

Local Wisdom-Based Pictorial Teaching Materials: A Strategy for Boosting Ecoliteracy in Elementary School Students

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<p><i>pictorial teaching material;</i></p> <p><i>eco-literacy;</i></p> <p><i>indramayu local wisdom;</i></p> <p><i>primary school</i></p>	<p><i>The pervasive influence of various advertisements across multiple media platforms, promoting instant and packaged food and beverages, has contributed to the unhealthy lifestyle habits of learners. Examples include the consumption of foods or beverages detrimental to health. Non-environmentally friendly materials can also have a negative impact on the environment. Consequently, there is a need for individuals to understand and recognise the importance of consuming healthy and environmentally friendly local food. This research examined the validity of pictorial teaching materials based on the local wisdom of Indramayu, aimed at enhancing learners' eco-literacy skills. The study was conducted among fourth-grade students at Public Primary School A and B in Indramayu. The research model applied was Borg & Gall's model. The researchers validated the product based on content, language, and graphic reliability. The validation process involved three experts and two practitioners. The data validity test incorporated interviews, observations, and documentation. The results demonstrated that the content reliability was 87.50%, language validity was 89.16%, and graphic validity was 91.66%. These results indicated a category of high validity. The findings suggested that the pictorial teaching material, grounded in Indramayu local wisdom, was beneficial for further learning. Future researchers could extend this research by developing other forms of teaching materials.</i></p>

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INTRODUCTION

Background of the Study

The quality of future human resources is intrinsically linked to the development of current human resources. Optimal human resource development should prioritise primary school age, often referred to as the golden age of growth. During this developmental stage, adults surrounding children should ensure the safety of children's food consumption at schools. Numerous meals or foods at schools are unhealthy and potentially contaminated by microbes. Some foods may also contain added or harmful ingredients (Paratmanitya & Veriani, 2016; Pusdatin, 2015). According to WHO data, Indonesia lacked a food-marketing policy for children in the years 2015, 2017, and 2019 (WHO, 2020). This finding indicates that food marketing was not properly regulated, posing risks to children's health. Children with unhealthy eating habits could suffer from various health problems and experience a decline in life quality (Anggiruling et al., 2019; Sari, 2017).

The primary and influential causes of behavioural shifts in the community, particularly among school-aged children, were advertisements and food promotions on various social media platforms (Kim et al., 2016; Stuart et al., 2020; Sudargo cited by Ulilalbab, 2015). These advertisements and promotions may create artificial necessities, thus enticing children to purchase these foods and beverages. One example is sweet packaged beverages. Consumption of these beverages may lead to weight gain, resulting in low concentration, feelings of sleepiness, and decreased learning activity (Talip et al., 2017; Ulilalbab, 2015). Another frequently consumed meal is instant noodles, which contain a high amount of preservatives detrimental to children's health. The impacts of consuming these foods and beverages also extend to the environment. The packaging of these foods and beverages, often made from plastics or paper, is not environmentally friendly. Moreover, the increased waste contributes to environmental contamination (Gunadi et al., 2020; Supriatna, 2016).

Mitigating the impacts of these habits involves efforts to implement environmental management (Igbokwe, 2012). The comprehension of environmental management can be applied in schools, which serve as effective venues for education (Adela et al., 2018; Maulana et al., 2021; Spínola, 2021; Tsegay, 2016). For instance, education could introduce the concept of eco-literacy to early childhood students. Eco-literacy refers to an individual's adaptive skills in relation to their surrounding environment (Rondli & Khoirinnida, 2013; Rusmana & Akbar, 2017). Eco-literacy plays a crucial role in instilling an awareness of the importance of environmental protection (Salimi et al., 2021). This attitude is observable from the objectives, impacts, and beliefs based on environmental activities (Okur-Berberoglu, 2015). Eco-literacy encompasses cognitive, emotional, and physical domains.

