Information Literacy Instrument for Primary School Students : A Validity and Reliability Study

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ABSTRACT

The purpose of this study was to develop the instrument of student information literacy through several stages consisting of instrument development, content validity, empirical validity, and relialbility instrument. This research used Borg and Gall development step such as research and information collecting, planning, develop preliminary form of product, preliminary field testing, operational field testing, operational product, main field testing, main product revision collecting and final product revision collecting. The data collection used in this study was in the form of questionnaire and test of student literacy measurement. The subjects of this study were fifth graders of primary school in Malang for about 105 student use purposive technique sample. 22 literacy items were obtained from the results of the instrument development and 17 items were categorized as valid items. Expert validity test results obtained an average total value of 3.6. The result of the trial showed that some of the items need to be revised, but are appropriate to measure the primary school students information literacy.

Keywords: *Information Literacy, Primary School student, Instrument Validity, Science learning*

1. INTRODUCTION

The development of information in this century has been extraordinary. Unwittingly, information has become an important part of human life. This leads to the flow of knowledge to enter and penetrate the boundaries of the dimensions of space and time so that information obtained over time can be known in seconds through the internet [1]. This allows one to access, manipulate existing information, create new things, and gather new information.

Currently, the content of information on the internet is available in various types [2] and can lead to the increasing number of internet users over year used it for various reasons. The results of survey conducted by [3] states that internet users in Indonesia reached 171.17 million people or around 68.4% of Indonesia's population consisting of various ages and various purposes, i.e. communicating by 24.7%, social media by 18.9% and looking for job by 11.5% and others. As a result of this condition, a person often uses information on the internet in accordance with their respective knowledge, if the internet is not used appropriately then various problems will arise including problems of adolescent behavior [4]; sexual crimes [5]; internet addiction and sleep quality [6] [7] [8] ; Bullying [9]; relationship problems with parents; stress level [10]. However, if information is used appropriately it will have a positive impact [11], e.g. learning interest [12] prosperity [13]. Based on assertions above, every individual is required to follow information developments that occur wisely by having good information literacy skills.

All this time, the measurement of information literacy for primary school students has not been done so much. Several developments of instruments and measurement of literacy that have been developed, i.e. media literacy of primary school students [14]; Information literacy at university level [15][16][17]; Information literacy at senior high school level [18]; at junior high school level [19]; ICT literacy [20]; nutrition literacy [21][22] teacher literacy [23] Therefore, it is necessary to develop a valid instrument of information literacy for primary school student. The purpose of this study is to develop a valid and reliable instrument of information literacy for primary school students.

Literacy is currently needed at the time of the industrial revolution 4.0, where people must be able to process information to be useful and not detrimental to themselves. Literacy is the ability to read and write. In broad terms, literacy includes the ability to speak, listen, and think as elements in it [24]. The concept of literacy teaching is defined as the ability to read and write and arithmetic that allows it to be utilized for itself and the development of society [25].

Information literacy is the ability to recognize information needs to solve problems, develop ideas, ask essential questions, use various gathering strategies of information, and determine information that is suitable, relevant and authentic [26][27] [28],; develop students' critical and logical thinking skills toward information so they need to evaluate the information obtained [19], be able to become someone's provision to analyze information, [1], ability to read and produce in writing, be able to able to organize, evaluate and use information ethically and appropriately, communicating and creating information to overcome problems and make formal and informal decisions in the context of learning, and be able to solve problem; be able to obtain and manage the information obtained so that the information received is in accordance with the validation and reliability of the information obtained [2].

Literacy identified consists of [29], [30]: 1). Defining / articulating an information (This ability is to understand the relationship of parts of the text, especially in terms of patterns of text development, and be able to take inference from the relationship patterns of the text. The ability to interpret is to make the interpretation of the text or the basis of something outside the text so that the reader is able to find assumptions and implications contained in the text), 2). Accessing information, (This ability is related to skills in finding, selecting and gathering information specifically, quickly and precisely from the text, 3). Organizing information, 4). Evaluating and using information (this ability requires the reader to have good skill in linking information from the text with his experience. So that, the reader is able to assess the true knowledge or the specific message contained in the text, and 5). Communicating (the ability to convey information obtained from the text that has been analyzed).

Raising awareness of information literacy is not easy since in order to develop someone's information literacy, one must know one's initial ability. So that, someone's information literacy is important to know, this is as a foothold to take action for the government, policy makers or teachers to develop student information literacy. Literacy measurements can be seen from how to find, evaluate, and use the information needed effectively.

