Developing the KATAKU Mobile Application to Enhance Vocabulary Acquisition for Deaf Students

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Abstract: This study presents the development of the KATAKU (Kata untuk Tunarungu Interaktif dan Unik) application as an educational tool designed to support vocabulary learning for deaf students. Deaf students, who have the same educational rights as their hearing peers, often attend Special Schools (SLB). The integration of visual aids and technology in learning has proven effective in increasing their engagement and interest. This study employed a mixed-methods approach, including vocabulary assessments for deaf students, classroom observations, and teacher interviews for a needs analysis to identify the specific requirements of schools and students. Results from the vocabulary assessments revealed that deaf students face significant challenges, particularly with academic terms and word categorization. Classroom observations at three SLB schools in Jombang highlighted engaging but challenging learning dynamics, reinforcing the need for accessible and efficient teaching tools for educators. Teacher interviews indicated that using the paper dictionary provided by the Ministry of Education can be time-consuming and lacks efficiency. This study concludes that deaf students in Jombang face substantial obstacles in vocabulary comprehension, especially with academic vocabulary. The findings underscore the need for targeted vocabulary interventions using modern technological tools to better prepare students for advanced educational demands.

Keywords: KATAKU; mobile learning application; deaf students; vocabulary learning

Abstrak: Penelitian ini menyajikan pengembangan aplikasi KATAKU (Kata untuk Tunarungu Interaktif dan Unik) sebagai alat pendidikan yang dirancang untuk mendukung pembelajaran kosakata bagi siswa tunarungu. Siswa tunarungu memiliki hak pendidikan yang sama dengan teman sebayanya yang dapat mendengar, meskipun sering kali mereka bersekolah di Sekolah Luar Biasa (SLB). Integrasi alat bantu visual dan teknologi dalam pembelajaran terbukti efektif dalam meningkatkan keterlibatan dan minat mereka. Penelitian ini menggunakan pendekatan *mixed-methods*, antaralain tes kosakata bagi siswa tunarungu, observasi kelas, dan wawancara dengan guru untuk menganalisis kebutuhan siswa tunarungu. Hasil dari tes kosakata menunjukkan bahwa siswa tunarungu menghadapi tantangan yang signifikan, khususnya yang berkaitan istilah akademis dan kategorisasi kata. Dari observasi kelas di tiga sekolah SLB di Jombang, ditemukan dinamika pembelajaran yang menarik tetapi menantang, yang memperkuat kebutuhan akan alat pengajaran yang mudah diakses dan efisien bagi para pendidik. Wawancara dengan guru menunjukkan bahwa penggunaan kamus kertas yang disediakan oleh Kementerian

Pendidikan dapat memakan waktu dan kurang efisien. Studi ini menyimpulkan bahwa siswa tuna rungu di Jombang menghadapi kendala substansial dalam pemahaman kosakata, terutama kosakata akademis. Temuan ini menggarisbawahi perlunya intervensi kosakata yang tepat sasaran dengan menggunakan perangkat teknologi modern untuk mempersiapkan siswa dengan lebih baik dalam menghadapi tuntutan pendidikan tingkat lanjut.

Kata kunci: KATAKU; aplikasi pembelajaran seluler; siswa tuna rungu; pembelajaran kosakata

INTRODUCTION

Inclusive education is a fundamental right emphasizing equal access to learning for all students, regardless of abilities or disabilities, by integrating those with special needs into mainstream education systems to provide a supportive, tailored experience that respects their unique needs and potential (Stankovska et al., 2015). This approach aligns with the United Nations' Sustainable Development Goals (SDG 4), which promotes accessible, quality education for everyone and lifelong learning opportunities (UNESCO, 2017). For children with disabilities, particularly those with hearing impairments, traditional auditory-focused environments often hinder progress, as deaf students rely primarily on visual cues to communicate and learn, requiring a more visual, context-driven approach to grasp language concepts, acquire vocabulary, and build communication skills (Marschark & Knoors, 2012; Esera, 2008).

