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Development of Smart Box Media to Support Early Literacy and Healthy Living Education for First-Grade Elementary School Students

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Abstract

This study aimed to develop Smart Box media to support early literacy skills and healthy living education among first-grade elementary school students. The study employed a modified ADDIE Research and Development (R&D) model consisting of analysis, design, development, implementation, and evaluation stages. The media was validated by a media expert and subsequently tested through a one-to-one evaluation involving four first-grade elementary school students.

Data were collected using media validation sheets and observation sheets. The observation instrument consisted of five aspects: students' interest in the media, ability to use the media, ability to arrange handwashing steps, ability to recognize syllables, and ability to mention simple words. The results showed that the developed Smart Box media met the feasibility criteria based on expert validation and received positive responses from students. Most students were able to use the media independently, participate actively in learning activities, recognize syllables, arrange handwashing steps correctly, and mention simple words with minimal assistance. These findings indicate that Smart Box media is feasible, practical, and engaging for supporting both early literacy development and healthy living education among first-grade elementary school students. Therefore, Smart Box media has the potential to be used as an alternative learning medium in elementary school classrooms.

INTRODUCTION

Literacy skills are one of the fundamental competencies that should be developed from the early years of elementary education. In first grade, students begin learning to recognize letters, syllables, words, and simple sentences as the foundation for further reading development. However, not all students enter elementary school with the same literacy readiness. Some students still experience difficulties in identifying syllables, combining letters into words, and understanding simple reading materials (Komalasari et al., 2024; Sakina et al., 2026).

The success of beginning reading instruction is influenced by various factors, including learning methods, learning environments, and the availability of appropriate learning media. Learning activities that rely solely on textbooks and verbal explanations often make students less engaged during the learning process. Therefore, teachers need learning media that are able to attract students' attention, encourage active participation, and provide meaningful learning experiences (Candiasa et al., 2024; Nyoman et al., 2022).

Interactive learning media are considered suitable for young learners because they combine visual, tactile, and game-based elements. Previous studies have reported that interactive learning media can increase students' motivation, participation, and learning outcomes in elementary school classrooms (Nyoman et al., 2022; Piryanto et al., 2025). Through direct interaction with learning materials, students are encouraged to explore concepts independently and become more actively involved in classroom activities.

Besides literacy development, healthy living education is also important for first-grade elementary school students. One of the basic healthy living behaviors that should be introduced from an early age is proper handwashing. Handwashing with soap is recognized as an effective way to prevent the spread of germs and reduce the risk of infectious diseases among children (Ababil et al., 2024; Gilangharjo, 2022). However, children often find it difficult to remember and apply the correct handwashing procedures when the learning process is delivered only through explanations or lectures. Consequently, learning activities that combine health education with interactive media are needed to improve students' understanding and participation (Trilus et al., 2024).

One learning medium that has the potential to support both literacy development and healthy living education is Smart Box. Smart Box is an interactive learning medium that allows students to learn through direct manipulation of learning components, educational games, and hands-on activities. Several studies have shown that Smart Box media can support learning activities in elementary schools and contribute positively to students' learning experiences (Hamdu & Respati, 2021; Komalasari et al., 2024; Saofah et al., 2025). Nevertheless, previous

developments generally focused on literacy learning, science learning, or other subject-specific competencies separately.

Based on this condition, there is still limited research that integrates beginning literacy activities and healthy living education into a single Smart Box learning medium designed specifically for first-grade elementary school students. Therefore, this study aims to develop Smart Box media to support early literacy and healthy living education among first-grade elementary school students. The developed media integrates illustrated stories about germs, handwashing sequencing activities, syllable recognition exercises, and word-building games into a single interactive learning tool. It is expected that the developed media can provide meaningful learning experiences while supporting literacy development and healthy living awareness among young learners.

METHODS

This study employed a Research and Development (R&D) approach using a modified ADDIE model, which consists of Analysis, Design, Development, Implementation, and Evaluation stages. The study aimed to develop Smart Box media to support early literacy and healthy living education for first-grade elementary school students and to determine its feasibility through expert validation and one-to-one evaluation.

The development process consisted of five stages: analysis, design, development, implementation, and evaluation. During the analysis stage, students' learning needs related to early literacy skills and healthy living education were identified. Based on the findings, Smart Box media was designed and developed as an interactive learning medium integrating syllable recognition, word formation activities, storytelling about germs, and handwashing sequence activities. The implementation stage was conducted through a one-to-one evaluation involving four first-grade elementary school students, while the evaluation stage included expert validation, observation, and product revision based on the findings.

