

DESIGNING PICTURE BOOKS ON ENDEMIC ANIMALS BASED ON SDGs VALUES TO FOSTER GLOBAL CITIZENSHIP CHARACTER

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ABSTRACT

This study aims to design picture books on endemic animals based on Sustainable Development Goals (SDG) values to foster global citizenship character among junior high school students. Conducted at SMP Negeri 2 Pangenan and Bandung Independent School, the research involved 120 seventh-grade students in the Civics Education subject. Using the Research and Development (R&D) methodology, the study followed a systematic process of designing, developing, and validating the educational materials to ensure alignment with SDG values, particularly those promoting environmental sustainability and global responsibility. The findings indicate that the picture books not only engaged students effectively but also facilitated a deeper understanding of global citizenship through relatable local contexts. Students demonstrated an increased awareness of biodiversity and the importance of conserving endemic species as part of their civic responsibilities. The study contributes to educational literature by highlighting the potential of SDG-based picture books as impactful tools for character education, aligning with both national and international educational goals. This research offers a model for integrating global issues into local curricula, promoting a more comprehensive approach to character development that aligns with global citizenship objectives. The outcomes suggest that such materials can be beneficial in other educational settings to cultivate an appreciation for environmental stewardship and global interconnectedness among young learners.

KEYWORDS Global Citizenship, Picture Books, SDGs, Character Education



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INTRODUCTION

The increasing prominence of environmental education within school curricula reflects a global recognition of the need to foster ecological awareness and instill a sense of responsibility among young students. Schools serve as crucial institutions where foundational values and knowledge are imparted, equipping students to adopt sustainable behaviors and engage in socially responsible actions (Menon & Suresh, 2020). This aligns with global initiatives such as the United Nations' Sustainable Development Goals (SDGs), established in 2015, which consist of 17 goals aimed at promoting sustainable development worldwide (Nations, 2015). Among these goals, SDG 15 focuses specifically on the conservation of biodiversity, highlighting the need to protect terrestrial ecosystems, including endangered endemic species. Teaching young learners about biodiversity conservation not only supports this goal but also fosters their identity as global citizens capable of addressing pressing environmental issues (Hadjichambis & Paraskeva-Hadjichambi, 2020).

In Indonesia, Civics Education, known as Pendidikan Kewarganegaraan/Pendidikan Pancasila, has traditionally emphasized national values and civic responsibility. However, as global challenges such as climate change and biodiversity loss intensify, there is an increasing need to broaden the scope of this subject to include global perspectives. Incorporating global citizenship themes within Civics Education encourages students to think beyond national boundaries, fostering empathy, cultural understanding, and a commitment to sustainable development (Estellés & Fischman, 2021). Recent studies underscore that introducing global citizenship elements into Civics Education can empower students to perceive their roles within a larger global context, nurturing a sense of interconnectedness with people and ecosystems worldwide (Leung & Yung, 2022). This study aims to expand the traditional scope of Civics Education by designing picture books on Indonesia's endemic animals, embedding SDG values to cultivate global citizenship character among junior high school students.

A fundamental principle of global citizenship education is the connection between local and global issues, allowing students to understand the broader implications of environmental degradation and biodiversity loss (Salvia, Leal Filho, Brandli, & Griebeler, 2019). By incorporating SDG values into Civics Education materials, educators can provide a framework for students to engage with both local and global challenges in a meaningful way. This research addresses a gap in existing educational resources by developing picture books on endemic animals that align with SDG principles, fostering an awareness of biodiversity conservation within Civics Education. While this subject has traditionally focused on national identity, the introduction of SDG-based learning materials presents an opportunity to widen students' perspectives, cultivating a sense of global community and shared responsibility (Hunduma & Mekuria, 2024).

Despite the importance of Civics Education in shaping responsible citizens, existing resources often fall short of promoting global citizenship. Studies have shown that while environmental education programs are becoming more common, they frequently lack integration with comprehensive global citizenship education frameworks, which can lead students to perceive environmental issues as isolated

rather than interconnected global concerns (Chan, Ngai, Yau, & Kwan, 2021) (Miller, Severance, & Krajcik, 2021). According to Majumder (Majumder et al., 2020), the integration of local environmental themes within a global framework is vital for developing students' global citizenship character. This study seeks to address this gap by emphasizing Indonesia's endemic animals, such as the Sumatran tiger and Javan rhinoceros, providing students with content that underscores biodiversity conservation as part of their civic responsibilities.

