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Feasibility of the literacy taxonomy guidebook in the digital age for high school biology teachers

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ABSTRACT

Literacy in the digital era has recently become an exciting topic in education policy, research, and practice because it is believed to be the foundation for dealing with life in the digital era. This study aimed to determine the feasibility of the literacy taxonomy guidebook in the digital era for high school biology teachers. The method used is the Research and Development (R&D) model ADDIE, which is limited to the Development stage. Data collection in this study used interview techniques and validation of literacy taxonomy guidebooks in the digital era for high school biology teachers by five validators using validation sheets and reliability tests using ICC. The validated aspects are material, presentation, language, and graphical aspects. This study found that the literacy taxonomy guidebook in the digital era for high school biology teachers received an Aiken validity value of 0.79 with a High Content Validity category, and the average reliability result using the ICC reliability formula was 0.947, with agreement between validators being on the Very Good criteria index. Thus, the literacy taxonomy guidebook in the digital era for high school biology teachers is suitable for teachers to implement literacy in the digital era in biology learning.

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INTRODUCTION

Literacy in the digital era has recently become an exciting topic trend in educational policy, research, and practice because it can positively affect human life by helping to eradicate poverty,

reduce child mortality, ensure sustainable development, and realize peace (Kholid, 2020; Munawar *et al., 2022;* Spante *et al.*, 2018; Zahroh *et al.*, 2020). In this regard, literacy in the digital era in the 21st century is now one of the essential skills believed to be the foundation for dealing with life in the digital era, both in human-individual, economic, political, social, and cultural aspects (Metiri Group, 2003; Iswanto et al., 2019). According to UNESCO (The United Nations Educational, Scientific and Cultural Organization), literacy is reading and writing with an understanding of simple, short sentences about everyday life (EFA Global Monitoring Report, 2005). In the digital era, literacy now has a broader meaning, namely an ability in a particular field that can be used in the age of digital technology, which means that literacy today is not just reading through words but also involves the use of various technologies and communications that can help understand the world and express identity, ideas and culture (Asrizal *et al.*, 2017; Rosyadi *et al.*, 2022). Reinforced in the document of Law of the Republic of Indonesia Number 3 of 2017, Article 1, paragraph 4 on the book system, literacy is "the ability to interpret information critically so that everyone can access science and technology as an effort to improve their quality of life".

Concerning literacy, Indonesia itself is currently still concerned. Referring to PISA (Program for International Student Assessment) data that measures reading, math, and science skills, Indonesia, out of 65 countries in 2012, ranked 62nd in reading skills, 64th in math skills, and 64th in science skills. Indonesia, in 2015, out of 70 countries, ranked 61st in reading ability, 64th in math ability, and 62nd in science ability. In 2018, Indonesia's literacy out of 78 countries ranked 73rd in reading and math skills and 71st in science skills (OECD, 2014, 2016, 2019). From the INAP (Indonesia National Assessment Program) data, which measures students' reading, mathematics, and science skills through evaluation activities, the reading ability score of Indonesian students is 46.83%, which means that the reading ability of Indonesian students is still lacking (Wiratsiwi, 2020). Furthermore, based on the reading literacy activity index in 34 Indonesian provinces in 2018 regarding the dimensions of skills, alternatives, culture, and access, it is known that overall it is still in the low category and West Kalimantan province is one of them, which is in the third lowest position (Solihin *et al.*, 2020) As seen from UNESCO data (2012), Indonesia's literacy is currently also at the second lowest level, ranking 60 out of 61 countries, which means that Indonesian children have an interest in reading only 0.001%, namely there is only one person who has an interest in literacy out of 1,000 people in Indonesia (Hastuti & Lestari, 2018). Judging from the various data presented, Indonesian literacy has not been included in good results because there have been no significant changes in several tests.

