



Development of a Guidebook for Green Skills Implementation in Vocational Schools to Support Green Economy Transformation

Tatang Suhendra^{1*}; Lambang Subagiyo²; Abd. Basir³

¹Environmental Science, Graduate School, Universitas Mulawarman, Indonesia

^{2,3}Faculty of Teacher Training and Education, Universitas Mulawarman, Indonesia

^{1*}Corresponding Email: tatang.suhendra01@gmail.com, Phone Number: 0822 xxxx xxxx

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Abstract: The transformation towards a green economy has become one of the global priorities in addressing climate change and environmental degradation. This research aims to develop a guidebook for implementing green skills in Vocational High Schools (SMK) to support the transformation to a green economy. Green Skills are the knowledge, abilities, values, and attitudes needed to live, develop, and support sustainable and resource-efficient communities. The method used is Research and Development (R&D) with the ADDIE model (Analysis, Design, Development, Implementation, Evaluation). The research was conducted at SMK Kehutanan Negeri Samarinda, with subjects consisting of 102 tenth-grade students. The guidebook's validity, practicality, and effectiveness were tested through questionnaires and observations. The research results show that the developed guidebook meets the criteria of validity (83%), practicality (82.5%), and effectiveness (81%). This guidebook can enhance students' understanding, skills, and attitudes toward applying sustainability concepts in the context of a green economy.

Abstrak: Transformasi menuju ekonomi hijau menjadi salah satu prioritas global untuk menghadapi perubahan iklim dan degradasi lingkungan. Penelitian ini bertujuan mengembangkan buku panduan penerapan keterampilan hijau (*green skills*) di Sekolah Menengah Kejuruan (SMK) untuk mendukung transformasi ekonomi hijau. Green Skills adalah pengetahuan, kemampuan, nilai, dan sikap yang dibutuhkan untuk hidup, mengembangkan, dan mendukung masyarakat yang berkelanjutan dan hemat sumber daya. Metode yang digunakan adalah Research and Development (R&D) dengan model ADDIE (Analysis, Design, Development, Implementation, Evaluation). Lokasi penelitian dilakukan di SMK Kehutanan Negeri Samarinda dengan subjek siswa kelas X sebanyak 102 siswa. Validitas, kepraktisan, dan efektivitas buku panduan diuji melalui angket dan observasi. Hasil penelitian menunjukkan bahwa buku panduan yang dikembangkan memenuhi kriteria validitas (83%), kepraktisan (82,5%), dan efektivitas (81%). Buku panduan ini mampu meningkatkan pemahaman, keterampilan, dan sikap siswa terhadap penerapan konsep keberlanjutan dalam konteks ekonomi hijau.

A. Introduction

The transformation towards a green economy is becoming increasingly urgent worldwide, primarily in addressing the challenges of climate change and the depletion of natural resources. According to [UNEP \(2025\)](#), a green economy can enhance human well-being and reduce social injustice while mitigating environmental risks. By integrating sustainable practices, the green economy offers a path to achieving inclusive and sustainable development ([UNEP, 2025](#)).

Education plays an important role in supporting the transformation to a green economy. Vocational High Schools (SMK), as vocational education institutions, are responsible for producing graduates ready to enter the workforce and contribute to sustainable development. This aligns with the [UNESCO \(2017\)](#) statement that emphasizes the importance of education in equipping individuals with the skills needed in a green economy.

Green skills are the knowledge, abilities, values, and attitudes needed to live, develop, and support a sustainable and resource-efficient society ([UNIDO, 2022](#)). These skills include the technical, managerial, and conceptual abilities needed to produce goods and services in a way that reduces negative environmental impacts. According to [Cedefop \(2022\)](#), green skills encompass knowledge and competencies that contribute to more efficient work practices in using energy, water, and other resources and support efforts to mitigate and adapt to climate change.

Green skills, or keterampilan hijau, have become essential in supporting sustainable practices in various sectors. According to [Kamis et al \(2016\)](#), green skills encompass the knowledge, abilities, and attitudes necessary to work in fields focused on environmental preservation. Therefore, developing green skills among vocational high school students should be a priority to prepare them for global challenges ([Handayani et al., 2020](#)).