The participants involved in this study consisted of one expert validator and four first-grade elementary school students. The expert validator was a lecturer from the Elementary School Teacher Education Program, Universitas Negeri Surabaya, who assessed the feasibility of the developed media. Meanwhile, the one-to-one evaluation was conducted with four first-grade students living in the researcher's neighborhood.

Data were collected using expert validation sheets, observation sheets, and documentation. The expert validation sheet was used to assess the media in terms of appearance, content suitability, usability, and benefits. The observation sheet consisted of five aspects: students' interest in the media, ability to use the media, ability to arrange handwashing steps, ability to recognize syllables, and ability to

mention simple words. Documentation in the form of photographs was also collected to support the research findings.

The validity of the media was determined through expert judgment. Suggestions and feedback provided by the validator were used as the basis for revising and improving the product before the one-to-one evaluation was conducted. The collected data were analyzed descriptively by calculating the average validation score and interpreting the results according to the predetermined feasibility criteria. Data obtained from observations and documentation were presented in narrative form to provide a comprehensive description of students' responses to the developed media.

The evaluation in this study was limited to expert validation and a one-to-one trial involving four first-grade elementary school students. This scope was intended to provide an initial assessment of the feasibility and usability of the developed Smart Box media before its implementation in a larger learning setting. The evaluation focused on students' initial responses, interactions with the media, and ability to complete the learning activities. A broader field trial and pre-test–post-test assessment were not conducted in this study. Therefore, the findings should be interpreted as preliminary evidence of media feasibility and student engagement rather than conclusive evidence of its effectiveness in improving literacy skills or healthy living behaviors. Further research involving more participants and a more comprehensive evaluation design is needed

RESULTS AND DISCUSSION

1. Development of Smart Box Media

The development of Smart Box media was initiated by the need for an interactive learning medium that could support early literacy skills while simultaneously introducing healthy living habits to first-grade elementary school students. Based on observations of students' learning characteristics, first-grade students tend to be more interested in learning activities involving games, colorful visuals, and direct interaction with learning materials. Therefore, Smart Box was developed as an interactive learning medium that integrates literacy learning and healthy living education into a single learning tool.



Figure 1. Smart Box Media (Overall View)

Smart Box is designed in the form of a four-sided learning box, with each side containing different activities that support students' engagement and participation. The media was developed using simple and accessible materials, making it practical for classroom use and suitable for the characteristics of first-grade elementary school students.



Figure 2. The first side of Smart Box

The first side of Smart Box contains an illustrated story about germs and the importance of maintaining personal hygiene. This section introduces students to healthy living habits, particularly proper handwashing practices. The use of visual storytelling is intended to help students understand the importance of cleanliness in an enjoyable and meaningful way.



Figure 3. The second side of Smart Box

The second side provides an activity in which students arrange and attach the correct sequence of handwashing steps. Through this activity, students actively participate in learning while reinforcing their understanding of proper handwashing procedures. This hands-on activity also encourages students to apply healthy living practices in their daily lives.



Figure 4. The third side of Smart Box

The third side consists of a spinning wheel containing the syllables “ka,” “ki,” “ku,” “ke,” and “ko.” Students spin the wheel and identify the syllable indicated by the pointer. This activity was designed to support beginning reading skills and syllable recognition among first-grade students.



Figure 5. The fourth side of Smart Box

The fourth side contains a word-building board. After spinning the wheel, students are asked to create simple words beginning with the selected syllable. For example, if the wheel stops at the syllable "ku," students may form words such as "kuda" or "kucing." This activity supports vocabulary development, syllable recognition, and early literacy skills.

Through the integration of literacy activities and healthy living education, Smart Box was designed to provide meaningful, interactive, and enjoyable learning experiences for first-grade elementary school students. The media is expected to support the development of early literacy skills while simultaneously promoting awareness of healthy living practices among young learners.

2. Expert Validation Results

The Smart Box media was validated by one expert validator, namely Ika Febriana Wati, M.Pd., a lecturer from the Elementary School Teacher Education Program, Universitas Negeri Surabaya. The validation process aimed to evaluate the feasibility of the developed media in terms of appearance, content suitability, usability, and benefits.

