

CHAPTER IV

RESULTS AND DISCUSSION

4.1 Result

The result of this research and development study is an English learning medium for children aged 4–6 years entitled *Mumu's Garden Adventure*. The product was developed using the Research and Development (R&D) method based on the Borg and Gall model adapted by Sugiyono (2019). The development process was carried out in response to the need for a learning medium that integrates visual, audio, and sensory elements in a way that is suitable for young children's characteristics and learning needs.

Mumu's Garden Adventure is an interactive learning book designed to help children learn basic English vocabulary through stories, illustrations, audio, and sensory play activities. The book follows Mumu's adventure in a garden and introduces various vocabulary items that are closely related to children's daily lives. Through this approach, children are expected to learn English in a more enjoyable and understandable way.

The product consists of 31 pages, including a cover page, table of contents, learning materials, Fun Challenge & Sensory Play activities, a mini certificate, and a closing page. The learning materials are divided into five main sections: ABC with Mumu, Everything in the Garden, Colors Around Us, Let's Count!, and Fun Challenge & Sensory Play. Each section was developed according to the abilities and developmental characteristics of children aged 4–6 years.

The book is equipped with audio features that can be accessed through QR codes provided in several learning sections. The audio materials include alphabet recognition, vocabulary based on each letter of the alphabet, letter phonics with vocabulary examples, colors, and numbers. These audio features are intended to help children listen to correct English pronunciation and improve their listening and pronunciation skills. In addition to the audio features, the book also includes sensory play activities designed to provide a more interactive learning experience. These

activities use various materials and textures that allow children to learn through tactile exploration.

Overall, *Mumu's Garden Adventure* was developed through several stages, including research and information gathering, planning, preliminary product development, expert validation, product revision, operational field testing, final product revision, and dissemination and implementation. The results of each development stage are presented in the following sections.

4.1.1 Research and Information Collecting

The development of the book *Mumu's Garden Adventure* is driven by the need for English learning media that aligns with the characteristics of young learners. At the age of 4–6 years, children learn through direct experiences that engage multiple senses. However, most available English learning media still focus heavily on images and text, failing to provide a learning experience that simultaneously involves auditory aspects and sensory exploration.

In addition, learning English vocabulary requires accurate pronunciation models so that children can listen to and imitate the pronunciation correctly. In practice, not all parents and teachers possess the same level of English pronunciation skills. Therefore, there is a need for learning media that can provide correct pronunciation models while remaining engaging for young children.

Based on these issues, the researcher developed the book *Mumu's Garden Adventure* as an audio- and sensory play-based English learning medium. This book is designed by integrating audio via QR codes into several learning materials, alongside sensory play activities that allow children to learn through direct seeing, hearing, and touching.

Data collection was conducted through a literature review and observations to gather information regarding young learners English learning, the use of audio media in language learning, and the implementation of sensory play as a learning activity suited to children's developmental stages.

1. Literature Review

The literature review was conducted by gathering various references related to young learners English learning, the use of audio media, and the application of sensory play. The results of the review indicate that young children comprehend learning materials more easily when presented through learning experiences that engage multiple senses. The use of audio is also considered effective in helping children acquire accurate pronunciation models, thereby supporting language proficiency development.

Furthermore, the researcher analyzed basic English materials appropriate for the development of children aged 4–6 years. Based on the results of this study, materials introducing the alphabet, simple vocabulary, colors, and numbers were selected and presented gradually through engaging and easily understandable activities.

2. Observation

Observations were carried out by examining various available English learning media for young learners. The observation results revealed that most learning media still focus on visual presentation in the form of images and text. Media that integrate audio and sensory play elements into a single learning product remain relatively limited.

These findings highlight the necessity of developing learning media capable of combining visual, auditory, and sensory aspects into a cohesive learning activity. Therefore, the book *Mumu's Garden Adventure* was developed as a learning medium that provides audio access via QR codes and sensory play activities to support the English vocabulary introduction process for children aged 4–6 years.

4.1.2 Planning

After identifying the needs and collecting data as the foundation for product development, the next stage is to establish the development plan for the book *Mumu's Garden Adventure*. In this stage, the researcher determines the content materials, audio features, sensory play activities, and product

design to be developed so that they align with the characteristics of children aged 4–6 years.

