Practicality and Validity of Children's Storybooks for Understanding Technological Innovation

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Abstract. Efforts to enhance elementary school students' understanding of the latest technology focus on presenting concepts in a manner that is comprehensible to them. Utilizing narrative storytelling, a children's storybook was developed to explore their comprehension of electric bicycles as a contemporary technological innovation. This endeavor was successfully executed through research and development methodologies. The resultant work underwent validation and practicality testing, constituting the core objectives of this study. Validation involved assessing the book's language and graphics, crucial parameters for children's storybooks, through a questionnaire administered to evaluators. Subsequently, the practicality of the book was evaluated based on feedback from educators and students who utilized it in their learning activities. The research findings indicate that the storybook has met the criteria for graphic and linguistic validation, aligning with the cognitive capabilities of elementary school students. Moreover, the book demonstrated high practicality as a learning tool for comprehending technology, garnering positive feedback from both educators and students. Overall, this research underscores the effectiveness of employing narrative storytelling to facilitate students' understanding of complex technological concepts at an elementary level.

Keywords: Technology-Based Learning, Storybook, Learning Media

1 Introduction

The transformation of children's learning methods reflects an ongoing effort to align educational strategies with the needs and interests of young learners. Researchers and

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educators recognize that engaging children in the learning process requires more than just presenting information. It requires capturing their attention and imagination. As such, recent advancements in children's learning media have focused on integrating elements that resonate with their unique characteristics and preferences. One notable trend in this regard is the development of modern children's storybooks that not only entertain but also educate. These storybooks leverage playful characters, relevant themes, and emerging technologies to create immersive learning experiences. Popular storybooks are a reading medium that almost all children [1], they are filled with stories whose plots are so sedating that it would be impossible if the child's memory of the content of the story is a long-term memory [2]. By incorporating elements like interactive features, multimedia content, and real-world applications, these storybooks offer a novel approach to introducing educational concepts to young minds. For instance, these modern children's stories may explore topics such as technological advancements, environmental sustainability, or cultural diversity, presenting them in a format that is accessible and engaging for children. By intertwining learning content with entertaining narratives, these storybooks foster curiosity and critical thinking skills in young readers while instilling valuable knowledge and values. Moreover, the introduction of innovative technologies early on helps familiarize children with digital tools and prepares them for the increasingly digital-centric world they will encounter as they grow older. By embracing these technologies in their learning journey from an early age [3], children develop important digital literacy skills and adaptability, setting a solid foundation for lifelong learning and success in the 21st century.

Learning is directed at introducing bicycle transportation which is a usual use for children [4], are bicycles , almost all children like bicycles [5]. It refers to the implementation of activities focused on introducing bicycle transportation with the innovative addition of electricity as a driving force in the storybook "Prof. Tito: The Electric Bicycle Edition" reflects a strategic response to the evolving educational landscape. The underlying situation driving this initiative likely stems from the recognition of the importance of integrating science and technology education into elementary school curricula. With advancements in technology shaping various aspects of daily life, there is a growing need to equip young learners with knowledge and skills relevant to these domains. By incorporating science and technology-based teaching components into the storybook, educators aim to provide elementary school students with practical insights into the applications of science and technology in real-world contexts. This aligns with broader educational objectives aimed at fostering scientific literacy and preparing students for the challenges and opportunities of an increasingly technologically-driven society. Moreover, the adaptation of the book's layout and visual design to suit the characteristics and interests of elementary school students underscores a student-centered approach to learning. Recognizing that engaging materials are more likely to capture students' attention and facilitate learning, the design of the storybook aims to make science and technology concepts accessible and compelling to young readers. The emphasis on validity and practicality assessment further highlights a commitment to ensuring the effectiveness and

relevance of the storybook as a teaching resource. By evaluating the suitability of the book in terms of content, language, graphics, and learning outcomes, educators can make informed decisions about its integration into science education curriculum. Overall, the implementation of activities centered around the storybook "Tito: The Electric Bicycle Edition" reflects a proactive approach to addressing the evolving educational needs of elementary school students. By leveraging innovative storytelling techniques and integrating science and technology education, educators seek to enhance students' understanding of key concepts while fostering curiosity and enthusiasm for learning.

