

CHAPTER I

INTRODUCTION

1.1. Research Background

English is known as global lingua franca, facilitates communication, access to information, education, and intercultural dialogue. Learning English provides multiple advantages to deaf children but learning the language presents significant challenges to students who have hearing impairments. The way they process language becomes more difficult because their hearing loss prevents them from understanding English words and complex concepts and proper pronunciation and sentence structure. The learning process becomes more difficult for students who depend on visual cues because English words that lack sign language equivalents need visual and contextual support to understand (Aldemir et al., 2023).

Deaf students who learn English require teaching methods based on visual learning, sign language supportive materials and vocabulary learning technologies (Ramadhani & Hufad, 2024; Yasin & Mohamad, 2024). This method is in line with the Pancasila Student Profile (Profil Pelajar Pancasila), a key framework in Indonesia's Merdeka Belajar curriculum that outlines six core dimensions of ideal student character: Beriman dan Bertakwa (Faith and Devotion to God), Berkebinekaan Global (Global Diversity), Bergotong Royong (Collaboration), Mandiri (Independence), Bernalar Kritis (Critical Thinking), and Kreatif (Creativity) (Kemendikbudristek, 2022).

Integrating visual and technology-enhanced methods in English learning environments can facilitate deaf students in becoming more autonomous, collaborative, and critically thinking learners, directly reflecting the dimensions of Mandiri, Bergotong Royong, and Bernalar Kritis. These characteristics are important for the development of Pancasila students who are competent, both in local and global societies. Besides, this research also contributes to the United Nations Sustainable Development Goals (SDGs) where SDG 4 (Quality Education) promotes inclusive and equitable quality education for all learners including those with disabilities and SDG 10 (Reduced Inequalities) emphasises the importance of

reducing educational inequalities for vulnerable groups. The use of Assemblr AR in the inclusive classroom is a concrete manifestation of these worldwide commitments in terms of giving accessible and interesting learning experiences for the deaf and ordinary students.

Systemic challenges at the elementary school level in Indonesia have a great impact on the learning of English. Some of the problems in teaching English in Indonesian primary schools have been a lack of skilled English teachers, too frequent changes in policy, poor teaching resources, a lack of time for English classes, and not giving students enough opportunities to expose themselves to English outside the classroom (Daud, 2024; Padmadewi, Sukma, et al., 2024). This complexity is further compounded by inconsistencies in the readiness to implement the English language curriculum at the elementary school level, both in terms of teacher competence and the availability of contextually relevant teaching materials (Padmadewi et al., 2023). The standard quality of English language teaching differs in various regions of the country. In fact that there are many primary school teachers who are not given necessary training and resources with which they can continue to provide English lessons effectively, thus resulting in a teacher proficiency gap that is very wide (Mohammed, 2023; Padmadewi, Artini, et al., 2024; Santosa et al., 2022).

Besides that, an overemphasis on examination-oriented learning and rote memorization in Indonesian schools typically makes becoming good at taking tests more important than developing actual language skills, and this may reduce emphasis in terms of communicative competence (Daud, 2024). Changes in the curriculum have had a big impact on the way English is taught, the subject has been changed from being a mandatory local content subject (in the KTSP period) to an elective one (under the 2013 Curriculum and the latest Merdeka Curriculum), which may cause some schools to have different access to English education, thus creating differences in knowledge between regions.

These broader systemic challenges are even more evident in inclusive contexts, such as SD N 2 Bengkala in Bali, where children with a range of abilities are taught together in one group. Educators have to deal with enormous challenges in providing effective English instruction if the students' needs and learning styles

are diverse, and this problem is made worse by a severe lack of resources that are accessible for teaching. Research confirms these implications that teachers face many obstacles while trying to adapt the national curriculum, which means that they have to create their own simplified materials for students with short attention spans or developmental disabilities (Putri & Maharsi, 2024). The traditional textbooks usually depict very limited and very stereotypical images of the disabled that make it difficult for the students to get interested in the topic and to understand it (Ulya et al., 2025).

