Validating Perceived ICT Literacy Scale for Senior High School

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ABSTRACT

This study aims to develop and validate high school students' perceived ICT literacy scale. The sample used was 156 students randomly from 7 Katingan, Central Kalimantan schools. The instrument consists of 18 items with three aspects: perceived information literacy, computer literacy, and internet literacy. Data were analyzed using Aiken for content validity. Seven experts in the field of ICT learning were involved in content validity. Construct validity uses Confirmatory Factor Analysis (CFA) because the instrument adapts the existing ICT literacy scale. The results of the content validity using Aiken, all items have a value above the limit, but there is one value below the limit and will be revised. Analysis using CFA obtained goodness of fit for χ^2 and CFI is fit. Correlation values for each item are also good values.

Keywords: ICT Literacy; Validity; Senior High School Students

1. INTRODUCTION

ICT is an essential part of 21st-century learning. Information is easily obtained and provides a real connection to classroom learning [1]. Students can also communicate and share exciting content more easily over the internet [2]. If students can master ICT, they easily independently create fun learning and increase creativity. The influence of ICT is significant to support classroom learning [3].

ICT literacy in students becomes the primary key in carrying out ICT-based learning. ICT literacy is an individual's ability to use digital technology, communication tools, and the internet to access, organize and integrate digital resources [4]. In terms of learning, students can use digital technology and communication tools in creating learning resources [5].

Learning in Indonesia began to develop various ICT for the teaching and learning process. Educators are trained to use ICT as a medium and learning resource. Various training both carried out by the government, such as on PEMBATIK and webinars conducted by private parties. What about students? Student perception of the importance of ICT literacy becomes a significant factor in the success of ICT-based learning. Students' perception of ICT impacts their efforts in developing proactive experiences and learning [6]. In addition, literacy perceived in students can accelerate the improvement of 21st-century abilities, namely creativity, collaboration, communication, and critical thinking [7].

Literacy perceived for high school students should be assessed before carrying out ICT learning. This is done to ensure that every student is ready to learn. The study aimed to develop an ICT literacy scale for high school students to assess several aspects. Aspects assessed in ICT literacy are information literacy, computer literacy, and internet literacy. The items developed are then validated and calculated for reliability to see how good the item is.

1.1. ICT Literacy

In line with the times, ICT is needed in all aspects. ICT learning is also very influential on the educational aspect. ICT learning is needed in the 21st century because it can create school-as-real-life [8]. To succeed in ICT-based learning, it is necessary to improve ICT literacy in students. ICT literacy uses digital technology, communication tools, and the internet to access, organize, integrate, evaluate, and create information used in everyday life [9]. Another definition of ICT literacy is the individual's ability to use digital technology, communication tools, and the internet to access, organize and integrate digital resources. [4]. ICT literacy has a broad meaning, which can assess ICT in various aspects, from conversational skills to more complex abilities [5].

The above understanding also applies to the five components of ICT literacy. The five components above define the skills process to improve ICT skills [9]. The meaning of each component is as follows: access: knowing about or how to collect or obtain information; manage: apply existing schemes or groupings; integrate:

interpret information, including summarizing, comparing, and contrasting; evaluating: making judgments about the quality, relevance, usefulness, or efficiency of information; creating: generating information by adapting, applying, designing, creating, or writing information.

1.2 Assessment of ICT Literacy

National assessments of ICT literacy have been carried out in many countries. One example is the NAP-ICTL08 conducted by Australia [4]. The key to the NAP-ICTL08 is to establish an authentic skills assessment. The assessment instrument is designed to assess students' ability to use ICT in everyday life. Students complete assignments on computers using various software. Some assignments are automatically graded, but some need to be graded by the assessor. Several assignments are collected on one theme containing topics about the subject matter and knowledge outside the classroom. Each task assesses the student's ability to gather information then synthesize and rewrite the information.

Assessment of ICT Literacy in Australia was also carried out using a questionnaire. This questionnaire serves to see students' habits in using ICT and their interest in using ICT. This questionnaire serves to see the factors that affect students' ICT literacy skills. The NAP-ICTL08 questionnaire consists of three aspects: students' habits of using computers, applications, and students' interest in computers.