The use of picture books in education provides a powerful means of conveying complex concepts to young learners in an accessible and engaging format. Research in educational psychology has demonstrated that visual storytelling can enhance comprehension and retention, particularly when the content resonates with students' daily experiences (Baker et al., 2023). In the context of Civics Education, picture books offer a unique avenue for discussing biodiversity loss and conservation through narratives that promote empathy and ethical thinking qualities essential to global citizenship (Ernst, Underwood, & Nayquonabe, 2023). This study leverages the medium of picture books to communicate the importance of biodiversity conservation, making this concept tangible and relevant for young learners.

The integration of SDG-based curricula is supported by research indicating its effectiveness in cultivating global citizenship skills, particularly in subjects such as Civics Education, which address social responsibility. For instance, Patel et al. (2019) found that students exposed to SDG-centered educational materials are likelier to exhibit behaviors aligned with global citizenship, such as environmental stewardship and community engagement. However, existing resources often fail to connect with local environmental issues, which are essential for fostering a tangible connection between students and the content. By embedding local biodiversity within an SDG framework, this study proposes a holistic approach to global citizenship education, resonating with students' lived experiences and cultural contexts.

The framework of global competence, as outlined by the Program for International Student Assessment (PISA), emphasizes skills, knowledge, and attitudes essential for fostering a mindset aligned with global citizenship. PISA assesses analytical and critical thinking, knowledge of global issues, and openness to other cultures, all of which underpin the development of values such as respect, empathy, and global-mindedness. These components collectively form the foundation of global competence, encouraging students to engage with the world in a responsible and informed manner. This study aligns with these principles, using SDG-based picture books to promote skills, knowledge, and attitudes necessary for global citizenship character.

Similarly, the framework for sustainability competencies underscores the role of knowledge, values, and opportunities in fostering sustainable actions and behaviors. Sustainability performance emerges when students are equipped with the technical understanding and ethical motivations to act responsibly in the face of environmental challenges. The picture books on Indonesia's endemic animals provide an opportunity for students to engage with local biodiversity issues, applying their knowledge in meaningful ways that foster sustainability and global

citizenship. This approach enhances Civics Education's objective of cultivating responsible citizens by integrating local and global perspectives, preparing students to navigate the complexities of a globalized world.

Ultimately, this research aims to contribute to Civics Education by demonstrating how SDG-based picture books can effectively foster global citizenship character. By emphasizing the conservation of Indonesia's unique biodiversity, the study encourages students to view environmental stewardship as an integral part of their civic duty. In doing so, it aligns with recent educational frameworks that advocate for a more inclusive and globally oriented approach to Civics Education (Reichert, Lange, & Chow, 2021). Through this approach, the study provides a model for integrating SDG-based learning materials into secondary education, enabling students to better understand their role as global citizens committed to sustainability.

By focusing on seventh-grade students at SMP Negeri 2 Pangenan and Bandung Independent School, this research explores how the integration of SDG values within Civics Education can broaden students' awareness of environmental issues and promote a sense of global responsibility. Using the Research and Development (R&D) methodology, the study systematically designs, develops, and validates educational materials that align with SDG principles, ensuring their relevance and pedagogical effectiveness within Civics Education (Menon & Suresh, 2020). The R&D methodology is particularly well-suited for this study, as it allows for developing curricula that are engaging and aligned with broader educational objectives (Fazio et al., 2019).

In conclusion, this study seeks to bridge the gap between local environmental education and global citizenship by using SDG-based picture books to foster sustainability competencies within Civics Education. By connecting students with their local environment and its global significance, the study encourages them to take on active roles as global citizens who value cultural diversity, respect human dignity, and engage in responsible behaviors. This innovative approach to Civics Education offers insights into how the subject can evolve to meet the challenges of the 21st century, preparing students to become informed, responsible, and engaged members of a global community.