Without interventions like sign language, visual aids, and supportive technology, deaf students often struggle with complex vocabulary and sentence structures, affecting their academic success and social integration (Alqraini & Paul, 2020). Effective vocabulary learning for deaf students is best supported by interactive, image-based materials that provide concrete context, helping them understand abstract language (Birinci & Sarıçoban, 2021). Such tools are essential to enable deaf students to engage more meaningfully in social settings, as vocabulary skills underpin reading comprehension, fluency, and communication. A robust vocabulary allows learners to interpret text, express ideas clearly, and interact effectively with others (Wright & Cervetti, 2017).

Deaf students face unique challenges in vocabulary acquisition due to limited exposure to spoken language and difficulty with abstract concepts. Unlike hearing peers, they can't rely on incidental learning through auditory cues, depending instead on direct, visual instruction, which may not cover the same breadth of language (Liu et al., 2018). This often limits their grasp of non-literal meanings and idiomatic expressions, creating barriers to academic and social participation. Researchers advocate for interactive, image-rich materials and sign language modeling to help deaf students bridge gaps between concrete and abstract language, enhancing literacy and community engagement (Yasin & Mohamad, 2024; Wainscott & Spurgin, 2024; López, 2020).

In this context mobile applications has transformed special needs education by making learning more accessible and tailored to individual needs. This is particularly

vital for deaf students, who face significant challenges with vocabulary acquisition, especially academic terms. A preliminary observation at SLB X (pseudonym) showed that many deaf students face persistent challenges in understanding teachers' instruction in the classroom. An initial interview with a deaf student about his experience with academic vocabulary also showed that he struggled with commonly used classroom terms which is essential for their classroom participation and academic progress. This issue indicates a critical gap in accessible vocabulary resources tailored specifically to the needs of deaf students, underscoring the importance of developing tools like KATAKU. Therefore, for students with disabilities, technology fosters independence and provides personalized, flexible instruction, meeting diverse cognitive and sensory needs (Aksal et al., 2016). Mobile apps with multimedia features-visuals, animations, and interactive tasks-boost engagement and comprehension, as seen with apps like Proloquo2Go, which has significantly enhanced communication for nonverbal children with autism (Alzrayer et al., 2017). For deaf students, tools that incorporate sign language and visual aids are vital for literacy and language acquisition, highlighting the impact of digital solutions (Escudeiro & Campos, 2023). One example is KATAKU (*Kata untuk Tunarungu Interaktif dan Unik*), a mobile app designed to help deaf students build vocabulary using interactive visuals and animations to make language learning engaging and accessible (Tahiri, 2020). KATAKU aims to enhance vocabulary and fluency, empowering deaf students with essential communication skills for academic and social environments.

Therefore, this study aims to address the following research questions:
1. What challenges do teachers face in teaching vocabulary to deaf students?
2. What types of vocabulary are most difficult for deaf students to learn?
3. How can the KATAKU application assist deaf students in learning new vocabulary?

LITERATURE REVIEW

Inclusive Education

Inclusive education has gained global attention, particularly for deaf students, who often face challenges in vocabulary acquisition and communication (Alqraini, 2018). Limited vocabulary can impede their interactions with peers and comprehension of subject matter, negatively impacting academic performance (Mayer & Trezek, 2020). In this context, teachers play a crucial role, as they must deliver content effectively while creating supportive learning environments for deaf students (Bunbun et al., 2020). However, many educators struggle to implement effective teaching methods for these students, making it essential to identify their challenges and develop suitable strategies.

Research indicates that teachers encounter several obstacles in teaching vocabulary to deaf students, such as insufficient training in specialized instructional techniques and limited access to tailored resources. Many report feeling unprepared to tackle the unique challenges these students face, especially in language modeling and visual aid usage (Miyauchi, 2020). Furthermore, the diverse language proficiency levels among deaf students complicate instructional efforts, as some may

be fluent in sign language while others struggle with both spoken and signed language (Shields & Lennox, 2017). These challenges highlight the need for targeted professional development for teachers to adopt effective strategies that foster vocabulary growth and enhance communication skills among deaf learners.