1.3 Relevant Research

Several studies on ICT literacy assessment have been developed. Lau & Yuen (2014) developed an ICT literacy scale to measure information literacy, computer literacy, and internet literacy, totaling 17 items. The results of his research for factor analysis are 0.764, 0.667, 0.836, which are overall significant with an alpha of 0.001. Siddiq et al. (2016) developed ICT literacy instruments to measure teacher and student readiness. The instrument was developed based on the efficacy of ICT literacy, frequent use of ICT, and perception of the importance of ICT. This instrument has a strong construct validation and can see the importance of ICT in the classroom.

2. METHODS

The sample of this study amounted to 156, which were taken randomly in 7 SMA/SMK in Katingan, Central Kalimantan. Overall, students are from class X. The age range of students is from 15 to 18 years. The test instrument was adapted from the ICT literacy instrument by dividing it into three aspects, namely information literacy, computer literacy, and internet literacy [11]. Information literacy is six items, computer literacy is five items, and internet literacy is seven.

Content validity was analyzed using the validity of Aiken with a total of 7 expert raters and five criteria so that the V limit was 0.81 for p = 0.01, which had a good category. The Aiken validity formula is as follows.

$$V = \frac{S}{n(c-1)} \text{ and } S = \sum ni(r - lo)$$

Description:

V = validity index of Aiken
ni = the number of experts who chose criterion i,
r = the ith criterion,
lo = lowest rating,
n = total of all experts,
c = the number of ratings/criteria

The instrument's construct validity was carried out using CFA (Confirmatory Factor Analysis). CFA is calculated using LISREL 8.0. EFA (Exploratory Factor Analysis) was not carried out because the instrument developed adapted Lau & Yuen (2014). CFA's first order or second order is decided with the goodness of fit of the instrument. The goodness of fit criteria of the instrument can be seen in table 1.

Table 1. The goodness of Fit Criteria

Criteria	Value Limit
X^2	>0.05
Ratio X^2	< 2
CFI	>0.9

3. RESULTS AND DISCUSSION

3.1 Result

Content validation was carried out with seven experts and five categories in a row very inappropriate, not appropriate, not suitable, suitable, very suitable. The results of the content validation are calculated using the Aiken formula. For seven experts and five categories, the value of V must be more than 0.81 with a p-value of 0.01 for good items. The items validated are Information Literacy (LI), Computer Literacy (LK), and Internet Literacy (LT). The following is the result of the calculation of the content validation with the Aiken formula.

Table 2. Results of Content Validity Calculation with the Aiken Formula

Item	v-value	Category
LI1	0.857143	Good
LI2	0.821429	Good
LI3	0.857143	Good
LI4	0.857143	Good
LI5	0.857143	Good

Item	v-value	Category
LI6	0.892857	Good
LK1	0.857143	Good
LK2	0.892857	Good
LK3	0.821429	Good
LK4	0.857143	Good
LK5	0.928571	Good
LT1	0.857143	Good
LT2	0.821429	Good
LT3	0.928571	Good
LT4	0.892857	Good
LT5	0.892857	Good
LT6	0.75	Revision
LT7	0.928571	Good

From the results of the content validation above, a good validity index value was obtained. However, there is one item with a value of 0.75 below 0.81. Item LT6 was revised as its value was close to 0.81.

3.1.1. Confirmatory Factor Analysis (CFA) First-order

The results of the first-order CFA analysis obtained the value of 2, Ratio 2, RMR, SRMR, and RMSEA can be seen in table 3.

Table 3. Goodness Results of Fit

Criteria	Value	Category
X^2	671.6	Fit
Ratio X^2	0.00	Fit
CFI	0.91	Fit

The goodness of fit test results obtained a value of 2 more than 0.05, the ratio 2 less than 0.05 and CFI more than 0.9 so that the test fit the sample. Factor analysis of each item using first-order can be seen in Figure 1.
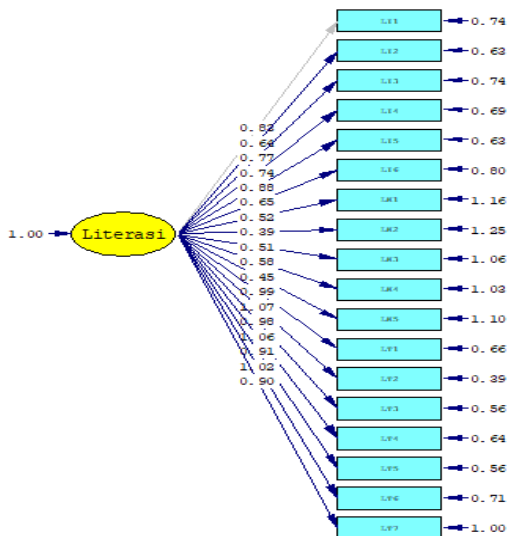