2. METHOD

2.1 Study Design

The purpose of this research was to develop the instrument of information literacy by using *Borg and Gall* development stages. However, it did not reach the dissemination stage. Information Literacy in this study was defined as the ability to analyze and interpret information contained in a text reading. Information literacy used in this study consisted of 6 main indicators, i.e. Accessing and retrieving information from the text, integrating information read, interpreting information read, reflecting the text and connecting with daily experiences, evaluating text and communicating. The development stages are shown in Figure 1.
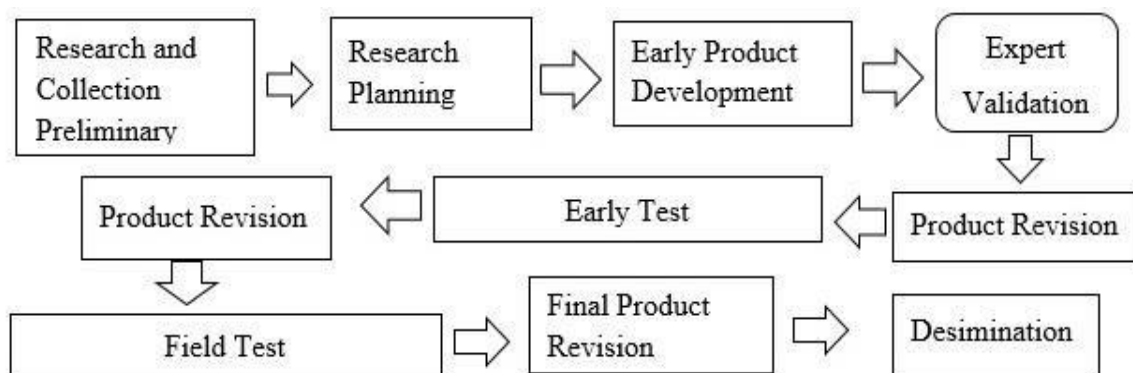

Figure 1. Borg and Gall Steps [31]

First Step is research and information collecting, at this stage a literature study was carried out related to literacy instruments that will be developed in accordance with the results of the needs analysis. In second step is planning, at this stage, the researcher formulated a research framework. Third steps is developing preliminary form of product, the researcher prepared the instruments. The instrument was also developed to measure the validity of the literacy instrument. After that, the construct validity was carried out by the researcher, followed by a test of the content validity to the linguist. Fourth steps is preliminary field testing, at this stage, the researcher conducted initial field trials on a limited scale and 10 respondents were involved. In this step, the data collection and analysis were done by interview and questionnaire, and in fifth step is product revision, the researcher made improvements in accordance with the advice and results of the initial trial conducted in stage 4. In the six steps is main field testing, the researcher

carried out a trial in five class at elementary school in Malang, Indonesia. And the seventh steps is operational product revision, at this stage, an improvement to the results of the trial on stage 6 will be carried out. Eight steps is operational field testing, This stage is validation stage of the trial results. The results of this trial were analyzed quantitatively (validity test, reliability test, difficulty level test, and discrimination power test) on the empirical instrument. After that the data were then analyzed using SPSS 2.0. The output of the empirical test was carried out in a quantitative descriptive manner. And last final product revision, the researcher improved the instrument in terms of redactor and content to produce the final product,

2.2 Study Sample

The subjects of this study were 5th grade students of the municipal and regency elementary schools in Malang. The Purposive selection of samples taken in downtown areas, suburbs, central districts and remote areas. It aims to find out the opinions of students from various regions to see students' ability in terms of getting information. The subjects of this study were selected from linguist lecturers and 5 primary school students in Malang for about 105 students.

2.3 Measurement

The instruments used in this study were questionnaire and test. The results of the questionnaire and tests were then measured to find out the validity, reliability, level of difficulty, and discrimination power. The results obtained were analyzed using quantitative data and qualitative data analysis techniques. Quantitative data was used to analyze the data derived from student literacy questionnaires. The following is the percentage calculation of student literacy assessment.

$$Assessment = \frac{total\ score\ obtained}{the\ total\ number\ of\ ideal\ scores\ in\ 1\ item} X100$$

The calculation results from experts can be given meaning and can be taken decisions using the measurement guidelines suggested by Arikunto (2007) as presented in table 1.

Table 1. The Conversion of Achievement level and Qualification

Level of achievement	Qualification	Explanation
90% - 100%	Very reliable	No revision needed
75% - 89%	Reliable	No revision needed
65% - 74%	Reliable	Revised
55% - 64%	Less reliable	Revised
0% - 54%	Not reliable	Revised

Furthermore, instruments that have been tested for construct validity by linguists, then empirical tests are carried out using the validity test, reliability test, different potential test and test the difficulty level of the test questions that the criteria are shown in table 2.