The implementation of green skills in vocational schools is not only important to meet industry demands but also to raise students' awareness of environmental issues. Data shows that environmental awareness among the younger generation is still low, with only 30% of students understanding the impact of human activities on the environment ([UNESCO, 2021](#)). Therefore, developing a guidebook for implementing green skills in vocational schools becomes highly relevant to enhancing students' understanding of the importance of sustainability ([GEC, 2020](#)).

Students' concern for the environment can also be enhanced through practical activities integrated into the guidebook. Activities such as waste management projects, tree planting, and environmental awareness campaigns can provide students with hands-on experiences. According to research by [UNESCO \(2021\)](#), practical experiences can enhance student engagement and strengthen their understanding of environmental issues.

Previous research by ([Ramli et al., 2020](#)) shows that implementing green skills in vocational schools can enhance students' awareness and skills in practicing environmentally friendly behavior, as well as support efforts to improve the quality of the environment around the school. This is in line with the study conducted by [Nizaar \(2022\)](#), which states

that green skills have become an important need in the workforce sector today, in line with the increasing demands of the job market for workers with environmental awareness.

Although the importance of implementing green skills in vocational schools (SMK) is recognized, there is a lack of educational resources, such as guidebooks that integrate sustainability concepts. A study by [Arfandi & Sampebua \(2021\)](#) shows that 85% of teachers in vocational schools feel they lack adequate resources to teach green skills. This indicates the need to develop a guidebook that can serve as a reference for educators ([Mayer & Fiorella, 2021](#)).

The Indonesian government has shown commitment to supporting the transformation of the green economy through various policies. In the National Action Plan for Climate Change (RAN-API), the government has set targets to reduce greenhouse gas emissions and increase the use of renewable resources ([Ministry of Environment and Forestry, 2021](#)).

Although there is awareness of the importance of green skills, their implementation still has many challenges. One of the main challenges is the lack of training for teachers in teaching sustainable concepts. According to research by [Arwan et al \(2021\)](#), 65% of vocational school teachers feel inadequately trained to integrate green skills into their teaching. This indicates educators' need for professional development programs ([Tuljannah & Khabibah, 2021](#)).

Guides can serve as important tools in the learning process. According to [Baharun \(2017\)](#), a comprehensive guidebook can help teachers deliver material more effectively and provide students with a better understanding of green skills. Therefore, developing a specific guidebook for applying green skills in vocational schools is essential.

The preparation of a practical guidebook requires an understanding of user needs. According to [Mayer & Fiorella \(2021\)](#), when designing a guidebook, it is important to consider cognitive learning theory to absorb the material more easily. This includes using explicit schemes, gradually organizing information, and illustrations supporting text comprehension.

Besides information presentation, the guidebook must also pay attention to readability. According to [Janan & Wray \(2014\)](#), the readability of a text can be improved by choosing simple words and avoiding using technical terms that are difficult for lay readers to understand. In this context, the preparation of the guidebook must be adjusted to the understanding level of the target users.

Thus, the guidebook is essential in supporting the effectiveness of learning, training, and operations in various fields. Therefore, the design of a good guidebook must pay attention to aspects of structure, clarity, and suitability to user needs.

This research aims to develop a guidebook for implementing green skills in vocational high schools (SMK) with diverse local contexts that can support the transformation of the green economy. Providing relevant and practical resources is hoped to help teachers and students implement green skills in the learning process and daily life. This research is expected to make a tangible contribution to improving education quality in

vocational schools and support the government's efforts to create a sustainable green economy (Partnership for Action on Green Economy, 2021).

B. Method

1. Location and Time of Research

This research was conducted at SMK Kehutanan Negeri Samarinda, located in Samarinda, East Kalimantan Province, a vocational school under the Ministry of Environment and Forestry (KLHK). The selection of SMK Kehutanan Negeri Samarinda as the research location is based on several reasons. SMK Kehutanan Negeri Samarinda specializes in forestry, which is highly relevant to the research theme, namely the development of a guidebook for applying green skills in supporting the transformation to a green economy. Forestry is an important sector in managing the environment and natural resources sustainably, so applying green skills to students at SMK Kehutanan Negeri Samarinda is very strategic in supporting the green economy in the future. When the research was conducted, SMK Kehutanan Negeri Samarinda used an independent curriculum.