The validation instrument consisted of 20 assessment indicators divided into four aspects: appearance, content suitability, usability, and benefits. The results of the expert validation are presented in Table 1.

Table 1. Expert Validation Results of Smart Box Media

No	Aspect	Number of Indicators	Average Score	Category
1	Appearance	5	4.40	Very Feasible

2	Content Suitability	5	4.40	Very Feasible
3	Usability	5	4.40	Very Feasible
4	Benefits	5	4.00	Feasible
5	Overall Average	5	4.30	Very Feasible

The results showed that the Smart Box media obtained an overall average score of 4.30 out of 5, indicating a very feasible category. The appearance, content suitability, and usability aspects each achieved an average score of 4.40, while the benefits aspect obtained an average score of 4.00. These findings indicate that the developed media is suitable for use in learning activities for first-grade elementary school students.

The validator stated that the media has an attractive appearance, appropriate learning content, and interactive activities that can actively engage students in the learning process. In addition, the integration of early literacy activities and healthy living education was considered relevant to the learning needs of first-grade elementary school students.

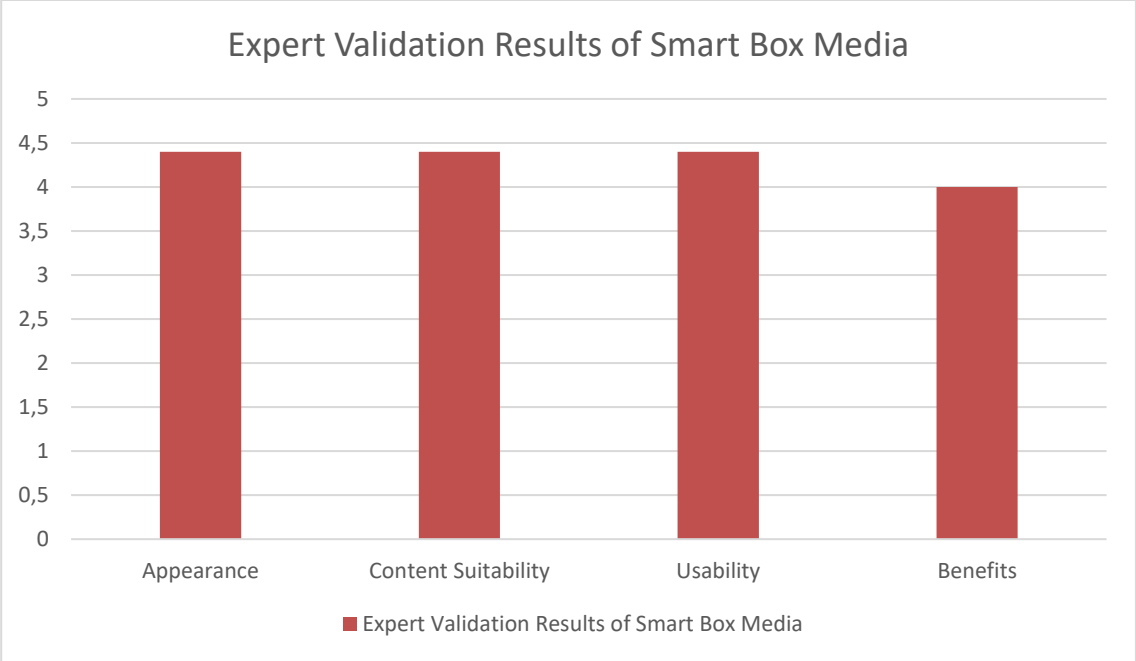


Figure 6. Expert Validation Results of Smart Box Media

Figure 1 shows the average scores obtained for each validation aspect of the Smart Box media. The appearance, content suitability, and usability aspects achieved the highest average score of 4.40, indicating that the media has an attractive design, appropriate content, and can be easily used in learning activities. Meanwhile, the benefits aspect obtained an average score of 4.00, which still falls within the feasible category. Overall, the expert validation results indicate that

Smart Box media is suitable for supporting early literacy and healthy living education for first-grade elementary school students.

Based on the validation results, the Smart Box media was categorized as very feasible and could proceed to the limited trial stage after minor revisions.

3. Product Revision

Following the expert validation process, several revisions were made to improve the quality and usability of the Smart Box media. The revisions were based on suggestions provided by the validator to enhance the effectiveness and sustainability of the media in classroom learning activities.