Figure 1. CFA Analysis of Each Item

From Figure 1, the correlation value between LK2 and the latent variable is 0.39. This value indicates a lower value than the other item correlation values. When traced, it turns out that there is a relationship between items LK1 and LT6, LI2 and LT6. Especially LK1 and LT6 have a reasonably significant correlation value of 0.31. If the two pairs of items are connected, then the correlation value of LK2 and the latent variable will be 0.41, as shown in Figure 2.
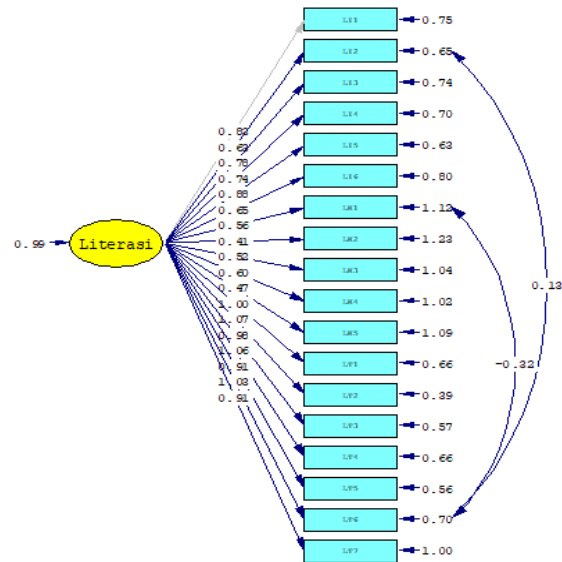

Figure 2. Suggestions for Modification of Items

LK2 items increase correlation value, but LK5, initially worth 0.45, becomes 0.47. A relationship between items from different aspects shows that the tendency of items to assess these aspects is still related to items in other aspects. From item, LK1 assesses students perceived in using software, on LT6 assesses student perceived in exporting files using the software. It turns out that there is a similar trend in both items, namely in the use of the software.

3.2. Discussion

Perceived ICT literacy is needed in 21st-century learning. ICT plays a major role in developing innovative education in the classroom. Therefore, students' awareness of the importance of ICT literacy needs to be assessed first as part of authentic value. Perceived ICT literacy also has an impact on student success in the classroom. The higher the level of student awareness, the higher the educational value obtained [12].

The development of ICT perceived literacy produces good scores on content validity using the Aiken formula. However, one item still needs to be revised, namely the sixth item on internet literacy. This item has almost the same meaning as the first item on computer literacy and the second item on information literacy. The similarity in this item

affects the value of the latent variable in the second item of computer literacy. From several studies, students' computer literacy and information literacy are influenced by several factors that make confirmatory scores have similarities between different aspect items [11].

The analysis results using CFA, each item produces a latent variable that is quite high and does not need to be revised. The results of the CFA analysis show that the developed instrument can be used as an instrument to assess the ICT literacy of high school students. The latent variables produced by all items were above 0.5 even though there was one item below 0.5 but could be revised according to research needs.

4. CONCLUSION

The development of the ICT literacy scale is based on students' ability to use digital technology, communication tools, and the internet in everyday life. In developing this ICT literacy perceived scale, there are 18 items with good categories on content validation using Aiken. Construct validation using CFA has a sufficient correlation with latent variables. This can be seen from all the items; only one item has a correlation value below 0.4.

Suggestions from developing this ICT literacy scale are to explore more points that require ICT in everyday life. In addition, the references used should refer to various journals because ICT literacy is a multidisciplinary science. The number of respondents in construct validation also needs to be increased to know better well.

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