This research was conducted over six months, from September to December 2024. This time frame was chosen to ensure that the entire process of developing and implementing the green skills guidebook can be carried out comprehensively, from the stages of material preparation, development, testing, and evaluation.

2. Subject and Object of the Research

The research subjects are parties related to the research (informants or sources) to obtain information related to the research data, which is a sample from a study (Sugiyono, 2017). In this study, the research subjects are 10th-grade students of the State Forestry Vocational School in Samarinda, totaling 102 students. These students were chosen as research subjects because they are at a crucial phase in developing life skills and mindsets related to environmental issues. Meanwhile, the object of the research is the thing that will be studied and investigated to obtain information and conclusions (Slamet, 2022). In this study, the object of research is the effectiveness of the implementation of green skills.

3. Type of Research

This research uses the Research and Development (R&D) type of research. Research and Development (R&D) is a research method aimed at developing new products or innovations and conducting tests to improve the quality of existing products. According to Slamet (2022), R&D is research conducted to produce a specific product and test its effectiveness. In the context of this research, R&D was chosen because its main objective is to produce a green skills guidebook that is theoretical, practical, and aligned with the needs of Vocational High School (SMK) students. The approach used in this research is the ADDIE model. The ADDIE model is an instructional design model with five stages: Analysis,

Design, Development, Implementation, and Evaluation. With the following development procedures:

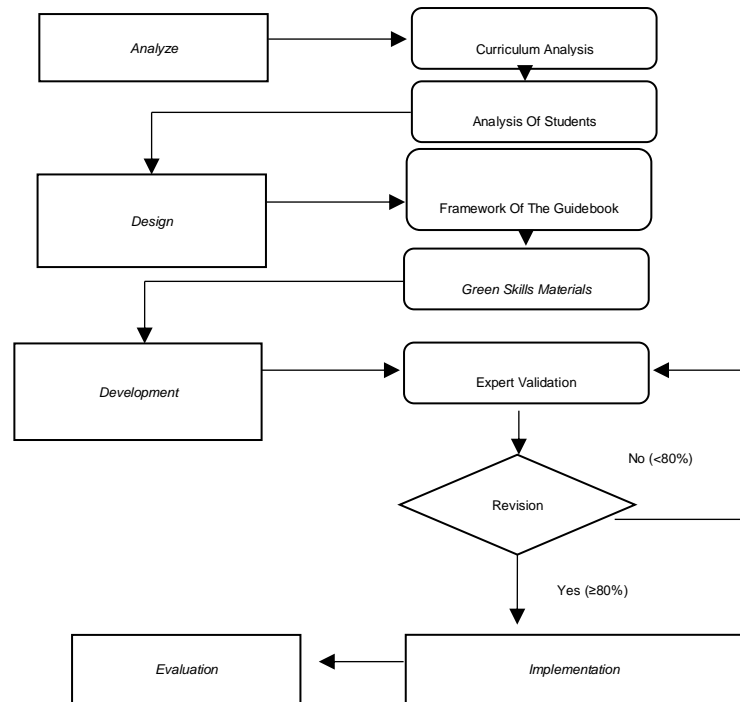


Figure 1. Research Procedure

4. Data Collection and Analysis Techniques

The research instruments include validation questionnaires by education and environment experts, teacher practicality questionnaires, and student effectiveness observations. Data is analyzed quantitatively and qualitatively to assess the guidebook's validity, practicality, and effectiveness. The indicators of green skills used are cognitive competence, intrapersonal competence, interpersonal skills, and technological skills (Pavlova, 2018). Quantitative analysis uses the formula:

$$\text{average score} = \frac{\text{the sum of all the average scores}}{\text{the total number of average scores}} \times 100$$

With the following product criteria:

Table 1. Product Criteria

Score	Category	Evaluation (%)
5	Very Effective, Valid, Practical	≥ 90,00%
4	Effective, Valid, Practical	80,00 - 89,99 %
3	Quite Effective, Valid, Practical	70,00 - 79,99 %
2	Less Effective, Valid, Practical	60,00 - 69,99 %
1	Not Effective, Valid, Practical	≤ 59,99 %

Source: (Hakim et al., 2023)

C. Result and Discussion

Result

Based on the development research, the results encompass the entire process within the development model, namely the ADDIE development model. The development research results are summarized into stages based on the ADDIE development model, which consists of 5 stages: analysis, design, development, implementation, and evaluation (Slamet, 2022).