2 Method

The foundation of the study involves employing the Borg and Gall research [6] and development approach to craft children's storybooks, encompassing several key stages. These phases include gathering information, strategizing, developing target products, conducting trials or demonstrations, revising as necessary, conducting primary demonstrations, refining operations, making final adjustments, and ultimately disseminating and implementing the finished product [7][6], The process commenced with comprehensive observations aimed at understanding the existing array of children's storybooks accessible to elementary school students. These observations were pivotal in gaining insights into the prevailing themes, styles, and content prevalent in such literature. Subsequently, an in-depth analysis ensued, focusing on discerning the essential requirements necessitating the inclusion of character-building elements and science and technology concepts within the upcoming children's storybooks. This analytical phase delved into identifying the educational gaps and the potential benefits of infusing such narratives with themes conducive to character development and science understanding.

The process of assessing a book's suitability involves several stages aimed at evaluating its validity and practicality [8] [9]. This multifaceted approach ensures that the book meets the necessary criteria for effective use in educational settings. Firstly, the validity of the book is examined, which entails scrutinizing its content, language, graphics, and alignment with learning objectives. This evaluation seeks to ascertain whether the book accurately conveys the intended information and aligns with educational standards. Additionally, practicality testing is conducted to assess the book's usability and effectiveness in real-world teaching environments. This phase involves practical trials and feedback sessions with educators and students to gauge how well the book facilitates learning and engages its intended audience. By subjecting the book to rigorous validity and practicality testing, educators can make informed decisions about its suitability for integration into educational curricula, ensuring that it effectively supports learning objectives and enhances the educational experience for students [8].

Validating children's storybooks is essential to ensure their quality and effectiveness as educational tools. This process involves experts who carefully evaluate the books' design,

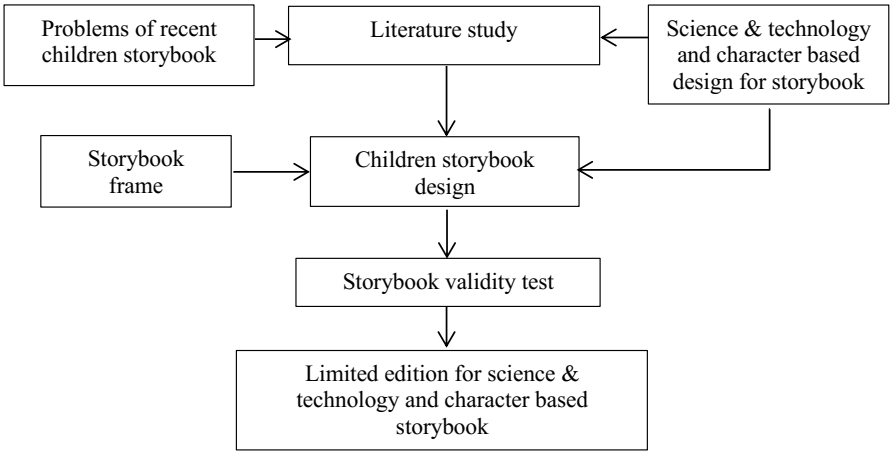
alignment with Indonesian science learning outcomes, and overall construction, focusing on character development and science and technology elements. Experts use a validation questionnaire to identify strengths and weaknesses, guiding further improvements, is a critical assessment of work results and research results [10]. Practicality testing involves actual research subjects, such as teachers and students. For example, at SD IT Andalas Padang in West Sumatra, 22 fifth-grade students assessed the books' practicality. Questionnaires distributed to students and teachers gather feedback on usability and effectiveness in real educational settings. This ensures the books meet educational criteria and enhance learning outcomes.

Table 1. Validation Criteria for Storybooks as Learning Media Instruments

(%)	Category
0 – 20	Not valid
21 – 40	Less valid
41 – 60	Valid enough
61 – 80	Valid
81 – 100	Very valid

Table 2. Categories of Practicality of Children's Story Books

(%)	Category
0 – 20	Not practice
21 – 40	Less practice
41 – 60	Practice enough
61 – 80	Practice
81 – 100	Very practice