Literacy in the digital era as a 21st-century skill needs to be improved through education to become a quality human being in utilizing technological advances as well as information flow effectively and efficiently (Lestari & Nuryanti, 2022; Rosyadi *et al.*, 2022; Sentoso *et al.*, 2021). For this reason, efforts to improve literacy in Indonesia need to be carried out through education, one of which is through biology learning activities. Biology (science) is one of the 21st-century subjects and themes important for students to master (Partnership 21st Century Skills, 2015). Biology is also the basis for mastering various literacies (multiliteracies) in the digital era and as an effort to create quality human resources. Thus, in this digital era, the role of biology learning is important in empowering students to have 21st-century skills, especially literacy skills in the digital era (Rosyadi et al., 2022). For this reason, biology teachers must be ready and able to implement literacy in the digital era in teaching and learning activities so that teachers can strengthen their understanding of various aspects such as curriculum, systems, management, models, strategies, and learning approaches (Rosyadi *et al.*, 2022).

Based on interviews with biology teachers of SMA Negeri 1 Sengah Temila, biology teachers of SMA Negeri 2 Sengah Temila, and biology teachers of SMA Negeri 2 Pontianak, in learning biology literacy in the digital era has been implemented, but only limited to basic literacy,

science literacy, ICT literacy, and environmental literacy. In contrast, biology learning does not implement economic, financial, cultural, and global literacy because there is no guidebook that contains economic, financial, cultural, and global literacy that is in accordance with biology learning to be used as a reference for teachers, this makes teachers not apply the four literacies. In implementing literacy in the digital era in biology learning, there are obstacles faced by teachers, namely, some students at SMA Negeri 1 Sengah Temila do not concentrate, at SMA Negeri 2 Sengah Temila students do not like and are lazy in finding information from reading, and at SMA Negeri 2 Pontianak students are not very enthusiastic when teachers apply literacy in the digital era except in the digital literacy aspect. As for supporting the implementation of literacy in the digital era in biology learning, teachers do not have a guidebook that is used.

Based on the above problems, improving literacy in Indonesia through biology learning by teachers is important. For this reason, in this study, a guidebook for the taxonomy of literacy in the digital era for high school biology teachers was developed in which the guidebook is a printed learning media that includes various information and coherent procedures in the form of text, images, and so on that can guide readers to find out information interestingly and entirely with the advantages of being able to provide knowledge to educators and students, can be read repeatedly, increase teacher understanding, support teachers in implementing literacy in schools, assist and support teaching activities, and improve student learning outcomes (Bachtiar *et al.*, 2021; Basuki, 2020; Fatin *et al.*, 2022; Jesisca *et al.*, 2023; Koro *et al.*, 2022; Kurniazuhroh & Adhe, 2019; Zulaiha & Ibrahim, 2014). The taxonomy in the title of the book is not biological material, but another word for classification or grouping. In this research, the guidebook developed will discuss the theories, concepts, and guidelines for implementing the taxonomy of literacy in the digital era in biology learning by biology teachers. Thus, biology teachers as educators are very likely to be able to develop literacy in the digital era in biology learning using the guidebook developed. In the aspect of implementation, it is carried out by including elements and literacy activities in the digital era in biology learning because, based on research by Pratiwi, Cari, & Aminah (2019), literacy has a direct relationship with learning, this can increase knowledge, understanding, and awareness of the demands of the digital era. Literacy in the digital era, discussed in the guidebook, includes basic, science, economic, financial, ICT, cultural, environmental, and global literacy. With this guidebook, biology teachers will find it easier to implement literacy in the digital era in biology learning activities to improve the competence of biology teachers in improving the literacy of students in the digital era through biology learning.

RESEARCH METHODS

Research Design

The method used in this research is Research and Development (R&D) with the ADDIE development model modified from Branch (2009). The ADDIE model is limited to conducting only the Analysis, Design, and Development stages to produce improved products. Due to time and cost limitations in research, implementation and evaluation are not carried out. In preparing the guidebook, the researcher refers to Haryono (2019).