1. Stage Analysis

At this stage, an analysis of the curriculum and students is conducted to support developing and implementing the green skills guidebook. Data were collected through the analysis of documents related to the curriculum and education policies in Indonesia and the characteristics of students' learning styles.

During the research, the curriculum used by the State Forestry Vocational School of Samarinda was the independent curriculum. Ministry of Education and Culture (2022) initiated the independent curriculum as a response to the changing needs of education that are more flexible and adaptive to the times.

This curriculum aims to create meaningful and practical learning in enhancing faith, devotion to God Almighty, and noble character, as well as fostering creativity, feelings, and will among students as lifelong learners with Pancasila character, as stated in the Indonesian Ministry of Education and Culture Regulation number 12 of 2024 concerning the curriculum for early childhood education, basic education, and secondary education levels. This curriculum consists of several main components, namely the curriculum structure, intramural components, and extracurricular and co-curricular activities, all of which aim to support students' holistic development (knowledge, skills, and character).

The structure of the independent curriculum consists of several main elements that differ from the previous curriculum, namely the 2013 curriculum. The most striking difference is the increased flexibility in determining the subject matter and teaching strategies. One of the important components is the Pancasila Student Profile Strengthening Project (P5), which emphasizes character education through project-based activities by the values of Pancasila (Kemdikbud, 2022). Another component is Learning Outcomes (LO), which replaces competency standards by focusing on developing abilities that align with students' developmental stages and society's needs. In addition, the allocation of learning time is also more flexible, allowing schools to adjust the duration of annual learning according to local needs and conditions.

The intramural components of the independent curriculum include structured learning through mandatory subjects at each educational level. This curriculum focuses on a student-centered approach, where teachers can adjust teaching methods based on students' interests, talents, and needs. Subjects such as the Indonesian language, mathematics, and IPAS remain central, but the teaching methods are more contextual to the local environment and current issues. Differentiated learning is an important approach in this component, where teachers adapt teaching methods to meet the needs of various

student learning styles. Technology also plays an important role in the intramural component, especially in developing 21st-century skills such as digital literacy and collaboration.

The co-curricular components in the independent curriculum include activities that support the development of student's skills outside the classroom but are still related to the primary curriculum. One important aspect of the co-curricular component is the Pancasila Student Profile Strengthening Project (P5), which is integrated into thematic activities and projects (Kemdikbud, 2022). This project supports the development of academic skills and students' character and social skills, such as empathy, cooperation, and leadership. Additionally, interdisciplinary projects often involve local content and entrepreneurship, which aim to develop students' holistic understanding of real-world issues, such as the environment and sustainability (International Labour Organization, 2019).

Extracurricular components in the independent curriculum are designed to support students' interests, talents, and skills beyond the core curriculum (Subhkan & Wahyudin, 2024). Extracurricular activities involve various activities such as sports, arts, music, and technical skills that support 21st-century learning. These components are important for students' character development, such as independence, social responsibility, and the ability to work together in teams. Extracurricular activities also allow students to explore their interests and develop potential that may not be found in formal classes.

The independent curriculum provides a more flexible and adaptive approach than previous curricula, with intramural components emphasizing teaching focused on relevant learning outcomes, co-curricular components supporting the development of fundamental skills, and extracurricular components providing space for students to explore their interests and talents. This curriculum creates a more holistic and learner-centered educational ecosystem (Sebastian et al., 2024).