1. Determining Content Materials and Audio

The book Mumu’s Garden Adventure is designed as an audio- and sensory play-based English learning medium for young learners. The selected materials consist of basic English vocabulary that is relevant to children's daily lives, making it easier for them to understand and remember.

The materials in the book are divided into several sections, as follows:

a. ABC with Mumu

- Introduction to letters A–Z
- Letter pronunciation audio via QR Code

b. Everything in the Garden

- Vocabulary introduction based on the alphabet
- Vocabulary pronunciation audio via QR Code

c. Colors Around Us

- Introduction to primary colors
- Color name pronunciation audio via QR Code

d. Let’s Count!

- Introduction to numbers 1–10
- Number pronunciation audio via QR Code

e. Fun Challenge & Sensory Play

- Review quiz activities based on the previous materials to test children's understanding
- Additional sensory play activities involving various textures and materials

Figure 4. 1 Content Materials and Audio in Mumu's Garden Adventure



4.1.3 Develop Preliminary Form of Product

At this stage, the researcher developed the initial draft of the book *Mumu's Garden Adventure* based on the materials compiled during the planning phase. The product is designed as an English learning medium for children aged 4–6 years that integrates audio and sensory play within a single educational book.

a. Development of Audio Features

The audio features were developed using QR Codes that can be scanned using a mobile phone. The audio is intended to help children listen to correct English pronunciation while supporting their listening and pronunciation skills.

Audio is provided for several material sections, including:

1. Introduction to letters A–Z.
2. Alphabet-based vocabulary introduction.
3. Phonetics for letters A–Z along with example vocabulary.
4. Color introduction.
5. Introduction to numbers 1–10.



Figure 4. 2 Audio Features in the Book

b. Development of Sensory Play Activities

Sensory play activities were developed as a learning tool that engages children's sense of touch. These activities are placed at the end of the book to reinforce the materials previously learned.

The developed activities include:

1. Guess the Fruit (Coconut) using velcro.
2. Is It Yellow? (Watermelon) using black sticky rice.
3. Touch the Iguana using faux leather paper texture.
4. This is a Rabbit using velboa fabric.
5. The use of these various textures aims to provide a more interactive and engaging learning experience for children.

Figure 4. 3 Sensory Play Materials



4.1.4 Preliminary Field Testing (Expert Validation)

After the initial product draft had been completed, an expert validation was conducted using a product validation form. The validator evaluated the audio and sensory play aspects of *Mumu's Garden Adventure* and provided feedback and suggestions for improvement. Based on the validation results, several revisions were made before the product proceeded to the next stage of development.

Figure 4. 4 Preliminary Expert Validation Form

Form Validasi Produk Pembelajaran
Buku Mama's Garden Adventure

Judul : Lila Laniesta Purwati, SPd, M.A.
Hari/Tanggal : Rabu, 03 Juni 2020

Berilah tanda centang pada kolom yang tersedia pada kolom (X)

Aspek, Validasi dan Saran Para				
1. Pengisian audio melalui barcode (QR Code) dinilai sesuai untuk mendukung pembelajaran kosakata bahasa Inggris pada anak usia 4-6 tahun.	☐ Sangat Tidak Setuju	☐ Tidak Setuju	☒ Cukup Setuju	☐ Sangat Setuju
2. Materi audio yang direkamkan dapat membantu anak mendengarkan dan memahami perbedaan kosakata bahasa Inggris dengan lebih baik.	☐ Sangat Tidak Setuju	☐ Tidak Setuju	☒ Cukup Setuju	☐ Sangat Setuju
3. Aktivitas sensory play yang dirancang sesuai dengan karakteristik dan tahap perkembangan anak usia 4-6 tahun.	☐ Sangat Tidak Setuju	☐ Tidak Setuju	☒ Cukup Setuju	☐ Sangat Setuju
4. Pemilihan bahan dan struktur pada aktivitas sensory play dinilai relevan dengan materi pembelajaran yang disajikan.	☐ Sangat Tidak Setuju	☐ Tidak Setuju	☒ Cukup Setuju	☐ Sangat Setuju
5. Integrasi audio dan sensory play dalam buku Mama's Garden Adventure bertujuan meningkatkan pengalaman belajar yang lebih mendalam dan menyenangkan bagi anak.	☐ Sangat Tidak Setuju	☐ Tidak Setuju	☒ Cukup Setuju	☐ Sangat Setuju
6. Saran Penggunaan audio sensory play di setiap halaman sangat tidak disarankan. Bisa saja aktivitas sensory play dilakukan pada satu tempat saja.				