The introduction and inculcation of eco-literacy are essential for children, and this can be achieved by incorporating eco-literacy into the learning process. This approach necessitates teaching materials, specifically pictorial teaching materials rooted in local wisdom. Teaching material refers to a systematically collected and arranged set of materials aimed at achieving learning objectives (Prastowo, 2017). Teaching materials are beneficial for teachers and learners with specific developmental needs. For teachers, learning is not solely dependent on textbooks. Learners become more interested, motivated, and self-directed in their learning when the development of teaching materials meets their needs (Yuanita & Kurnia, 2019). Furthermore, teaching materials can be effectively, efficiently, and joyfully utilised (Hosnan, 2016; Setiyawati et al., 2022).

Teaching materials are the references for teachers during the learning process. Thus, teaching materials are important (Nurafni et al., 2020; Setiyawati et al., 2022). One of the teaching materials is - pictorial teaching material. Pictorial teaching materials are storybooks with verbal language and pictures as the integrated media to deliver messages to readers (Mustadi et al., 2017; Nugriyantoro, 2005). The teaching materials are suitable for primary school learners because they are at the concrete

operational stage. They like stories and thinking narratively so pictorial teaching materials are useful as complementary books for the learners (Oktapyanto, 2017).

Schools, as part of a community, should also introduce the surrounding environment, including local wisdom. Local wisdom is a tradition of truth (Dwianto et al., 2017; Suastra et al., 2017; Sutarto, 2006). Local wisdom consists of facts, concepts, and community perceptions toward the original environment (Ramdani & Sapriya., 2017; Suwanti et al., 2020). By introducing local wisdom, learners can enrich their knowledge as the future generation (Budiastra et al., 2021; Dewi et al., 2019; Uge, 2019; Utari et al., 2020). Thus, local wisdom refers to a set of facts, concepts, and community perceptions in a certain environment. In this case, the community believes and culturalize the local wisdom as tradition.

Schools have the function as part of community institutions to maintain the traditional values of a community. Thus, schools have important roles to develop and preserve certain local wisdom (Istiawati, 2016; Suastra, 2017). The local wisdom of each region in Indonesia is unique and useful to foster the national character (Haryanti & Kaltsum, 2019). One of the local wisdom to foster is eco-literacy for primary school learners, by introducing healthy local foods and beverages with the local potential of a community. Local potential must be preserved (Dwianto et al., 2017). Thus, the implementation of eco-literacy requires teachers' roles to provide environmental understanding for the learners. Eco-literacy understanding with pictorial book teaching implementation provides benefits for the learners. Thus, they can choose healthy foods and beverages for their personal needs and the environment.

Problem of the Study

Teaching materials must align with the learning needs at schools and adapt to the learning objectives. However, educators may encounter challenges in sourcing eco-literacy-based teaching materials. Preliminary interviews with R and T, the principal and a fourth-grade teacher at Primary School A in Indramayu, revealed learning challenges, such as teaching eco-literacy due to a scarcity of books rooted in local wisdom that promote environmental care. The majority of books were textbooks with limited emphasis on awareness of healthy local food consumption.

These interview findings were corroborated by other teaching materials. The results indicated that the applied teaching materials did not offer potential environmental benefits, resulting in monotonous learning (Suwarni, 2015). These issues necessitate an immediate solution to prevent further difficulties in teaching eco-literacy at primary schools. The creation of pictorial teaching materials based on local wisdom could facilitate the learning process and instil eco-literacy during early childhood or primary school years. The activity was designed to aid learners' learning. In addition, the teaching material could enhance effectiveness and efficiency (Suyatman, 2013)..

Research's State of the Art

The success of previous research has demonstrated the effectiveness of implementing pictorial teaching materials grounded in local wisdom. Prior studies have found that pictures can facilitate teachers during the teaching-learning process, catering to the needs of learners (Inayah et al., 2021). Additionally, reflective pictorial teaching materials can cultivate character values and knowledge about inter-individual socialisation (Mustadi et al., 2017). Other research has discovered that local wisdom can serve as a resource for teaching and fostering eco-literacy cognition, thereby encouraging learners to appreciate nature and reduce plastic use (Supriatna, 2016).