The student analysis phase was conducted using the results of the psychological test documents upon entering the State Forestry Vocational School in Samarinda. It aims to identify students' learning preferences to deliver the material optimally according to their characteristics. The results of the psychological tests conducted on 102 students show that the students' learning styles are divided into three main types: visual, auditory, and kinesthetic. The distribution of the psychometric test results is as follows: visual learning style 49% (50 students), auditory learning style 27% (28 students), kinesthetic learning style 24% (24 students).

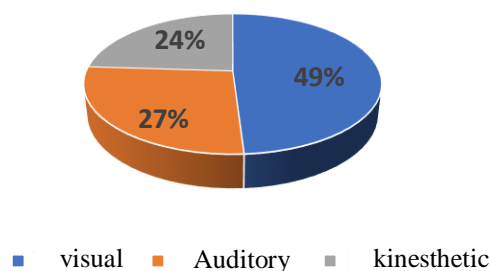


Figure 2. Student Learning Style Data

The results of this learning style analysis serve as an important foundation in designing a practical green skills application guidebook. Most students (49%) have a visual learning style, so the learning materials should emphasize visual elements such as diagrams, graphs, videos, and concept maps. However, to support students with auditory and kinesthetic learning styles, a variety of materials is also needed, such as audio explanations for auditory learners and practical tasks for kinesthetic learners.

Thus, the results of the psychometric tests indicate that developing a guidebook for applying green skills must consider three types of student learning styles to ensure the inclusivity and effectiveness of the presented material. This aligns with Paivio's (1986) findings, which state that combining various forms of information delivery, whether visual, auditory, or kinesthetic, can significantly enhance students' understanding.

2. Stage Design

The guidebook is prepared by considering the results of curriculum analysis, students' learning styles, and competency indicators such as cognitive competence, interpersonal skills, intrapersonal competence, and technological skills. The framework and content of this book include several chapters that support the understanding and application of green skills in learning.

3. Stage Development

These development stages encompass various complex and interconnected activities, ranging from designing attractive visual elements, preparing comprehensive and practical materials, and creating evaluation indicators to conducting validation and practicality tests. All visual and content aspects are meticulously designed so that this guidebook is informative, engaging to read, easy to apply, and feasible for implementation. Here are the results of the validation test by media and environmental experts, with an 83% rating falling into the eligible category. Meanwhile, the practicality test results conducted by the teacher, who scored 82.5%, fall into the practical category.

a. Expert Validation Test Results

1) Expert Media Validation Test

Table 2. Results of Media Expert Validation Test

No	Validity Aspect	Criteria for Assessment	Score Assessment
1	Content Validity	The material in the guide is relevant to the topic and the readers' needs.	5
2		The content of the guide aligns with the learning objectives to be achieved.	5
3	Construct Validity	The structure of the guide is clear and easy to understand.	4
4		The flow of material delivery is orderly and systematic.	5
5		Instructions and tasks in the guide are easy to understand.	4
6	Validity of language	The language used is simple and appropriate for the target audience.	4
7.		The style of language is appropriate for the characteristics of the readers.	4
8		There are no grammatical, spelling, or writing errors.	4
9	Display validity	Visual design (font, color, and layout) supports readability.	4
10		Images and illustrations clarify the material being presented.	4
11		The appearance of the guide is tailored to the target audience's characteristics.	4
Total Score			47

$$\begin{aligned} \text{Presentase} &= \frac{47}{55} \times 100 \\ &= 85\% \end{aligned}$$

2) Environmental Expert Validation Test

Table 3. Result of Environmental Expert Validation Test

No	Validity Aspect	Criteria for Assessment	Score Assessment
1	Content Validity	Guideline materials relevant to the concept of green skills for vocational high schools.	4
2		The guide includes environmentally friendly skills that support a green economy.	5
3		Guide to support environmental awareness and pro-environmental attitudes among vocational high school students.	4
4		The material in the guide is based on the principles of sustainability.	5
5		The guide includes knowledge about environmental impacts and ways to mitigate them.	4
6	Construct Validity	A clear and systematic guide structure to help students understand green skills.	4