One innovative approach to support deaf students is technology, particularly mobile applications, which have been shown to enhance engagement and facilitate effective learning experiences (Bedenlier, 2020). The KATAKU application is designed to help deaf students enrich their vocabulary through interactive and engaging learning experiences, focusing on relevant and easily comprehensible vocabulary to address some of their language learning challenges.

The Role of Technology in Deaf Education

Assistive Technologies

Assistive technologies play a crucial role in enhancing the educational experiences of deaf students, enabling them to access information and communicate more effectively within academic environments. These technologies encompass a wide range of devices and tools designed to support individuals with hearing impairments, facilitating their engagement in learning activities that may otherwise be challenging. For instance, hearing aids and cochlear implants are among the most widely recognized assistive devices, providing auditory input that enhances sound perception for many deaf individuals (Oh et al., 2022). These technologies can significantly improve communication capabilities, allowing deaf students to participate more fully in classroom discussions and social interactions with peers.

In addition to traditional hearing devices, visual aids such as captioning services and video relay services have emerged as vital resources for deaf students. Captioning services, which provide real-time text representation of spoken content, are essential for ensuring that deaf learners can follow lectures and classroom discussions (Alsalamah, 2020). Video relay services enable deaf individuals to communicate via sign language through a video interpreter, thus fostering more accessible interactions in various contexts, including educational settings (Henney & Tucker, 2019). These technologies not only promote inclusivity but also help bridge the communication gap between deaf students and their hearing counterparts.

Moreover, the integration of mobile applications designed specifically for deaf learners has expanded the scope of assistive technologies. Applications that provide visual vocabulary instruction, interactive language learning, and resources tailored to the unique needs of deaf students have shown promise in enhancing literacy and language acquisition (Kourbetis et al., 2016). For example, mobile apps that incorporate sign language videos and visual prompts can significantly aid in vocabulary development, making learning more engaging and effective (Setiawan, 2023). By utilizing these various assistive technologies, educators can create a more inclusive and supportive learning environment, enabling deaf students to thrive academically and socially.

Mobile Applications and Digital Tools

Mobile applications and digital tools have become transformative in deaf education, offering innovative ways to support vocabulary acquisition and

engagement among deaf learners. These technologies use interactive features and multimedia content, making learning accessible and enjoyable for students with hearing impairments. Proloquo2Go, an AAC app, empowers nonverbal and minimally verbal individuals to communicate effectively with customizable vocabulary boards and text-to-speech capabilities, which also aid deaf students in contextual vocabulary understanding (Nakkawita et al., 2021). Another app, SignSchool, provides ASL lessons with video demonstrations, combining visual learning with practice opportunities to support vocabulary acquisition (Sze Ee et al., 2020). These multimedia tools promote retention and comprehension, helping deaf users incorporate new vocabulary into everyday interactions.

Mobile applications can significantly enhance vocabulary acquisition for deaf students by integrating gamification and interactive tasks that maintain learners' interest. For instance, Endless Alphabet application utilize animations and engaging visuals to introduce new words and their meanings in an entertaining manner. The app encourages exploration and self-paced learning, allowing students to familiarize themselves with vocabulary in a playful context (Yang & Song, 2024). By making vocabulary acquisition enjoyable, these digital tools help reduce the barriers that deaf students may face in traditional learning environments.

Furthermore, mobile apps can facilitate collaborative learning experiences, allowing deaf students to engage with peers and educators in dynamic ways. Applications that support group activities, such as Kahoot!, enable learners to participate in quizzes and games that reinforce vocabulary in a fun, interactive setting. Such tools not only promote vocabulary development but also foster social interaction, which is essential for the holistic development of deaf learners (Situmorang & Simanjuntak, 2023).

