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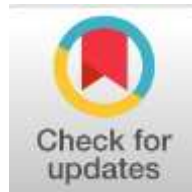
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Illustrated Discovery Learning Modules Facilitate Indonesian Vocabulary Mastery For Hearing Impaired Students: Modul Bergambar Discovery Learning Memfasilitasi Penguasaan Kosakata Indonesia Bagi Siswa Tunarungu

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Abstract

General Background Vocabulary mastery forms the essential foundation for linguistic comprehension, effective communication, and academic achievement within language education. **Specific Background** Fifth-grade students with severe hearing impairments at SDN 004 Teluk Pandan currently experience delayed language development and low assessment scores due to conventional, auditory-reliant instruction lacking appropriate visual media. **Knowledge Gap** While visually supported materials are generally beneficial, the specific integration of structured conceptual exploration frameworks combined with digital verification mechanisms for special needs literacy remains underexplored. **Aims** This study investigates the application of an illustrated instructional tool based on an active conceptual discovery framework to facilitate language acquisition for a hearing-impaired pupil. **Results** Utilizing Classroom Action Research across two instructional cycles, the analysis revealed a continuous score progression from a pre-cycle average of 65 to 89 in Cycle II, culminating in 100 percent classical proficiency. **Novelty** This research distinctly integrates structured visual exploration with QR Code-assisted digital verification to scaffold independent conceptual discovery without relying on auditory input. **Implications** Deploying highly visual, inquiry-oriented pedagogical materials provides a highly supportive alternative strategy for inclusive education, fostering learner autonomy, active classroom participation, and concrete semantic understanding.

Highlights

- Classroom Action Research spanning two intervention cycles demonstrated a mean score progression from 65 to 89.
- Visual exploration and QR Code verification mechanisms successfully stimulated active participation within an inclusive educational setting.
- Tailored pedagogical interventions guided the participant to achieve complete classical proficiency standards.

Keywords

Visual Exploration Framework; QR Code Verification; Inclusive Education Strategies; Special Needs Pedagogy; Classroom Action Research

INTRODUCTION

Vocabulary mastery is one of the basic aspects of Indonesian language learning because it is the basis for understanding information, communicating well, and expressing ideas orally and in writing. According to Nastiti (2017: 5) mastery of vocabulary is the ability to understand the meaning of the word and use it correctly in various linguistic contexts. Similarly, Tarigan as quoted in Widiyaningsih (2017) emphasises that the quality of a person's language proficiency is highly dependent on the quality and quantity of their vocabulary. The larger the vocabulary of a person, the better his language competence and the learning process. Therefore, mastery of vocabulary should be fostered from the elementary school level as a foundation for understanding the material being studied and interacting effectively in a social environment. Students with hearing impairments are at a greater disadvantage in vocabulary acquisition since their access to auditory information is restricted, which hinders the natural process of language acquisition. Hallahan, Kauffman, and Pullen (2019) noted that students with hearing impairments have difficulty processing linguistic information through hearing, which in turn negatively impacts their language development and academic achievement. Likewise, Mangal (2015) states that the major issue for the hearing impaired students is the delayed development of language, especially vocabulary and sentence structure. Thus, these students tend to find concrete vocabulary easier to understand than abstract vocabulary, emphasising the importance of visual, concrete, and systematically structured learning experiences.

Initial observations at SDN 004 Teluk Pandan, Grade V, showed a student with severe hearing impairment and limited vocabulary mastery. The student's achievement in the Indonesian language was below the school's Minimum Mastery Criterion (MMC) which is 70 and showed difficulties in understanding the teacher's instructions, understanding the reading texts, and using the newly learned vocabulary in simple sentences. The student's vocabulary consisted mostly of concrete, common words in daily life, and abstract words and action verbs were still hard to understand. This had negative impact on communication skills and learning outcomes in Indonesian language classes. The problem was compounded by the fact that the instructional practices still used mostly verbal modes of communication and had not yet incorporated the use of appropriate learning media to cater to the characteristics of students with hearing impairments. The visual representations of the instructional media used in the classroom were not clear enough for the student to make connections between linguistic symbols and their meanings. Hearing impaired students are people who rely on visual information more than auditory information. So that learning media is needed that can provide learning experiences that are concrete, interesting, and meaningful.

