DEVELOPMENT OF AN INSTRUMENT TO MEASURE FOOD SECURITY LITERACY CAPABILITY OF PRIMARY SCHOOL STUDENTS

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ABSTRACT

This study aims to produce an instrument for measuring the level of food security literacy ability of 5th grade elementary school students. This type of research is research and development carried out using four of the five stages of the ADDIE model. Instrument development uses two types of validation, including expert validation and empirical validation. The results of expert validation consist of material experts and language experts. Based on the results of the material validation, an average score of 3.67 was obtained in the very high category. while the language experts get a score of 50 with a very high category. The results of empirical validation show that of the thirty instruments, there are 27 valid instruments and 3 invalid instruments. The instrument reliability test obtained a reliability coefficient score of 7.8 in the high category

Keywords: Instrument Development, Food Security

1. INTRODUCTION

In the ever-growing digital era, literacy has become an important skill for individuals to participate actively in an increasingly complex and global society. Literacy is not only about the ability to read and write, but also includes an in-depth understanding of information, media and technology. Today's society is faced with many sources of information, including social media, websites, and news platforms, which require strong literacy skills to sort, evaluate, and integrate information wisely.

Along with the development of technology, literacy has experienced a shift from traditional literacy to more inclusive literacy, such as information literacy, media literacy and digital literacy. Information literacy involves critical skills to identify reliable sources of information, avoid spreading false information, and use information to make informed decisions. Media literacy, on the other hand, involves understanding how messages and content are conveyed through various types of media, as well as the ability to critically read these messages [1]. One of

the skills that needs to be developed at this time is food security literacy skills.

Food security has become an increasingly pressing issue amidst the complexity of global challenges such as climate change, population growth and changes in food consumption patterns. Law of the Republic of Indonesia Number 18 of 2012 explains that food security is a condition where food is met for the country and individuals, which is reflected in the availability of sufficient food, both in quantity and quality, safe, diverse, nutritious, equitable and affordable and does not conflict with religion. , beliefs, and culture of the community, to be able to live a healthy, active and productive life in a sustainable manner [2]

In various parts of the world, people face the threat of hunger and malnutrition, which highlights the need to prioritize sustainable approaches to managing food resources. Early food security literacy is emerging as the key to overcoming these challenges and building a better future. Food security literacy is an individual's ability to understand, access and manage food resources wisely. Instilling this literacy from an early age provides an

important foundation for children to develop a healthy relationship with food and understand the social, economic and environmental implications of their food decisions. With this understanding, future generations will be better able to make sustainable decisions regarding food and agriculture.

Based on Global Food Security Index (GFSI) data, Indonesia's food security index in 2022 is at level 60.2 and is ranked 63rd [4]. Indonesia's food security level this year is still below the global average with an index of 62.2, and lower than the Asia Pacific average with an index of 63.4. the availability of Indonesia's food supply is considered not good with a score of 50.9. Nutritional quality also only got a score of 56.2, and sustainability and adaptation scored 46.3. In these three indicators, Indonesia's resilience is considered worse than the average Asia Pacific country.

In essence, food security starts with awareness about food from an early age. Not many practices to achieve food security start from schools, the younger generation, or from an early age. Building food security should start early by introducing food security literacy to children in the early grades of elementary school [5]. Literacy is the ability to read and write [6]. [7] in his article entitled "Framing an Undergraduate Minor through the Civic Agriculture and Food Systems Curriculum" states that food security literacy is a literacy whose function is not widely recognized by society and is multi-dimensional. While other researchers, Ramirez in a journal article published in the "Journal of Food Education and Nutrition" by Penelope, researchers emphasize the importance of food security literacy in addressing hunger and malnutrition problems [8]. They write that education about food security from an early age has the potential to create a paradigm shift in the way we view food. It is not only about providing information, but also forming a sustainable mindset related to food explaining that the definition of literacy varies quite a bit depending on the social context [9]. They write that education about food security from an early age has the potential to create a paradigm shift in the way we view food. This is not only about providing information, but also forming a sustainable mindset regarding food explaining that the definition of literacy is quite varied depending on the social context [10]. They write that education about food security from an early age has the potential to create a paradigm shift in the way we view food. This is not only about providing information, but also forming a sustainable mindset regarding food explaining that the definition of literacy is quite varied depending on the social context.

Based on the problems above, this research aims to develop literacy skills instruments for grade 5 elementary school students. Through this research it is hoped that it

can be used as an alternative to determine the literacy level of students in the field of food security. Furthermore, in the future it is also expected to develop learning models that can improve students' ability in food security literacy so that they can foster awareness of food security from an early age.

