



INSTRUMENT VALIDITY FOR LEARNING RESOURCES ANALYSIS OF  
DIGITAL DISASTER FOR COASTAL AREAS:  
AN ANALYSIS OF AIKEN'S V

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VALIDITAS INSTRUMEN ANALISIS SUMBER BELAJAR SUMBER DAYA  
BENCANA DIGITAL WILAYAH PESISIR: ANALISIS AIKEN'S V

ARTICLE HISTORY

ABSTRACT

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**Abstract:** This paper describes the instrument validity for digital learning resources for coastal areas based digital in the elementary school by using Aiken's V analysis. The purpose of the research is to develop an instrument that can be seen as the validity for every instrument item to obtain information about the need for digital-based coastal area disaster learning resources in elementary schools. The research approach uses a quantitative approach with a descriptive research method. Instrument design and validation were carried out in three stages; (a) literature review, (b) instrument draft design, and (c) qualitative and quantitative rater review of the instrument. Content validity is validated using the V Aikens coefficient. The content validity coefficient is measured by 8 raters based on the assessment results. It is assessed based on certain scales, which consisted of strongly agree (scale 4), agree (scale 3), disagree (scale 2), and strongly disagree (scale 1). The research results indicate that aspect 1, with four instrument items, is in the high category. For aspect 2, three instruments are in the high category. Aspect 3 with three instruments is in the moderate category. For aspect 4, two instruments are in the moderate category. Aspect 5 with three instruments is in the moderate category. In aspect 5, there are two high-category instrument items and three medium-category instrument items. It is concluded that out of the 22 items of needs analysis, in general, it was valid. Nevertheless, several instrument items needed to be reviewed, namely on the editorial aspect of the statement.

**Keywords:** instrument validity, needs analysis, digital disaster learning resources

**Abstrak:** Tulisan ini akan mendeskripsikan tentang validitas instrumen analisis kebutuhan sumber belajar kebencanaan daerah pesisir berbasis digital di sekolah dasar dengan menggunakan analisis Aiken's V. Tujuan penelitian diharapkan instrumen yang dikembangkan dapat diketahui validitas tiap butir instrumennya untuk digunakan dalam memperoleh informasi tentang kebutuhan sumber belajar kebencanaan daerah pesisir berbasis digital di sekolah dasar. Pendekatan penelitian menggunakan pendekatan kuantitatif, dengan metode penelitian adalah metode deskriptif. Perancangan instrumen dan validasi, dilakukan dalam tiga tahap, (a) tahap tinjauan pustaka, (b) tahap perancangan konsep instrumen, (c) tahap tinjauan kualitatif dan kuantitatif penilai terhadap instrumen. Validitas isi dihitung dengan menggunakan koefisien V Aikens. Koefisien validitas isi didasarkan pada hasil penilaian oleh penilai yang berjumlah 8 orang terhadap butir instrumen yang diukur. Penilaian dilakukan dengan cara memberikan penilaian yang terdiri dari sangat setuju (pada skala 4), setuju (pada skala 3), tidak setuju (pada skala 2), dan sangat tidak setuju (pada skala 1). Hasil penelitian menunjukkan bahwa aspek 1 dengan empat butir instrumen berkategori tinggi. Pada aspek 2, didapatkan tiga instrumen berkategori tinggi. Aspek 3 dengan tiga butir instrumen berkategori sedang. Pada aspek 4, dua butir instrumen berkategori sedang. Aspek 5 dengan tiga butir instrumen berkategori sedang. Terakhir, aspek 5 dengan dua butir instrumen berkategori tinggi dan tiga butir instrumen berkategori sedang. Disimpulkan bahwa dari 22 butir instrumen analisis kebutuhan secara umum

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adalah valid. Namun, ada beberapa butir instrumen perlu dilakukan kajian ulang, yaitu pada aspek redaksi pernyataan.

**Kata Kunci:** *validitas instrumen, analisis kebutuhan, sumber belajar kebencanaan digital*

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#### **INTRODUCTION**

Natural disasters have a very complex impact on every aspect of life, including economic, social, and health. Natural phenomena related to disaster threats include tsunamis, eruptions, tectonic earthquakes, volcanic earthquakes, earthquake tremors, multiphase earthquakes, hot clouds, hot lava, cold lava, lava domes, and volcanic ash, which are becoming more and more familiar to the public. That is the learning that society accepts. Communities become familiar with the natural environment and its phenomena or symptoms. Natural phenomena like natural disasters do not need to be addressed negatively but should address positively. These natural phenomena should accept with common sense and rationality, no need to be associated with irrational, mystical things from the point of view of scientific thought. What the community needs to do is how prevent the various natural phenomena from disturbing or less disturbing the comfort of human life.