RESEARCH METHODS

Research Design

This study employed a mixed-methods approach to explore the challenges faced by teachers in instructing deaf students, the types of vocabulary considered difficult by the students, and how the KATAKU application can assist students in learning new vocabulary. The mixed-methods design combines quantitative and qualitative data collection techniques to provide a comprehensive understanding of the research problem (Vivek & Nanthagopan, 2021). This method aligns with the perspective that integrating multiple sources of data can enhance insights into educational contexts (Fischer et al., 2020).

Participants

Participants in this study consist of 13 deaf students from three SLBs in Jombang, referred to as SLB X, Y, and Z in Jombang. Three teachers from the schools were also recruited as interview participants. Inclusion criteria for teachers include those with at least two years of experience teaching deaf students and a willingness to participate in interviews. The selection of participants were purposive, meaning that individuals with relevant experience and knowledge related to the research focus were chosen (Campbell et al., 2020).

Research Instruments and Data Collection for Needs analysis

Needs analysis is a systematic approach used to identify specific learner needs, which in turn informs the design of educational programs (Richards, 2001). In this study, we conducted a needs analysis using student tests, classroom observations, and teacher interviews to gather data. The student tests evaluated deaf students' comprehension of vocabulary and sentence structure through questions about word types, picture comprehension, and sentence construction. Classroom observation sheets documented teacher-student interactions while using the KATAKU app, capturing aspects such as engagement, language usage, and social interactions during lessons (Finkelstein et al., 2019). Furthermore, in-depth interviews with teachers, utilizing open-ended questions, provided valuable insights into teaching challenges and the types of vocabulary that students find difficult.

Data Analysis

For quantitative data from student tests, descriptive analysis calculated means, medians, and score distributions to evaluate students' understanding of vocabulary taught through the KATAKU application. Graphs and tables were employed to visualize and facilitate interpretation of the analysis results (Park at al., 2022). Interview and observation data were transcribed verbatim and analyzed using thematic analysis. This involved familiarizing with the data, coding, and identifying emerging themes to understand the challenges faced by teachers and students' responses to the KATAKU application (Raskind et al., 2018). Validity was ensured through triangulation, comparing findings from interviews, observations, and student test data (Natow, 2020).

FINDINGS AND DISCUSSION

Findings

Findings from Students Test

The analysis of the results from the ability tests for deaf students indicates that significant challenges remain in their comprehension of vocabulary, particularly concerning word usage and academic vocabulary. While some students demonstrated a stronger understanding in specific areas, the majority exhibited a need for improvement across all facets of vocabulary learning. Table 1 below describes the test results for each student categorized by type of vocabulary.

A needs analysis of 13 deaf students from three special schools (SLB) in Jombang revealed significant challenges in vocabulary proficiency. For word types, the average score was 33.33, indicating that most students could identify nouns, verbs, and adjectives, but only one student achieved a perfect score. In sentence construction, the average score was 38.46, with some students struggling to form sentences; three students scored the highest at 66.67, while others scored 0.00. Visual comprehension mirrored this trend, averaging 33.33, with two students scoring 66.67 and others showing lower comprehension levels.

Table 1. The Test Results for Each Student

Student Partici-pants	Vocabulary Types					Overall Score
	Word Type	Structure	Picture Compre-hension	Color Compre-hension	Academic Terms	
1	66.67	66.67	33.33	33.33	0.00	44.44
2	16.67	33.33	0.00	66.67	33.33	27.78
3	50.00	0.00	66.67	33.33	0.00	33.33
4	33.33	33.33	0.00	66.67	33.33	33.33
5	0.00	0.00	0.00	0.00	0.00	0.00
6	16.67	0.00	66.67	0.00	33.33	22.22
7	33.33	66.67	66.67	66.67	33.33	50.00
8	0.00	0.00	0.00	0.00	0.00	0.00
9	0.00	33.33	66.67	100.00	66.67	44.44
10	50.00	66.67	66.67	66.67	0.00	50.00
11	50.00	66.67	66.67	100.00	66.67	66.67
12	33.33	66.67	0.00	33.33	0.00	27.78
13	33.33	66.67	0.00	33.33	0.00	27.78
Average Score	25.64	38.46	33.33	46.15	20.51	32.91