Moreover, kids with disabilities, like those with hearing impairments, stumble over abstract language concepts when they are taught through the traditional way (Ismayani et al., 2024). Therefore, specialised strategies become necessary in this case, such as heavy usage of visual aids, role-playing, and also both Indonesian and international sign language being called upon for assistance (Amin et al., 2024; Ismayani et al., 2024). Unfortunately, educators are not sufficiently trained in these approaches (Putri & Maharsi, 2024), which clearly shows the acute necessity for the provision of appropriate inclusive education training and continuous support. In a similar Indonesian inclusive education context, Dewi & Lee (2025) found that an effective bilingual-inclusive program for students with special needs requires well-prepared instructional practices, visual supports, assistive technologies, qualified teachers, and continuous teacher professional development. Therefore, inclusive English learning for deaf students should also be supported by accessible, visual, and technology-enhanced learning media.

Vocabulary is known as the fundamental of any language, it serves as the base upon all other linguistic skills. Effective comprehension and communication are significantly affected with the absence of a strong vocabulary, even when grammatical knowledge is present. Rashid et al. (2022) state that "Students would not comprehend others' ideas or communicate their own ideas if they did not have a broad vocabulary," highlighting the fact that even if grammar is mastered, a lack of vocabulary knowledge may affect communication. The core competencies which surpass basic recognition for advanced application and understanding include correct word identification, comprehension, and application according to Pascual et

al. (2022). A student needs to know words well enough to use them in different situations and handle difficult schoolwork which involves understanding word meanings and their correct forms and grammatical roles. Understanding this concept remains essential for students because they need it to advance in all language areas.

In contrast to students who are capable of hearing, students who are deaf face challenges in reading comprehension and writing because of their limited vocabulary (Zhao et al., 2021). Students who are hearing impaired achieve lower vocabulary test results than their hearing counterparts who share similar cognitive abilities because they need specific educational approaches to build their vocabulary (Socher et al., 2020). The learning process of vocabulary for deaf students differs from others because they acquire word meanings through alternative methods which need explicit teaching approaches that connect words to their real-world contexts (Warner-Czyz et al., 2024). According to Aldemir et al. (2023), structured programs that combine text, pictures, and signs are very helpful for deaf students.

The field of education went through a major shift because of the fast progress in technology. The new methodologies born out of this advancement help educators in enhancing their pedagogical strategies and creating improved learning environments. The growth of mobile technology during the past two decades led to the creation of augmented reality systems which became the foundation of this transformation (Belda-Medina & Marrahi-Gomez, 2023). The education sector has recently seen an increase in augmented reality (AR) adoption because to its ability to create interactive learning environments that enhance student engagement (Binhomran & Altalhab, 2021). The continuous evolution of technology requires teachers to develop innovative educational methods which transform learning into an enjoyable experience for students. More and more schools are using augmented reality (AR) technology because it helps students learn better.

Augmented reality (AR) provides users with superior visual and environmental advantages when compared to traditional 2D media. Through the application of augmented reality (AR) technology, users can link written text with real-world signs, annotations, and three-dimensional objects, thereby augmenting

meaning signals and improving language retention. The use of Augmented Reality technology leads to better student motivation and improved understanding of educational content and enhanced language and reading abilities for deaf students (Fernandes et al., 2024). Research on handheld augmented reality systems for students with disabilities has identified three essential principles which include personalized content delivery, user-friendly interfaces, and accessibility features that support deaf students in mainstream educational environments (Žilak et al., 2022). The technology of augmented reality (AR) which converts sound data into visual signals has proven successful for deaf students because it creates new methods of communication and educational delivery.

Augmented reality operates as a digital system which combines real-world settings with virtual sensory information that includes sound and visual and written data. The platform delivers virtual environments which unite with actual surroundings to provide users with interactive digital environments that stimulate multiple senses for improved cognitive learning (Vaishnav, 2024). AR creates immersive and interactive learning experiences which resolve numerous educational difficulties found in conventional teaching methods (Christou et al., 2025). Students can interact with digital content in real time while they are in their physical environment. The way AR interacts with and adds to the real environment has a lot of potential for education.