From these study results, it is evident that pictorial teaching materials are relevant to the needs of learners. These materials can also enhance character development and knowledge of socialisation. Local wisdom emerges as a recommendation for improving eco-literacy as a strategy to reduce plastic use. Therefore, the introduction of eco-literacy is crucial at an early childhood age or at primary school. The eco-literacy package should incorporate pictorial teaching materials for instruction at primary school.

Gap Study & Objective

Prior research has centred on the development of teaching materials for students. It has been established that pictorial teaching materials can assist teachers in delivering learning content and serve as a resource for students to understand the material presented by the teacher. Furthermore, through the lens of local wisdom, students can become more engaged in learning and develop a deeper appreciation for nature, thereby reducing plastic usage. The novelty of this research lies in its discussion of the challenges in the learning process that necessitate solutions to outline the production requirements of valid teaching materials. Consequently, it is crucial to conduct a field study on pictorial teaching materials based on local wisdom to ascertain the validity of content, language, and graphics.

METHOD

Type and Design

This Research & Development applied Borg & Gall model to develop and examine the product effectiveness based on certain criteria (Gall et al., 1983). The research stages consisted of (1) preliminary study and data collection, (2) research plan, (3) product draft development, (4) initial field test, (5) product trial test revision, (6) field test, (7) field test result improvement of the product, (8) field test, (9) final product perfection, and (10) implementation and dissemination. From the stages, the researchers grouped the stages into three, shown in Figure 1.

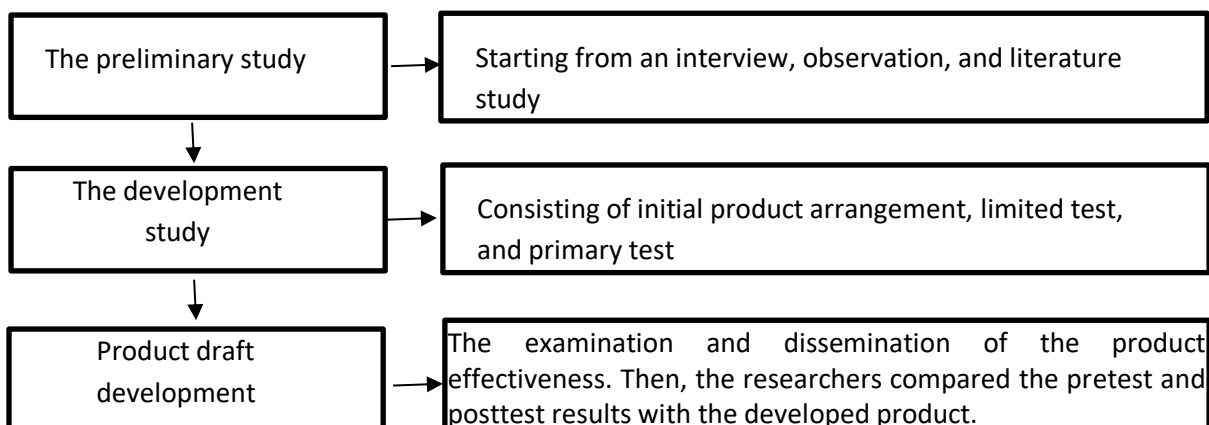


Figure 1. Development Research Procedures

The researchers examined the collected data to determine its validity and reliability. The data reliability test applied interviews, observation, and documentation from the teachers. Then, the research validation was done by comparing the instrument content and the given materials for the learners. Then, the researchers examined the reliability with the retest technique. The researchers examined the reliability based on the correlation coefficient between the first trial and the subsequent trial. Positive and significant coefficients indicated the reliable instrument (Sugiyono, 2016).

