CHAPTER I
INTRODUCTION

1.1 Background

The environment is currently facing many problems, from pollution to damaged ecosystems and the extinction of certain species that's caused by reckless human activity that harms the environment. Many ecosystems are damaged from land ecosystems to sea ecosystems. Sharks as the apex predator is inevitable to face the ongoing issue, according to NOAA (National Oceanic and Atmospheric Administration) there are 450 species of sharks in the world, but according to a report by IUCN (International Union for Conservation of Nature) in early 2025 around 37% species of sharks is known to be near its extinction. According to WWF Indonesia, there are 118 shark species in Indonesia. According to BRIN , 5 shark species are nearly extinct, 28 shark species are vulnerable and 35 shark species are nearly threatened.

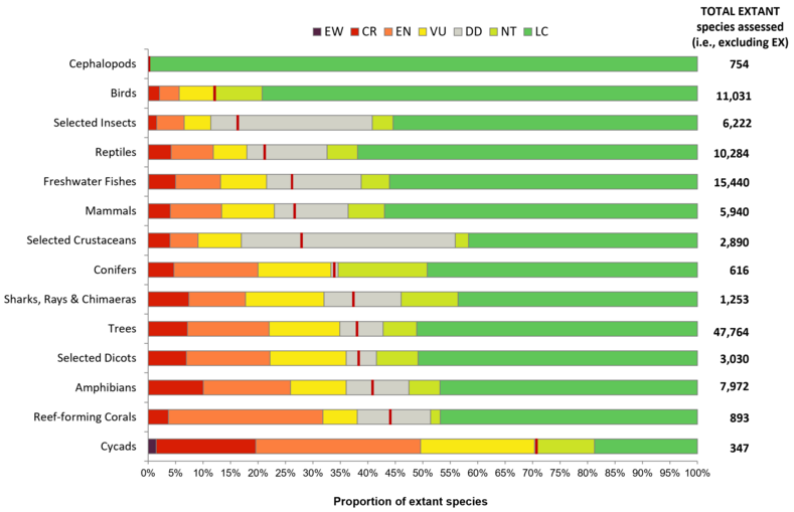

Figure 1.1 2025 Animal Extinction Statistic

(Source: iucnredlist.org accessed at 28 September 2025)

According to the Shark Research Institute there's at least 100 million sharks killed every year around the globe. Current shark extinction is caused by many factors, one of the biggest driving factors of shark extinction is overfishing or large-scale fishing practices that threaten fish populations (Habibie, 2024). Overfishing happens because of shark finning practice of live sharks and throwing its remains back to the sea Jaiteh (2017). Shark finning is done because of its high value compared to other fish products. According to an article by mongabay.com, shark fins can cost from Rp400.000 up to Rp12.000.000 per kilogram. The longer the fin, the more

valuable it is, as a comparison, according to SISKAPERBAPO East Java, the price of tuna fish is Rp40.000 per kilogram, this encourages fishermen to do shark finning because of a much higher selling price compared to other fish products.

Shark fishing in the world is not only encouraged by economy factor but also high demand from many industries that utilize various shark products, such as food industry that utilizes its meat and fins for shark fin soup that uses shark fin, the cosmetic industry also use shark products for sunscreen and anti-aging cream that relies on shark liver oil, and the fashion industry that utilize shark skin for exotic clothes.

Indonesia is one of the countries with the most shark fishing in the world, according to The Ministry of Maritime Affairs and Fisheries in 2023 there's as many as 16,500 tonnes or 45 tonnes per day of shark captured, this happens because the lack of attention by government, lack of enforcement encourages fishermen to capture sharks and sell their fins for a very high price, even though there are regulations that prohibit shark fishing, such as Regulation of the Minister of Maritime Affairs and Fisheries of the Republic of Indonesia Number 5/PERMEN-KP/2018 that states oceanic whitetip shark and hammerhead shark products are not allowed to leave the territory of Indonesia to protect oceanic white tip and hammerhead sharks, but regulations doesn't stop shark finning in Indonesia. According to a mongabay.com article in 2023, a port in East Java received up to 10 tonnes of shark and stingrays shipped to the port every day.