For this reason, it is essential to learn about natural disaster mitigation both through public education channels and through formal channels in schools. Schools are an effective and efficient means of growing and developing disaster mitigation education through a learning process. Learning is essentially a conscious effort owned by an educator to educate his students, thereby directing students through interaction with other learning resources to achieve the educator's desired goals (Pidie, 2019).

Disaster mitigation is a conscious effort to reduce all disaster risks through development in physical and social forms that are useful for increasing awareness, knowledge, and community capacity in dealing with disasters (Suarmika & Utama, 2017). In addition, Law no. 24 of 2007 concerning Disaster Management in Article 1 paragraph (6) states that the implementation of disaster management is a series of efforts which include establishing development policies at risk of disasters, disaster prevention activities, emergency response, and rehabilitation.

Knowing and understanding disaster mitigation is very important for prospective elementary school teachers and teachers (Hedden et al., 2017; Noviana et al., 2021). Disaster mitigation education is a form of effort made to be able to reduce or even eliminate the occurrence of victims or losses that are likely to occur (Maryani, 2016), whether due to natural disasters (Utomo et al., 2018) or also disasters caused by humans (man-made disasters) (Ridwan, 2019). Alternatively, it can also be interpreted as an effort or all kinds of ways to prepare before a disaster occurs. For this reason, learning about natural disaster mitigation through public education or formal channels in schools is essential.

Schools are an effective and efficient means to grow and develop disaster mitigation education through a learning process. Learning is essentially a conscious effort owned by an educator to educate his students, thus being

able to direct, through the interaction of students with other learning resources, to achieve the educator's desired goals. More clearly, learning is an interaction between two directions, namely from an educator and a student, both of which occur through good and directed communication to produce a previously set target.

They were learning resources that prospective elementary school teachers and teachers could use digital learning resources. With the existence of digital learning resources about disasters, it is hoped that prospective elementary school teachers and teachers in elementary schools can understand the essential concepts of disaster so that they can be used in designing disaster learning to be practised in the classroom. Therefore, the development of digital-based coastal disaster learning resources in elementary schools needs to be developed and provided as the content of disaster knowledge for prospective teachers and teachers in elementary schools so that they can be used in designing learning about the disaster to be practiced in the classroom.

However, valid instruments are needed to assess the products produced in developing digital-based coastal disaster learning resources in elementary schools. Therefore, before developing digital-based coastal disaster learning resources in elementary schools, it is necessary to conduct a needs analysis. In conducting a needs analysis, it is necessary to develop an instrument. One of the instruments developed in this research is an instrument for analyzing the need for digital-based coastal disaster learning resources in elementary schools. The instrument for analyzing the need for digital-based coastal disaster learning resources in elementary schools that were developed will later be distributed to prospective elementary school teachers to obtain information about the need for developing digital disaster learning resources.

Based on the explanation above, this paper will describe the instrument's validity for analyzing the needs of digital-based coastal area disaster learning resources in elementary schools. The instrument's validity for analyzing the needs of digital disaster learning resources in coastal areas is essential. Validity cannot be separated from instrument items because the validity of research instrument items determines accuracy in measuring the object under study (Sugiharni & Setiasih, 2018). An instrument can be said to be good if it is valid because the interpretation of a research result will be meaningful if the validity of the research instrument can be presented (Cor, 2016).

Several studies on measuring the validity of instrument items that have been carried out include the results of research on measuring the validity of STEM-based physics literacy performance assessment instruments using five rating categories and seven raters by obtaining an Aiken score above 0.75 (Bashoor & Supahar, 2018). Then, Kurniawati, (2021) analyzed the IPS critical thinking test instrument for class V SD Yogyakarta City using four raters with details of 7 instrument items having an Aiken index of 0.75 and 33 items > 0.80. Another study tested the teacher's social competence assessment instrument in the industrial revolution 4.0 era using seven raters, with the results having an Aiken index above 0.60 (valid) (Rusijono et al., 2020). Research on the analysis of the Aiken index to measure the content validity of the soccer task commitment instrument using six raters obtained an Aiken index of 0.86 (Yuliarto, 2021). Research on the development and validation of test instruments to measure the problem-solving skills of high school students in physics lessons obtained information that the research results explained that the assessment instruments developed were valid according to experts with a validation value between 0.93 to 1 (Z et al., 2020). Based on this explanation, the more raters, the smaller

the required V value (Aiken, 1980, 1985). The more experts who study the instrument, the better the quality of the instrument in terms of content validity (Bashooir & Supahar, 2018).