Population and Samples

The population in this study is high school biology teachers in the West Kalimantan region. In this study, the samples used were 35 high school biology teachers who were civil servants or non-civil servants who taught in grades X, XI, and XII, who had teaching experience and were easily accessible, and five validators, namely two lecturers and three high school biology teachers. The sampling technique in this study was purposive sampling, which is a technique for determining samples with specific considerations (Sugiyono, 2019).

Instruments

The research instrument used is the validation sheet of the literacy taxonomy guidebook in the digital era for high school biology teachers which consists of 4 aspects of assessment, namely content/material consisting of 5 assessment indicators, presentation consisting of 3 assessment indicators, linguistics consisting of 3 assessment indicators, and graphics consisting of 5 assessment indicators. Data collection techniques are obtained from the validation sheet of the literacy taxonomy guidebook in the digital era for high school biology teachers, which consists of 4 aspects of assessment: content/material, presentation, language, and graphics. Validation assessment data uses a Likert scale, namely Strongly Agree (SS), Agree (S), Disagree (TS), and Strongly Disagree (STS) from four aspects of assessment.

Procedures

The stages of this research consist of (Figure 1): (1) the analysis stage, namely validating the performance gap through interviews and literature studies, determining instructional objectives, confirming participants who will use the guidebook, identifying information and materials that are relevant or needed for guidebook material development, making a guidebook development plan and schedule, (2) the design stage, namely conducting an inventory of tasks that need to be done, creating objectives and indicators, developing a guidebook testing strategy, (3) the development stage, namely developing material related to literacy in the digital era in biology learning, developing products through making guidebook storyboards, developing product usage guides, and developing assessment tools in the form of validation sheets, and (4) validating products which then analyze the results of validation using Aiken's validity analysis and analyze reliability using ICC, and revise products according to validator comments and suggestions.

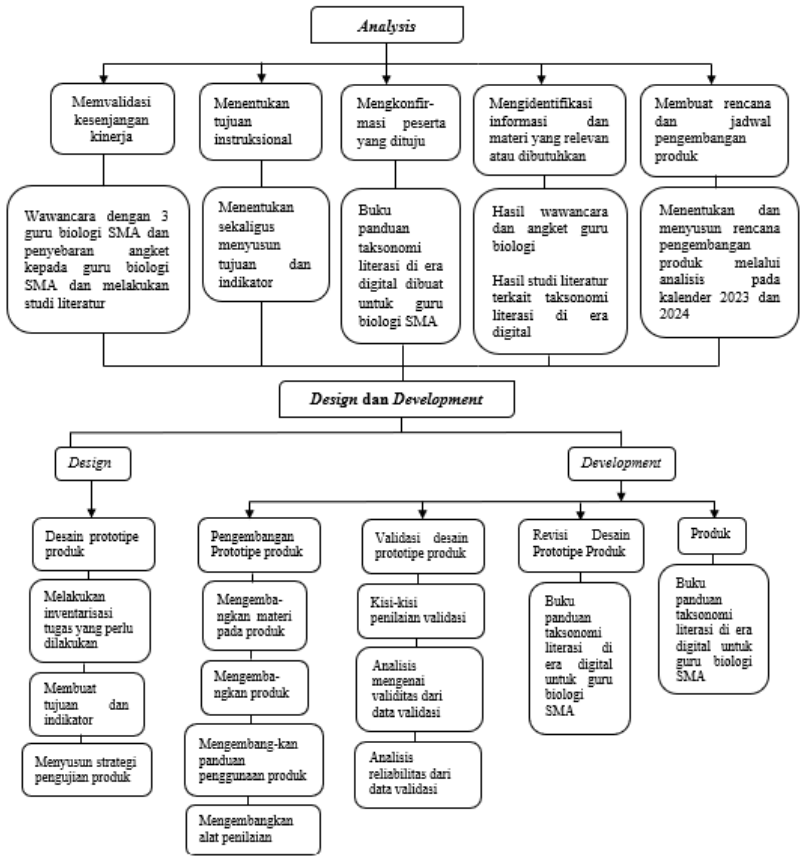

Figure 1. Research flow

Data Analysis

The data analysis technique used was data analysis of validation results with five validators as experts in guidebook assessment. After five validators assessed the guidebook, the validation data were analyzed using Aiken's validity analysis from Aiken (1985). The formula used is:

$$V = \sum s / [n(C-1)]$$

Description:

s : $r - l_o$
l_o : The lowest validity score (in this study = 1)
c : The highest validity score (in this study = 4)
r : The score given by a rater (validator)