The high rate of shark fishing in Indonesia threatens the existence of sharks. Extinction of an apex predator can permanently damage an ecosystem, as at the top of the food chain in the marine ecosystem sharks have an important role in maintaining balance in the ecosystem (Fahmi, 2013). The loss of an apex predator can cause many fish, especially shark's prey, to explode in population and dominate the marine ecosystem and damage ocean ecosystem balance. Shark's existence as apex predator in the marine ecosystem protects diversity and richness of marine ecosystem (Fahmi, 2013)

Shark finning and shark fishing are generally carried out by fishermen, according to research conducted by Saddiah (2021) shows the average age of fishermen is in the productive age range of 15-64 years with the majority having only education up to elementary school. According to Broek et al. (2023), the education process for adults is challenging due to various factors, such as negative experience at school, the perception that relearning is risky and not realistic, social-economy factors also limit their motivation to learn. With the majority of fishermen being adults, educating them is challenging and ineffective.

Besides shark overfishing, other factors that contribute to shark extinction are the lack of public awareness. Research conducted by Rianto (2023) shows that fishermen do not support shark management and lack the understanding of existing regulations regarding prohibiting shark fishing especially towards certain species of sharks. Many fishermen say that shark fishing is a way to get an additional income, especially when they don't have a lot of fish to catch. The lack of understanding towards sharks causes fishermen to continue shark fishing. This lack of understanding of sharks is caused by the lack of socialization, information and knowledge about sharks, consequently fishermen still continue to catch several shark species that are already critically endangered. According to Afonso (2022) shows that public support towards shark preservation and conservation relies on public familiarity with shark species. Previous studies have shown that people who understand marine predators like sharks support marine predator conservation, conversely those who are not familiar with sharks hinders shark conservation policy effort and influences shark population and decline.

Delivering the material that will be discussed, traditional learning media such as books are more effective compared to digital media. According to research done by Støle (2020) that's conducted to 10 years old children shows that children who used traditional media in a reading test have a higher comprehension level compared to children who use digital media in a reading test. Therefore, traditional media that uses paper such as interactive encyclopedia books will be chosen as the medium for conveying information to children in an effective manner

Awareness towards shark extinction should be raised among the public, especially young children. Research by Saputra (2025) shows that education for elementary students are effective in building environmental awareness and has a better understanding of the environment and the important role of maintaining environmental cleanliness. According to

Jean Piaget's cognitive development theory, children aged 10-11 years old are in the operational concrete stage where thinking considers a logical outcome of a situation, and an interest in learning new things, where new experiences can spark interests to children (Marina, 2020). Jean Piaget's cognitive development theory shows children aged 10-11 years old can receive an education effectively by bringing an experience that can arouse their interest.

To attract the interest of children aged 10-11 in learning, one media that fits are encyclopedias. Research conducted by Alfian (2020) proves that encyclopedia is the effective learning medium for elementary school children, this can be seen by the increased understanding of the material provided in the encyclopedia, increasing interest in reading and developing curiosity. Research by Saputri (2023) shows that there are increase in understanding of the material among elementary school children with pre-test and post-test score shows the increase of average score from 61 to 76 in the open trial, this results are also consistent in a research conducted by Mutamima (2024) that shows an increase in post-test score compared to the pre-test with the trial score exceeding the minimum completeness criteria (KKM). Based on Jean Piaget's cognitive development theory, children at this age are at a concrete operational stage so they still need learning media that shows pictures and illustration. Encyclopedia explains the content of the book through pictures and brief explanations so it is considered suitable for use by this age group.