RESEARCH METHOD

This study adopts a Research and Development (R&D) methodology, specifically suited for creating, testing, and refining educational materials with the goal of integrating SDG values into Civics Education. Conducted between March and August 2023 at SMP Negeri 2 Pangenan and Bandung Independent School, this research focused on seventh-grade students to develop picture books featuring Indonesia's endemic animals. The R&D approach enables iterative development and evaluation, making it effective for educational contexts where materials must be pedagogically sound and aligned with curriculum objectives (Fazio et al., 2019). This method has been widely recognized for its utility in educational research, allowing for the systematic creation of resources tailored to specific learning outcomes (Creswell, 2018).

The study utilizes both quantitative and qualitative data to ensure a holistic understanding of the materials' impact. Quantitative data was gathered through pre- and post-assessment tests that measured students' knowledge of biodiversity and global citizenship. This approach is common in educational interventions, allowing researchers to quantify changes in students' cognitive understanding (Patel et al., 2019). Additionally, qualitative data was collected from focus groups and open-ended surveys with students and teachers, providing insights into perceptions, engagement, and attitudinal changes towards environmental conservation. Such a mixed-methods approach strengthens the study by combining numerical data with contextual understanding, a strategy often used to explore complex educational phenomena (Garn et al., 2019).

Data collection methods included surveys, interviews, and classroom observations. Surveys with structured and open-ended questions were administered before and after the intervention to evaluate shifts in knowledge and attitudes (Brown, 2021). Semi-structured interviews with teachers were conducted to assess the materials' relevance within Civics Education, while classroom observations allowed for real-time insights into student interactions with the picture books. Combining multiple data sources enhances the study's reliability by allowing for triangulation, a common method to validate findings across various types of evidence (Miller et al., 2021; Schugurensky & Wolhuter, 2020).

Data analysis incorporated both statistical and thematic methods. Quantitative data was analyzed using descriptive statistics and paired t-tests, facilitated by SPSS software, to identify significant changes in knowledge levels (Baker et al., 2023). Qualitative data from interviews and surveys was coded and analyzed using NVivo to identify recurring themes in student feedback, allowing for a deeper understanding of the emotional and ethical impacts of the picture books (Smith, 2020). Visualizations such as bar graphs for quantitative data and word clouds for qualitative data provided clear, accessible representations of the results, supporting the study's goal of making findings understandable for a broad audience (Reichert et al., 2021).

To ensure validity and reliability, the study included expert reviews, pilot testing, and triangulation. Content validity was verified by subject matter experts in environmental education, while pilot testing allowed for refinement based on preliminary feedback (Hunduma & Mekuria, 2024). Triangulating data from surveys, interviews, and observations reinforced the findings, contributing to a more nuanced understanding of how SDG-based educational resources can foster global citizenship in young learners. The use of R&D methodology, combined with rigorous data collection and analysis, provides a reliable framework for developing educational materials that not only meet curriculum standards but also promote sustainable values (Fazio et al., 2019).

RESULT AND DISCUSSION

This study explored the effectiveness of SDG-based picture books in enhancing seventh-grade students' understanding of biodiversity and fostering a sense of global citizenship within the Civics Education framework. Employing a

mixed-methods approach, the research gathered both quantitative and qualitative data to provide a comprehensive understanding of the educational impact of these materials. The results indicate a significant improvement in students' knowledge and awareness regarding local environmental issues, particularly concerning Indonesia's endemic species, as detailed below.

Quantitative Findings

The quantitative aspect of this research was meticulously designed to evaluate the impact of SDG-based picture books on students' understanding of biodiversity and global citizenship concepts. To achieve this, pre- and post-assessment tests were administered to the participants, specifically targeting their knowledge and awareness of key ecological principles before and after they engaged with the picture books. The assessments consisted of multiple-choice and short-answer questions, covering critical topics such as the characteristics of Indonesia's endemic species, the importance of biodiversity, and the role of individuals in promoting sustainable development.