4.1.5 Main Product Revision

The main product revision was conducted based on the feedback from expert validation during the initial testing phase. The validators provided input indicating that placing sensory play activities on every page of the book was impractical, as it could result in excessive book thickness and reduce the usability and practicality of the learning medium.

To follow up on this feedback, the researcher revised the product design by altering the sensory play concept. Initially designed for every page, it was modified into a single main sensory play activity positioned at the end of the book. This revision was carried out while still maintaining the intended learning objectives, which are to provide a learning experience that engages children's sensory exploration through various safe textures and materials.

In addition to reducing the book's thickness, this adjustment aimed to increase production cost efficiency without diminishing the interactive elements that define the product's core characteristics. Consequently, the book became more practical, economical, and user-friendly, while still delivering an engaging learning experience through integrated sensory play activities. The sensory play activity was subsequently placed in the Fun

Challenge & Sensory Play section, allowing it to function as a reinforcement activity for the materials learned in the preceding sections.

Following these revisions, the book *Mumu's Garden Adventure* became more concise, practical, and functional without compromising the targeted learning objectives. The results of this revision were then used as the basis for proceeding to the next stage of the validation process.

Figure 4. 5 Revision Results from Initial Testing (Expert Validation)



4.1.6 Main Field Testing (Advanced Expert Validation)

Following the product revision based on the initial testing results, the researcher conducted the second stage of expert validation for the book *Mumu's Garden Adventure*. This stage aimed to determine the product's feasibility level after improvements were made and to ensure that the revisions aligned with the recommendations provided by the validators in the previous stage.

The second stage of expert validation was carried out by asking the validators to review the revised product, specifically focusing on the aspects that underwent changes. The evaluation was conducted using validation instruments that covered material, design, audio, and sensory play aspects. At this stage, the validators evaluated the alignment of the revision results with the product development goals and provided an assessment of the overall product quality.

Figure 4. 6 Main Product Validation Form

Form Validasi Produk Pembuatan
Buku *Mumu's Garden Adventure*

Validator : Lili Lamschut Panjaitan, SPd, M.A.
Hari/Tanggal : Rabu, 03 Juni 2026

Berikanlah tanda centang pada salah satu jawaban yang dipilih (✓)

Aspek Audio dan Sensory Play

- Barcode audio pada media pembelajaran mudah digunakan dan dapat diputar menggunakan handphone

☐ Sangat Tidak Setuju	☐ Tidak Setuju	☒ Cukup Setuju	☐ Sangat Setuju
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- Kecepatan pengucapan pada audio sudah sesuai untuk anak-anak usia dini

☐ Sangat Tidak Setuju	☐ Tidak Setuju	☒ Cukup Setuju	☐ Sangat Setuju
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- Sensory play pada media pembelajaran aman dan nyaman digunakan oleh anak-anak

☐ Sangat Tidak Setuju	☐ Tidak Setuju	☒ Cukup Setuju	☐ Sangat Setuju
---	------------------------------------	---	-------------------------------------
- Penggunaan bahan pada aktivitas sensory play aman digunakan oleh anak-anak

☐ Sangat Tidak Setuju	☐ Tidak Setuju	☒ Cukup Setuju	☐ Sangat Setuju
---	------------------------------------	---	-------------------------------------
- Pemilihan bahan sensory play pada media pembelajaran sudah sesuai dengan objek yang diperkenalkan kepada anak-anak

☐ Sangat Tidak Setuju	☐ Tidak Setuju	☒ Cukup Setuju	☐ Sangat Setuju
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- Penggunaan berbagai tekstur pada sensory play mendukung pengalaman belajar yang lebih interaktif

☐ Sangat Tidak Setuju	☐ Tidak Setuju	☒ Cukup Setuju	☐ Sangat Setuju
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- Saran

*gunakan bahasa yang lebih sederhana
untuk native, apabila selanjutnya akan untuk
mengajarkan bahasa pada native speaker.*

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4.1.7 Operational Product Revision