3. METHOD

3.1. Types of research

This research is Research and Development (R&D) research. The instrument developed is a problem solving ability test instrument developed by adapting the ADDIE development model from Branch [10]. The five stages of ADDIE include (1) analyze, (2) design (planning), (3) develop (development), (4) implement (implementation), and (5) evaluate (evaluation). This study uses four of the five stages of ADDIE. Research and development was carried out for two months (July 2023—August 2023).

3.2. Research procedure

Procedure The development procedure used in this study uses the following steps. First, analyze how to assess problem solving abilities. Second, planning the development of test instruments by determining indicators of problem solving abilities. Third, develop a problem solving ability test instrument based on the selected indicators. Fourth, the implementation of problem solving ability test instruments.

In the development stage, instrument validation is carried out before the developed instrument is implemented. The validation carried out includes expert validation and empirical validation. Expert validation aims to obtain an assessment covering two aspects, namely first validation of content suitability which includes (1) suitability of question items with indicators, (2) level of difficulty of question items, (3) correctness of the concepts used [10]. The second aspect is the aspect of language accuracy. language use. In addition, expert validation also aims to obtain suggestions for improving the instrument. Instruments that have been declared appropriate by experts are then tested for empirical validation to determine the validity and reliability of the instruments measuring the level of food security literacy skills of grade 5 elementary school students.

3.3. Data analysis technique

This study uses two types of data, namely qualitative data and quantitative data. During content (construct) validation, qualitative data was obtained in the form of suggestions from experts which were collected as material for consideration for improving the literacy ability instrument for grade 5 students. Apart from qualitative data, there was also quantitative data from experts which would later be used to determine the

suitability of the instrument. Meanwhile, during the empirical validation, quantitative data was obtained from the test results of students' food security literacy ability instruments. Data from empirical test results were then analyzed for validity and reliability. Validity testing uses the person product moment test while the reliability test uses the Cronbach Alpha test with the help of SPSS 21 for Windows.

4. RESULTS AND DISCUSSION

This study developed an instrument for food security literacy skills for grade 5 students in the form of a questionnaire. Researchers used four of the five ADDIE development procedures with stages, namely analysis, design, development and implementation. The four stages are presented in detail as follows.

Analyze

At this stage an analysis of the food security literacy skills of grade 5 students is carried out. Assessment of food security literacy skills can be carried out by giving a questionnaire. These measurement characteristics are the basis for developing instruments for students' food security literacy skills.

Planning (design)

At the planning stage, an analysis of the food security literacy ability indicators of grade 5 students was carried out. The food security literacy ability indicators were used as a basis for developing a food security literacy ability test instrument. Based on the results of the analysis, the indicators used to measure the literacy ability level of students' food security were determined. Food absorption is a person's need for a healthy life in using food including (1) the need for energy, nutrition, water, (2) environmental health, knowledge of household members on sanitation, water availability, health service facilities, nutrition education, and the health level of children under five Very effective in absorption of food [11].

Development (develop)

The development of an instrument for measuring food security literacy skills was carried out based on the selected indicators. The instrument preparation was carried out through FGD between the research team and elementary school teachers. From the preparation of the instrument, 30 items were produced which were developed from two indicators, namely meeting nutritional needs and clean and healthy living behavior [13]. Details of the results of instrument development are shown in the following table 1.

Table 1 Grid of Students' Food Security Literacy Ability Instruments

indicator	Sub indicators	Instrument Number
Fulfillment of nutritional needs	Understanding of nutrition	1,2,3,4,5
	Determine the type of nutritious food	6,7,8,9,10,18,19
	Identify types of food based on their nutrients	11,12,13,14,20
Get used to clean and healthy living behavior	Identify food safety and quality	15,16,17
	Understand clean living behavior	21,22,23,24,25
	Analyze the impact of	26,27,28,29,30

indicator	Sub indicators	Instrument Number
	nutritional deficiencies on humans	

The thirty instrument items that have been developed are further validated by experts (construct) and empirical validation. Expert validation was carried out by two lecturers in the PGSD department at PGRI Yogyakarta University, consisting of a science expert lecturer and a language expert lecturer. Validation is carried out to obtain an assessment including two indicators, namely first, validation of the material which includes (1) accuracy of the content, (2) level of difficulty of the question items, (3) correctness of the concepts used. The second aspect is the aspect of language accuracy. use of language.

a. expert validation
   1) Material Aspects

Material expert validation is carried out to ensure that the instruments used are appropriate to the curriculum and the level of student development. The measurement of the validity of this material uses three aspects, namely the accuracy of the content, the level of difficulty of the items and the correctness of the concept used. The following is a recapitulation of the calculation results of the material expert's assessment.