Based on the thoughts and considerations of the problems faced, researchers consider it necessary to develop an instrument for analyzing the needs of digital-based coastal area disaster learning resources in elementary schools. Furthermore, the developed instrument needs to be tested for the validity of the items. From this research, it is hoped that the instruments developed can be known for the validity of each item of the instrument so that it can be used in research on analyzing the needs of digital-based coastal area disaster learning resources in elementary schools.

## METHOD

Research on instrument validation analysis of digital-based coastal disaster learning resource needs analysis in elementary schools uses a quantitative approach with a descriptive research method. Instrument design and validation were carried out in three stages,

namely: (a) literature review stage, (b) instrument draft design stage, and (c) qualitative and quantitative review stage of the instrument rating. The first stage is to review through the Google Scholar search engine using the keywords "*validitas instrumen*" and "*instrumen penelitian*." After selecting the articles with observational instruments, the researcher reviewed the components, indicators, and sub-indicators. The second stage is developing draft indicators from the related scientific literature. The final instrument consists of six aspects, namely: aspect 1 of the need for digital disaster learning resources consisting of 4 statements, aspect 2 of the strengths (strength) of digital disaster learning resources consisting of 5 statements, aspect three weaknesses of digital disaster learning resources consisting of 3 statement items, aspect four opportunities of digital disaster learning resources consisting of 2 statements, aspect five threats of digital disaster learning resources consisting of 3 statements, and aspect six skills using digital learning resources consisting of 5 statements (Table 1).

**Table 1. Design of Instruments for Analysis of Learning Resources for Digital Disaster Resources for Coastal Areas**

No	Aspect	Number of Statements
1	Aspect 1: Need for Digital Disaster Learning Resources	4 items
2	Aspect 2: Strength of Digital Disaster Learning Resources	5 items
3	Aspect 3: Weaknesses of Digital Disaster Learning Resources	3 items
4	Aspect 4: Opportunities Digital Disaster Learning Resources	2 items
5	Aspect 5: Threats Digital Disaster Learning Resources	3 items
6	Aspect 6: Skills in Using Digital Learning Resources	5 items

Then, eight raters (validators) conducted content validity in the third stage. The raters (validators) consisted of 4 people from elementary school teacher education lecturers and four practitioners who served as elementary school teachers. Finally, the rater (validator) conducts a quantitative assessment using a scale of 1-4 and a qualitative assessment by providing suggestions for

improving the instrument. Content validity was calculated using Aikens V coefficients (Aiken, 1980, 1985). The content validity coefficient is based on the assessment results by the raters (validators), totalling eight people on the instrument items being measured. Assessment is done by giving an assessment consisting of strongly agree (scale 4), agree (scale 3), disagree (scale 2), and strongly disagree (scale

1). The results of the assessment of the raters (validators) were analyzed using the V'Aiken formula (Aiken, 1985), namely:

$$v = \frac{\sum s}{n(c - 1)}$$

s = r - I<sub>o</sub>

I<sub>o</sub> = The lowest validity rating score (in this case, 1)

c = The highest score of validity assessment (in this case, 4)

r = numbers given by raters (validators)

n = number of validators

After getting the assessment results from the raters (validators), the scores are converted into three categories with the Aiken V index range from 0-1, as presented in Table 2.

**Table 2. Validation Categories**

Validation Results	Category Validation
0,8 < v ≤ 1	High
0,4 < v ≤ 0,8	Medium
v ≤ 0,4	Low

Table 2 is used by researchers to categorize the results of the raters' calculations (validators) with an index of agreement. For example, if the agreement index score is less than 0.4, then the validity is in a low category, the agreement index between the scores is 0.4 - 0.8, the validity is in a low category, and the agreement index score is 0.8, the validity is in the high category. If the instrument item is in the high category, then the instrument item is used. Then the instrument items in the low category, then the instrument items are discarded or not used. Moreover, it is necessary to review the instrument's items for items in the medium category.