According to Jean Piaget's cognitive development theory one of the characteristics of concrete operational stage are activity, where children are given the chance to interact with the objects that are being studied, with that statement, the learning media that's used for children aged 10-11 years old who are in the concrete operational stage are interactive media. According to a research conducted by Ali (2025) shows that learning interest and motivation to learn by taking advantage of interesting video, audio and pictures can increase and show an increase in interest and motivation to learn and can maintain children's interest in learning, this can happen because interactive media can visualize abstract concepts or material and difficult to understand concepts or material to be easier to understand by children. Interactive media is media that utilizes interactive elements and involves user interaction (Aryfien, 2025). According to research conducted by Ali (2025) interactive learning based on interesting video or pictures can increase children's interest in reading, but in addition, based on the research conducted by

Anindita (2025) shows that traditional interactive media like pop-up can increase children's understanding of the material presented.

According to an interview conducted with the head of Bangsring Beach Shark Clinic, Banyuwangi Mr. Sukir and Mr. Abi stated that shark education for elementary school children are very important to preserve and protect the environment and media such as encyclopedia books are suitable for use as an educational media for children.

According to an interview conducted with an elementary school teacher, Ms. Karunia Sagita Hermana states that shark education in elementary school is still very lacking and does not discuss it in more depth, elementary school children still have the perception that sharks are ferocious predators, that perception is obtained from consuming media such as movies and cartoons. The misperception that exists in elementary school children caused by the lack of education about shark, this misperception needs to be corrected with an encyclopedia that will actual education and facts in an effective and interesting manner for children about sharks so that elementary school children can understand what sharks really are and understand their important role so they can eliminate this misperception, this statement aligns with a research conducted by Warren (2018) where after reading books about sharks, children's perception about sharks changed and are more interested and like sharks.

According to an observation made on the availability of books about sharks or types of shark in Indonesia on three book stores, namely Gramedia Royal Plaza Surabaya, Gramedia Central Park Jakarta and Periplus Galaxy Mall Surabaya and one library, namely the Surabaya City Library, no encyclopedia discuss about types of shark in Indonesia or interactive encyclopedia about types of sharks in Indonesia.

To measure the book's effectiveness in educating children about sharks, an evaluation with elementary school children will be conducted using the summative evaluation method, summative evaluation itself is an evaluation that's conducted at the end of a learning to measure effectiveness of a learning unit (Irawan, 2020).

Therefore, the proportion in this design is, if education about sharks and their important role in Indonesia is provided from a young age with an education media in accordance with

cognitive development theory, awareness towards sharks in Indonesia and their important role in marine ecosystem can increase. This is in accordance with Saputra (2025) research. Therefore an informative, interesting and easy to understand learning media for kids are needed, such as an interactive encyclopedia book that utilizes interactive to arouse children's interest in sharks in Indonesia and their important role in marine ecosystem.

This design will use the ADDIE method. This method is used to develop effective and efficient education media (Aldoobie, 2015). This method will go through 5 stages of development: namely Analysis, Design, Development, Implementation, and Evaluation (Astuti, 2020).

There are already several designs for educational media about sharks such as the Design of an Augmented Reality Encyclopedia of Protected Sharks and Rays (Christy, 2023), the Design of an Educational Illustration Book on Shark Conservation Efforts (Gunawan, 2016), the Design of an Illustration Book on Shark Conservation for Children Aged 6-11 Years (Agustine, 2019), and the Design of an Interactive Illustration Book on Sharks in Indonesia for Children Aged 6-12 Years as an Environmental Conservation Media (Bachtiar, 2023) has developed several education media about sharks in different encyclopedia format. The novelty of this design is this book is utilizing an interactive encyclopedia book to discuss 27 sharks in Indonesia, where in the design of the Protected Shark and Ray Augmented Reality Encyclopedia utilizes an app that's accessed using a handphone and only discuss 14 sharks and stingray and this design uses an outdated data, this design will use the latest data published by IUCN where several sharks are not included in the IUCN Red List or have an outdated classification. Most of the design has made children books that utilize narratives where in this design it will emphasize scientific information about sharks in Indonesia. This design adjust the content of the books to Jean Piaget's cognitive development theory and BSKAP Book Grading so the contents of this book can be more tailored to children's target audience so they can understand the material well and easily. The design that has been done by Gunawan (2016) discusses shark conservation effort in a complex way because the target audience is catered to a mature audience 18-25 years old and this design will discuss sharks simply to ensure ease of understanding by children. The design by Agustine (2019) discusses shark conservation efforts in general in narrative form and does not discuss sharks in detail. The statement provided shows