Color comprehension yielded a better average of 46.15, with two students achieving perfect scores, while some scored 0.00. Word usage was particularly challenging, with an average score of 25.64 and the highest reaching 33.33. Academic vocabulary scores were low at 20.51, with only one student scoring 66.67. Overall, the average across all aspects was 33.33, indicating substantial vocabulary comprehension difficulties, especially in word usage and academic terms. Most students need improvement, highlighting the necessity for further observations and intensive interventions to enhance vocabulary understanding.

From the analysis, a hierarchy of vocabulary types faced by deaf students can be established, from most to least difficult:
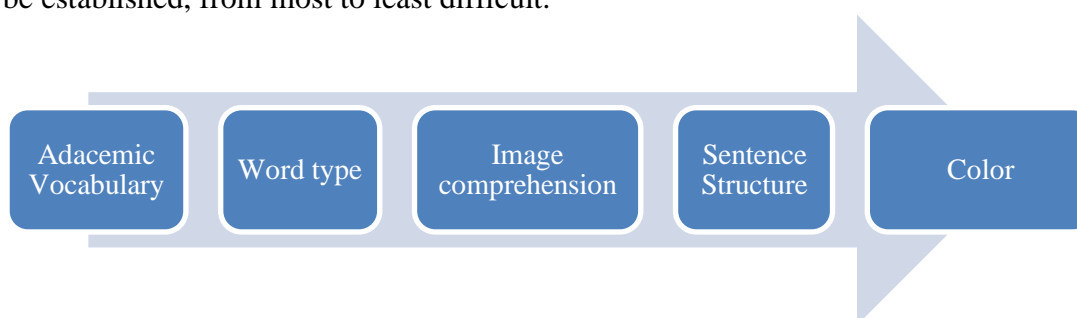

Figure 1. The Sequence of Difficult Word Types Faced by Deaf Students in Three SLB Schools in Jombang

Findings from Observations

Observation at SLB X

Observations of deaf students at SLB X in Jombang highlight both engaging and challenging dynamics. In Mr. Kantoni's sign language lessons, students learn vocabulary types, like names and objects, using visual aids such as logos and sticky notes. However, student participation is often low, with many struggling to understand written instructions. This reveals a need for additional support, especially in vocabulary comprehension, as limited vocabulary hampers students' retention and usage of new words. Mr. Kantoni combines sign language and lip movements to clarify explanations, yet increased interactivity and varied visual aids are needed. Reinforcing vocabulary instruction through hands-on practice and repetition could significantly boost students' comprehension and communication skills.

Observation at SLB Y

Observations of the deaf class at SLB Y in Jombang, led by Ms. Yura, reveal key insights into the learning process. In one lesson, Ms. Yura introduced vocabulary from "Indonesia Raya," contextualizing it by saying, "Indonesia Raya is sung on Mondays during the flag ceremony," which teaches vocabulary and highlights cultural significance. She uses multiple teaching methods—verbal, sign, and lip movements—to aid comprehension, along with resources from pmpk.kemdikbud.go.id and wall posters to engage students. However, only two out of seven students actively participated, suggesting room for improved classroom engagement.

While students use SIBI sign language, many struggle with pronunciation and understanding new vocabulary, and participation varies, with some taking notes and others remaining passive. Despite Ms. Yura's varied strategies, enhancing student engagement remains a challenge. Adopting more interactive methods could improve both comprehension and active involvement in class.

Observation at SLB Z

Observations of Ms. Raisa's sign language class at SLB Z in Jombang highlighted an engaging focus on Pancasila vocabulary, with a lively classroom atmosphere among the 15 deaf students. Ms. Raisa used PowerPoint images and diverse materials, such as laptops and a picture-guessing game, which maintained student interest and supported two-way communication. Students actively participated, showing enthusiasm in discussions, and the interactive methods fostered a positive learning environment.

