CHAPTER I

INTRODUCTION

This chapter provides an introduction to the research, detailing the background and rationale, articulating the core research questions, and outlining the specific purpose, scope, and significance of the study.

1.1 Background of the Study

In 21st-century education, navigating an era characterized by rapid information flow and complex global challenges requires more than just basic language proficiency. While critical thinking is widely recognized as essential to filter this influx of information (Zubaidah, 2016), its abstract nature must be anchored in a tangible competency. Specifically, it requires the ability to evaluate evidence, distinguish valid data from misinformation, and make informed, rational decisions. These competencies define modern scientific literacy (Hurd, 1998; Holbrook & Rannikmae, 2009). Despite its terminology, contemporary literature emphasizes that scientific literacy is not confined to the laboratory or the mere memorization of scientific facts. Rather, it is a foundational life skill and a mindset necessary for societal participation (Bybee, 1997). The National Research Council [NRC] (1996) further defines it as the ability to ask curiosity-based questions, engage thoughtfully with science-related public issues, evaluate the quality of information, and construct evidence-based arguments. This pressing need is echoed by the OECD (2012) framework, which emphasizes the application of scientific knowledge to acquire new insights and draw logical conclusions.

To operationalize this concept for the current study, the researcher adopts the framework proposed by BouJaoude (2002), which identifies four key dimensions of scientific literacy. These dimensions comprise the knowledge of science, the investigative nature of science, science as a way of knowing, and the interaction of science, technology, and society. The knowledge of science refers to

the mastery of core facts and concepts, while the investigative nature of science involves applying analytical methods such as observation and inference. Furthermore, science as a way of knowing emphasizes evaluating how knowledge is logically constructed, and the interaction dimension focuses on applying this analytical reasoning to real-world societal issues. By explicitly defining these four measurable pillars, the framework provides a clear theoretical structure for integrating evidence-based reasoning into language learning.

Within the classroom ecosystem, the teacher is the central agent in facilitating the learning experience. However, results from the national assessments in Indonesia, specifically the AKM (Asesmen Kompetensi Minimum), suggest that students' reading and critical thinking abilities remain at low to moderate levels. A study by Nugraha et al. (2024) supports this finding, concluding that all indicators of critical thinking skills remain in the low category. The study notes that while certain indicators are categorized as good, others, such as reasoning and clarity, are still merely sufficient. This is partly attributed to students' incomplete reading of questions, which hinders their overall comprehension. Given these low baseline skills, particularly among Junior High School (SMP) students who are still mastering foundational English, introducing scientific literacy might initially appear to overwhelm the learning process. However, integrating scientific literacy in the EFL context does not mean forcing students to comprehend complex scientific jargon. Instead, it involves utilizing inquiry-based reading and basic evidence evaluation to make texts more relevant to real-world contexts. By training students to ask curiosity-based questions and verify simple information within English texts, teachers can actually scaffold reading comprehension rather than burden it.

This challenge is rooted in a systemic disconnect between educational policy and daily teaching practice. While the specific term "scientific literacy" is not explicitly mandated as a standalone subject in the Indonesian EFL curriculum, its foundational elements are formally required. Competencies such as inquiry, reasoning, and evidence evaluation are strictly mandated through the integration of Higher-Order Thinking Skills (HOTS) and the critical reasoning dimension of

the Profil Pelajar Pancasila. Therefore, scientific literacy in this context is not an entirely new or optional concept. It is the practical realization of existing curriculum goals. The critical issue lies in the execution. Recent findings highlight a disconnect in translating these mandates into practice. At the level of learning materials, a study by Mukhlis et al. (2023) revealed that reading literacy questions developed by teachers were predominantly not HOTS-based. This problem extends to teacher competency, where Sumardi and Guci (2023) identified a significant knowing-doing gap. They found that while English teachers possessed foundational knowledge of HOTS, this did not translate into the practical ability to design aligned assessments. Teachers do not lack the motivation to teach an unmandated subject. Rather, they lack the practical teachers' strategies to translate mandated higher-order thinking into accessible language tasks.