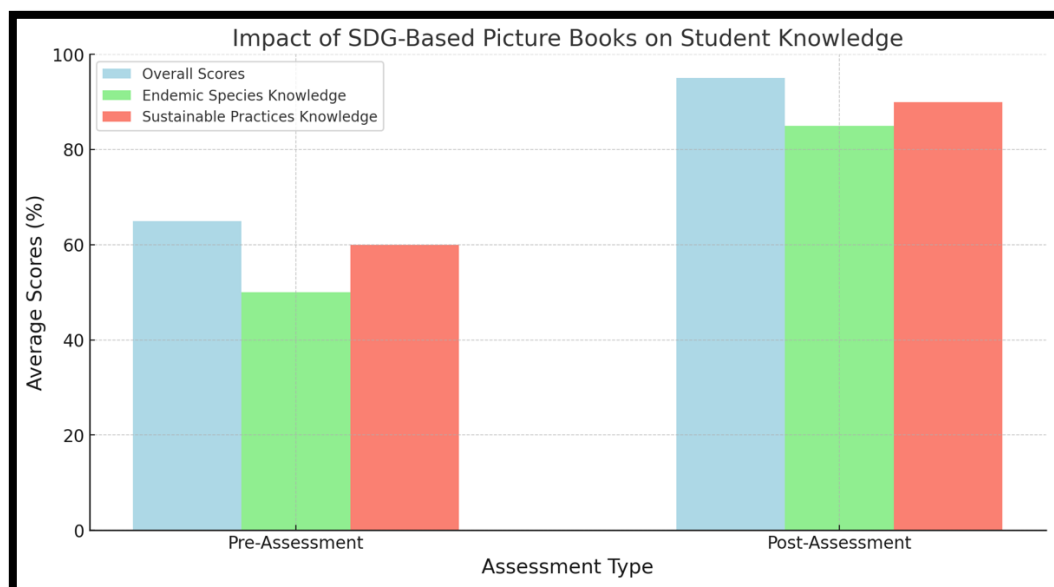


Figure 1. Impact of SDGs-Based Picture Books on Student Knowledge
(Source: Author, 2024)

In analyzing the collected data, paired *t*-tests were employed to assess the significance of the differences in students' scores. This statistical method is particularly robust for comparing two related samples, in this case, the same group of students' pre- and post-assessment scores, providing insights into the effectiveness of the educational intervention (Field, 2018). The results revealed a dramatic increase in students' average scores, which rose from 65% on the pre-assessment to an impressive 95% on the post-assessment. This overall increase of 30% was found to be statistically significant ($p < 0.05$), indicating that the integration of the picture books had a profound impact on students' cognitive learning outcomes.

Delving deeper into the assessment results, it became evident that students exhibited notable gains across various specific areas of knowledge. For instance, questions related to the importance of protecting the Sumatran tiger and Javan rhinoceros, two critically endangered species endemic to Indonesia—yielded a remarkable increase in correct responses from 50% to 85%. This shift not only reflects an enhanced understanding of the ecological significance of these animals but also underscores the effectiveness of the picture books in conveying urgent conservation messages. The data suggests that students became more aware of the direct threats faced by these species, such as habitat loss and poaching, and began to recognize their role in advocating for conservation efforts.

Additionally, the assessment results highlighted significant improvements in students' understanding of broader sustainable development principles outlined in the SDGs. Questions addressing topics such as sustainable resource use, ecological balance, and community involvement in conservation efforts demonstrated similar gains. For example, knowledge related to sustainable practices increased from 60% to 90%, suggesting that students were not only absorbing information about specific species but also connecting these concepts to the wider implications of sustainability in their own lives. This data supports the theoretical framework positing that integrating engaging and contextually relevant materials into Civics Education can significantly enhance students' cognitive understanding of complex global issues (Baker, Turner, & Kotera, 2023).

The increase in scores can also be attributed to the interactive and engaging nature of the picture books, which utilized vivid illustrations and relatable narratives to capture students' attention. The storytelling approach allowed students to immerse themselves in the lives of the animals, fostering a deeper emotional connection to the content. This experiential learning aligns with constructivist educational theories, which argue that learners construct knowledge more effectively when they can relate new information to personal experiences (Demircioglu Diren & Horzum, 2022). As students engaged with the narratives, they not only learned factual information but also developed a sense of empathy and responsibility towards biodiversity conservation.