The method section must explain the research methodology, including place, time, and procedure. Tools, materials, media, or research instruments must be appropriately explained. If

essential, there should be an attachment regarding the lattice of the instrument or fragment of material used only to provide examples for the readers. If statistical formulas are used as part of the research method, it is suggested not to be written for commonly used formulas. For example, if there are specific provisions set by researchers in order to collect and analyze research data, it can be explained in this section. The author must also submit a reference source for the method used.

**RESULTS AND DISCUSSION**

The instrument items will analyze the need for digital-based coastal disaster learning resources in elementary schools. The results of the instrument's validity using the Aiken formula are described as follows.

**Table 3. Aspect Validation 1 (The Need for Digital Disaster Learning Resources)**

Aspect	No	Statements	v	Category Validation
Aspect 1: The Need for Digital Disaster Learning Resources	1	Forms/types of learning resources needed by prospective elementary school teachers (Options: textbooks, modules, transparencies (OHT), audio program cassettes, video program cassettes, sound slide programs, CAI (computer-based/digital learning), films, resources digital learning)	0,83	High

Aspect	No	Statements	v	Category Validation
	2	Prospective elementary school teacher students need disaster content/materials	0,92	High
	3	Prospective elementary school teacher students need digital disaster learning resources.	0,92	High
	4	What disaster content/material is needed by prospective elementary school teachers (may choose more than one or all of them are selected: Earthquake Disaster, Tsunami Disaster, Volcanic Eruption/Eruption Disaster, Flood Disaster, Landslide Disaster, Tornado Disaster, Disaster Drought, Forest, and Land Fire Disaster, Extreme Wave / Tidal Wave Disaster, Dangerous Sea Wave Disaster, Sea Level Rise Disaster, Coastal Erosion Disaster)	0,92	High
<b>Average</b>			<b>0,90</b>	<b>High</b>

Table 3 is the validation result on Aspect 1, which consists of four statements. First, the validation results from aspect 1 obtained an average score of 0.90 in the high category. Second, statement Forms/types of learning resources needed by prospective elementary school teachers (Options: textbooks, modules, transparencies (OHT), audio program cassettes, video program cassettes, sound slide programs, CAI (computer-based/digital learning), films, digital learning resources) obtained a score of 0.83 in the high category. Third, statements of disaster content/materials required prospective elementary school teaching students to get a

score of 0.92 in the high category. Fourth, the statement of digital disaster learning resources requires that prospective elementary school teacher students get a score of 0.92 in the high category. Finally, a statement of what disaster prospective elementary school teachers need content/materials (may choose more than one or all of them: Earthquake Disaster, Tsunami Disaster, Volcanic Eruption/Eruption Disaster, Flood Disaster, Landslide Disaster, Tornado Disaster, Drought Disaster, Forest and Land Fire Disaster, Extreme Wave Disaster / Tidal Wave, Dangerous Ocean Wave Disaster, Sea Level Rise Disaster, Coastal Erosion Disaster) obtained a score of 0.92 with a high category.

**Table 4. Validation of Aspect 2 (Strength of Digital Disaster Learning Resources)**

Aspect	No	Statements	v	Category Validation
Aspect 2: Strength of Digital Disaster Learning Resources	1	Digital learning resources make it easy to repeat learning material	0,88	High
	2	Digital learning resources can increase learning motivation.	0,96	High
	3	The use of digital learning resources in learning is more fun.	0,83	High
	4	Digital learning resources support learning creativity.	0,92	High
	5	Digital learning resources assist in the implementation of learning.	0,88	High
<b>Average</b>			<b>0,89</b>	<b>High</b>

Table 4 is the validation result on Aspect 2, which consists of five statements. The validation results from aspect 2 obtained an average score of 0.89 in the high category. The statement of digital learning resources makes it easy to repeat learning materials and gets a score of 0.88 with a high category. The statement of digital learning resources can increase learning motivation to get a score of

0.96 in the high category. Statement: Using digital learning resources in learning is more fun to get a score of 0.83 with a high category. Statement Digital learning resources support learning creativity to score 0.92 with categories. The statement of digital learning resources helps implement learning to get a score of 0.88 in the high category.

**Table 5. Validation of Aspect 3 (Weaknesses of Digital Disaster Learning Resources)**

Aspect	No	Statements	v	Category Validation
Aspect 3: Weaknesses of Digital Disaster Learning Resources	1	The use of digital learning resources requires a significant source of funds.	0,79	Medium
	2	The use of digital learning resources requires specific abilities.	0,67	Medium
	3	Digital learning resources are challenging to use.	0,75	Medium
<b>Average</b>			<b>0,74</b>	Medium

Table 5 is the validation result on Aspect 3, which consists of three statements. The validation results from aspect 3 obtained an average score of 0.74 in the medium category. From the statement that using digital learning resources requires a significant source of funds, it gets a score of 0.79 in the medium

category. Then, using digital learning resources requires specific abilities to get a score of 0.67 in the medium category. Finally, the statement that digital learning resources are challenging to use gets a score of 0.75 in the medium category.

