

Developing Reading Assessment Instrument Using Digital Technology for Students with Dyslexia

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Abstract: This research aims to develop a reading assessment instrument using digital technology for students with dyslexia. The development functions are to (1) develop a reading assessment instrument based on digital technology for students with dyslexia, (2) examine the appropriateness of reading assessment instrument using Articulate Storyline to screen students with dyslexia. The data was collected through observation, interviews, and questionnaires. The data was validated by the material expert, information technology expert, and language expert in elementary school. The responses were also collected from teachers and students in inclusive elementary school as the users. A validation test was performed to find out the appropriateness of the developed assessment instrument. During the validation test, the experts assessed three aspects (content, digital technology, and language) and the teachers and students also gave their responses as the users of the assessment instrument. The total score of the validation results in all categories was 778 with an average score of 155.6. The aspect of content scored 3.79, the aspect of technology scored 3.60, and the aspect of language scored 3.85, with an average score of 11.24. Thus, the validation results by experts were categorized as very good and the final product that has been developed can be used as reading assessment instrument to screen students with dyslexia.

Keywords: Instrument; Reading Assessment; Digital Technology; Dyslexia

INTRODUCTION

Reading skills is one of the characteristics of early development. Students need reading skills to accomplish other tasks like writing. This means when a student is failed to learn reading skills, they will also encounter more problems. Reading skills is not only learned through formal learning but also electronic media (Widyorini, 2017). People today prefer smartphones like android to read than books because it is more simple and easier to use. Moreover, it can be embedded with questionnaires and assessments. Developed assessment instruments in the forms of speed reading, critical reading, reading comprehension, and literal reading. In addition, (Helen Keller International Indonesia 2014) has also published a printed book on assessment guide to the Indonesian language for students that have difficulties in learning.

Assessment is a process of collecting information from students after learning in school (Wardani 2017). The information becomes the basis in the decision-making of quality learning Wahyuni & Ibrahim, (2014). (Xu & Liu 2009) stated that teachers need three essential elements in the learning process (1) knowledge on assessment, (2) implementation of assessment, and (3) professional development in assessment. Assessment will allow a teacher to identify their students' difficulties during the learning process and find the solution for them (Zainal, Priyatni, & Widiati, 2018). The assessment results will become a reference and evaluation framework to improve student's learning outcomes.

According to (Orton Dyslexia Society 2004) reading assessment is essential to identify students' reading difficulties and detect those with dyslexia. Hence, a correct intervention can be performed for them. (Alimin, Z.2013) explained that assessment is a process of collecting detailed information about an individual in making judgments and decisions. Dyslexia is a

neurological disorder with hereditary component that impairs someone's language ability. Irdamurni, et al (2018). Dyslexia has different severity levels depends on the person's difficulties in receiving and expressing language, which involves phonology, reading, writing, spelling, and counting (Orton Dyslexia Society, 1994). Dyslexia refers to a learning disability that is caused by a neurological disorder and impairs reading skills. According to Widyorini, (2017) dyslexia involves disability to recognize letters, numbers, symbols, punctuations, words, sentence analysis, dictation, reading technique, reading comprehension, and speech.

As stated in DSM 5 (Diagnostic and Statistical Manual of Mental Disorder edition 5) dyslexia is a term that refers to learning difficulties with the problem in recognizing words, failure in decoding, and inability in spelling. (Harry, 2017). Findings from research conducted in Indonesia showed that the prevalence of dyslexia in school-age is 3 –17% (Dewi, 2014). Dyslexia cases are often found in elementary school, which sometimes make the teachers confused. To solve this problem, a reading assessment instrument is needed to identify students' abilities, the type of challenge they encounter, and the causes of the difficulties. The instrument aims to provide information to professionals/ teachers and parents about the prediction of their children's skills and the possibility of their children's performance. Hence, it allows an easier process in designing the correct strategy for early intervention (Hallahan, Kaufman & Pullen. 2012).

METHOD

This research used the ADDIE model procedure which consists of several stages: Analysis; Design; Development; Implementation and, Evaluation (Sugiono, 2013). A literature study was also conducted to investigate the concept of digital literacy and determine the dimension and indicators of digital literacy. The design stage focused on the arrangement of instrument outlines from the obtained indicators. In the development stage, a reading assessment instrument was made using digital technology. The process was followed by making the guide of validation sheet for instrument appropriateness. The validation was examined by three experts and two teachers of students with dyslexia. After the validation, the experts suggested a revision on 15 items of the content (including material and purpose of learning, instruction, and assessment instrument); 12 items of language indicators (including readability, communicativeness, and appropriateness to students' development; 15 items of digital technology (including display, readability, convenience, colors, and developed instrument). Results from the experts were summarized into four categories: very good; good; fair; poor.

RESULT AND DISCUSSION

Result(s)

Results of validation from three experts and two teachers on the content developed for the assessment instrument are described in the Table 1. Table 1 shows that both aspects of content and digital technology in assessment instrument using digital technology are categorized as good. Meanwhile, validation on language aspect is categorized as very good. Thus, reading assessment instrument using digital technology is considered good for students with dyslexia. Further validation test was conducted for all categories as seen in Table 2.