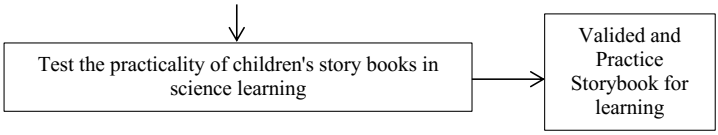


Fig. 1. Research Design Flow Diagram

3 Result

Initial observations were conducted to ascertain elementary school students' preferences regarding storybooks, covering various aspects such as traditional storybooks, picture stories, and comics. It was found that the majority of students favored picture stories, particularly those with adventurous themes. Additionally, there was a notable inclination towards comics and legendary tales. When asked about specific storybook titles of interest, students mentioned a diverse range, including "Naruto Shippuden," "Kancil yang Bijak," "Journey of the Prophet Muhammad," "Si Juki," "Ultraman Comics," "Boboiboy Comics," "Upin and Ipin Comics," "Pokemon," "Plants vs Zombie," "Chaisaw-man," "Science Story Book," "The Kancil," "One Piece," "Doraemon," "Hosino," "Demons Layer," "Chibi," "Shinbi House," "Omar and Hana," "Kind Kancil," "Hana and Hani Nisa Dear Friends," "Anna and Elsa," "Oshi No Ko," "Islamic Stories," "Stories of Little Prophets Who Have Works," "Prayer Mats for Fathers," "Friends Memorizing the Qur'an," "Tokyo Revenger," "Lutung Kasarung," "Rawa Pening," "Ali and Hana," "Timun Mas Land of a Thousand Flowers," "Gifts Mother's Birthday," "Collection of Islamic Stories," "25 Shabiah," and others.

In initial observations, students' interest in storybooks was explored, revealing a penchant for picture stories, particularly those with adventure storylines, and comics, including legendary tales. The diverse range of titles mentioned by elementary school students showcased their varied interests, from popular series like Naruto Shippuden to beloved comics such as Ultraman and Boboiboy. Students expressed positive opinions regarding picture stories, finding the illustrations captivating (63.6%) and the stories exciting (77.3%). Additionally, humorous characters were well-received (63.6%), and there was an interest in stories that incorporated science and technology concepts (45.5%). Surprisingly, despite limited exposure to storybooks in previous learning experiences, a significant portion of students (68.2%) indicated their preference for using storybooks as educational tools. However, the availability of educational stories at school was found to be limited, with existing titles focusing on diverse themes such as dinosaurs, prophets, and Islamic fairy tales. Despite this limitation, students acknowledged the positive impact of educational stories in facilitating understanding, sparking curiosity, and generating new

ideas. Notably, almost half of the students showed a keen interest in stories related to science and technology, reflecting their curiosity about innovations, such as bicycles as a mode of transportation. Based on students' interests, the conclusions from observations provide a definite picture that some students like stories about science and technology which, based on previous research, are easily introduced through storybooks [11]. The results of observations provide a definite picture that almost half of students like stories about science and technology. The twists and turns of children in their daily lives like bicycles [12].

3.1 Story Book Display

In the "Prof. Tito: Electric Bicycles Edition" book design, the story presented aligns with the previous observations regarding students' interest in narratives involving science and technology. The story introduces themes of electric bicycles and technology that resonate with students' interests in innovation and the use of technology in daily life. Introducing main characters like Tito, Zul, Roi, and Hana lays the narrative foundation depicting friendship dynamics and values such as empathy, innovation, and a penchant for new discoveries. Through the story, readers are taken on Tito's journey as he faces challenges to assist his friend Zul by designing and assembling an electric bicycle. This exploration delves into the concepts of problem-solving and utilizing technology for positive purposes, in line with students' interest in stories that feature innovation and the practical use of technology.

The incorporation of electric technology in the narrative, as exemplified by Tito's efforts to aid Zul, introduces the notion of problem-solving and the utilization of technology for beneficial ends. This resonates with students' interest in stories that present innovation and the application of technology in everyday life. Furthermore, the character of Tito serves as a representation of positive values such as empathy, initiative, and innovation, providing inspiration to readers in accordance with students' preference for narratives containing moral messages and positive values.With the theme of electric bicycles and the application of technology in daily life as the focal point of the story, the "Prof. Tito: Electric Bicycles Edition" book design appears to successfully establish resonance with students' interests and preferences as revealed in the previous observations. This suggests that the storybook leverages themes and values that align with students' interests while offering an engaging and relevant narrative in the context of learning and personal development.