Despite this urgency, a gap remains in the existing literature. Previous studies have primarily focused on scientific literacy within science classrooms. While research such as the study by Sipe et al. (2024) demonstrates that English teaching strategies can benefit science communication, the reverse dynamic remains largely unexplored. Specifically, there is limited research on how language teachers actively utilize inquiry and evidence-based strategies to build literacy in EFL settings. As a result, the specific teachers' strategies used to foster these cognitive skills in English classrooms have not been widely documented. Without understanding these strategies, educators lack sufficient guidance to integrate evidence-based reasoning into their language instruction. Therefore, this study aims to address this gap by describing how EFL teachers facilitate scientific literacy in their daily teaching.

1.2 Research Questions

This study is guided by the following research questions:

1. What teachers' strategies do English teachers employ to facilitate scientific literacy in the EFL classroom?
2. How are the four dimensions of scientific literacy integrated into these teachers' strategies?

1.3 Purposes of the Study

The primary purpose of this study is to describe how scientific literacy is facilitated through the teachers' strategies employed by English teachers at a Junior High School. Specifically, this research seeks to achieve the following objectives:

1. To describe the teachers' strategies employed by English teachers to facilitate scientific literacy in the EFL classroom.
2. To describe how the four dimensions of scientific literacy are integrated into those teachers' strategies.

1.4 Scope of the Study

To ensure the depth and focus of the research, this study is specifically bounded by several key parameters. The research focuses on English as a Foreign Language (EFL) teachers at the Junior High School level. The central analysis revolves around two main elements: the teachers' strategies employed in the classroom and the four dimensions of scientific literacy being facilitated.

To systematically examine these elements, this study utilizes three theoretical frameworks. First, Brown's (2015) principles provide a foundational framework for understanding how teachers create meaningful and interactive learning environments. Second, the study employs Chamot's (2005) Cognitive Academic Language Learning Approach (CALLA) to identify and classify the specific strategies observed. While CALLA is a broad instructional approach, this research specifically utilizes its classification system, categorizing the teachers'

instructional actions into metacognitive, cognitive, and social/affective strategies. Third, the scientific literacy aspect is analyzed based on the framework defined by BouJaoude (2002), which encompasses four specific dimensions: the knowledge of science, the investigative nature of science, science as a way of knowing, and the interaction of science, technology, and society.

In terms of context, the study observes teaching and learning activities where foundational scientific literacy skills, such as inquiry and evidence-based reasoning, are facilitated, regardless of the specific text genre being taught. Furthermore, it is important to note that this study is strictly limited to the teacher's performance and instructional delivery. It does not aim to measure the students' proficiency levels in scientific literacy or their English language achievement, but focuses solely on how the teacher facilitates these skills through their teachers' strategies.

1.5 Significance of the Study

This study is expected to contribute to the body of knowledge regarding the facilitation of scientific literacy in English language education, particularly in the context of teaching strategies. The significance of this research is categorized into two main domains: theoretical and practical significance. Further elaboration on each of these categories is presented in the following subsections.

1.5.1 Theoretical Significance

Theoretically, this study aims to expand the understanding of how scientific literacy can be fostered within a non-science context. By analyzing authentic classroom interactions, this research provides empirical insights into how the cognitive processes associated with scientific literacy are embedded in language teaching. Furthermore, it enriches the existing literature by synthesizing insights from Brown's (2015) teaching principles and Chamot's (2005) learning strategy frameworks to understand how they intersect with scientific literacy concepts (BouJaoude, 2002). This synthesis offers a fresh perspective on how 21st-century skills are operationalized in the EFL classroom.

1.5.2 Practical Significance

Practically, the findings of this study are expected to provide meaningful contributions to several stakeholders. Firstly, for EFL teachers, this study offers concrete descriptions of teaching strategies used to facilitate scientific literacy. It serves as a practical reference for teachers to reflect on their own practices and explore ways to integrate critical thinking and scientific reasoning into their daily instruction without neglecting language learning goals. Furthermore, for future researchers, this study can serve as a reference for subsequent inquiries because research on scientific literacy in the EFL context is still limited. It provides a baseline for further exploration into interdisciplinary approaches, particularly those examining teacher strategies through qualitative methods. Finally, for curriculum developers and educational institutions, the findings may offer valuable insights into the feasibility of integrating cross-curricular skills, such as scientific literacy, into language education. This insight can subsequently inform the development of teacher training programs and curriculum policies that support the holistic development of students' twenty-first-century skills.