13	I13.1	Each Chancellor's support at the state university in Bali of online learning implementation on mathematics education research courses.
	I13.2	Each Dean's support at state university in Bali f online learning implementation on mathematics education research courses.
A14	I14.1	Support from the Head of Department at each state university in Bali of online learning implementation on mathematics education research courses.
	I14.2	Support from the Chair of the Study Program at each state university in Bali of online learning implementation on mathematics education research courses.

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