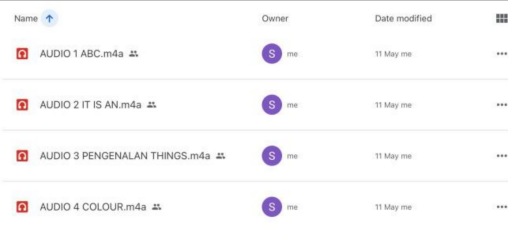
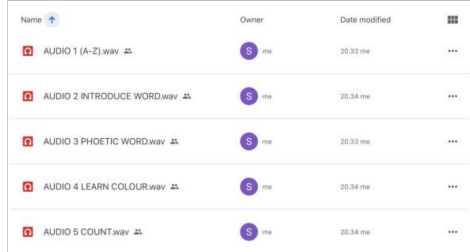
Operational product revision was conducted based on the feedback obtained during the second stage of expert validation. At this stage, the validator provided recommendations regarding the use of audio in the book *Mumu's Garden Adventure* to improve the quality of English pronunciation heard by the children.

To follow up on this feedback, the researcher revised the audio feature by replacing the previously used voice recordings with Artificial Intelligence Text-to-Speech (AI TTS) audio. The implementation of AI TTS technology aims to produce clearer, more consistent, and near-native pronunciation, thereby providing a better English pronunciation model for young children.

In addition, the researcher also added an audio feature to the *Let's Count!* section, which covers the introduction of numbers 1–10. This audio addition was carried out to support children in listening to and imitating the pronunciation of English numbers more accurately.

The revisions at this stage were executed to perfect the audio aspects of the book *Mumu’s Garden Adventure* before the product advanced to the operational testing phase

Table 4. 1 Comparison of the Product Before and After Revision

Before	After
The audio recordings were manually recorded. 	The audio was replaced with Artificial Intelligence Text-to-Speech (AI TTS) technology, resulting in clearer and more consistent pronunciation. 
The <i>Let’s Count!</i> section only provided counting activities without audio support.	The Let’s Count! section was equipped with a QR Code linked to audio recordings, enabling children to listen to and imitate the pronunciation of numbers in English.



4.1.8 Operational Field Testing

Once the product was declared feasible based on the expert validation results, the next stage was the field implementation test. This stage aimed to obtain user feedback regarding the book *Mumu's Garden Adventure* as an audio- and sensory play-based English learning medium for young learners.

The field implementation test was conducted at Karangturi Kindergarten (TK Karangturi), involving 11 teachers as respondents. At this stage, respondents were given the opportunity to review the book's content, the audio features accessed via QR codes, and the sensory play activities located in the Fun Challenge & Sensory Play section. After evaluating the product, respondents were asked to complete a questionnaire distributed via Google Forms.

The assessment instrument utilized a four-point Likert scale, namely Strongly Disagree (1), Disagree (2), Agree (3), and Strongly Agree (4). The statements in the questionnaire were structured based on several evaluation aspects, which included material, design, audio, and sensory play aspects. The data obtained from the questionnaire results were then analyzed to determine the product's feasibility level based on respondent feedback.

The results of the field implementation test served as the basis for determining the acceptance and feasibility level of the book *Mumu's Garden Adventure* as an English learning medium for young learners. The processed questionnaire data are presented in the following subsection.

Table 4. 2 Number of Product Testing Respondents

Respondent Type	Number of Respondents
KGA Teachers (<i>Guru TK A</i>)	6
KGB Teachers (<i>Guru TK B</i>)	5
Total	11

During the field implementation testing stage, the *Mumu's Garden Adventure* product was introduced to 11 teachers at Karangturi Kindergarten to obtain feedback on the developed learning medium. The respondents were given the opportunity to examine the book's content, the audio features accessed via barcodes, and the sensory play activities contained within the product. Following this, respondents were requested to fill out an evaluation questionnaire using a four-point Likert scale, consisting of Strongly Disagree (1), Disagree (2), Agree (3), and Strongly Agree (4). The questionnaire statements were grouped into three evaluation aspects: the design aspect, the material aspect, and the audio and sensory play aspect. The statements used in the questionnaire can be seen in Table 4.3 below.

Table 4. 3 Questionnaire Statements for Operational Field Testing

No.	Statement
Design Aspect	
1.	The illustrations of the character <i>Mumu</i> and the visual elements in the book are attractive and appropriate for children aged 4–6 years.
2.	The design of the images and backgrounds on each page supports an enjoyable learning atmosphere.
3.	The arrangement of images, numbers, and text in the book is well organized and easy for children to understand.