The guidebook can be declared valid if the results of Aiken's validity analysis calculation are in the range of 0.80 - 1.00 (very high validity), 0.60 - 0.79 (high validity), and 0.40 - 0.59 (moderate validity) (Sutama *et al.*, 2014). As for the provisions of the eligibility criteria, they are listed in Table 1.

Table 1. The provisions of the eligibility criteria are as follows

Assessment Aspects	Achievement Indicators	No Item
Contents/Materials	1. The suitability of the material reflects the relevant background to the use of the handbook and the arrangement of the material in each chapter to the goals to be achieved	1
	2. Suitability and completeness of understanding in the implementation steps of each literacy taxonomy in the digital era	2
	3. The material is up-to-date with the development of education in the industrial revolution 4.0 of the 21st century and does not cause misconceptions	3
	4. Material compatibility with illustrations, graphics, data tables, and images	4
	5. Reliability of references, information, and citations	5
Presentation	6. The material is presented sequentially and systematically, starting from simple to complex concepts and from concrete to abstract	6
	7. Compatibility with the structure of the handbook	7
	8. There are instructions on the use of books and guides on learning steps in each literacy taxonomy in the digital age	8
Language	9. The grammar in the guidebook is by PUEBI (General Guidelines for Indonesian Spelling) and reads clearly	9
	10. The terms used are standard by the Great Dictionary of the Indonesian Language (KBBI) and efficient	10
	11. The language used is according to the user's level of cognitive and emotional development	11
Graphics	12. The layout of the illustrations and various elements on the title page or cover is attractive and by the content	12

Assessment Aspects	Achievement Indicators	No Item
	being discussed	
	13. The type and size of the letters on the cover are proportional and clear, so that they can attract the interest of the user to read them	13
	14. The layout of chapter and sub-chapter titles, as well as illustrations and descriptions, is clear and attracts users to study the content	14
	15. The illustration has an interesting mix of colors and high resolution	15

The ICC reliability value was calculated using the validity data obtained, referring to Koo & Li (2016) with the formula:

$$\rho = \frac{MS_R - MS_E}{MS_R + \frac{MS_C - MS_E}{n}}$$

Description:

MS_R : Mean square for rows
MS_E : Mean square for errors
MS_C : Mean square for columns
n : Number of subjects

The guidebook can be declared reliable if the results of the calculation of the ICC reliability analysis are at an index of 0.5 ≤ ICC ≥ 0.75 with a moderate category and an index of 0.75 ≤ ICC ≥ 0.9 with a good category and >0.9 with a very good category (Koo & Li, 2016).

RESULTS

The literacy taxonomy guidebook in the digital era for high school biology teachers is the result of development and literature studies related to literacy in the digital era and high school biology learning. This guidebook contains nine chapters, consisting of chapter 1, the nature of literacy; chapter 2, literacy in the digital era; chapter 3, basic literacy taxonomy; chapter 4, science literacy taxonomy; chapter 5, economic and financial literacy taxonomy; chapter 6, ICT literacy taxonomy; chapter 7, cultural literacy taxonomy; chapter 8, environmental literacy taxonomy; and chapter 9, global literacy taxonomy. The guidebook has been tested for feasibility through validation. The results of the validation of the literacy taxonomy guidebook in the digital era for high school biology teachers are presented in Table 2.