No	Validity Aspect	Criteria for Assessment	Score Assessment
7.		The flow of material delivery supports a gradual understanding of environmentally friendly skills.	4
8		Instructions and exercises in the guide are adequate and practical for application.	3
9		The language used is simple and suitable for vocational high school students.	4
10	Validity of language	The language style is clear and precise in explaining the concepts of the environment and sustainability.	4
11		There are no grammatical, spelling, or technical term errors that could hinder understanding.	4
12		Visual design (fonts, colors, and layout) supports understanding and interest in green skills.	4
13	Display validity	Images and illustrations help explain the practices and environmental impacts of green skills.	4
14		The guide's appearance is tailored to the characteristics and interests of vocational high school students.	4
Total Score			57

$$\begin{aligned} \text{Presentase} &= \frac{57}{70} \times 100 \\ &= 81\% \end{aligned}$$

Therefore, the validity level of the guidebook:

$$\frac{85+81}{2} = 83\% \text{ (valid category)}$$

b. Practicality Test Results

Two teachers conducted the practicality test.

Table 4. Practicality Test Results

No	Validity Aspect	Criteria for Assessment	Score Assessment	
			Teacher 1	Teacher2
1	Ease of Use	The guidebook is easy for teachers and students to understand.	4	5
2		The instructions in the manual are clear and easy to follow.	4	4
3	Suitability with Conditions	The guidebook is relevant to the learning conditions in vocational schools.	4	4
4		The guide is based on the facilities and resources available at the school.	5	5
5		The guide can be used for self-study as well as group study.	4	4
6	Efficiency of Use	The guide includes practical activities that are relevant and easy to implement in the school environment.	4	5
7		The environmentally friendly instructions in the book are easy for students to understand and apply.	4	4

No	Validity Aspect	Criteria for Assessment	Score Assessment	
			Teacher 1	Teacher2
8	Visualization	The appearance of the guidebook attracts students' attention to read and apply it.	3	3
Total Score			32	34

$$\begin{aligned} \text{Presentase} &= \frac{(32+34)/2}{40} \times 100 \\ &= \frac{33}{40} \times 100 = 82,5\% \text{ (practical category)} \end{aligned}$$

The validation and practicality testing stages aim to ensure that the green skills implementation guidebook meets high standards of quality and relevance and is easy to use in the learning process at vocational schools. Validation from environmental and educational experts ensures that the content of the guide meets academic standards and accurate sustainability concepts, while practical testing by teachers guarantees that the guide is applicable and practical when implemented in teaching. With these stages, the guidebook for applying green skills can be a practical tool to shape a generation ready to support sustainability and actively participate in the green economy.

4. Stage Implementation

The implementation phase was conducted from November 11 to 22, 2024, with 102 tenth-grade students at SMK Kehutanan Negeri Samarinda. The green skills guidebook was trialed in learning activities to develop green skills in the context of a green economy through waste management, with teachers acting as facilitators. This stage aims to assess the effectiveness of the guidebook, which has undergone validation and practicality tests by teachers, to be used effectively in learning activities and identify aspects that require improvement during its implementation process. This implementation is carried out with a planned approach and involves several key steps to ensure that the learning outcomes align with the intended objectives. The trial was conducted during extracurricular activities in the P5 learning hours and the local content curriculum, organized in a block system and using the project-based learning (PjBL) method. The results of the observations during the learning process are:

Table 5. Observation Results

Indicator	Average Score (%)	Category
Cognitive Competence	80	Effective
Intrapersonal Competence	84	Effective
Interpersonal Skills	80	Effective
Technology Skills	80	Effective
Average	81	Effective



Figure 3. Implementation of the Guidebook

5. Stage Evaluation

The evaluation stage follows up on the criticism or suggestions from experts and teachers, which are important inputs for developing the green skills guidebook that has been created. After the product has been improved based on all the feedback and suggestions from the respondents, the green skills implementation guidebook will meet the criteria of being valid, practical, and effective for use in learning.

Discussion

From the research results on the development of the green skills guidebook at the State Forestry Vocational School in Samarinda. This discussion is structured by referring to the three main aspects evaluated in the research, namely the validity, practicality, and effectiveness of the guidebook and its relevance in supporting the green economy transformation and sustainable development.