4.	The font size and type used in the book are clear and easy to read.
5.	The visual appearance of the book creates an interactive impression and increases children's interest in learning English.
Content Aspect	
6.	The English vocabulary presented in the book is easy for children aged 4–6 years to understand.
7.	The simple sentences in the book are easy for children to pronounce and imitate.
8.	The vocabulary taught in the book is related to children's daily lives, particularly the themes of gardening and fruits.
9.	The use of A1–A2 language levels in the book is arranged progressively according to children's abilities.
10.	The content of the book is appropriate for the characteristics and developmental stage of children aged 4–6 years.
Audio and Sensory Play Aspect	
11.	The QR code audio in the learning media is easy to use and can be accessed using a smartphone.
12.	The pronunciation speed of the audio is appropriate for young learners.
13.	The sensory play activities in the learning media are safe and comfortable for children to use.
14.	The materials used in the sensory play activities are safe for children.
15.	The sensory play materials are appropriate for the objects introduced to the children.

After the respondents evaluated all the statements in the questionnaire, the collected data were processed using the Likert scale method to determine the product's feasibility level for each evaluated aspect. The processed data results from the 11 respondents are presented in Table 4.4 below.

Table 4. 4 Questionnaire Results on a Likert Scale

Aspect	Statement Number	Scale				Mean Score	Mean Score of Aspect
		1	2	3	4		
Design Aspect	1	0	0	7	4	3,36	3,24
	2	0	0	8	3	3,27	
	3	0	1	9	2	3,18	
	4	0	0	9	2	3,18	
	5	0	0	7	3	3,18	
Content Aspect	6	0	1	8	2	3,09	3,14
	7	0	0	9	2	3,18	
	8	0	0	9	2	3,18	
	9	0	0	8	2	3,09	
	10	0	0	9	2	3,18	

Audio and Sensory Play Aspect	11	0	0	9	2	3,18	3,18
	12	0	0	9	2	3,18	
	13	0	0	9	2	3,18	
	14	0	0	9	2	3,18	
	15	0	0	9	2	3,18	
Overall Mean Score							3,19

Based on the results of the field implementation test involving 11 Karangturi Kindergarten teachers, the *Mumu's Garden Adventure* learning medium obtained an overall average score of 3.19. This value indicates that the product falls into the feasible category for use as an English learning medium for children aged 4–6 years.

In the design aspect, an average score of 3.24 was obtained, demonstrating that the book's visual appearance, illustrations, color selection, and layout were rated as appealing and appropriate for young learners characteristics. The colorful book design, supported by engaging illustrations, was deemed capable of increasing children's learning interest while using the learning medium.

The material aspect obtained an average score of 3.14. This result shows that the presented material is appropriate for the developmental stage of children aged 4–6 years, easy to understand, and relevant to daily life. The vocabulary and activities within the book were also considered capable of supporting the basic English learning process for children.

In the audio and sensory play aspect, an average score of 3.18 was achieved. Respondents noted that the audio feature accessed via QR Codes

successfully helped children hear English vocabulary pronunciation more clearly. Furthermore, the sensory play activities presented in the book were evaluated as being able to increase children's engagement in the learning process through a more interactive and enjoyable learning experience.

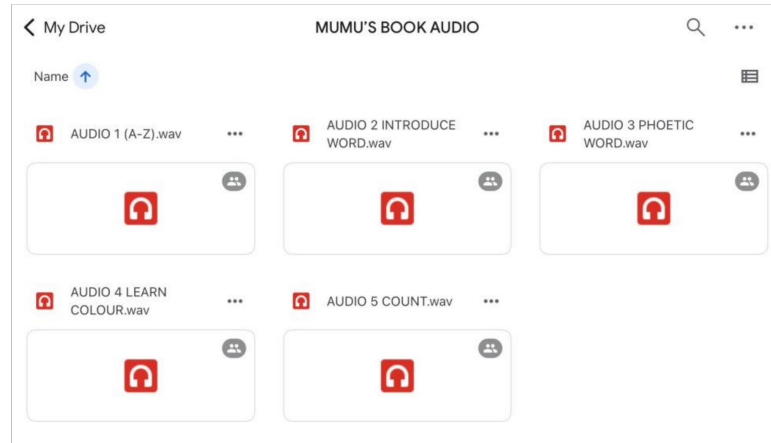
Overall, the results of the field implementation test indicate that the book *Mumu's Garden Adventure* has met the feasibility criteria as an audio- and sensory play-based English learning medium for young learners. These findings show that the product can be utilized as an alternative learning medium that is engaging, interactive, and aligned with the developmental characteristics of children aged 4–6 years.