The validator suggested that the syllable components, particularly the "ka," "ki," "ku," "ke," and "ko" sections, should be designed as detachable elements. In addition, the validator recommended adding a greater variety of syllables to expand the learning content and allow the media to be used for a longer period. Based on these suggestions, improvements were made by modifying the syllable components to be more flexible and by considering the inclusion of additional syllables for future development. These revisions were intended to increase the practicality, durability, and instructional value of the Smart Box media.

Table 2. Product Revision Based on Expert Suggestions

Validator Suggestions	Revisions Made
The syllable components should be detachable and include more syllable variations.	The syllable components were redesigned to be detachable, and additional syllable variations were considered for future development.

4. One to One Trial Results

The revised Smart Box media was subjected to a one to one trial involving four first-grade elementary school students, coded as S1, S2, S3, and S4. The trial session lasted approximately 35 minutes and was conducted to evaluate students' responses and interactions with the media. During the trial, students participated in several activities, including reading an illustrated story about germs, arranging handwashing steps, recognizing syllables through the spinning wheel activity, and constructing simple words based on selected syllables. The observation focused on five aspects: students' interest in the media, ability to use the media, ability to arrange handwashing steps, ability to recognize syllables, and ability to form simple words.

The observation results indicated that all students demonstrated positive interest in the Smart Box media. Students were attracted to the colorful appearance, interactive components, and game-based learning activities provided by the media.

Throughout the session, students actively participated in each activity and showed enthusiasm when exploring the different components of the Smart Box.



Figure 7. Student Using Smart Box During the Limited Trial

In terms of media usability, three students were able to operate the media independently, while one student required minor guidance during the initial stages of the activity. The handwashing activity also showed encouraging results. Three students successfully arranged the handwashing steps correctly without assistance, whereas one student required verbal guidance for several steps. Despite this difficulty, the student was eventually able to complete the activity with support from the observer.

The literacy activities produced similarly positive outcomes. Most students were able to recognize syllables and construct simple words based on the syllables obtained from the spinning wheel. One student required assistance in identifying certain syllables but remained actively engaged throughout the activity. Furthermore, all students were able to participate in the word formation activity and demonstrated their ability to generate simple words related to the selected syllables.

The observational notes further revealed different learning characteristics among the students. One student demonstrated a high level of enthusiasm and confidence throughout the session, while another student showed a more cautious learning style and preferred observing peers before participating. Nevertheless, all students successfully engaged with the media and completed the learning activities according to their individual abilities. These findings suggest that Smart Box media can accommodate diverse learning characteristics among first-grade elementary school students.

A descriptive analysis of the observation results showed that all four students (100%) demonstrated positive interest in the Smart Box media. Three students (75%) were able to operate the media independently, while one student (25%) required initial guidance. Similarly, three students (75%) arranged the handwashing steps correctly without assistance, whereas one student (25%) required verbal guidance. All four students (100%) participated in the word-building activity. These findings indicate that the media encouraged student participation and could be used by most participants with minimal assistance. However, because the trial involved only four students and did not include pre-test and post-test measurements, the results cannot establish the effectiveness of Smart Box in improving students' literacy skills or handwashing knowledge.

The results of the limited trial indicate that Smart Box media is practical, engaging, and suitable for classroom implementation. The combination of literacy activities and healthy living education provided meaningful learning experiences and encouraged students to participate actively during the learning process. Therefore, Smart Box media has the potential to support both early literacy development and healthy living education among first-grade elementary school students.

5. Discussion

The purpose of this study was to develop Smart Box media to support early literacy skills and healthy living education among first-grade elementary school students. The development process resulted in an interactive learning medium that integrates literacy activities and handwashing education into a single learning tool (Fitriana, 2025; Hamdu & Respati, 2021; Saofah et al., 2025). The media includes illustrated stories about germs, handwashing sequencing activities, syllable recognition exercises, and word-building games. The integration of these activities was designed to provide meaningful learning experiences that align with the developmental characteristics of young learners.