However, some challenges arose as students found the PowerPoint slides too brief and lacking detail on Pancasila symbols, causing some confusion. Extending presentation time and providing more context could enhance understanding. Overall, Ms. Raisa's interactive approach effectively supports vocabulary comprehension, though adjustments to slide duration and content depth would further enrich the learning experience.

Results from Interviews

Based on interviews with three special education teachers from different schools in Jombang, several interesting perspectives emerged regarding their experiences teaching deaf students and their hopes for the KATAKU application.

Teaching Experiences with Deaf Students

Teaching deaf students requires unique skills and approaches, as shared by the interviewed teachers. Mr. Imran from SLB X noted the significant challenges due to the diverse needs of his students. He emphasized the importance of tailoring teaching methods to individual requirements, stating:

> "The curriculum must address student needs, recognizing that each deaf student has different abilities in hearing and sign language. Therefore, I must create a learning environment that accommodates and supports all students effectively." (Mr. Imran, SLB X)

Meanwhile, Mrs. Yura from SLB Y highlighted the necessity of adapting materials based on students' abilities, as differences in hearing impairments and educational backgrounds impact understanding. She mentioned, "Teaching deaf students demands extra patience, as their abilities vary widely."

Mrs. Raisa from SLB Z echoed these challenges, revealing that seemingly simple topics, like currency, can be difficult for students to grasp. She remarked, "Teaching basic concepts often requires special approaches and repetition."

Teaching Methods and Strategies

Teaching deaf students necessitates careful adaptation of methods and strategies. Mr. Imran employs a combination of sign language and verbal communication, finding that non-verbal cues like facial expressions and lip movements significantly aid learning. He said, "Deaf students often understand better when I use clear facial expressions and lip movements."

Conversely, Mrs. Yura emphasizes the use of visual media to enhance understanding. She stated:

> "Deaf students rely heavily on visuals, so I always use pictures or real objects to explain concepts." She also utilizes intensive repetition to help students master new vocabulary.

Mrs. Raisa prefers using picture cards and videos to clarify abstract concepts, admitting that some ideas, like currency, can be challenging. She shared, "I often use picture cards and videos to explain complex ideas, making abstract concepts more tangible."

Vocabulary Challenges

Teaching vocabulary poses unique challenges. Mr. Imran noted that abstract words often hinder comprehension. He stated, "Words like 'trust' or 'freedom' are difficult to explain." Visual aids are crucial for conveying meaning, and he emphasized the need for a strong, gradual introduction to vocabulary. Similarly, Mrs. Yura identified abstract terms, such as "honesty" or "trust," as particularly challenging. She mentioned, "Words that cannot be seen or touched pose greater challenges compared to physical objects."

Mrs. Raisa highlighted that vocabulary related to emotions, like "angry," "sad," or "happy," is also tough for deaf students. She pointed out that while she uses facial expressions to convey emotions, it doesn't always ensure understanding.

Expectations for the KATAKU Application

The KATAKU application is anticipated to effectively enrich deaf students' vocabulary. Mr. Iman believes it should be interactive and visually engaging, emphasizing that vocabulary should consist of commonly used words. "The application should introduce at least 200 everyday words to help with basic communication," he advised. Mrs. Yura hopes the app will serve as a self-learning tool accessible outside the classroom. She suggested it should include appealing animations and visuals to maintain student interest.

Mrs. Raisa stressed the need for vocabulary relevant to students' daily lives, recommending around 100-200 frequently used words. She also emphasized the importance of including sign language videos to clarify abstract concepts.

Discussion

Challenges Teachers Face in Teaching Vocabulary to Deaf Students

Teaching vocabulary to deaf students presents unique challenges, primarily due to varied learning needs and differences in sign language and verbal comprehension. Observations at SLB X, Y, and Z reveal that many students struggle with comprehension and participation, often due to limited vocabulary. This low engagement underscores the need for tailored instruction and additional support to foster vocabulary acquisition (Scammacca & Stillman, 2018). Teachers must adapt methods to the diverse needs of deaf students, as Mr. Imran highlighted the necessity for a curriculum that is flexible enough to address each student's unique abilities. Similarly, research supports the importance of individualized instruction in deaf education to enhance comprehension and retention (Sullivan et al., 2020).