AR has many diverse and broad educational advantages. The unique learning experiences have been confirmed by various experiments that resulting a higher student motivation in learning (Lampropoulos et al., 2022). Furthermore, AR is beneficial in the development of the necessary skills, because it encourages the learner to be more creative and sharpens the problem-solving abilities by allowing more interaction with the learning environment. From a cognitive perspective, AR-based instructions may reduce attention shifts between the instructional materials and the task at hand, which can increase the degree of learning motivation (Marrahi-Gomez & Belda-Medina, 2024). The research works also suggest that AR may be the reason that users are able to complete their assignments more quickly, are less prone to make mistakes, and feel more comfortable as compared to the use of conventional methods, e.g., paper manuals, or screen-based instructions.

Of all the education technology platform, Assemblr provides an accessible and easy-to-use AR tool that teachers can utilize to develop interactive learning materials (Nafi & Asih, 2024). This greatly reduces the entry barrier for teachers who might not be proficient in 3D modeling or advanced programming. One major obstacle to AR adoption is the lack of teacher training and expertise, which Assemblr Edu address by simplifying the technical aspects of creating AR content (Nafi & Asih, 2024).

Assemblr Edu offers an engaging educational experience that directly supports vocabulary learning by turning written content into 3D models. This makes learning more engaging and may enhance understanding and memory by giving words a visual and interactive representation (Nurjanah, 2024). Its learning potential, and particularly for learning vocabulary, is the potential to provide learners with contextual, visual, and auditory cues helps in vocabulary mastery.

AR has been shown to improve education (Amores-Valencia et al., 2022), but its use in inclusive schools, particularly in rural areas, is still limited. Even while previous research has shown improvements in both immediate and delayed vocabulary outcomes, there is still little data on short-term vocabulary mastery when utilising AR in inclusive classrooms, especially with deaf students and the Assemblr platform. This study employs the Assemblr AR platform at SD N 2 Bengkala to address existing gaps and the specific needs of deaf learners who primarily depend on visual input. It evaluates the short-term effectiveness of the platform in increasing English vocabulary learning within an inclusive Grade 5 classroom.

According to the Alur Tujuan Pembelajaran (ATP) of English for Grade 5 in the Merdeka Curriculum, English instruction at this level is categorized as Phase C. At the end of this phase, students are expected to be able to understand and respond to simple spoken, written, and visual text, in addition to utilizing English for regular social and classroom interactions. In addition, they are expected to develop their vocabulary through contextual and visual signals and to generate simple written texts with the assistance of their instructor (Kemdikbud, 2022). Nevertheless, it is not always possible for deaf students to completely realize these expectations in inclusive classrooms like SD N 2 Bengkala, as traditional

instruction frequently employs static text and oral explanations, which are less accessible to learners who rely on visual input. The essential role of adaptive strategies becomes even more highlighted because students experience a difference between what they need to learn and what teachers actually teach in their classrooms. The ATP objectives find a suitable match with Assemblr Augmented Reality (AR) through its interactive visual learning features which enhance English comprehension for deaf students (Fernandes et al., 2024).

1.2. Problem Identification

Research on English vocabulary training and on educational technology is developing, but there are still some gaps in the literature that need to be filled. First, there is a lack of visual learning media that is accessible to deaf students in inclusive classroom settings. Most vocabulary teaching still depends mainly on text based or auditory centred methods that do not sufficiently match the visual learning features of deaf learners leading to restricted access to meaningful vocabulary input for this group of students. Second, some previous studies have investigated the use of Augmented Reality in language learning, but research specifically focused on the effectiveness of AR for English vocabulary mastery is still limited. Third, there is still limited research on the application of Assemblr AR in rural inclusive classrooms. The current research on AR based language learning has mainly been conducted in urban schools with more established technological infrastructure. This leaves a gap in knowledge about the implementation and effectiveness of AR based media such as Assemblr Edu in rural inclusive classrooms with limited resources such as SD N 2 Bengkala where deaf and regular students learn together in the same classroom. This study addresses these three gaps by analysing the adoption of Assemblr AR for English vocabulary mastering in an inclusive rural elementary classroom with deaf and regular students.

