CHAPTER I
INTRODUCTION

1.1 Background

The golden age is a critical stage in human life when growth and development occur optimally (Diana et al., 2021; Wulandari & Purwanta, 2020). During this period, children undergo motor and adaptive behavioral development, making it an ideal stage for learning (Meléndez-Jara et al., 2021). This development can be fostered through play, social interaction, and hands-on experiences that engage the five senses, allowing children to connect what they learn with the real world around them (Mastuinda & Yaswinda, 2023). Thus, early childhood education plays a crucial role in providing age-appropriate stimulation (Novitasari & Prastyo, 2020; Wulandari & Purwanta, 2020)

Early childhood education models from other developed countries have been widely studied and adapted in Indonesia; one such model is the STEM approach (Fauziaturromah et al., 2021). The STEM (Science, Technology, Engineering, and Mathematics) model emphasizes the interconnections among these fields of study. This approach is not only oriented to theoretical understanding but also encourages its application in daily life as an effort to solve real-world problems (Septiyanto et al., 2024). Moore, as cited in Widyastuti (2024: 93), defines STEM education as a learning approach that integrates the four disciplines of science, technology, engineering, and mathematics into a cohesive learning activity. This approach is designed based on the interconnections among these fields and is linked to real-world problems in daily life. Therefore, the application of the STEM approach in early childhood education plays a crucial role in building a foundation for logical thinking from an early age, while also fostering children's curiosity and their ability to connect knowledge with real-world situations around them.

According to Chesloff, as cited in Margorini and Rini (2019), STEM education should be instilled from an early age because, fundamentally, the core of STEM lies in the development of curiosity, creativity, and logical thinking skills. The application of the STEM approach in early childhood education also encompasses other aspects such as motor skills and language. This development is realized through project-based learning and problem-solving, which involve active hands-on and mind-on activities (Lestari & Kurniati, 2021). This approach provides children with the opportunity to learn through direct experience, so that the knowledge they gain is the result of exploration and interaction with their surroundings (Barokah et al.,

2024). Through these activities, children are trained to observe, experiment, and draw simple conclusions from their observations.

Early childhood education does not focus solely on knowledge but is also aimed at shaping children's personalities and character, as at this stage children are still in the egocentric phase, characterized by a tendency to view the world from their own perspective (Novitasari & Prastyo, 2020). Therefore, learning that emphasizes self-awareness is a crucial aspect to help children develop self-awareness while connecting it to their daily learning experiences.

Teaching young children about their bodies and senses is the learning experience closest to them (Permataasri & Ardiansah, 2023). Through this learning, children can identify the parts of their bodies, understand the functions of each sense, and learn how the body and senses work together to interact with the surrounding environment. Learning about the body and senses also helps children develop self-awareness, motor skills, and language skills through simple conversations (Lestari & Kurniati, 2021; Tsabitah et al., n.d.). Additionally, this activity can serve as a foundation for understanding cause-and-effect relationships and functional connections, which are crucial in STEM-based learning. Therefore, introducing the body and the senses from an early age not only enriches children's learning experiences but also fosters curiosity and an initial understanding of the world around them.

Based on observations carried out on October 1–2, 2025, at TK Negeri IV Kota Bekasi, the activities involved two classes of 5–6-year-olds, each consisting of 15 to 16 students. During the learning process, the children mostly talked about things related to themselves, whether in the form of imagination or experiences with their families. Additionally, the author found that some children still struggled to answer simple questions related to the learning material. For example, during the learning activity on October 1 with the theme of animals, when asked the question "What does a chicken's beak look like?", only a small number of children were able to answer correctly. This finding indicates that the logical thinking skills of 5–6-year-old children still need to be improved through more interactive and contextual learning methods

Meanwhile, based on observations conducted on October 16, 2025, at TK Al-Wahyu Kota Surabaya involving Class B3, a group of 10 children aged 5-6 it was found that during the learning process, most children tended to follow the teacher's instructions directly when completing classroom tasks. The learning activities were divided into four types of tasks performed in rotation: coloring, answering questions, cutting, and making paper crafts. The

observation results showed that the children still had difficulty completing tasks that required logical thinking and fine motor skills. Based on these findings, there is a need to develop learning media in the form of STEM-based interactive books capable of developing the logical thinking and fine motor skills of early childhood students.

Teachers at TK Negeri IV Kota Bekasi and TK Al-Wahyu Kota Surabaya aya explained that lessons on the theme of the body and the senses were taught to students during the first semester of the school year. The learning process was conducted through various methods, such as play, singing, storytelling, and demonstrations or hands-on activities, all aimed at helping children retain the material in an enjoyable way. However, in early childhood education, the ability to remember alone is not enough. Children also need to be trained to be more sensitive to real-world events around them and to be able to solve problems logically (Susilowati, 2013). Therefore, early childhood learning activities are expected not only to foster basic knowledge but also to develop children's logical thinking skills and curiosity about their surroundings.