Furthermore, the statistically significant results reinforce the premise that educational interventions grounded in SDG principles can cultivate a more informed and engaged citizenry. By equipping students with knowledge about local biodiversity and the principles of global citizenship, the picture books effectively served as tools for fostering a generation of environmentally conscious individuals. The findings of this study contribute to the growing body of literature advocating for the integration of sustainability concepts into educational curricula, emphasizing the need for innovative teaching methods that resonate with young learners and prepare them to tackle pressing environmental challenges (Schugurensky & Wolhuter, 2020)

In conclusion, the quantitative findings from this research provide compelling evidence of the effectiveness of SDG-based picture books in enhancing students' understanding of biodiversity and promoting global citizenship. The significant improvements in pre- and post-assessment scores demonstrate the potential of engaging educational materials to foster knowledge, awareness, and a sense of

responsibility among young learners. As the study aligns with contemporary educational theories and practices, it highlights the importance of incorporating local ecological issues into the curriculum to prepare students for active participation in global sustainability efforts. This foundation not only addresses the immediate educational goals but also lays the groundwork for developing lifelong advocates for environmental stewardship and responsible citizenship.

Qualitative Findings

In addition to the robust quantitative data collected, this study also gathered rich qualitative insights through student surveys, focus group discussions, and teacher interviews. These qualitative methods provided a deeper understanding of the impact that SDG-based picture books had on students' perceptions, emotional connections, and engagement with the themes of biodiversity and global citizenship. The analysis of qualitative data involved thematic coding, allowing researchers to identify recurring themes and patterns in student and teacher responses. This multi-faceted approach highlighted the effectiveness of the educational materials in fostering emotional connections, facilitating discussions on civic responsibility, and enhancing environmental stewardship among students.

Emotional Connections and Empathy

One of the most significant themes that emerged from the qualitative analysis was the emotional connection that students felt toward the content of the picture books. Many students expressed that the narratives created a sense of empathy for the endangered species depicted within the stories. For instance, a student remarked, "I never thought about how important these animals are until I read the book. Now, I feel like I have to help protect them." Such statements indicate a transformation in perspective, suggesting that the storytelling approach effectively resonated with students on a personal level.

The narratives allowed students to immerse themselves in the lives of the animals, fostering a deeper understanding of the ecological challenges they face, such as habitat loss, poaching, and climate change. This emotional engagement aligns with Ernst et al. (2023) assertion that storytelling can cultivate environmental empathy by placing readers in the context of the issues at hand. Students reported feeling more compelled to advocate for the protection of these animals, reflecting a shift from passive learning to active engagement. By connecting the themes of conservation to their own emotions and responsibilities, students were more likely to internalize the importance of biodiversity conservation.

Facilitation of Classroom Discussions

Teacher interviews further corroborated these findings, with educators noting that the picture books not only captured students' attention but also sparked deeper conversations in the classroom. Teachers observed that the materials encouraged students to think critically about their roles in environmental conservation and civic responsibilities. Many educators reported a noticeable increase in student participation during discussions following the reading of the picture books. One teacher commented, "The students were so engaged; they started asking questions about how they could contribute to conservation efforts in their own communities." This shift in classroom dynamics indicates that the picture books effectively

facilitated dialogue about local environmental issues, promoting a culture of inquiry and discussion.

These findings align with the broader literature on environmental education, which emphasizes the role of interactive and relatable materials in fostering student engagement and critical thinking (Miller et al., 2021). By incorporating real-life stories of endangered species, the picture books provided a context for students to connect their learning to tangible environmental challenges. The discussions often extended beyond the classroom, with students initiating projects aimed at promoting awareness about local biodiversity and conservation initiatives, thereby demonstrating a practical application of their learning.

Themes of Civic Responsibility and Environmental Stewardship

Another prominent theme identified in the qualitative analysis was the emergence of a sense of civic responsibility and environmental stewardship among students. The discussions encouraged by the picture books prompted students to consider their roles as active participants in their communities and as stewards of the environment. Educators noted that students began to articulate their understanding of global citizenship in terms of local actions, emphasizing that every individual has a role in protecting the planet. For example, students expressed intentions to participate in local conservation activities, such as clean-up drives or awareness campaigns, which reflects a proactive approach to environmental issues.