1.3. Limitation

The scope of this study is limited to the implementation of Assemblr Edu Augmented Reality (AR) as the main tool for teaching English vocabulary to deaf children in SD N 2 Bengkala. It is focussed to fifth-grade students during the second semester of the academic year 2025 only, excluding the other grades and language skills like speaking, listening, reading and writing. The purpose of this study is to

examine the efficiency of Assemblr Edu AR in improving students' vocabulary mastery. Vocabulary mastery is the ability to recognise, understand and use words in English. This study does not cover other aspects of English proficiency or communication ability. Moreover, the absence of a control group may affect the internal validity of the pre-experimental design with one group pre-test and post-test because of the history and maturation effects. The process of vocabulary acquisition of the students that had been observed may not be influenced not only by the implementation of the Assemblr AR app, but also by the development of time and classroom activities at the same time. It was impossible to use another group of students as control group since SD N 2 Bengkulu is an inclusive school with only one Grade 5 class. The implementation is conducted over a limited duration of eight meetings, consisting of one pre-test session, six treatment sessions using Assemblr Edu AR, and one post-test session.

1.4. Research Questions

Is there a significant difference in the English vocabulary mastery of Grade 5 deaf students at SD N 2 Bengkulu before and after being taught using the Assemblr Augmented Reality (AR) platform?

1.5. Research Objectives

To determine whether there is a significant difference in the English vocabulary mastery of Grade 5 deaf students at SD N 2 Bengkulu before and after being taught using the Assemblr AR platform.

1.6. Research Significance

This research is expected to provide significance in two aspects as follows.

Theoretical Significance

The results of this study are expected to improve the theoretical comprehension of technology-assisted language acquisition, especially within inclusive educational environments. This study investigates the influence of Assemblr Augmented Reality on the vocabulary acquisition of deaf students, which improves the existing literature on the role of visual and interactive technology in facilitating language learning for individuals with special needs. This research might potentially be added to the theoretical framework of technology-enhanced

learning for learning the English language since it shows how augmented reality could be used to improve multisensory involvement and comprehension for visual learners.

Practical Significance

1. For Teachers

The result from this study may help the teachers apply the Assemblr Augmented Reality in order to improve the teaching of the English language to the deaf learners. The use of augmented reality can help the deaf learners comprehend abstract information through visual representation. This study findings can be useful in helping teachers apply technology based learning tools in classroom settings.

2. For School

This research may offer schools information on the possibilities of Augmented Reality as a beneficial learning tool for deaf students in inclusive school settings. The results may encourage the school to use AR-based learning media to enhance access, engagement, and learning possibilities for the deaf student and promote a more effective practice of inclusive education. Furthermore, the research may help schools to design technology-enhanced learning environments that will serve the different requirements of students.

3. For Further Research

This research may provide guidance to future researchers who want to conduct studies concerning the implementation of Augmented Reality technology in language learning and the specifically for deaf students as well as other children with special educational needs. The results of the present research may encourage more studies focusing on the long-term impact of AR on vocabulary development, skill improvement, engagement and overall academic success. In addition, future studies may focus on comparison of AR with other digital tools for learning.

1.7. Definition of Key Terms

1. Theoretical Definition

- Vocabulary mastery requires people to correctly identify words and understand their meanings and use them in different situations. Rahmah et al. (2023) highlight vocabulary mastery serves as a basic element for

language proficiency because it determines how well students perform in reading, writing, speaking, and listening tasks.

- Deaf students are students with partial or total hearing impairment, which largely hinders them from listening to auditory information and thus have to rely on visual stimulation and sign language in an effort to communicate and acquire knowledge (Duniangella et al., 2024)
- Augmented Reality (AR) is a technology that integrates digital elements like 3D objects, animations, or text to the real world which makes learning more immersive and engaging (Carmigniani et al., 2011)

2. Operational Definition

- Vocabulary mastery in this study represents to the ability of Grade 5 deaf students at SD N 2 Bengkala to identify, comprehend, and use English vocabulary. It is evaluated using a vocabulary test designed by the researcher.
- Deaf students in this study are Grade 5 students at SD N 2 Bengkala who have hearing impairments, and learn mainly through visual and sign language.
- Augmented Reality (AR) in this study refers to the use of Assemblr Edu as a tool to present 3D models and visual content in teaching English vocabulary, providing an interactive and engaging medium to facilitate deaf students' vocabulary mastery.