Fig. 2. Prof. Tito: Electric Bicycle Edition Storybook Display

3.2 Storybook Validity Test

A Storybook is to be used as a learning media instrument, it needs to be validated by the media instrument expert concerned. This is a form of testing the validity of qualitative data such as the validity parameters that will be mentioned [8] as a measurement of the performance of the elements targeted in the research [13]. When evaluating the validity of a storybook, input from the educational community is crucial. This can be represented through assessments by validators with extensive experience and understanding of cultural contexts and reader needs [14]. Validators representing the community as consumers can provide valuable insights into the extent to which the storybook is acceptable and beneficial to readers.Commonly used validation standards often involve a specific percentage, with widely accepted confidence levels at or above 75% [15]. This means that a storybook can be considered valid if more than 75% of validators, representing the community as consumers, state that the book meets expected standards of quality and relevance. It is important to remember that the validity of a storybook can also be influenced by various other factors, such as content, design, and educational objectives. Therefore, it is important to take a holistic approach in assessing the validity of a storybook, considering various aspects and relevant prior resources, as well as direct input from the community as consumers.

At the same time, when evaluating the graphic validity of a storybook, involving relevant experts in the field is crucial. In the case of Prof. Tito, an assessment by an instrument expert stated that the book met standards well, although there were minor suggestions for improvement regarding typos and punctuation usage. The book received a validation score of 92, categorizing it as highly valid. Additionally, the language suitability of the book, assessed by experts, concluded that the book could be used without revisions. Validation of both language and story content involved linguistic experts scrutinizing various aspects, including the symmetry of visual images, integration of images with text, and adherence to standard Roman letters. Despite some minor observations, the overall evaluation resulted in a score of 95, indicating a high level of validity for the book and suitability for use without further revisions.

3.3 Storybook Practicality Evaluation

Evaluating storybook practicality also involves considering the perceptions of educators and students of storybook implementation in learning [16]. The data collection method for determining the practicality of storybooks, which is basically a form of transformation of qualitative assessments which are weighted into quantitative figures, test to measure the influence of the use of certain components on several aspects within the scope of the component's usefulness [13]. Their insights provide valuable perspectives on how well the storybook aligns with educational objectives and engages learners. Educators' perceptions offer insights into the storybook's suitability for instructional purposes. They assess factors such as relevance to the curriculum, ease of integration into lesson plans, and potential for facilitating learning outcomes. Additionally, educators evaluate the effectiveness of the storybook in catering to diverse learning styles and abilities among students. On the other hand, students' perceptions shed light on the storybook's appeal and comprehensibility. They provide feedback on aspects such as readability, engagement, and relevance to their interests and experiences. Students' perspectives also highlight the storybook's ability to stimulate imagination, provoke critical thinking, and foster a love for reading. By incorporating feedback from both educators and students, assessments of storybook practicality become more holistic. This approach ensures that the selected storybooks not only meet educational standards but also resonate with the needs and preferences of both educators and learners, ultimately enhancing their effectiveness in supporting learning outcomes.

Table 3. Results of Practicality Test of Storybooks with Educators

Aspect	Rates	Category
Language	100	Very practice
Illustration	75	Practice

Helping teacher to teach character	100	Very practice
Helping teacher to teach science and technology	100	Very practice
Helping teacher increase students' interest in learning	100	Very practice
Average	95	Very practice

Table 4. Results of Practicality Test of Storybooks with Educator Participants

Aspect	Rates	Category
Intersested display	87,5	Very practice
Language	93	Very practice
Letter and graphic	92	Very practice
Learn for character	94	Very practice
Learn for new knowleadge	88,6	Very practice
Learn for technologies	87,5	Very practice
Icrease curiosity	87,5	Very practice
Average	90	Very practice

The test questionnaire given to the 5th grade teacher at SD IT Cendikia Andalas gave a practical response that Prof. Tito's book was very interesting. Instilling character and providing knowledge about technology in the Electric Bicycle edition. This book also embeds/tells of Minang cultural stories. The comment given is that there are changes to the character illustrations on page 52. There are still illustrations that are cut off so that the printing settings can be corrected. The electric bike on the cover doesn't match the outcome of the story. This response comes from a questionnaire asking respondents to assess storybooks in terms of aspects, language, picture illustrations in children's stories, and the level of ability of storybook learning media in helping educators teach character, science and technology, and increase students' interest in learning. The aspect value was obtained from the percentage of respondents' assessment as a weight for the practicality of the storybook to obtain a test average calculation of 95 or classified as very practical.