4.1.9 Final Product Revision

Based on the results of the field implementation test, respondents provided feedback regarding the audio quality in the book *Mumu's Garden Adventure*. The feedback primarily related to the pronunciation accuracy of several English letters and vocabulary.

As a follow-up, the researcher revised the audio feature by updating the recordings using Artificial Intelligence Text-to-Speech (AI TTS) technology. This revision was carried out to produce more accurate, consistent, and easily understandable pronunciation for children aged 4–6 years. With these improvements, the audio feature is expected to provide better English pronunciation models and optimally support the learning process.

Figure 4. 7 Results of Audio Revision Using AI Text-to-Speech (TTS)



After the audio revision had been completed, the revised version of *Mumu's Garden Adventure* was re-evaluated by the same validator using a final product validation form. The purpose of this validation was to assess whether the revisions had addressed the previous feedback and to determine the overall quality of the product.

Based on the final validation results, the validator considered the revised product appropriate for use as an English learning book for children aged 4–6 years. No further revisions were required. However, the validator suggested that the audio feature should be fully implemented in the book to support children's pronunciation learning. In addition, the sensory play component could be further developed and enhanced in future studies by incorporating more varied and innovative activities.

Figure 4. 8 Final Product Validation Form

Form Validasi Produk Pembuatan
Buku Mumu's Garden Adventure

Validator : Lili Lamehat Panjaitan, SPd, M.A.
Hari/Tanggal : Rabu, 03 Juni 2026

Berikanlah tanda centang pada salah satu jawaban yang dipilih (✓)

1. Pelafalan huruf dan kosakata pada audio telah sesuai dengan pengucapan bahasa Inggris yang benar

☐ Sangat Tidak Setuju	☐ Tidak Setuju	☐ Cukup Setuju	☒ Sangat Setuju
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2. Kualitas audio yang digunakan sudah jelas dan mudah dipahami

☐ Sangat Tidak Setuju	☐ Tidak Setuju	☐ Cukup Setuju	☒ Sangat Setuju
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3. Penggunaan QR Code sebagai akses audio sudah sesuai dengan tujuan pembelajaran

☐ Sangat Tidak Setuju	☐ Tidak Setuju	☐ Cukup Setuju	☒ Sangat Setuju
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4. Aktivitas sensory play yang disajikan telah sesuai dengan karakteristik anak usia 4-6 tahun

☐ Sangat Tidak Setuju	☐ Tidak Setuju	☐ Cukup Setuju	☒ Sangat Setuju
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5. Produk Mumu's Garden Adventure layak untuk didiseminasikan sebagai media pembelajaran bahasa Inggris berbasis audio dan sensory play.

☐ Sangat Tidak Setuju	☐ Tidak Setuju	☐ Cukup Setuju	☒ Sangat Setuju
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6. Saran
Revisi audio pada buku, pengembangan sensory play pada permainan selanjutnya.

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4.1.10 Dissemination and Implementation

The dissemination stage was carried out by introducing the book *Mumu's Garden Adventure* to the teachers at Karangturi Kindergarten as potential users of the learning medium. This product, which has been declared feasible for use, is designed as an audio- and sensory play-based English learning medium for children aged 4–6 years.

As a form of copyright protection for the developed product, the book *Mumu's Garden Adventure* was registered with the Direktorat Jenderal Kekayaan Intelektual (DJKI). In addition, the final product was presented in an undergraduate thesis defense (*sidang tugas akhir*) as a research and development output.

Figure 4. 9 Dissemination and Implementation of the Product
at TK Karangturi Semarang



4.2 Discussion

This research aimed to develop an English learning medium for children aged 4–6 years in the form of an audio- and sensory play-based book entitled Mumu's Garden Adventure. The product was developed using the Research and Development (R&D) method adapted from Borg and Gall through several stages, including research and information collecting, planning, preliminary product development, expert validation, product revision, operational field testing, final revision, and dissemination. Based on the results of the development and testing process, the product can be considered feasible as an English learning medium for young learners.