Table 2. Analysis of the validation results of the literacy taxonomy guidebook in the digital era for high school biology teachers

Validator	Assessment Indicators																Total
	I	2	3	4	5	6	7	8	9	I0	I1	I2	I3	I4	I5	I6	
Validator 1	4	4	4	3	4	4	3	4	3	4	4	4	4	3	3	3	58
Validator 2	4	3	3	3	3	4	3	4	4	3	3	3	3	4	3	3	53
Validator 3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	48
Validator 4	4	4	4	4	3	4	4	4	4	3	3	4	4	4	4	4	62
Validator 5	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	63

The validation results were analyzed by referring to the content validity of Aiken's validity from Aiken (1985). The results of the content validity analysis of the literacy taxonomy guidebook in the digital era for high school biology teachers are presented in Table 3.

Table 3. The results of the content validity analysis of the literacy taxonomy guidebook in the digital era for high school biology teachers

Assessment Aspects	Assessment Indicators	Aiken's Validity Value	Category	Description
Content or material	1. The suitability of the material reflects the relevant background to the usefulness of the guidebook and the arrangement of the material in each chapter by the objectives to be achieved	0,87	Very high content validity	Feasible
	2. Appropriateness and completeness of understanding of the implementation steps of each literacy taxonomy in the digital era	0,81	Very high content validity	Feasible
	3. The material is up-to-date with the development of education in the Industrial Revolution 4.0 of the 21st century and does not cause misconceptions	0,81	Very high content validity	Feasible
	4. Appropriateness of material with illustrations, graphics, data tables, and images	0,75	High content validity	Feasible
	5. Reliability of references, information, and citations	0,81	Very high content validity	Feasible
Presentation	6. The material is presented coherently and systematically, starting from simple to complex concepts and from concrete to abstract things	0,87	Very high content validity	Feasible
	7. Conformity to the guidebook structure	0,75	High content validity	Feasible
	8. The existence of instructions to use the book and guidance on the learning steps for each literacy taxonomy in the digital era	0,87	Very high content validity	Feasible
Language	9. The grammar in the guidebook is in accordance with PUEBI (Pedoman Umum Ejaan Bahasa Indonesia) and is clearly legible	0,81	Very high content validity	Feasible
	10. The terms used are standardized according to the Kamus Besar	0,75	High content	Feasible

	Bahasa Indonesia (KBBI) and efficient		validity	
	11. The language used is appropriate for the cognitive and emotional development level of the user	0,75	High content validity	Feasible
Graphical	12. The layout regarding illustrations and various elements on the title or cover page is attractive and in accordance with the content discussed	0,81	Very high content validity	Feasible
	13. The type and size of the font on the cover is proportional and clear so that it can attract users to read it	0,81	Very high content validity	Feasible
	14. The layout of chapter and sub-chapter headings and illustrations, along with their captions, is clear and attracts the interest of users to examine the contents	0,81	Very high content validity	Feasible
	15. Illustrations have an interesting mix of colors and high-resolution	0,75	High content validity	Feasible
	16. The illustrations shown can clarify the user's under-standing of the subject matter of the taxonomy of literacy in the digital era	0,68	High content validity	Feasible
	V	0,79	High content validity	Feasible

Based on the results of the validity analysis above, the literacy taxonomy guidebook in the digital era for high school biology teachers gets an average Aiken validity value of 0.79, which means it is in the range of 0.60 - 0.79 with a high content validity category, so it is suitable for use.

Based on the reliability test using ICC (Intraclass Correlation Coefficient) (Table 4), which refers to Koo & Li (2016), an individual value(single measures) of 0.528 was obtained with a moderate category, while the average value (average measure) was 0.947 with a very good category. These results show that there is a very good validator agreement in assessing the literacy taxonomy guidebook in the digital era for high school biology teachers.