The selection of interactive books at TK Negeri IV Kota Bekasi and TK Al-Wahyu Kota Surabaya is still relatively limited, particularly when it comes to STEM-based interactive books. The available books generally consist only of folk tales, legends, or simple stories about children's daily activities. Based on observations at TK Negeri IV Kota Bekasi, during recess only about two children were seen showing an interest in reading books, while the majority of children preferred to play. In comparison, the students at TK Al-Wahyu Kota Surabaya demonstrate a higher interest in reading. Every Friday, the students are allowed to choose a book they like to take home and read, then return it on Monday. This practice indicates that children will select books based on their interests, highlighting the need for the development of more engaging, diverse, and enjoyable educational materials.

Interactive books have more varied visual designs, colors, and layouts compared to conventional books, so their appearance is able to capture children's attention and create a more enjoyable learning experience (Halawa et al., 2025). According to Rumah Juara Indonesia (2025), interactive books are a learning medium that can be used to assess the extent to which students have achieved the expected competencies. Including practice exercises, this book is also equipped with learning materials presented in an engaging and communicative manner. Through a combination of text, images, and activities that involve children's participation, interactive books serve not only as a learning resource but also as a tool that fosters curiosity and learning motivation from an early age (Siregar et al., 2020).

The interactive book “STEM-Based Introduction to the Human Body and Senses for Children Aged 5–6” is designed to help children understand learning concepts in a more tangible way. Through this medium, children not only learn about the parts and functions of the body and the senses, but also learn to relate them to their daily experiences. The interactive activities in the book are designed to foster logical thinking and fine motor skills through solving simple problems, in line with the principles of the STEM approach. Thus, children can develop a deeper understanding of themselves while fostering curiosity about how the body and senses work in daily life.

STEM-based books have several advantages over conventional books because they integrate concepts of science, technology, engineering, and mathematics into learning. A study conducted by Yuberti et al. (2022) showed that STEM-based books can improve students’ literacy and interest in learning. Therefore, STEM-based books are considered more effective than regular books because they not only emphasize cognitive aspects but also develop logical thinking skills, curiosity, and the ability to solve problems logically from an early age

There is a study with a similar focus titled “STEAM-Based Picture Story E-Books Improve Children's Science Skills in Kindergarten” (Mastuinda & Yaswinda, 2023), which focuses on designing STEM-based learning materials, however, using e-books as the medium. The results of this study indicate that: (1) book design has a significant influence on children’s interest and curiosity, (2) the use of simple sentences is important to facilitate understanding, (3) media development must be based on a needs analysis, (4) children’s direct involvement in evaluating the book is necessary to obtain relevant feedback, and (5) observations of children’s responses before and after using the book are needed to assess its effectiveness. With this understanding, this study provides insights into how to effectively design STEM-based books that align with children’s learning needs.

1.2 Problem Identification

1. Young children are still in the egocentric stage and tend to view the world from their own perspective (Novitasari & Prastyo, 2020; Tsabitah et al., n.d.). At this stage, children more often rely on their imagination rather than logical thinking to solve simple problems.
2. Based on observations of students at TK Negeri IV Kota Bekasi and TK Al-Wahyu Kota Surabaya, 5- to 6 years old tend to get bored easily when presented with learning

materials; therefore, the methods used need to be designed to be varied, interactive, and enjoyable.

3. Based on interviews with teachers at TK Negeri IV Kota Bekasi and TK Al-Wahyu Kota Surabaya, learning about the body and the senses in early childhood is still limited to learning through play and singing, which focuses on children's ability to memorize the material. This approach does not yet fully emphasize understanding and utilizing the functions of the body and the senses in daily life.
4. Based on observations of the learning process of students at TK Negeri IV Kota Bekasi and TK Al-Wahyu Kota Surabaya, children's ability to answer simple logical questions remains relatively low. Many children choose to remain silent rather than respond when questions are asked of them.
5. Based on observations of the classroom literacy corners TK Negeri IV Kota Bekasi and TK Al-Wahyu Kota Surabaya, the availability of interactive books presenting material on the body and the senses using a STEM approach remains limited.

1.3 Problem Statment

How to design an interactive, engaging, and educational STEM-based picture book about the human body and the senses for young children?

1.4 Scope and Limitations

1. The target audience for this design is children aged 5–6 years
2. The book's content focuses on teaching young children about the body and the senses
3. The book's content is based on a STEM approach
4. The interactive features in this book consist solely of lift-the-flap, wipe-and-clean, and simple puzzle.