The development of Mumu's Garden Adventure was based on the need for a learning medium that is appropriate to the characteristics of children aged 4–6 years. At this stage of development, children tend to learn more effectively through concrete experiences, repetition, visual stimulation, and activities that involve more than one sense. Therefore, the product was designed not only as a visual learning book, but also as a medium that integrates audio and sensory play to provide a more interactive learning experience. This finding is in line with Gainsley (2011), who explains that children learn through the use of all their senses, such as seeing, touching, and feeling. Similarly, Kachur (2025) emphasizes that a multisensory approach involving visual, auditory, tactile, and kinesthetic elements can enhance children's memory, understanding, and learning motivation. Thus, the development of this product reflects the importance of multisensory stimulation in young learners learning.

The content of the book was developed by considering the developmental stage and language needs of young learners. The materials selected in Mumu's Garden Adventure, namely the alphabet, simple vocabulary, colors, and numbers, are basic English materials that are close to children's daily lives and suitable for their cognitive and linguistic development. In addition, the materials were organized into several sections such as ABC with Mumu, Everything in the Garden, Colors Around Us, Let's Count!, and Fun Challenge & Sensory Play. This organization was intended to make the learning materials easier for children to follow gradually. The use of a garden theme also helped contextualize the vocabulary and made the learning content more meaningful and relatable for children. This supports the findings of Utami and Mulyadi (2025), who state that children understand and remember vocabulary more easily when it is connected to direct experiences and familiar contexts. Therefore, presenting vocabulary through a theme that is close to children's environment can support more meaningful English learning.

One of the main features developed in this product is the use of audio accessed through QR Codes. The inclusion of audio was intended to support children in listening to and imitating the correct pronunciation of English vocabulary. This is particularly important in young learners' English learning because children at this age are still in the process of building their basic language awareness, including pronunciation and listening skills. Through the audio feature, children can hear English pronunciation directly, while teachers and parents can use the book without having to rely entirely on their own pronunciation ability. Therefore, the integration of QR Code audio can be seen as one of the strengths of the product, as it provides pronunciation support and increases the interactivity of the learning process. This finding is in line with Kachur (2025), who explains that auditory elements in multisensory learning help children recognize language sounds more effectively and support language acquisition. In this study, the audio feature functioned not only as a pronunciation model but also as an additional support system for teachers and parents in introducing English vocabulary to children.

In addition to audio, sensory play was also included as an important component of the product. Sensory play activities in Mumu's Garden Adventure were designed

to stimulate children's tactile exploration through the use of different textures and materials, such as velcro, faux leather paper, black sticky rice, and velboa fabric. The inclusion of these activities reflects the understanding that young children learn effectively through direct physical interaction with learning materials. Through touching, feeling, and exploring textures, children are not only introduced to vocabulary but are also encouraged to engage more actively in the learning process. In this sense, sensory play serves as both a reinforcement activity and a strategy to maintain children's attention and motivation. This result supports previous studies on sensory-based learning in young learners. Rahayu et al. (2023) state that sensory play can make learning more interactive and engaging while supporting children's cognitive, motor, and language development. Likewise, Munzilin et al. (2021) argue that sensory-based learning increases children's interest in learning because it provides enjoyable and active learning experiences. In the tactile aspect, the findings are also relevant to Putri (2025), who found that textured media can improve young children's tactile abilities and exploratory skills. Therefore, the sensory play component in this product is not only an attractive feature but also pedagogically meaningful for supporting children's learning process.

The results of expert validation and product revision also show that the development process was not only focused on producing a product, but also on improving its practicality and quality. In the first validation stage, the validator suggested that placing sensory play activities on every page was less practical because it would make the book too thick and less efficient to use. This feedback led to a major revision in the product design, in which the sensory play activities were moved to one section at the end of the book, namely Fun Challenge & Sensory Play. This revision indicates that product development for young learners learning media should consider not only educational value, but also practicality, durability, and production efficiency. By placing the sensory play activities in one section, the product became more practical while still maintaining its interactive characteristics. This also shows that sensory-based media need to be designed in a way that balances pedagogical value with usability in real classroom contexts.