Table 4. Reliability analysis results of the literacy taxonomy guidebook in the digital era for high school biology teachers

	Intraclass Correlation[b]	95% Confidence Interval		F Test with True Value 0			
		Lower Bound	Upper Bound	Value	dfI	df2	Sig
Single Measures	.528[a]	.252	.907	19.397	4	60	<,001
Average Measures	.947[c]	.844	.994	19.397	4	60	<,001

DISCUSSION

Content or Material Aspect

The content or material aspect consists of 5 assessment indicators. The first indicator is "The suitability of the material reflects the relevant background to the usefulness of the guidebook and the arrangement of the material in each chapter by the objectives to be achieved". This indicator received an Aiken's validity value of 0,87 with a very high content validity category. Referring to the results of the validator's assessment, the material in the literacy taxonomy guidebook in the digital era for high school biology teachers has described the background of the usefulness of the guidebook, developed with the objectives to be achieved (Figure 2a). This is in line with Jesisca, Panjaitan, & Afandi (2023) that the material to be conveyed to the reader must be accompanied by a background description with the objectives to be achieved. The urgency of the background of making this guidebook is because literacy, as the foundation of public welfare in Indonesia, has not been included in good results in several tests.

The second indicator is "Appropriateness and completeness of understanding of the implementation steps of each literacy taxonomy in the digital era". This indicator received an Aiken validity value of 0,81 with a very high content validity category. Referring to the results of the validator's assessment, the material presented in the literacy taxonomy guidebook in the digital era for high school biology teachers is appropriate and complete with the implementation steps of each literacy taxonomy in the digital era (Figure 2b). This is in line with the statement of Ambri & Arsih (2023); Arnila, Purwaningsih, & Nehru (2021) that the material must be presented sequentially and completely to make it easier for readers to understand each stage of the material.

The third indicator is "The material is up-to-date with the development of education in the Industrial Revolution 4.0 of the 21st century and does not cause misconceptions". This indicator received an Aiken validity value of 0,81 with a very high content validity category. Referring to the results of the validator's assessment, the material presented in the literacy taxonomy guidebook in the digital era for high school biology teachers is up-to-date according to the development of education in the Industrial Revolution 4.0 of the 21st century and does not cause misconceptions (Figure 2c). According to Nurcahyani (2023), the material to be conveyed in a media or learning resource must be up to date with the times so as not to be left behind by the current situation. In addition, according to Hanifah (2021), the material presented in the book must also be free from misconceptions.

The fourth indicator is "Appropriateness of material with illustrations, graphics, data tables, and images". This indicator received an Aiken's validity value of 0,75 with a high content validity category. Referring to the results of the validator's assessment, the presentation of illustrations, graphics, data tables, and images is by the material presented in the literacy taxonomy guidebook in the digital era for high school biology teachers (Figure 2a). As stated by Ersando, Muharini, Lestari, Sartika, & Rasmawan (2022), Larasati (2021), the presentation of illustrations, graphics, data tables, and images must be by the material presented so that it is not boring and can support the material presented and make it easier for readers to understand the content of the material.

The fifth indicator is "Reliability of references, information, and citations". This indicator received an Aiken's validity value of 0,81 with a very high content validity category. Referring to the results of the validator's assessment, the material in the literacy taxonomy guidebook in the digital era for high school biology teachers has been compiled based on reliable references and information, and citations on each material have been included according to the references and information in the guidebook developed (Figure 2c). As stated by Anjali & Istiqomah (2020); Jesisca, Panjaitan, & Afandi (2023); Perdana (2020), in writing using ideas or information from other sources, it is necessary to use reliable information and references, and it is appropriate to quote or include the source to avoid acts of theft or plagiarism.

(a) (b) (c)

Figure 2. (a) Materials reflect relevant and appropriate background to the infographic, (b) Understanding of literacy implementation steps, (c) Reliability of references, information, and citations

Presentation Aspect

The presentation aspect consists of 3 assessment indicators. The first indicator is "The material is presented coherently and systematically, starting from simple to complex concepts and from concrete to abstract things". This indicator received an Aiken's validity score of 0,87 with a very high content validity category. Referring to the results of the validator's assessment, the material has been presented coherently and systematically from simple to complex concepts and from concrete to abstract things (Figure 3b). According to Rahayu, Bintaro, & Murti (2023), to make it easier for readers to understand the material, it is necessary to present the material coherently and systematically.