Table 2 Expert validation of students' food security literacy skills

Aspect	Score	category
Content accuracy	3,5	Very high
Item difficulty level	3	Very high
The correctness of the concept used	3.3	Very high
Average Score	3.67	Very high

Table 2 shows the results of material expert validation of the resilience literacy skills instrument product for grade 5 elementary school students. Validation of the feasibility of the instrument was based on two indicators of material validation which included (1) the accuracy of the content, (2) the difficulty level of the items, (3) the correctness of the concepts used. The second indicator is the aspect of language accuracy. Based on the results of the validation carried out by material experts, it can be concluded that the food security literacy ability instrument in grade 5 students is declared "Easy to use".

   2) Aspects of language accuracy

Language accuracy validation is carried out so that the instruments used to measure food security literacy skills can be understood and are in accordance with the indicators to be measured. The recapitulation of the validation results of language experts is shown in table 3 below.

Table 3. Language expert validation of students' food security literacy skills

Aspect	Maximum Score	Actual score	Eligibility percentage	Category
Using plain language	15	14	93.3%	Very high
Using communicative language	5	4	80%	Very high
Dialogic and Interactive	5	4	80%	Very high
Suitability with student development	10	9	90%	Very high
Conformity with the rules of the Indonesian language	10	9	90%	Very high

Use of terms, symbols and icons	10	10	90%	Very high
The average result of validating the language aspect			87.2%	Very high

Table 3 shows the results of the linguists' validation of the instrument product of the resilience literacy ability of grade 5 elementary school students. Validation of language appropriateness is based on indicators from Arif Wiyat Purnanto & Ali Mustadi which include 6 aspects, namely (1) language used is straightforward, (2) language used is communicative, (3) language used is dialogic and interactive, (4) language The language used must comply with the development of students, (5) the language used must comply with Indonesian language rules, (6) consistency in the use of terms, symbols and icons. Based on the validation results of the linguists, it was found that all the items obtained a very high category so that they were feasible to use. Some suggestions are given by language experts as presented in Table 4.

Table 4. Language Expert Suggestions

Question Items	Suggestion
2,15,19	There is a typo
9	Avoid using non-standard sentences
21	Correct the choice of words used according to the level of development of elementary students

The suggestions given by the language experts were then followed up as considerations in revising the instrument for measuring students' food security literacy skills. An example of the results of the revised instrument is presented in Table 5.

Table 5. Instrument improvements based on language expert input

Item item before repair	Item item after repair
The need for water every day is 8 glasses or 2 liters	Every day humans need 8-9 glasses of water to meet their needs
Excessive sugar consumption can have implications for anemia	Excessive consumption of sugar can cause anemia

b.   Empirical Validation

Empirical validation testing was carried out to determine the validity and reliability of the student food security literacy ability test instrument [14]. In the empirical validation testing stage, 70 fifth grade students were used as research subjects, including 21 students from Semarangan 1 Elementary School, 24 students from Tegalyoso Elementary School, and 25 students from Nogosaren Elementary School. Students worked on 30 questionnaire questions in 50 minutes independently. The results of the students' work were then analyzed by comparing the correlation coefficient of the questions (Rcount) with the correlation coefficient for n = 70 students. One way to find out which questionnaires are valid and invalid, we have to find out the table first. The formula for r table is df = N-2 so 70-2 = 68, so r table = 0.306.

Table 6 recapitulates the empirical validation analysis of the instrument

Item No	Rcount	Table	Information
1	0.631	0.306	valid

2	0.573	0.306	valid
3	0.620	0.306	valid
4	0.647	0.306	valid
5	0.440	0.306	valid
6	0.518	0.306	valid
7	0.745	0.306	valid
8	0.145	0.306	Invalid
9	0.559	0.306	valid
10	0.454	0.306	valid
11	0.491	0.306	valid
12	0.638	0.306	valid
13	0.565	0.306	valid
14	0.573	0.306	valid
15	0.557	0.306	valid
16	0.295	0.306	Invalid
17	0.534	0.306	valid
18	0.561	0.306	valid
19	0.549	0.306	valid
20	0.596	0.306	valid
21	0.669	0.306	valid
22	0.514	0.306	valid
23	0.583	0.306	valid
24	0.400	0.306	valid
25	0.135	0.306	Invalid
26	0.708	0.306	valid
27	0.672	0.306	valid
28	0.626	0.306	valid
29	0.552	0.306	valid
30	0.591	0.306	valid

Based on the results of validity testing using product moment correlation with the help of SPSS 21 for window, it can be shown that there are 27 instruments whose rcount score is > from r table and there are 3 items whose rcount score is <than r table. Based on the results of these calculations, it can be concluded that there are 27 instrument items that are declared valid and 3 instruments that are declared invalid.