Students' feedback on Prof. Tito's book highlights its strengths and areas for improvement. Many students commend the vibrant color display and captivating illustrations, noting their appeal and ability to draw readers into the story. They also appreciate the clarity and quality of the writing, finding the explanations engaging and easy to understand. Despite these positive remarks, some students mention minor discrepancies in the writing and illustrations, but acknowledge that they do not significantly detract from the overall reading experience. Assessing the practicality of the storybook based on student responses reveals a high level of usability, with an average test score of 90 categorizing it as highly practical. This indicates that the book effectively meets the needs and preferences of students, making it a valuable resource for enhancing learning experiences.

4 Discussion

The results of the analysis highlight the significant impact of children's storybooks as effective learning media, particularly in conveying educational interpretations that are easily absorbed by children [17]. The more interesting the story book is read, the more the child is carried away by the imagination of the story, in the sense that it directly influences the child's mental state [18]. It is not surprising that some characters in popular stories tend to be imitated and practiced in children's daily lives. Children's interest in storybooks from the visual, written and storyline aspects is the key to making educational children's storybooks. Children's stories in the form of printed books follow the tendency of children to read in printed story books [19]. This finding aligns with previous research indicating that children are more likely to engage with and learn from storybooks that captivate their interest through visual, written, and storyline elements [20]. Moreover, the success of the "Prof. Tito: Electric Bicycles Edition" storybook in passing both validity and practicality tests underscores its potential as a valuable educational resource for elementary school students. The validity testing conducted by linguistic and graphic experts confirmed the quality of the book's design and content, particularly its illustrations, which play a crucial role in capturing children's interest and facilitating effective learning [20]. This finding supports existing literature suggesting that high-quality graphics enhance children's engagement and comprehension when reading storybooks. Additionally, the practicality testing, based on feedback from educators and students, affirmed the book's suitability for language teaching materials in elementary schools, with minor adjustments to improve image display.

Furthermore, the content of the "Prof. Tito: Electric Bicycles Edition" storybook encompasses both natural knowledge and the latest technology, making it accessible and comprehensible for elementary school students combined with the use of electrical energy-based technology and balance the trend of using electric bicycles by the wider community [21]. The existence of technology integration is a form of effort to broaden students' horizons in understanding technology [22]. Then, if a storybook passes the validity and practicality test, then the decision to use open media that teaches technological innovation depends on the teacher who is ready to use open media in the learning framework because research has proven that introducing technology to children at an early age is suitable for their education [23], where showing innovation in children's education gives rise to creativity but needs to be encouraged by a learning framework that leads to children's creativity [24]. The inclusion of character values such as curiosity, empathy, and cooperation further enhances the book's educational value, aligning with the objectives of promoting innovation and technology literacy among students. Comparing these results with other relevant studies, such as the "My Water" storybook [25], which focuses on environmental and everyday life knowledge, highlights the diversity of educational content available in children's storybooks. The success of integrating technology learning into storybook media reflects the increasing importance of technological literacy in today's

society, particularly for young learners growing up in a technology-driven era [26]. In conclusion, the findings underscore the effectiveness of children's storybooks as versatile and engaging learning tools, capable of conveying complex concepts in a manner that is accessible and enjoyable for elementary school students. By leveraging innovative storytelling techniques and incorporating relevant educational content, such as science and technology principles, educators can harness the power of storybooks to enhance students' learning experiences and foster a deeper understanding of key subject areas.

5 Conclusion

The implementation of "Prof. Tito: Electric Bicycle Edition" as a children's storybook aimed at elementary school students in science subjects has yielded promising results. Through the rigorous research and development process, which included testing for both validity and practicality, the storybook has successfully achieved its objectives. Specifically, the book effectively introduces students to the latest technological innovations, such as electric bicycles, as practical applications of science and technology principles. The content of "Prof. Tito: Electric Bicycle Edition" directly imparts knowledge about bicycle shapes and the components of electric bicycles, demonstrating how these advancements facilitate human work. The validation process confirmed the book's suitability as a learning instrument, while feedback from educators and students affirmed its practicality in learning settings. These findings highlight the importance of incorporating innovative educational materials, such as children's storybooks, to enhance students' understanding of complex subjects like science and technology. By providing engaging and accessible content, storybooks like "Prof. Tito: Electric Bicycle Edition" play a crucial role in sparking students' curiosity and fostering their interest in learning. Moving forward, further research and development efforts can build upon these findings to create additional educational resources that leverage storytelling techniques to promote scientific literacy and technological understanding among elementary school students. By continuing to innovate in educational content development, educators can empower students to become lifelong learners equipped with the knowledge and skills needed to thrive in an increasingly technology-driven world.

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