Data and Data Sources

The researchers took the fourth graders of Primary School A Indramayu and B Indramayu as the research subjects. The researchers promoted the trial test of the pictorial teaching materials based on local wisdom in the even semester of 2020/2021. The research data were quantitative and qualitative. The researchers processed the quantitative data based on the data analysis scores, such as the teaching material validation and the instrument reliability and validity. The researchers obtained qualitative data from the interview with the teachers and the learners.

In this case, the researchers invited three experts. They were SK, M.Pd as the first expert; Prof. Dr. AR, M.Pd as the second expert; Dr. Sn, M.hum as the third expert; and Prof. Dr. TJR, M.Pd as the fourth expert. Then, the researchers also involved two practitioners, En, S.Pd and VF, S.Pd. The researchers selected the experts to provide suggestions during the revising stage. The researchers also took the suggestions from the practitioners as the executors of the developed product. Eventually, these experts would determine and asses the instruments (Sari, 2014).

Data collection technique

The researchers collected the data with (1) interview to collect the initial data and to identify the problems of the fourth grader at primary school, (2) the applied documentation before developing the pictorial teaching materials based on local wisdom, (3) the test to determine the product quality, and (4) the questionnaire to obtain the data about the pictorial teaching materials, teacher responses toward the teaching material, and the learners’ responses about the learning implementation with the developed product. As for the guidelines for interviews, tests and questionnaires used, they were adjusted to be the result of development and not standard so that they could be adapted to conditions in the field.

Data analysis

The applied data analysis to determine the reliability was by combining the data from the experts for each component and each question item assessment. The assessed teaching material indicators were content, language, and graphic validity. Table 1 shows the assessment of the pictorial teaching material based on local wisdom.

Table 1. The indicators of assessing the pictorial teaching materials are based on local wisdom

Indicators	Questions
The content validity	The relevance between the learners' necessities and development, the relevance with teaching materials, the relevance between the teaching materials and the learners' life, the benefits of improving eco-literacy insight, and the relevance of the pictorial teaching material based on local wisdom and eco-literacy
Language	The readability of the teaching material, the readability of the given information, the effective and efficient implementation, the implementation of the direct and communicative language, and the relevance with the learners' developments
Graphics	The font types and sizes, the layout, the position, the graphic illustration, the figures and pictures, the interesting photographs, and the displayed design

RESULTS

The research results were the validation of the experts and the practitioners to assess the pictorial teaching materials based on Indramayu’s local wisdom. Here is the cover design of the developed product.



Figure 1. The cover design of the pictorial teaching material is based on Indramayu's local wisdom

After developing the product, the researchers examined the realizability with experts' validation. The results were the validations of the experts and the practitioners, starting from content, language, and graphic validity. Here are the validation results.

Content Validity

This aspect consisted of five indicators judged by both experts and practitioners. Table 2 shows the results.

Table 2. The assessment on the book content aspect

The assessed indicators	Scores						Total	Suggestions and Recommendations
	E1	E2	E3	E4	P 1	P2		
The relevance between the book content with the learners' necessities and developments.	3	3	4	4	3	4	21	The focused materials on signature dishes, the connection between the benefits of healthy foods and the health of the children
The teaching material adequacy	3	3	3	4	4	4	21	
The relevance with the learners' life	4	4	3	3	4	4	22	
The benefits to enrich the learners' eco-literacy insight	3	3	3	3	4	4	20	
The relevance of the pictures, local wisdom, and eco-literacy	4	3	3	3	4	4	21	
Total							105	
Percentage							87.50%	
Conclusion							Very Valid	

E: Expert; P: Practitioner

From Table 2, the experts assessed the book content by considering the teaching material was valid based on four indicators. For content validity, the experts suggested and recommended the materials to focus on signature dishes and to provide related explanations about healthy foods for children's health. The obtained result of the content aspect is 87.50%. Therefore, the researcher made improvements according to the suggestions from the validator. This improvement aims to improve the quality of teaching materials developed. The suggestions and results of improvements are detailed in Table 3.