Table 2. Criteria for empirical instrument testing

No	Name of Test	Criteria
1	Validity Test	If r count> r table with $\alpha = 0.05$, then the measurement tool is declared valid, and vice versa if r count> r table then the measurement tool is invalid
2	Reliability test	This testing criterion is that if r count <r table with a significance level of 0.05 then the instrument meets the reliable requirements and vice versa if r count> r table then the instrument does not meet reliable.
3	Different Potential Test	The discrimination index (distinguishing power) is good if it ranges from 0.00 to 1.00.
4	Test the difficulty level of the test questions	Numbers that indicate the difficulty and ease of something is called the difficulty index (difficulty index) the magnitude of the difficulty index between 0.00 and 1.0. This difficulty index shows the level of difficulty of the questions.

3. RESULT AND DISCUSSION

The instrument developed was adapted from the theories suggested by UNESCO and OECD. The instrument was developed through two fable readings which were further developed into questions. As a result, the results obtained from the 6 indicators were characterized into 10 sub-indicators. After that, the questions will be used as test to measure students' information literacy as shown in the following table 3.

Table 3. Development of Information Literacy Test

Indicators	Sub-Indicators
Accessing and retrieving information from text	Looking for the right information
	Choosing the right information
	Gathering the right information
Integrating information read	Understanding parts of the text
	Drawing a conclusion
Interpreting the information read	Finding assumptions in a text
	Finding implications in a text
Reflecting text and connecting with everyday experience	Linking information from the text with the experience you have
Evaluating the text	Assessing the true message contained in the text
Communicating	Giving clear information about the message from the text read

The results of the instrument development were carried out construct validity by checking the measured variables and expressed in the form of logical constructs of the theory used. According to Nunally 1978 (in Retnawati, 2016) explains that the construction validity expresses a certain theoretical ability to be measured. The content validity test was validated by Indonesian lecturer. The purpose is to measure the readability of the instrument. The construction results of the linguist are shown in the following Table 4:

Table 4. The construction test result of questions

NO.	Assessed aspect	Value
I.	The appropriateness of the content presentation	
	1. The clarity of the performance carried out	3,66
	2. The clarity of the assessed aspect	3,75
	3. The compliance with indicators	3,66
II.	The appropriateness of the content construction	
	4. The subject matter is clearly formulated	3,83
	5. The validity of the content / material	3,58
III.	The appropriateness of language	
	6. The language used is in accordance with the Indonesian spelling	3,83
	7. The clarity of instruction and direction	3,58
	8. The communication language used	3,5
IV	The literacy measurement	
	9. Be able to measure the students' literacy	3,6
	10. Referring to the relevant theory	3,6
Average		3,6

The results of the study were also added some suggestions by the validator as shown in the following table 5.

Table 5. The suggestions from the linguist

Questions	The suggestions from the linguist
What paragraph does explain the deer is hunted by tiger ? why?	The question of why is ambiguous. It would be better if it is given additional words to clarify it
Which paragraph (4 or 5) does explain that the crocodile is being deceived by	It is too easy. You should choose an informative information

Questions	The suggestions from the linguist
deer?	
What paragraph does explain that the crocodile is obedient to its king? Explain!	Misstyping occurred on the word Pragraph
What attitude can be learned from the tiger, crocodile, and deer in daily life?	It can be related to the students' experiences, or it can also be clarified with what kind of attitude words students can take.
What does the story tell about?	In number 1, the question is too easy for the fifth grade students, because the contents of the paragraph are clear. It would be better if the students were asked about the meaning of the story.
What paragraph does explain that grandfather meets the goldfish? Explain!	In number 2, you can give additional description by your own sentence.
What do you think of the goldfish? Why? And from what paragraph can you conclude?	Adjust the indicators developed and note the writing error in general.

Content validity test was used to determine the representation of each item in the instrument to represent the components of content to be measured [32]. The results of the content validity of the Linguists were quite proper as indicated by the average value of 3.6 which was still considered as proper item, but improvements were needed at some points as suggested by the Linguists. [32] states that there are three stages to do content validity test, i.e. 1). Providing the instrument items to experts, 2) Obtaining suggestions from experts related to the suitability of the instrument with indicators, 3) Obtaining suggestions for improvement, 4) Conducting item evaluation.