Teachers also face difficulties ensuring consistent engagement. Observations showed that many students exhibit low participation levels, often requiring teachers to use more interactive and visual methods. Despite their efforts, as noted by Mrs. Yura and Mrs. Raisa, many teachers find abstract terms and vocabulary challenging to convey. Given that deaf students rely heavily on visual information for learning, utilizing clear facial expressions, pictures, and sign language has proven effective, but it requires significant patience and adaptation from educators (Arjun Prasad, 2023).

Types of Vocabulary Most Difficult for Deaf Students to Learn

The interviews highlighted that deaf students particularly struggle with abstract vocabulary, such as concepts like "trust," "freedom," or "honesty," which lack tangible representations. This challenge aligns with research findings that abstract words and ideas, which cannot be easily visualized, are often the most difficult for deaf students to comprehend (Rocha, 2018). Abstract emotional vocabulary, such as "happy" or "angry," also proves difficult, despite efforts to use facial expressions as a teaching aid. Abstract words, unlike concrete nouns, cannot be demonstrated through objects or visual cues, limiting their comprehensibility for students who primarily rely on visual learning (Salkić & Mahmutović, 2023).

Observations at SLB Z further revealed that while students engage well with interactive content, such as images or games, brief displays of slides or the lack of detailed explanations of symbolic meanings can lead to confusion. Teachers often

find that even basic conceptual vocabulary can be challenging without adequate context and consistent visual aids (Sanjaya et al., 2022).

How the KATAKU Application Can Assist Deaf Students in Learning New Vocabulary

The KATAKU application is anticipated to bridge gaps in vocabulary comprehension by providing deaf students with a visually rich and interactive platform. According to Mr. Imran, the application should focus on basic and commonly used vocabulary to facilitate effective communication. Interactive digital tools, such as KATAKU, are known to enhance vocabulary retention, especially when they involve repetitive practice, visual aids, and multimedia elements (Teng, 2022). By incorporating sign language videos and animations, KATAKU can cater to different levels of language acquisition, addressing both abstract and concrete vocabulary needs (Amirreza, 2019).

Teachers like Mrs. Yura and Mrs. Raisa envision the application as a self-learning tool, which can increase vocabulary retention and engagement beyond the classroom. Literature supports this approach, noting that technology-driven learning aids can offer valuable reinforcement for vocabulary acquisition in students with hearing impairments, providing them with the ability to interact with vocabulary repetitively and independently (Ahmad et al., 2021). Further, KATAKU's potential to integrate visuals with sign language may be particularly beneficial for abstract word acquisition, where traditional classroom methods fall short.

CONCLUSION

This study has emphasized the critical need for specialized vocabulary teaching tools to support deaf students' learning in Jombang. Vocabulary comprehension remains a significant hurdle, especially when it comes to abstract and academic terms. Classroom observations and teacher interviews highlighted that while visual aids, repetition, and the use of sign language are valuable methods, these approaches often require extensive time and are not always sufficient to address the varied needs of deaf students. The traditional SIBI manual dictionary, though a useful resource, is limited by its time-consuming nature, underscoring the demand for more efficient educational tools.

The KATAKU application, designed with interactive and visually engaging elements, is positioned to address these challenges effectively. By providing a tailored, self-learning platform, KATAKU can support teachers in reinforcing vocabulary comprehension and offer students a means to interact with vocabulary in an engaging, accessible format. This tool aligns with modern approaches in special education by combining technology with educational strategies proven to enhance engagement and understanding in deaf students. The findings of this study support the integration of applications like KATAKU in the learning process, as they not only facilitate vocabulary acquisition but also address the unique requirements of deaf students, ultimately contributing to a more inclusive educational environment.

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