Table 3. Suggestions from expert validators and results of revisions to teaching materials

Validator's suggestion	Revision results
The material is further focused on typical food	Teaching materials are focused on typical Indramayu food
Benefits of healthy food are associated with children's health	Linking the benefits of healthy food to children's health

Language Validity

The language validity consisted of five indicators assessed by the experts and practitioners. Table 4 shows the results.

Table 4. The language aspect assessment

The assessed indicators	Scores							Suggestions and Recommendations
	E1	E2	E3	E4	P1	P2	Total	
The teaching material's readability	4	3	4	4	3	3	21	Writing consistently and accurately
Information clarity on the given teaching materials	3	3	4	4	4	3	21	
The implementation of effective and efficient language	3	4	4	4	3	3	21	
The benefits to enrich the learners' eco-literacy insight	4	4	4	4	3	4	23	
The relevance with learners' developmental levels	4	3	3	4	4	3	21	
Total							107	
Percentage							89.16%	
Conclusion							Very Valid	

E: Expert; P: Practitioner

Table 4 shows that the experts assessed and concluded the language aspect was valid based on five indicators. The experts suggested and recommended writing consistently and accurately. The obtained result of content aspect is 89.16%.

The graphic validity

The graphic validity has four indicators to assess by both experts and practitioners. Table 5 shows the results.

Table 5. The graphic aspect assessment

The assessed indicators	Scores							Suggestions and Recommendations
	E1	E2	E3	E4	P1	P2	Total	

The font type and size used	4	4	3	3	4	4	22	-
Excellent layout and position	4	3	3	3	4	4	21	
Interesting illustrations, graphics, figures, and photographs for the learners	3	3	4	4	4	3	21	
Interesting display design	4	4	4	4	4	4	24	
Total							88	
Percentage							91.66%	
Conclusion								Very Valid

E: Expert; P: Practitioner

Table 5 presents the evaluations and conclusions, which were deemed highly valid based on the specified indicators. In this regard, the experts did not proffer any suggestions or recommendations. The content aspect yielded a result of 91.66%.

Table 6 provides a summarised account of the validation results for the developed product intended for fourth-grade primary school students. It reveals that the developed product achieved a percentage score that falls within the 'very valid' category..

Table 6. The recapitulated validation results of the developed product

Indicators	Scores	Categories
The content validity	87.50%	Very valid
Language validity	89.16%	Very valid
Graphics	91.66%	Very valid
Mean	89.44%	
Conclusion		Very valid

The results showed that the developed pictorial teaching material based on Indramayu's local wisdom was reliable to apply in the learning process, and revising teaching materials focused on typical Indramayu food and linking the benefits of healthy food to children's health. After a validation test, teaching materials are implemented through small-scale trials or limited to a single school. There is a difference in the average score and the average nGain ecoliteracy score of students on aspects of knowledge, attitudes, and skills. This was seen from before and after the implementation of the educational materials product of illustrated storybooks charged with local wisdom in the activities of the Pancasila Student Profile Strengthening Project (P5).