Furthermore, the content validity test was conducted on 10 students who became trial subject. The results of instrument test based on the students' literacy obtained suggestions from students, i.e. the questions are made using simpler language, one item should have one question, there was a mistyping on question and the question was too long. The item validity test was also carried out. The following Table 6 describes in detail the result of item validity test:

Table 6. Validity test

No. question	The Correlation of Result Calculate	The Value of Difficulty level	Potention of The test
1	0,197	0,3455	0,1323
2	0,510	0,3603	0,5147
3	0,560	0,5515	0,3382
4	0,715	0,2794	0,5584
5	0,843	0,3161	0,5147
6	0,692	0,3603	0,4264
7	0,745	0,3382	0,5885
8	0,745	0,2764	0,294
9	0,743	0,2132	0,25
10	0,818	0,2112	0,220
11	0,000	1	0
12	0,000	1	0
13	0,403	0,5	0,1111
14	0,651	0,7013	0,2278
15	0,421	0,7638	0,0278
16	0,656	0,8611	0,2778
17	0,931	0,6875	0,5694
18	0,411	0,6527	0,26667
19	0,245	0,6458	0,22778
20	0,701	0,8611	0,2778
21	0,696	0,6180	0,5417
22	0,189	0,5763	0,2056

Table 6 above shows that the items number 1, 11, 12, 19, 22 have an average value of <0.400, which shows that the items are invalid. It indicates that out of the 22 items that have been developed, there are 17 valid items that can be used as research instruments for collecting data on the measurement of primary school students' literacy. The results of level of difficulty test show that all items 1 to 22 can be categorized as sufficient, so that those 17 items can be used to measure students' information literacy. In the aspect of the discrimination power test, it is shown that from 22 items, the value obtained in numbers 1, 11, and 12 is categorized as low, while 19 items are categorized as sufficient. Result of reliability test in table 7.

Tabel 7. Reliability Statistics

Cronbach's Alpha	**N of Items**
.523	105

In terms of reliability test of the instrument, the researchers used test results calculated using the Cronbach Alpha formula, i.e. If $r_{103} > r_{table}$, then the item is said to be reliable with a significance level of 5% or equal to (0.19). The results obtained in this study were 0.523 categorized as reliable item. An instrument is said to be reliable if it can show the consistency and constancy of the measurement results of the test. Consistency and constancy are related to the error rate of test results in the form of value of the test [33]. The results of the empirical test were further improved and revised based on the students' empirical testing process. So that, it can be concluded that from the empirical test results obtained 17 valid and reliable items. Based on the results of empirical test, it can be seen that in this study, the instrument has been validly and empirically constructed to be used as instruments for literacy measurement.

Based on the results of the study, noted that in the development of instruments must be in accordance with the criteria. These criteria will serve as benchmarks to measure the instruments. The knowledge of measurement aims to develop a better test to get more valid, reliable, practical and optimal results. [34]. In this research, first stage is preparation and develop the instrument. [35] explains that the preparation stage of the test instrument consists of determining the purpose of the preparation, determining the scope of the material, determining indicator of the questions, and compiling the instrument.

Next step is validity test. Validity test in education should involve content analysis and empirical analysis of test scores and responses to items by test takers. Contents analysis related to the validity of the test, empirical analysis is used to determine the validity of the test construction. The function of analysis is to compile a test that meets the standards [35]

In the context of instrument development, [36] provides 15 stages in the development process, i.e. (1) development of conceptual definitions; (2) developing operational definitions; (3) granting scale; (4) reviewing items on the technique for granting the scale that has been set; (5) choosing a sample size; (6) compiling instructions for the sample; (7) preparing a draft instrument; (8) developing final instruments; (9) initial trial data collection; (10) trial data analysis using factor analysis techniques, item analysis, and reliability; (11) instrument revisions; (12) conducting a final trial; (13) producing instruments; (14) conducting additional validity and reliability analysis; and (15) preparing a manual test. The development of the instrument is a conceptual theory development arranged based on the construct that aims to produce a standard instrument that refers to techniques that have been determined by experts proportionally and gradually. [37]

The instrument determines the quality of a study because the validity of the data obtained will be determined by the quality of the instrument used, in addition to the data collection procedures used. The instrument has functions to reveal facts into data, therefore if the instruments used have adequate or valid and reliable quality, the data obtained will be in accordance with the facts in the field that are used to obtain factual information, observe, and assess attitudes and opinions.

4. CONCLUSION

The development of information literacy instruments has been valid in terms of construction and experiments. The literacy instrument development test results according to linguist have been quite reliable i.e. 3.6 and can be categorized as proper instrument but there are a number of points that need to be improved. In terms of empirical tests consisting of validity, reliability, level of difficulty and discrimination power test have been met. The valid instrument will be able to measure the variables to be studied appropriately. The results of valid instruments can be further disseminated and can be used by further research to measure students' information literacy skill.

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