**Table 6. Validation of Aspect 4 (Opportunities of Digital Disaster Learning Resources)**

Aspect	No	Statements	v	Category Validation
Aspect 4: Opportunities of Digital Disaster Learning Resources	1	Digital learning resources can be applied synchronously and asynchronously.	0,75	Medium
	2	Digital learning resources can be used for classical learning or independent learning.	0,75	Medium
<b>Average</b>			<b>0,75</b>	Medium

Table 6 is the validation result on Aspect 4, which consists of two statements. The validation results from aspect 4 obtained an average score of 0.75 in the medium category. The statement of digital learning resources can be applied synchronously and

asynchronously, obtaining a score of 0.75 in the medium category. The statement of digital learning resources can be used for classical learning or independent learning to get a score of 0.75 with a medium category.

**Table 7. Validation of Aspect 5 (Threats of Digital Disaster Learning Resources)**

Aspect	No	Statements	v	Category Validation
Aspect 5: Threats of Digital Disaster Learning Resources	1	The use of learning resources can only be done with the support of adequate facilities and infrastructure.	0,79	Medium
	2	The use of digital learning resources only on certain materials.	0,63	Medium
	3	The use of digital learning resources is very difficult and burdensome.	0,54	Medium
<b>Average</b>			<b>0,65</b>	Medium

Table 7 is the validation result on Aspect 5, which consists of three statements. The validation results from aspect 5 obtained an average score of 0.65 in the medium category. The statement on the use of learning resources can only be made with the support of adequate facilities and infrastructure, obtaining

a score of 0.79 in the medium category. The statement on using digital learning resources only on certain materials scored 0.63 in the medium category. Using digital learning resources is very difficult and burdensome to get a score of 0.54 in the medium category.

**Table 8. Validation of Aspect 6 (Skills Using Digital Learning Resources)**

Aspect	No	Statements	v	Category Validation
Aspect 6: Skills Using Digital Learning Resources	1	I have used digital learning resources to learn.	0,83	High
	2	I am very skilled at using digital learning resources.	0,67	High
	3	I always ask friends for help in using digital learning resources.	0,71	High
	4	I am very confident in using digital learning resources.	0,83	High
	5	My friends always ask for my help in using digital learning resources.	0,63	High
<b>Average</b>			<b>0,73</b>	High

Table 8 is the validation result on Aspect 6, which consists of five statements. The validation results from aspect 6 obtained an average score of 0.73 in the moderate category. Statement I have used digital learning resources to learn to get a score of 0.83 in the high category. Statement I am skilled at using digital learning resources,

scoring 0.67 in the moderate category. Statement I always ask friends for help using digital learning resources to get a score of 0.71 in the moderate category. Statement I am very confident in using digital learning resources, scoring 0.83 in the high category. Statement of friends I always ask for help in.



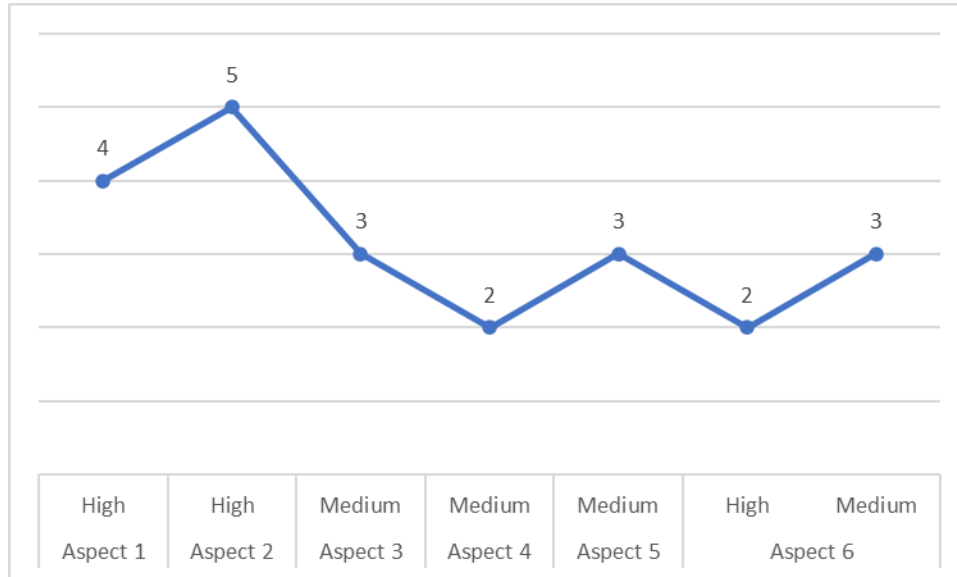
**Table 9. Recapitulation of Validation Analysis of Learning Resources for Digital Disasters for Coastal Areas**