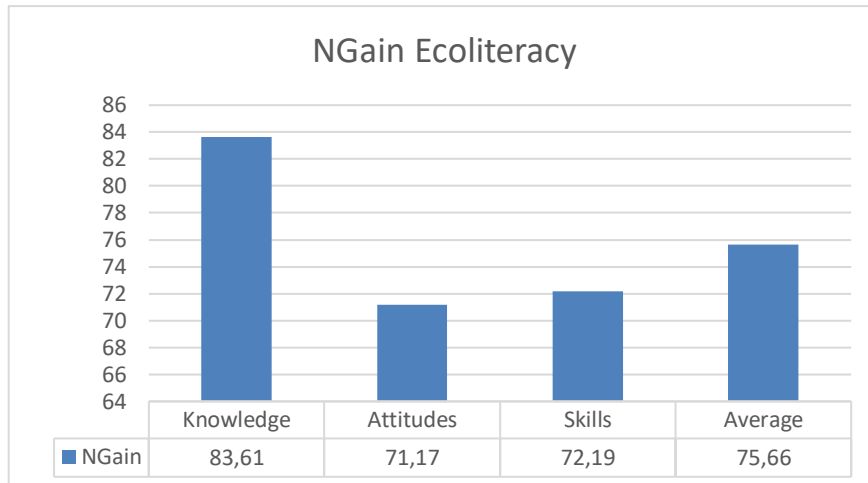


Figure 2. Average nGain Ecoliteracy Students on Product Implementation at P5 Activities

Based on Figure 2, it can be seen that there is an increase in students' ecoliteracy score on the implementation of illustrated storybook products charged with local wisdom in the activities of Pancasila Student Profile Strengthening Project. The figure above shows the average score of nGain in terms of knowledge, attitude and skills. The average score of nGain on the knowledge aspect was 83.61%, the attitude aspect value was 71.17% and the average score on the skills aspect was 72.19%.

DISCUSSIONS

The research findings, corroborated by expert recommendations, affirm the validity of the developed educational product for fourth-grade students. The pictorial teaching materials, which draw upon the local wisdom of Indramayu, have been deemed highly valid. Consequently, these materials can serve as valuable learning resources for fourth-grade students (Cahyaningrum et al., 2017). The researchers undertook a series of evaluative processes to ascertain the content validity, linguistic validity, and graphic validity of the product, thereby examining its reliability. The content validity, the first component, achieved a score of 87.50%, placing it in the 'very valid' category. This score indicates that the content of the teaching materials aligns with the learners' needs and developmental stages, is relevant to the teaching materials, connects with the learners' lives, enhances eco-literacy insight, and is pertinent to the pictorial teaching material based on local wisdom and eco-literacy.

The developed teaching materials were designed to familiarise and inculcate the habit of consuming healthy local food. This initiative aligns with the needs and development of learners aged between 7 and 12 years, who require a healthy diet to support their growth and development. The materials also serve to caution learners about the risks associated with unhealthy and hazardous meals, as depicted in Figure 2. This aligns with the assertion that the development of teaching materials should encapsulate targeted competencies, learning objectives, learning needs, and be economically viable and easily implemented (Majid, 2014; Mursalin, 2018; Prastowo, 2014). Furthermore, it should be contextual and resonate with everyday life (Noverita et al., 2021).



Figure 3. The healthy food and beverage introduction of the product.

The teaching materials that have been developed are predicated on the healthy foods and beverages indigenous to Indramayu, their benefits, and the consequences of not consuming such healthy sustenance. The product incorporates games and recipes for creating these healthy foods and beverages, enabling learners to prepare the foods as depicted in Figure 4. The importance of teaching materials in the learning process is underscored, as they cater to the needs of both teachers and learners, thereby enhancing the quality of learning (Yuanita & Kurnia, 2019). Furthermore, these materials facilitate learners in constructing knowledge and augmenting their learning efficacy (Sari, 2017).



Figure 4. The games and recipes of the local foods on the developed teaching material

The materials presented in the product bear relevance to the learners' lives. Given the significant influence of advertisements on learners' lives, it is imperative that they possess a comprehensive understanding of healthy local meals. Moreover, the local foods presented are familiar and integral to their lives. Consequently, the researchers have incorporated the topic of Indramayu's local wisdom. The teaching materials also encompass information about the surrounding locales of Indramayu, such as the Mangrove forest and the Islamic Center of Indramayu, as illustrated in Figure 5. These materials serve to enhance learners' eco-literacy awareness and equip them with the skills to address environmental issues (Afiani et al., 2022). Additional benefits include the application of the materials in daily life (Kholifah & Kristin, 2021). The learners are thus enabled to construct their knowledge, leading to a better understanding. They can comprehend the effects of consuming fast food or instant foods and beverages in comparison to local foods and beverages (Kuswandi et al., 2016).