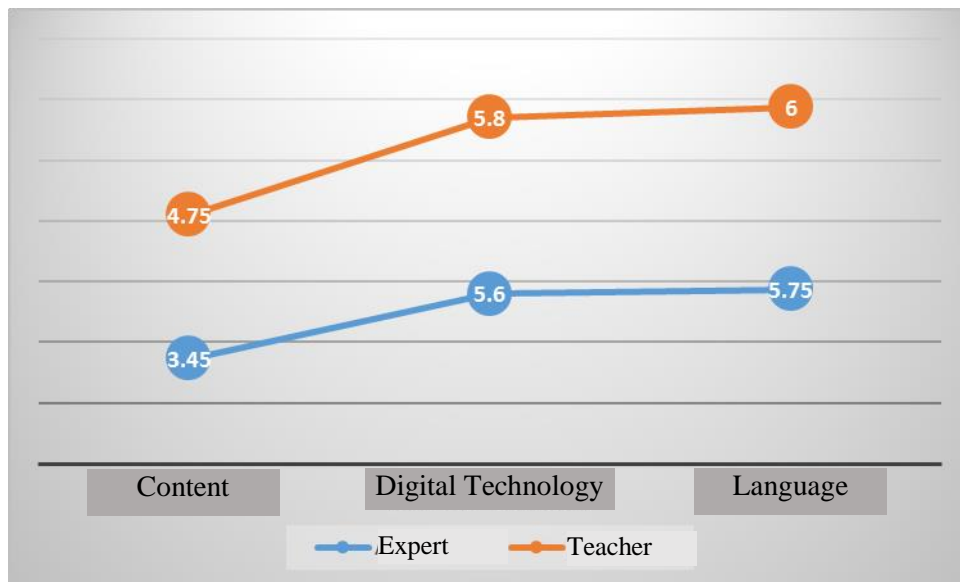
Table 1. Summary of Validation Scores from Experts and Teachers

Aspect	E1	E2	E3	T1	T2	Total	Average	Average Score	Category
Content	55	50	57	58	58	278	55.6	3.70	Good
Digital Technology	42	57	55	58	58	270	54.0	3.60	Good
Language	42	45	48	48	48	231	46.2	3.85	Very Good
Total								11.24	
Average Score								3.75	Good

Based on validation from experts and teachers, the assessment instrument developed to detect students with dyslexia is categorized as very good. In other words, the reading assessment instrument that has been developed using digital technology can be used to screen students with dyslexia.

Table 2. Summary of Validation Test from Experts and Teachers

Aspect	Expert	Teacher	Total	Category
Content	3.70	4.75	8.45	Very Good
Digital Technology	3.60	5.80	9.40	Very Good
Language	3.85	6.00	4.93	Very God
Average Score				Very Good

**Figure 1. Validation Results from Experts and Teachers**

Discussion(s)

The conversion results of the assessment instrument based on digital technology show that the instrument is good and appropriate to be used. The instrument aims to screen students with dyslexia and help teachers in elementary schools to develop a learning program for students with dyslexia. The developed assessment instrument has complied with the National Professional Certification Agency (BNSP) which meets four elements of appropriateness: the content is properly assessed; the level of difficulties is adequate for students cognitive level; the materials are easily understood; the material concept and content are relevant; the implementation of digital technology can be accessed through smartphone (Regulation of the National Professional Certification Agency, 2013).

The aspects of content and language were categorized as very good as the language used in the assessment instrument is easily understood and is appropriate for children's development in elementary school. As asserted Khalfan (2004), a child, until they are nine years old, can master up to seven languages when they are placed in a setting where they need to use the languages for daily communication. Furthermore, the language used in the assessment instrument is correct and decent. The language is suitable for students' development and the sentences are effective. The questions are provided in a communicative way that reflects direct communication with the students.

The communicative language is shown from the use of greetings, the use of the second-person point of view that belongs to students, and the use of the first-person point of view that belongs to the assessment instrument (Muslich, 2010:76). The display is also considered good as its writing system is consistent, it serves the procedures of the process, and the proportion of picture and text is centered on students. The technology used here is Articulate Storyline that improves the interaction between teachers and students (<http://belajar.kemdikbud.go.id/pelatihan>).

The final product of the assessment instrument that has been developed using Articulate Storyline is able to screen students with dyslexia. The instrument has successfully detected students with dyslexia through visual discrimination, figure-ground, visual ground, visual memory, auditory discrimination, phonological awareness, auditory memory, auditory order, and auditory combination. Irdamurni et al (2018). The instrument helps to identify the challenge that students encounter and seek the solution based on their respective challenges. Irdamurni, et al.(2019) Based on the conversion results, the reading assessment instrument is good and appropriate to be used and hence, it can be used as a reference and evaluation framework to improve student's learning outcomes.

CONCLUSSION

The results of the material expert validation test and the teacher's response to the reading assessment instrument were declared good or suitable for use. Furthermore, the overall validity results from material experts, language experts and technology experts, the reading assesment instrument developed has a good category. Based on the results of the overall expert test assessment, it is known that the digital technology-based reading assessment instrument for elementary school students is categorized as very good, meaning that the digital technology-based reading assessment instrument is suitable for use in elementary schools, to capture students with dyslexia.

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