potential in designing an interactive encyclopaedia book about sharks in Indonesia for 10-11 years old.

1.2 Problem Identification

Based on the background that has been explained above, the existing problem can be identified, namely:

1. According to a research conducted by Broek et al. (2023), fishermen as the main perpetrators of shark fishing are at the average age of 15-64 years old are difficult to educate, fishermen are difficult to educate because the importance of education for adults are not very important and hindered by socio-economic factors.
2. Based on the research conducted by Rianto (2023) fishermen have a lack of awareness of sharks, the lack of socialization for fishermen makes them continue to practice shark fishing and the lack of educational media about sharks available for children.
3. Based on an existing study of interactive encyclopedia conducted by Alfian (2020) on elementary school children, interactive encyclopedia is an effective media for children 10-11 years old and in accordance with Jean Piaget's cognitive development theory.
4. According to an interview conducted with an elementary school teacher, shark education is still very lacking. This is caused by misperception of sharks and the lack of awareness of sharks' important role in the marine ecosystem.
5. No encyclopedia discuss sharks in Indonesia, an observation conducted at Gramedia Central Park Jakarta at 20 August 2025, Gramedia Royal Plaza Surabaya at 30 August 2025, Periplus Galaxy Mall at 28 October 2025 and the Library of Surabaya City at 13 September 2025 showed a lack of encyclopedia book discussing shark types in Indonesia. The existence of interactive encyclopaedias that discuss shark or shark types in Indonesia was also not seen in the three book stores and library. During the observation there were several encyclopaedias discussing sharks in general but it did not discuss shark types in Indonesia.

1.3 Problem Formulation

Based on the background and problem identification, the problem formulation in this design is as follows.

"How to Design Interactive Encyclopedia Book about Sharks in Indonesia as Education Media for Children Ages 10-11 Years Old?"

1.4 Scope of Problem

1. This encyclopedia only discusses sharks in Indonesian water and will not discuss shark types that are not in Indonesian water.
2. This book is designed to only discuss basic information about sharks in general, such as anatomy, taxonomy and sharks' important role, as well as information about sharks in Indonesia and provide characteristics, facts, and whereabouts of these sharks.
3. This book will only discuss 27 sharks out of 180 sharks in Indonesia, sharks that are selected are sharks that are categorised as Critically Endangered, Endangered, and Vulnerable according to the IUCN Red List 2025.
4. The media used is an interactive encyclopedia with pop-ups, Augmented Reality and pull-tab. These media were chosen to provide an engaging and interesting learning experience for children.

1.5 Design Objectives

1. Introducing sharks in Indonesia especially critically endangered sharks to raise awareness among children 10-11 years old about the importance of sharks for the marine ecosystem.
2. Increase children’s interest in reading books by providing them an interesting and unique experience through interactive book media.
3. Increase children's interest in studying the environment and nature.

1.6 Benefit of Design Results

1. Increasing knowledge about sharks in Indonesia to children 10-11 years old.
2. Attract children’s interest in reading books with an interactive and unique book.
3. Make children more aware and care about the environment by providing them with education.
4. Become one of the references in designing an interactive encyclopedia that utilizes augmented reality, pop-up and pull-tab.