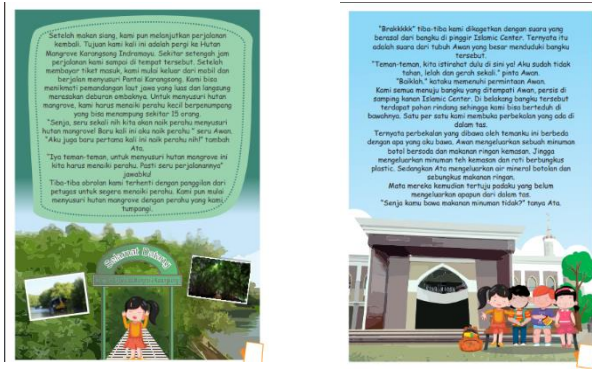


Figure 5. The introduction of the names of Indramayu's places on the pictorial teaching materials based on local Indramayu's local wisdom

The developed teaching materials had specific features, the ecoliteracy and local wisdom of Indramayu. The product could directly enrich the learners' insights about eco-literacy and local wisdom. The teachers introduced the learners with *nasi lengko*, *bubacek*, *pedesan entog*, *kerupuk kulit ikan*, *pindang gombyang manyung*, and *rumbah semanggan* as shof in Figure 6. The local Indramayu signature dishes are organic foods so they are healthy to consume. The materials encouraged the learners to avoid consumptive behaviors and live simply and modestly (Supriatna, 2016).

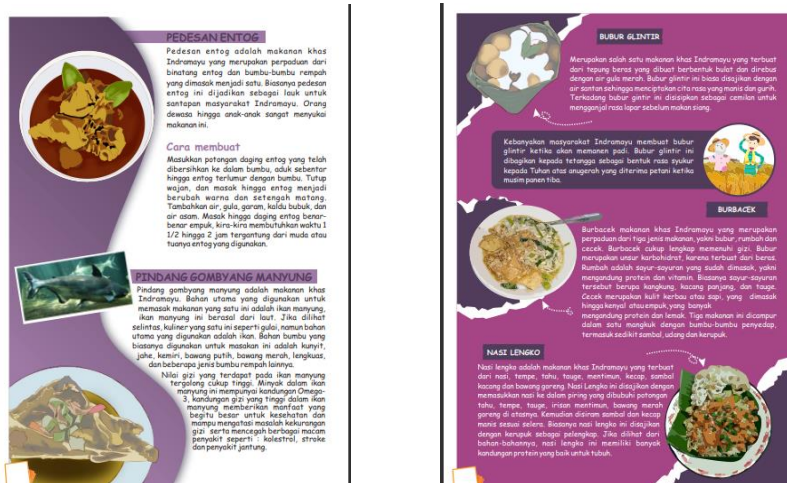


Figure 6. The introduction of Indramayu's signature dish on the pictorial teaching materials based on local Indramayu's local wisdom

Besides that, the validated language aspect of the teaching material obtained a score of 89.16%, categorized as very valid. The applied language was relevant. The given information was clear with effective, efficient, brief, and communicative language styles and met the learners' development as shown in Figure 7. Based on the development theory, primary school learners, aged between 7 and 11 years old, are at the concrete operational stage. In this stage, the learners use concrete and specific objects with examples to understand (Fatmawati et al., 2018; Oktapyanto, 2017).