The second indicator is "Conformity to the guidebook structure". This indicator received an Aiken's validity value of 0,75 with a high content validity category. Referring to the results of the validator's assessment, the guidebook for the taxonomy of literacy in the digital era has been developed by the guidebook structure (Figure 3b). The guidebook developed refers to Siregar & Pramesti (2017) (modified) which consists of the front cover, preface, instructions for using the book, table of contents, list of figures, list of tables, the contents section which contains literacy material in the digital era and its implementation in biology learning accompanied by descriptions, objectives, concept maps, summaries, evaluation questions, answer keys, then bibliography, glossary, index, and back cover. Concerning book writing standards, the size of the guidebook developed refers to the UNESCO standard size of 15,5 × 23 cm with top, bottom, and left margins of 2,1 cm and 2,2 cm right. According to Leo (2017), content standards and book structure need to be considered in writing, both nationally and internationally.

The third indicator is "The existence of instructions to use the book and guidance on the learning steps for each literacy taxonomy in the digital era". This indicator received an Aiken's validity value of 0,87 with a very high content validity category. Referring to the results of the validator's assessment, the guidebook developed has instructions for using the book and a guide to learning steps on each taxonomy of literacy in the digital era by the contents of the book (Figure 3a & c). As stated by Rofiqoh & Subyantoro (2020), the instructions for using the book aim to facilitate readers in using and understanding the guidebook. The purpose of the learning steps

guide in each taxonomy of literacy in the digital era is to guide and provide references to readers or teachers when applying literacy in the digital era in high school biology learning.

(a) (b) (c)

Figure 3. (a) Presentation of guidelines for using the book, (b) Presentation of material and book structure, (c) Presentation of guidelines for implementing learning steps

Language Aspect

The language aspect consists of 3 assessment indicators. The first indicator is "The grammar in the guidebook is by PUEBI (Pedoman Umum Ejaan Bahasa Indonesia) and is legible". This indicator received an Aiken's validity value of 0,81 with a very high content validity category. Referring to the results of the validator's assessment, in the literacy taxonomy guidebook in the digital era, the grammar used is generally by PUEBI. It reads, such as using capital letters at the beginning of sentences, using appropriate punctuation marks, and italicizing the writing of foreign words (Figure 4). According to Ghunu (2023), writing must use standardized language as is by the KBBI and PUEBI. In addition, writing must also be clear so that it can be read by readers (Jesisca *et al.*, 2023).

The second indicator is "The terms used are standardized according to the Kamus Besar Bahasa Indonesia (KBBI) and efficient". This indicator received an Aiken's validity score of 0,75 with a high content validity category. Referring to the results of the validator's assessment in general, the terms in the literacy taxonomy guidebook in the digital era are standardized by the Big Indonesian Dictionary (KBBI) (Figure 4). As stated by Ghunu (2023), writing must use standardized language, namely, by the KBBI and PUEBI.

The third indicator is "The language used is appropriate for the cognitive and emotional development level of the user". This indicator received an Aiken's validity value of 0,75 with a high content validity category. Referring to the results of the validator's assessment, the literacy taxonomy guidebook in the digital era for high school biology teachers has language that is by the level of cognitive and emotional development of users (Figure 4). According to Haslinda, Maghfiroh, & Fadillah (2022); Purnanto & Mustadi (2016), teaching materials or teaching media must be adapted to the cognitive and emotional development of readers so that the reading content can be understood properly by using a certain amount of knowledge to obtain messages or information in writing so that it becomes useful for readers.