No	Aspect	v	Kategori Validasi
1	Aspect 1: The Need for Digital Disaster Learning Resources	<b>0,90</b>	High
2	Aspect 2: Strength of Digital Disaster Learning Resources	<b>0,89</b>	Medium
3	Aspect 3: Weaknesses of Digital Disaster Learning Resources	<b>0,74</b>	Medium
4	Aspect 4: Opportunities of Digital Disaster Learning Resources	<b>0,75</b>	Medium
5	Aspect 5: Threats of Digital Disaster Learning Resources	<b>0,65</b>	Medium
6	Aspect 6: Skills Using Digital Learning Resources	<b>0,73</b>	Medium
	<b>Average</b>	<b>0,77</b>	<b>Medium</b>

Table 9 recapitulation the validation of needs analysis of digital disaster learning resources for coastal areas with an average score of 0.77 in the moderate category. In aspect 1, regarding the need for digital disaster learning resources, an average score of 0.90 is obtained in the high category. For aspect two regarding the strength (strength) of digital disaster learning resources, an average score of 0.89 is obtained in the high category. Aspect 3 regarding weaknesses (weaknesses) of Digital Disaster Learning Resources obtains an average score of 0.74 in the medium category. Then, in aspect four regarding opportunities (opportunities), digital disaster learning resources obtained an average score of 0.75 in the medium category. Aspect 5 regarding

threats (threats) of digital disaster learning resources obtains an average score of 0.65 in the medium category. Finally, aspect 6, regarding skills in using digital learning resources, obtains an average score of 0.73 in the medium category.

Based on the results of the research that has been described, it is known that the needs analysis instrument is generally valid, but several items of the instrument need to be reviewed, namely the editorial aspect of the statement. So that it can be illustrated that the instrument items can be used to find information about the needs analysis of digital-based coastal area disaster learning resources in schools, as shown in Figure 1.



**Figure 1. Instrument Item Categories For Each Aspect**

Figure 1 explains that aspect 1, with four instrument items, is in the high category. In aspect 2, with three instruments in the high category. Aspect 3 with three items in the medium category. In aspect 4, with two instruments in the medium category. Aspect 5 with three instruments in the moderate category. Lastly, in aspect 5, there are two high-category instrument items and three medium-category instrument items. If the instrument items are in the high category, then the instrument items are used. Then the instrument items are in a low category, and the instrument items are discarded or not used. Moreover, for items in the medium category, it is necessary to review the instrument items.

As for data analysis for expert validation in the form of content validation results, we are using V'Aiken as an essential step to produce a needs analysis instrument to find information about analyzing the needs of digital-based coastal area disaster learning resources in

schools. In addition, conducting content validation has an essential role in the development and validation of instruments (Istiyono et al., 2014; Prihono, 2019).

Content validity research is used to demonstrate the quality of the content of the developed instrument (Gul et al., 2022; Kalkbrenner, 2021; Villafañe et al., 2011). Therefore, content validity is essential in developing all types of instruments (Gul et al., 2022; Kalkbrenner, 2021). Furthermore, content validity is determined by validators who are experts in their fields, namely experts who can make decisions in revising instrument content to obtain clarity, correctness, and relevance (Afriana & Festiyed, 2020; Suprpto et al., 2020).

## CONCLUSIONS

Based on the exposure to the results of the research and discussion, it can be concluded that of the 22 items of the needs analysis instrument in general, it is valid, but several items of the instrument require a

review, namely the editorial aspect of the statement. The validation of the instrument for analyzing the needs of digital disaster learning resources for coastal areas obtained an Aiken V index with a score of 0.77 in the medium category. So that the instrument items can be used to find information about the needs analysis of digital-based coastal area disaster learning resources in schools.

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