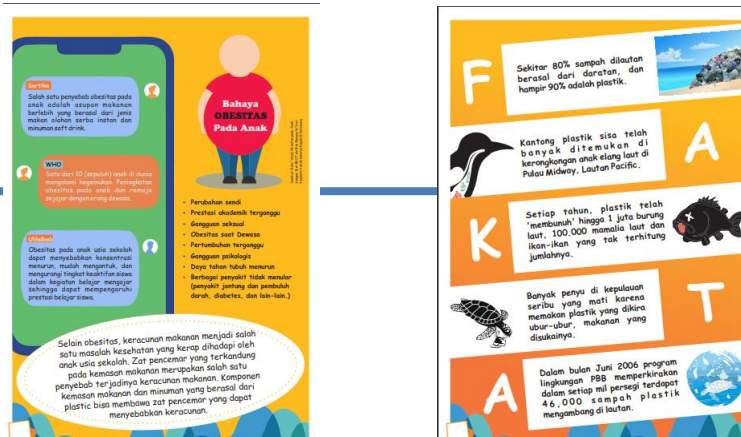


Figure 7. The example of the relevant figures with the learners on the pictorial teaching materials based on local Indramayu’s local wisdom

The graphic aspect of the developed product gained a percentage score of 91.66% with a very valid category. The validity showed that the developed product, with the font type of *comic sans ms* and the font size of 12pt. thus, the font was clear and interesting for primary school learners. Besides that, the implementations of the terms, foreign names, and symbols continuously were categorized as excellent (BSNP, 2014).

The presented materials of the product had some colorful illustrations and photographs based on the discussed materials. These components met the learners' age criteria so they were interested to learn. The relevance between the illustrations and the presented materials could facilitate teachers in explaining the materials to the learners (Gilang et al., 2017). The other finding also found that orderly arranged materials, starting from the texts, tables, figures, and attachments had to be tidy to guide the learners’ systematic thinking (BSNP, 2014). The figures made the learners easily understand the given materials compared to long text writing (Furenes et al., 2021; Haryati et al., 2022). The figures also made something abstract to be more real and applicable to sharing the learning courses and classes (Anitah, 2010).



Figure 8. The illustration example of the pictorial teaching material is based on local wisdom.

The outcomes of small-scale or limited tests indicate that the aspect demonstrating the most significant improvement was the knowledge aspect, followed by the skill and attitude aspects. Ekawati (2019) posits that the theoretical foundation of education can essentially be bifurcated into two categories. The first is the theory of association, which is inductively oriented, implying that the construction of knowledge in educational development is predicated on the units of knowledge, attitudes, and skills coalescing into a more universal unit. This theory is underpinned by the behaviourism stream, also known as the Stimulus-Response (S-R) stream, which presupposes that education is aimed at engendering new behaviours in learners through the stimulus response provided during the learning process.

The second category is field theory, which diverges significantly from the theory of associations. This theory is more deductive in nature, suggesting that knowledge is derived from a broader context to discern the truths of the units present in learning. This theory encompasses two streams:

cognitivism and humanism. According to this theory, the knowledge aspect predominates over other aspects, given that a child's curiosity often surpasses the implementation in everyday life or understanding how things function. Consequently, it can be inferred that the attitude and skill aspects require more time to influence compared to the knowledge aspect.

The inclination towards cognitive aspects taking precedence has also been noted in prior research undertaken by Murniayudi and Sujarwo (2021). The preponderance of the knowledge facet is fundamentally associated with the inculcation of character values within students. Nevertheless, this is not isolated from other facets, specifically attitude and skills. The realm of moral education is profoundly intertwined with the aspects of knowledge, attitudes, and skills.

CONCLUSION

The research outcomes underscore that the pictorial teaching material, rooted in the local wisdom of Indramayu, has been validated by a panel of three experts and two practitioners. The content validity was ascertained to be 87.50%, the linguistic validity stood at 89.165%, and the graphic validity was 91.66%. The scrutiny revealed that the results were of high validity. As a result, the aggregated validation test outcomes affirm that the developed product is fit for deployment. The implications of the research are dual-faceted - to harness the results as a benchmark for future research and to incorporate the product into the learning process. It is the responsibility of future researchers to devise other accessible teaching materials that can be employed by anyone, at any juncture, and from any geographical location, without necessitating any expenditure.

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