After carrying out validity testing, reliability testing was then carried out using Cronbach alpha with the help of SPSS 21 For window. Before testing the reliability of the student's food security literacy ability instrument, there must first be a basis for decision making, namely an alpha of 0.60 [13]. A variable is considered reliable if the value of the variable is greater than >0.60, if it is smaller then the variable under study cannot be said to be reliable. Based on the results of calculations using SPSS 21 for window, the following results were obtained:

Lots of questions	Reliability Coefficient	Category
27	0.78	tall

Based on the results of the reliability analysis of 27 valid instruments, a coefficient score of 0.78 was obtained which was greater than 0.60. Thus, it can be concluded that the 27 instruments measuring students' food security literacy skills are reliable in the high category [14]

CLOSING

This research concludes that the results of the development of an instrument for measuring the food security literacy skills of grade 5 elementary school students are the first. The measurement instrument used a questionnaire totaling 30 which was developed from two indicators. Second, the instrument for measuring food security literacy skills for grade 5 students is proven to have a level of construct validity. Proof is done through an analysis of the validation results of material experts and linguists who give very high category ratings. third, based on the results of empirical validation, out of 30 instruments there are 27 valid instruments and 3 invalid instruments. Meanwhile, the reliability test results obtained a score of 7.8 in the high category.

AUTHORS' CONTRIBUTIONS

The title "AUTHORS' CONTRIBUTIONS" should be in all caps.

ACKNOWLEDGMENTS

The title "ACKNOWLEDGMENTS" should be in all caps and should be placed above the references. The references should be consistent within the article and follow the same style. List all the references with full details.

REFERENCES

[1] Asih, AM. Literacy Culture as an Effort to Improve Critical Thinking Skills in the Industrial Revolution 4.0 Era. 2019. Proceedings of SNP2M (UNIM).http://snp2m.unim.ac.id/index.php/snp2m/article/view/334/187

[2] FAO (Food and Agriculture Organization of the United Nations). (2021). "The State of Food Security and Nutrition in the World 2021: Transforming Food Systems for Food Security, Improved Nutrition, and Affordable Healthy Diets." F.A.O.

[4] Wardani, K., et al. (2021). "Collaborative Education for Food Sustainability: A Case Study in Sustainable Agriculture." International Journal of Sustainable Agriculture, 7(3), 105-120.

[5] The Economict Group. Global Food Security Index. 2022.https://impact.economist.com/sustainability/project/food-security-index/.

[6] Fahmi, Etika K, Cucu A, Tatu H. Literacy Design for Food Security through Innovation in Learning the Learning Needs of Early Grade Elementary School Students. JPSD. 2018; 4(1): 55-69.http://dx.doi.org/10.30870/jpsd.v4i1.2840

[7] Jatnika, S. Literacy Culture to Grow Interest in Reading and Writing. Indonesian Journal of Primary Education. 2019;3(2):1-6https://doi.org/10.17509/ijpe.v3i2.18112

[8]. Framing an Undergraduate Minor through the Civic Agriculture and Food Systems Curriculum. NACTA Journal. 2013; 57(2): 56-67.

[9] Ramirez, P., et al. (2022). "Literacy for Food Resilience: Nurturing Sustainable Futures." Journal of Food Education and Nutrition, 10(2), 45-62.

[10] Agnaou, F. 2003. Gender, Literacy, And Empowermen In Morocco. New York: Routledge.

[9], R. M. (2009). Instructional Design: The ADDIE Approach. Springer US

[11] Webb, Patrick and Rogers, Beatrice. 2003. Addressing the In in food insecurity. Occasional Paper, No.1. USAID office of food for peace.https://pdf.usaid.gov/pdf_docs/PA00SXB9.pdf [9] A. Pnueli, In transition from global to modular temporal reasoning about programs, in: K.R. Apt (Ed.), Logics and Models of Concurrent Systems, Springer, Berlin, Heidelberg, 1984, pp. 123–144. DOI: https://doi.org/10.1007/978-3-642-82453-1_5

[12] Arif Wiyat Purnanto, AM (2016). Analysis of the suitability of language in theme 1 textbooks for class I elementary school curriculum 2013. Basic Education Profession, 2(3), 103–105.http://journals.ums.ac.id/index.php/ppd/article/view/2773

[13] Sugiyono. (2017). Quantitative Research Methods, Qualitative, and R&D. Bandung : Alfabeta, CV.

[14] Azwar, Saifuddin. 2016. Research Methods. Yogyakarta: Student Libraries.