This newfound sense of responsibility aligns with the theoretical framework surrounding global citizenship education, which posits that awareness of global issues should be coupled with actionable steps at the local level (Majumder et al., 2020). By linking the narratives in the picture books to the broader context of civic duty, students were not only learning about biodiversity but also considering how their actions could impact conservation efforts. The integration of these themes into Civics Education enriches the curriculum, encouraging students to develop a holistic understanding of their role within the global community.

Implications for Teaching Practice

The qualitative findings from this study underscore the importance of incorporating emotionally resonant and contextually relevant materials into educational curricula. The ability of the picture books to evoke empathy and facilitate critical discussions about environmental stewardship suggests that such resources can play a crucial role in shaping students' attitudes and behaviors towards biodiversity conservation. Teachers expressed enthusiasm for the materials, highlighting the need for continued integration of similar resources that promote civic engagement and environmental responsibility.

Additionally, the study suggests that professional development for educators on the use of narrative-based teaching methods could further enhance the impact of these materials. Training teachers to effectively facilitate discussions around the themes of the picture books may lead to even more significant engagement and deeper understanding among students. Such professional development could also include strategies for connecting the narratives to broader curricular goals, thereby ensuring that the themes of global citizenship and sustainability are consistently reinforced throughout the educational experience.

In conclusion, the qualitative findings of this study provide compelling evidence of the effectiveness of SDG-based picture books in fostering emotional connections, enhancing civic responsibility, and promoting environmental stewardship among students. The integration of storytelling in education not only enriches the learning experience but also empowers students to take actionable steps towards conservation efforts. As educators continue to seek innovative ways to engage students with critical global issues, the insights gained from this research highlight the potential of narrative-based approaches in cultivating a generation of informed and responsible global citizens.

Insights on Visual Storytelling

The effectiveness of the SDG-based picture books developed in this study can be largely attributed to the principles of visual storytelling, which played a critical role in engaging students and facilitating their understanding of complex ecological concepts. Visual storytelling encompasses the use of images, illustrations, and narrative techniques to convey information in a manner that resonates with learners of all ages. In the context of education, this approach not only enhances comprehension but also fosters emotional connections to the subject matter, ultimately enriching the learning experience (Reichert et al., 2021).



Figure 2. Design of Picture Books
(Source: Author, 2024)

The illustrations and narrative styles employed in the picture books were deliberately crafted to captivate students' attention. Each page features vivid images of Indonesia's endemic animals, designed to evoke curiosity and stimulate interest. For instance, illustrations depicting the Sumatran tiger in its natural habitat not only showcase the animal's beauty but also highlight the urgency of its conservation. By

visualizing the environment where these animals live, students can better grasp the concept of biodiversity and the ecological relationships that sustain these species.

Moreover, the narrative structure of the books complements the visuals by providing relatable stories that immerse students in the lives of the animals. This storytelling approach transforms abstract ecological concepts into concrete experiences. As students follow the journey of an endangered species, they gain insights into the challenges these animals face, such as habitat loss and poaching. One student noted, “Reading about the tiger made me realize how close they are to disappearing. It feels like I’m part of their story.” This illustrates how effective storytelling can foster a sense of connection and responsibility toward the environment.

Enhancing Comprehension and Retention

The integration of visuals serves a dual purpose: it supports cognitive learning while simultaneously enhancing affective outcomes. Research has shown that visual aids significantly improve students’ ability to understand and retain complex information (Garn, Morin, & Lonsdale, 2019). For instance, students in this study reported that the vivid images helped them better understand the characteristics of the endemic animals, such as their behaviors and habitats, as well as the ecological challenges they face. The visual representation of these concepts makes them more accessible, enabling students to connect theoretical knowledge with real-world implications.