The expert validation results indicated that Smart Box media achieved a very feasible category, with an overall average score of 4.30 out of 5. The appearance, content suitability, and usability aspects each obtained an average score of 4.40, while the benefits aspect obtained a score of 4.00. These findings suggest that the developed media has an attractive design, appropriate learning content, and can be effectively implemented in classroom learning activities. The positive validation results support the idea that learning media should be designed according to students' developmental characteristics and learning needs to maximize learning effectiveness. Similar findings were reported by Nyoman et al. (2022), who found that interactive learning media can improve student engagement and facilitate the learning process. Likewise, Candiasa et al. (2024), Wildaniaty (2024) and Sijabat et

al. (2024) emphasized that well-designed learning media can enhance students' attention, participation, and learning achievement during classroom instruction.

The positive evaluation of the media appearance aspect may be related to the use of colorful visual elements, interactive components, and hands-on learning activities (Nyoman et al., 2022; Piryanto et al., 2025). First-grade students generally prefer concrete learning experiences and visual representations rather than abstract explanations. According to Rachmidiana et al. (2024), lower-grade elementary school students tend to learn more effectively through visual, concrete, and interactive learning experiences because they are still in the concrete operational stage of cognitive development. Therefore, the visual and manipulative features incorporated into Smart Box media may contribute to students' interest and engagement during learning activities. Similar findings were also reported by Safitri & Koeswanti (2021), who found that interactive learning media can increase students' motivation and learning outcomes.

The limited trial results further demonstrated that Smart Box media was practical and engaging for students. All four students showed positive responses toward the media and actively participated in each learning activity. Most students were able to use the media independently, recognize syllables, arrange handwashing steps correctly, and construct simple words based on the syllables obtained from the spinning wheel activity. These findings indicate that Smart Box media can support both literacy learning and healthy living education simultaneously (Fitriana, 2025; Hamdu & Respati, 2021; Saofah et al., 2025).

The literacy activities included in Smart Box media were designed to strengthen students' beginning reading skills through syllable recognition and word formation exercises. Early literacy development is an important foundation for future academic achievement because students who possess strong beginning reading skills are more likely to succeed in subsequent learning stages (Komalasari et al., 2024; Sakina et al., 2026). This finding is supported by Kurniasari & Muhammad 2025), who reported that literacy strategies significantly improve students' reading and writing abilities. Similarly, Pebriana et al. (2026)emphasized that literacy-based learning activities can strengthen students' literacy competence in elementary education. In addition, Darniyanti et al. (2024) found that manipulative learning media can improve beginning reading skills among first-grade students. The positive responses observed during the trial suggest that the use of interactive and game-based learning activities can facilitate literacy learning among young learners. This finding is consistent with previous studies that reported that interactive learning media can improve students' motivation and learning outcomes by encouraging active participation in learning activities (Nyoman et al., 2022; Piryanto et al., 2025).

The incorporation of game-based learning elements may also contribute to the effectiveness of Smart Box media. Educational games provide opportunities for students to learn while playing, making the learning process more enjoyable and less intimidating. Widyastuti & Puspita, (2020) explained that educational games can stimulate students' curiosity, concentration, and motivation through the concept of learning while playing. Such characteristics are particularly suitable for first-grade students, who generally prefer active and enjoyable learning experiences rather than passive learning activities.

In addition to supporting literacy development, Smart Box media was designed to introduce healthy living habits, particularly proper handwashing practices. The observation results showed that students were able to arrange the handwashing sequence correctly and demonstrated an understanding of the steps involved in proper handwashing. This finding is important because handwashing behavior is one of the most effective preventive measures against infectious diseases among children (Ababil et al., 2024; Gilangharjo, 2022). Previous studies have shown that handwashing education can improve students' awareness of clean and healthy living behaviors and reduce the risk of disease transmission in school environments (Darwis et al., 2022; Pratami & Nugraheni, 2024; Trilus et al., 2024).

The findings also support previous research indicating that educational interventions delivered through engaging learning media can improve students' understanding and application of handwashing practices. Ababil et al. (2024) reported that educational programs utilizing learning media significantly improved students' handwashing practices after the intervention. Similar findings were reported by Mathar et al. (2023) who found that health education programs delivered through attractive learning activities can strengthen healthy living habits among elementary school students. Likewise, the use of Smart Box media in this study enabled students to learn handwashing procedures through direct interaction and active participation rather than passive observation alone (Candiasa et al., 2024; Nyoman et al., 2022).

Another important finding is that Smart Box media appeared to accommodate different learning characteristics among students. During the trial, some students demonstrated high confidence and independence, while others required initial guidance before participating actively. Nevertheless, all students were able to complete the learning activities according to their individual abilities. This suggests that the media can provide flexible learning opportunities and support diverse learning needs among first-grade elementary school students (Candiasa et al., 2024; Nyoman et al., 2022; Wildaniaty, 2024).