1.7 Design Framework

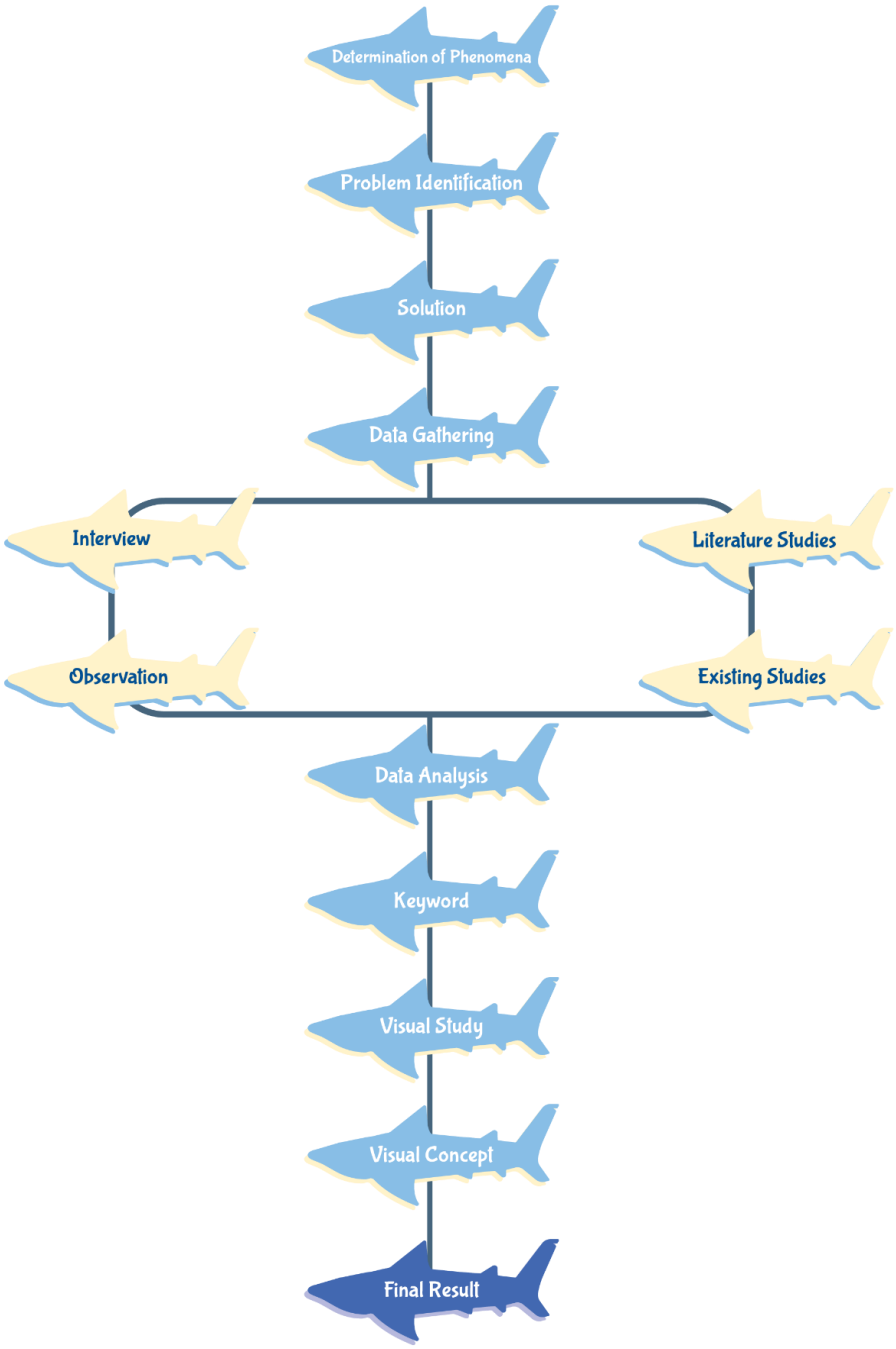

Figure 1.2 Design Framework

(Source: Personal Documentation)