Based on the validation test results involving education and environmental experts, the green skills guidebook developed in this research obtained a validity percentage score of 83%, which falls into the eligible category. This indicates that the guidebook has met good quality standards, particularly in content, language, and construction. This validity includes aligning the material with the expected learning outcomes, relevance to contemporary environmental issues, and the simplicity of the language that facilitates user understanding.

The material compiled in this guidebook is deemed relevant to the needs of vocational education focusing on green skills, which are crucial in supporting the green economy transformation. The validity of this guidebook aligns with the principles of sustainable education as stated by UNESCO (2017), where sustainable education must equip students with relevant skills to address environmental and social challenges.

Based on the practicality test results, the developed green skills guidebook received a practicality percentage score of 82.5%, which falls into the practical category. This indicates that the guidebook is easy for teachers to use and can be well implemented in the learning process at the State Forestry Vocational School in Samarinda.

The practicality of this guidebook is also evident from its flexibility of use. Teachers can quickly adapt this guide to the needs of students and local conditions. Students involved in the trial also feel that this guide helps them better understand green skills concepts, as the material is presented gradually and supplemented with relevant real-life examples.

The results of the effectiveness test show that the developed green skills guidebook successfully improved students' understanding, skills, and attitudes towards applying green skills in the school environment and daily life. The percentage effectiveness value of this guidebook is 81%, which falls into the practical category.

With proven effectiveness through students' understanding, skills, and attitudes, this guidebook successfully supports the transformation of vocational education toward a green economy. Students involved in environmental projects also express a greater interest in pursuing careers in sustainability-related sectors, such as renewable energy and waste management, demonstrating the long-term impact of implementing this guidebook.

The green skills guidebook developed in this research is powerfully relevant to Indonesia's green economy transformation agenda. As stated by [UNEP \(2020\)](#), the transformation towards a green economy requires active involvement from all layers of society, including the education sector. This guidebook provides a clear framework for vocational high school students to understand their roles in supporting sustainability through individual actions and their contributions to the workplace in the future.

This guidebook helps students understand green economy concepts in a practical and relevant way. For example, students are taught about waste management concepts and directly involved in projects that support sustainability. These skills are important to prepare students to face global challenges such as climate change and to ensure that they can contribute to sectors that focus on sustainability.

D. Conclusion

The developed green skills guidebook was deemed valid with a percentage score of 83%, which falls into the eligible category. This guidebook has met the validity criteria regarding content, language, construction, and appearance. The material presented in this guide is relevant to the current vocational education curriculum, thereby supporting vocational high school students' understanding, skills, and attitudes in promoting the green economy transformation. The results of the practicality test show that this guidebook has a percentage of 82.5%, which falls into the practical category. This guidebook is considered easy for teachers to apply in the learning process and relevant to school conditions. The guide material, accompanied by practical steps, enables teachers to carry out learning activities that focus on applying green skills to support the green economy's transformation. The effectiveness of this guidebook is reflected in the test results, with a percentage score of 81%, which falls into the practical category. This guidebook has proven to enhance students' understanding, skills, and attitudes toward green skills in supporting the transformation of the green economy.

This research has significant implications for the development of vocational education in Indonesia. With the development of the green skills guidebook, this research provides an example of how sustainability can be integrated into the vocational education curriculum. This guidebook can serve as a model for developing teaching materials in other

vocational schools, especially when facing global challenges related to sustainability and the green economy transformation.

Based on the conclusions obtained, several suggestions can be made for further development in green skills education in vocational schools, and Further development is needed to expand the material in the green skills guidebook by integrating the concept of green skills with the vocational subjects available in vocational high schools (SMK). Although this guidebook has been tested at the State Forestry Vocational School in Samarinda, it is recommended to be implemented in several other vocational schools to assess its effectiveness in different contexts. To optimize the implementation of green skills in schools, it is recommended that training programs for vocational school teachers be organized. This training aims to enhance teachers' understanding of green skills and how to integrate them into daily learning. Further research is recommended to assess the long-term impact of implementing this green skills guidebook. This research can focus on measuring the contribution of green skills taught in vocational schools (SMK) to students' success in the workforce, particularly in industries engaged in sustainability and green technology. Further research can also measure the impact of changes in students' behavior towards the environment in their daily lives.

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