Figure 4. Language presentation in the guidebook

Graphical Aspect

The graphical aspect consists of 5 assessment indicators. The first indicator is "The layout regarding illustrations and various elements on the title or cover page is attractive and by the content discussed". This indicator received an Aiken's validity value of 0,81 with a very high content validity category. Referring to the results of the validator's assessment, the taxonomy of literacy guidebook in the digital era for high school biology teachers has illustrations and various elements on the title page or cover that are attractive and appropriate to the content discussed. Even though the validity results are high, there are improvements in the cover section according to comments and suggestions from validators. The improvements made were by changing the images or illustrations and making the colors brighter because the previous book cover looked dark and had a busy impression, so it was necessary to improve the book cover to make it attractive. The design changes to the book cover are presented in Figure 5. The book cover acts as a protector for the contents of the book, which is equipped with illustrations or various interesting elements that can attract interest in reading. Hence, it is important to pay attention to the selection of interesting illustrations, and of course, they must be by the content being discussed (Fadilah *et al.*, 2021; Ilham *et al.*, 2023). In line with this, Soedarso (2015) stated that a book cover accompanied by illustrations or pictures is a gateway for readers to enter the contents of the book.

(a) (b)

Figure 5. (a) Guidebook cover before revision, (b) Guidebook cover after revision

The second indicator is "The type and size of the font on the cover is proportional and clear so that it can attract users to read it". This indicator received an Aiken's validity value of 0,81 with a very high content validity category. Referring to the results of the validator's assessment, the type and size of the letters in the literacy taxonomy guidebook in the digital era for high school biology teachers look proportional and clear, so it looks attractive. As stated by Kurnia, Sastromiharjo, Mulyati, & Damaianti (2021), proportional and clear type and size of letters can attract readers' attention and make it easier for readers to read them.

The third indicator is "The layout of chapter and sub-chapter headings and illustrations, along with their captions, is clear and attracts the interest of users to examine the contents". This indicator received an Aiken's validity value of 0,81 with a very high content validity category. Referring to the results of the validator's assessment, the layout of the chapter and sub-chapter titles, as well as illustrations and information in the taxonomy of literacy guidebook in the digital era for high school biology teachers, is clear and attractive, allowing interested users to study its contents. As stated by Sari & Anantyarta (2018), the layout of both chapter and sub-chapter titles, as well as illustrations along with clear and interesting information, can attract readers' interest. Apart from that, Jesisca, Panjaitan, & Afandi (2023); Leo (2017) also stated that when compiling a book, it is necessary to pay attention to the layout, book structure, and book content standards.

The fourth indicator is "Illustrations have an interesting mix of colors and high resolution". This indicator received an Aiken's validity score of 0,75 with a high content validity category. Referring to the results of the validator assessment, the illustrations in the taxonomy of literacy guidebook in the digital era for high school biology teachers have an attractive color combination with high resolution. According to Chairiyah & Fandi (2016); Harahap (2023), choosing illustrations and colors with high resolution can influence reading interest, so when writing a book, it is important to consider the illustrations, colors, and resolution used.

The fifth indicator is "The illustrations shown can clarify the user's understanding of the subject matter of the taxonomy of literacy in the digital era". This indicator received an Aiken's validity score of 0,68 with a high content validity category. Based on the results of the validator assessment, the illustrations used in the literacy taxonomy guidebook in the digital era for high school biology teachers can clarify users' understanding of the subject matter. This is in line with the statement by Sunantri, Suyatna, & Rosidin (2016) that the illustrations displayed in each material are to clarify the existing material.

CONCLUSION

Referring to the results of the study, it can be concluded that the literacy taxonomy guidebook in the digital era for high school biology teachers assessed from the aspects of content or material, presentation, language, and graphics get an average validity value of 0.79 with a high content validity category so it is feasible to use. The average results of the ICC reliability analysis show a reliability value of 0.947, which means that there is a very good validator agreement in assessing the literacy taxonomy guidebook in the digital era for high school biology teachers. Thus, the literacy taxonomy guidebook in the digital era for high school biology teachers is suitable for teachers to use in implementing literacy in the digital era in biology learning. Biology teachers in high school are always advised to apply literacy in the digital era in learning activities so that students' literacy can develop sufficiently so that they can become qualified individuals to face life and compete globally.

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