Another important revision was related to the audio feature. Initially, the product used manually recorded audio. However, based on expert feedback, the researcher replaced the recordings with Artificial Intelligence Text-to-Speech (AI TTS) audio to improve pronunciation quality, clarity, and consistency. This revision was significant because pronunciation quality is one of the key elements in English learning media, especially for young learners who rely heavily on imitation. The use of AI TTS made the audio clearer and more standardized, which is expected to help children receive a better model of English pronunciation. In addition, the researcher also added audio to the Let's Count! section so that number pronunciation could also be learned through listening activities. This shows that the revision process strengthened the role of audio as an essential component of the product. In relation to previous studies, this finding extends Kachur's (2025) argument regarding the importance of auditory support in multisensory learning by showing how digital audio integrated through QR Codes can be applied practically in a book-based learning medium for young learners.

The operational field testing results further support the feasibility of Mumu's Garden Adventure. Based on the questionnaire distributed to 11 teachers at TK Karangturi Semarang, the product obtained an overall mean score of 3.19, which indicates that it is feasible for use as an English learning medium for children aged 4–6 years. The design aspect obtained a mean score of 3.24, the content aspect obtained 3.14, and the audio and sensory play aspect obtained 3.18. These findings suggest that the product was positively accepted by the respondents in all evaluated aspects.

The high score in the design aspect indicates that the visual appearance of the book successfully attracted attention and matched the characteristics of young learners. For children aged 4–6 years, visual elements such as colorful illustrations, clear layouts, and readable typography are important because they influence children's motivation and engagement during learning. The respondents' positive evaluation of the design suggests that the book was visually appropriate and capable of supporting an enjoyable learning atmosphere. This is consistent with the idea of multisensory learning proposed by Gainsley (2011) and Kachur (2025), in which

visual presentation plays an important role in supporting children's understanding and sustaining their interest during learning activities.

The material aspect also obtained a positive result, with an average score of 3.14. This indicates that the vocabulary and activities included in the book were considered suitable for children's developmental stage and understandable for young learners. The materials presented in the book focus on simple and familiar English vocabulary, which is essential in young learners learning. Since children aged 4–6 years are still at the beginning stage of foreign language learning, introducing vocabulary that is closely related to their daily environment is an effective strategy. Therefore, the positive result in the material aspect shows that the content of *Mumu's Garden Adventure* was relevant and pedagogically appropriate. This finding is in line with Utami and Mulyadi (2025), who found that children's vocabulary mastery improves when learning is connected to sensory and direct experiences.

Furthermore, the audio and sensory play aspect obtained an average score of 3.18, showing that respondents viewed these features positively. The audio feature was considered useful in helping children listen to correct pronunciation, while the sensory play activities were seen as increasing children's engagement and making learning more interactive. This result confirms the importance of combining auditory and tactile elements in learning media for young learners. It also supports previous studies by Rahayu et al. (2023), Munzilin et al. (2021), and Kachur (2025), which highlight that sensory and multisensory learning can improve children's participation, motivation, and learning effectiveness. The integration of these features differentiates *Mumu's Garden Adventure* from conventional picture-based learning books, as it offers a more varied and engaging learning experience.

Overall, the findings of this research indicate that *Mumu's Garden Adventure* has fulfilled its purpose as an English learning medium that integrates visual, audio, and sensory play elements for children aged 4–6 years. The product not only provides learning materials appropriate for young learners, but also offers pronunciation support and interactive activities that can enhance children's involvement in learning. The revisions made throughout the development process

also demonstrate that the product was continuously improved based on expert input to achieve better practicality and quality.

In relation to previous studies, this research confirms that sensory-based learning and multisensory stimulation are effective in supporting children's engagement, vocabulary learning, and learning motivation. However, this study also offers a specific contribution by applying those principles in the form of a book-based English learning medium integrated with QR Code audio and tactile sensory activities. While previous studies mostly focused on sensory play in the form of classroom activities, direct games, or tactile exercises, this study developed an interactive smart book that combines visual, auditory, and tactile elements in one medium. Therefore, Mumu's Garden Adventure can be considered not only feasible but also innovative as an English learning medium for young learners.

Therefore, it can be concluded that Mumu's Garden Adventure is a feasible and innovative English learning medium for young learners. It can serve as an alternative medium for teachers and parents in introducing basic English vocabulary to children in a more interactive, enjoyable, and developmentally appropriate way. In addition, the findings of this research suggest that integrating audio and sensory play into children's learning media can provide meaningful contributions to young learners English learning, especially in supporting pronunciation practice, sensory engagement, and children's motivation to learn.