1.5 Design Objectives

Creating interactive STEM-based learning materials designed to develop logical thinking, fine motor skills, and the ability to maintain focus, with a theme of the human body and the senses for young children. Through this book, children are encouraged not only to memorize information but also to practice solving simple problems.

1.6 Significance of the Design

As a learning tool that encourages logical thinking and helps students connect bodily functions and the senses to real-life situations. This design can also serve as a reference for educators in developing innovative learning materials. Meanwhile, for parents, this design can be used as a learning tool for their children at home.

1.7 Conceptual Framework

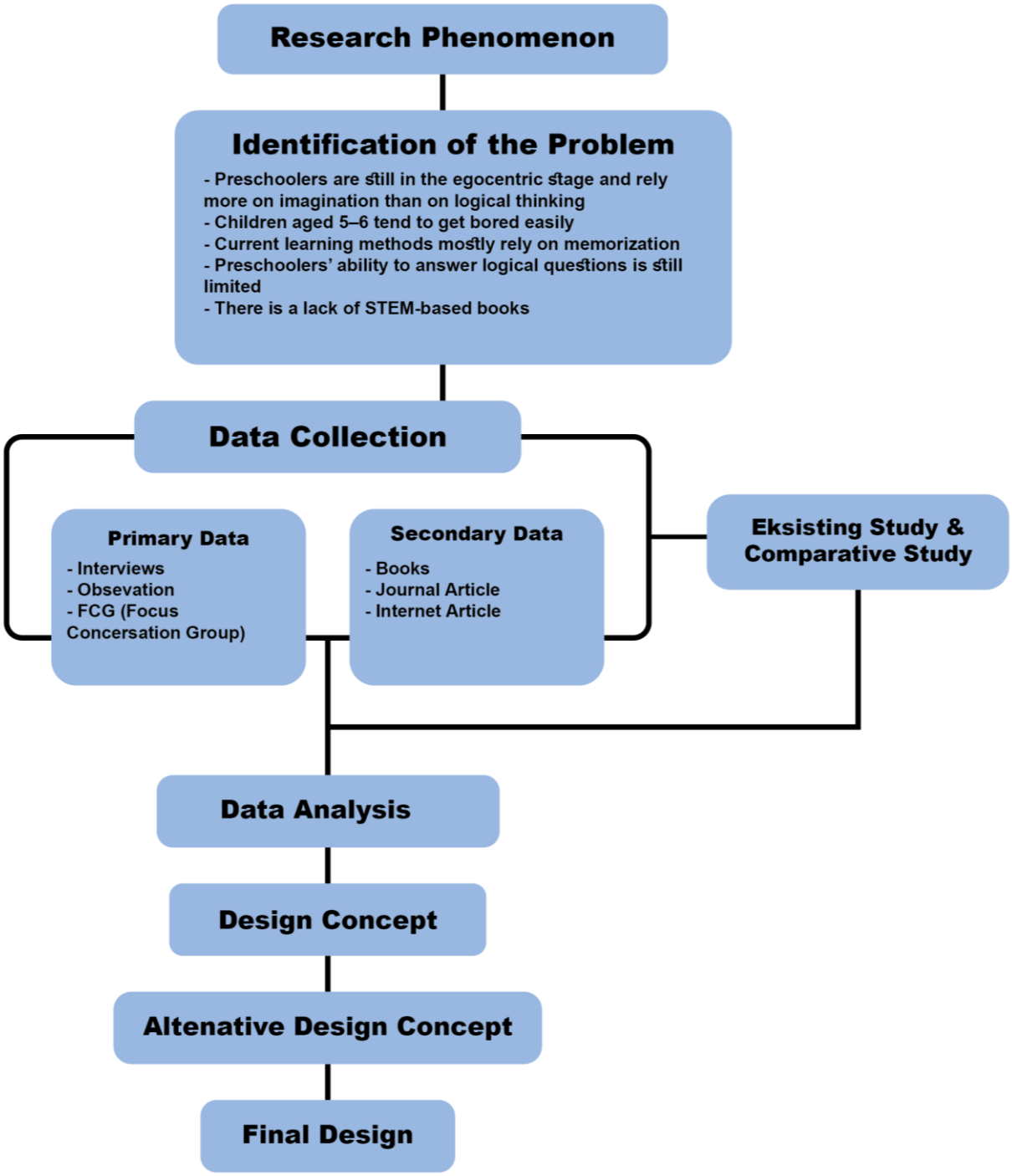

Figure 1. 1 Conceptual Framework, 2025
(Sources: Personal Document)