Additionally, the combination of engaging visuals with meaningful narratives created an educational experience that was not only informative but also inspiring. Students expressed increased interest and motivation to learn about biodiversity as a result of engaging with the picture books. Many remarked that the stories ignited their curiosity and encouraged them to explore related topics further, such as ecosystem dynamics and conservation strategies. This aligns with the educational theories emphasizing the importance of multisensory engagement in the learning process. By engaging multiple senses—visual, auditory, and emotional—students can construct knowledge more effectively and retain information longer (Brusilovsky & Millán, 2019).

Emotional Engagement and Empathy

Visual storytelling also enhances emotional engagement, which is a critical factor in fostering empathy and social responsibility among students. The illustrations serve not just as decorative elements; they convey emotions and narratives that resonate with young readers. For example, images portraying the plight of endangered animals elicit feelings of compassion and urgency, prompting students to think critically about their role in conservation efforts. Many students articulated a newfound sense of responsibility toward these species, expressing a desire to take action and advocate for their protection.

This emotional engagement is supported by Ernst et al. (2023) findings, which highlight the role of storytelling in nurturing environmental empathy. By connecting emotionally with the characters and stories presented in the picture books, students are more likely to internalize the conservation messages and see themselves as active participants in the ecosystem. This aligns with the broader

goals of global citizenship education, which seeks to cultivate a sense of shared responsibility for the planet and its inhabitants.

Visual Storytelling as a Teaching Strategy

Incorporating visual storytelling into educational materials represents a strategic approach to teaching that aligns well with contemporary pedagogical practices. Educators increasingly recognize visual literacy's value as a critical skill for the 21st century, particularly in a world inundated with information (Miller et al., 2021). Teachers can use visual storytelling techniques to create more engaging and effective learning environments that promote critical thinking and problem-solving skills.

Furthermore, the adaptability of visual storytelling allows for its application across various subjects and educational levels. While this study focused on biodiversity and global citizenship within the context of Civics Education, the principles of visual storytelling can be extended to other subjects, such as science, history, and social studies. This versatility enhances the overall educational experience, making learning more interconnected and relevant to students' lives.

In conclusion, the insights gained from the use of visual storytelling in the SDG-based picture books underscore its significant impact on students' engagement and learning outcomes. By effectively combining captivating illustrations with relatable narratives, these educational materials not only enhance comprehension and retention of complex ecological concepts but also foster emotional connections and a sense of responsibility toward biodiversity conservation. The findings of this study reinforce the importance of incorporating visual storytelling into educational practices, advocating for innovative teaching strategies that resonate with young learners and prepare them to navigate the challenges of an interconnected world. As educators continue to explore creative approaches to teaching, the principles of visual storytelling offer valuable opportunities to cultivate a generation of environmentally conscious and socially responsible individuals.

CONCLUSION

This study successfully met its research objectives by examining the impact of SDG-based picture books on students' understanding of biodiversity and their development as global citizens within Civics Education. The findings indicate that engaging educational materials grounded in visual storytelling significantly enhance students' cognitive and emotional connections to environmental topics. Pre- and post-assessment data revealed substantial improvements in students' knowledge, with average scores rising from 65% to 95%, highlighting the effectiveness of visually stimulating and contextually relevant resources in fostering awareness of key ecological concepts. Additionally, qualitative insights showed that students developed a deeper emotional engagement with the material, expressing increased empathy toward endangered species and a heightened sense of responsibility for conservation. The narrative-driven approach allowed students to connect personally with the stories, promoting not only understanding but also a desire to take action in their communities. Teachers reported that these materials facilitated meaningful classroom discussions about civic responsibility, reinforcing

the role of education in cultivating informed and engaged global citizens.

In conclusion, the study demonstrates that visual storytelling is a powerful pedagogical strategy for making complex ecological issues accessible and relatable to students. Integrating SDG principles into the curriculum not only aligns with educational standards but also equips students with the knowledge and values essential for navigating a rapidly changing world. Future research should explore the long-term impact of these materials on students' attitudes and behaviors toward biodiversity conservation. Additionally, expanding the study to include various educational contexts and age groups could provide further insights into the effectiveness of visual storytelling across different demographics. The findings underscore the importance of continued innovation in educational resources to prepare the next generation to advocate for sustainability and environmental stewardship effectively.

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