Recent studies further strengthen the effectiveness of Smart Box as an interactive learning medium for early literacy development in elementary school. Smart Box-based learning media has been reported to significantly improve

students' literacy skills by providing multisensory and interactive experiences that support beginning reading ability (Permata & Siswanto, 2025). The integration of visual cards, interactive tasks, and structured learning activities allows students to connect abstract symbols with concrete meanings, which is essential for early-grade learners.

In addition, research shows that Smart Box media is not only effective in literacy learning but also adaptable across various subjects and learning contexts. For example, studies in elementary science learning demonstrate that Smart Box media improves student engagement and understanding through interactive visual representation and hands-on activities (Aini & Septantiningtiyas, 2025). This indicates that Smart Box is a flexible instructional medium that can be applied beyond literacy learning, including health education such as handwashing behavior in the present study.

Furthermore, empirical findings from early childhood and elementary education confirm that Smart Box significantly improves reading readiness, particularly in letter recognition and word formation skills. Experimental studies show that students taught using Smart Box media demonstrate higher post-test scores compared to conventional learning methods, indicating its effectiveness in improving early literacy outcomes (Lestari & Mizan, 2025; Putri et al., 2024). These results align with the findings of this study, where students were able to recognize syllables and construct simple words independently after using the Smart Box media.

From a broader perspective, interactive and game-based learning media have been widely recognized as effective tools for improving student motivation and engagement in early-grade classrooms. Educational game-based approaches create enjoyable learning environments that reduce learning anxiety and increase participation. This is particularly important for first-grade students, who require learning experiences that are playful, concrete, and engaging.

Moreover, literacy development in early childhood education is strongly influenced by the availability of meaningful learning environments that encourage active participation. Studies highlight that literacy-based instructional media should provide opportunities for exploration, interaction, and feedback to support cognitive development in young learners (Amelia & Lestari, 2023). The Smart Box media in this study aligns with these principles by integrating storytelling, visual cues, and interactive tasks that promote active learning.

In addition, health education components such as handwashing instruction have been proven effective when delivered through interactive learning media. Research shows that students demonstrate better understanding and retention of health behaviors when learning is supported by engaging and hands-on media rather than traditional instruction alone (Samyoun et al., 2021). This supports the

findings of this study, where students successfully learned and practiced proper handwashing procedures through Smart Box activities.

Recent advances in educational technology also emphasize the role of interactive storytelling and gamified learning systems in enhancing student engagement and critical thinking. Interactive learning environments encourage students to actively construct knowledge rather than passively receive information, leading to deeper learning outcomes (Roth et al., n.d.). This further supports the relevance of Smart Box media as an innovative instructional tool that combines literacy, health education, and play-based learning strategies.

Overall, the findings indicate that Smart Box media is a feasible, practical, and engaging learning medium for supporting early literacy development and healthy living education. The integration of literacy learning and handwashing education within a single interactive medium provides meaningful learning experiences and encourages active student participation (Fitriana, 2025; Hamdu & Respati, 2021; Komalasari et al., 2024; Sakina et al., 2026; Saofah et al., 2025). Therefore, Smart Box media has the potential to be utilized as an alternative learning medium for first-grade elementary school students, particularly in activities related to beginning literacy and healthy living education.

CONCLUSION

This study aimed to develop Smart Box media to support early literacy and healthy living education among first-grade elementary school students. The developed media integrates illustrated stories about germs, handwashing sequencing activities, syllable recognition exercises, and word-building tasks into a single interactive learning tool.

The results of expert validation indicated that Smart Box media was categorized as very feasible for use in elementary school learning. Furthermore, the limited trial involving four first-grade students demonstrated positive responses toward the media. Students showed enthusiasm during learning activities, were able to participate actively in literacy tasks, and demonstrated an understanding of proper handwashing procedures. These findings suggest that Smart Box media is practical, engaging, and appropriate supporting both early literacy development and healthy living education among first-grade elementary school students.

Future studies are recommended to involve a larger number of participants and broader implementation settings to further examine the effectiveness of Smart Box media in improving literacy skills and healthy living behaviors.

DISCLOSURE STATEMENT

No potential conflict of interest was reported by the author(s).

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