The use of an illustrated module with the Discovery Learning model is another alternative with great potential. Modules with illustrations provide students visual representations of the vocabulary through pictures, and Discovery Learning encourages learners to actively construct concepts through observation, identification, exploration and drawing of conclusions. Instructional media are communication tools capable of increasing student engagement throughout the learning process (Smaldino et al., 2019). Hence, the integration of illustrated modules and Discovery Learning can lead to more active, meaningful and learner-centred instruction that is more appropriate to the needs of students with hearing impairments. Previous studies have demonstrated that visual media and illustrated learning modules can improve the learning participation and academic achievement of students with special educational needs. Illustrated modules help students with hearing impairments to visualise abstract concepts, therefore, assist them to learn more independently (Hidayat & Sugiarto, 2018). Besides, Mohamad and Suleman (2020) also proved that Discovery Learning instructional design supported by visual instructions can significantly enhance the learning engagement of students with hearing disability. The findings indicate that visual instruction has a lot to contribute to enhancing the quality of education for learners with hearing impairments.

However, research that specifically integrates Discovery Learning-based illustrated modules to improve Indonesian vocabulary mastery in elementary school students with hearing impairments is relatively limited. Furthermore, little attention has been given to the use of QR Codes as visual verification tools for reinforcing the concept discovery process in vocabulary instruction. This gap shows the need to carry out further research that will be aimed at creating more innovative instructional alternatives consistent with the characteristics of students with special educational needs. The purpose of this study was to improve the instructional process and Indonesian vocabulary mastery through the use of a Discovery Learning-based illustrated module for a Grade V student with hearing impairment at SDN 004 Teluk Pandan. It is expected that the integration of illustrated modules, visual exploration activities and QR Code based verification can improve vocabulary mastery, increase learning engagement, and develop students' independence in understanding and using vocabulary in different learning contexts.

METHOD

The method used in this research is Classroom Action Research (CAR) with the model of Kemmis and McTaggart which consists of 4 cyclical stages namely planning, acting, observing and reflecting. Classroom Action Research was chosen because it allows teachers and researchers to systematically identify classroom problems, implement instructional improvements, measure their effectiveness, and continuously improve teaching practices through repeated cycles. The study was conducted in two research cycles consisting of two instructional sessions of 2×35 min. The intervention was expected to improve the learning process and students' mastery of Indonesian vocabulary through the application of Discovery Learning-based illustrated module. The research was conducted at SDN 004 Teluk Pandan, East Kutai Regency, East Kalimantan, Indonesia in the second semester of the 2025/2026 academic year. The study involved 24 fifth-grade students. The classroom intervention was designed to help one student with a severe hearing impairment who had considerable trouble learning Indonesian vocabulary. The participant was selected based on results from an initial assessment, classroom observations, and diagnostic evaluation indicating that the student's vocabulary mastery was below the school's Minimum Mastery Criterion (MMC) of 70. The intervention was directed to one student with hearing impairment, but the learning

activities were carried out in the inclusive classroom with all the students.

The instructional intervention employed an illustrated learning module based on principles of Discovery Learning. The learning activities were implemented in six steps: stimulation, problem identification, data collection, data processing, verification and generalisation. Learners were supported to observe illustrations, identify unfamiliar vocabulary, discuss word meanings, check their understanding through visual resources based on the QR Code, and use new vocabulary in contextual learning activities. The approach was intended to foster active learning, while at the same time providing meaningful visual support to hearing-impaired students. Data collection through classroom observations, vocabulary tests and documentation. The classroom observations were conducted using structured observation sheets to assess teacher performance and student engagement during the implementation of the instructional intervention. Vocabulary mastery was assessed by objective tests of 10 multiple-choice questions in the cognitive level of C1 (remembering) to C4 (analysing) of Bloom's revised taxonomy. Test items were developed based on the learning objectives on narrative texts on the theme of environmental awareness. Documentation including photographs, students' worksheets, field notes and recordings of classroom activities were collected to support and validate the findings derived from the observations and test results.

The data collected were analysed using descriptive quantitative and qualitative approaches. The quantitative analysis was carried out by comparing the students' vocabulary test scores obtained in the pre-cycle, Cycle I and Cycle II, and calculating the class average and the percentage of students who achieved the Minimum Mastery Criterion. Qualitative analysis involved interpretation of observation records and documentation to describe changes in students' learning behaviours, participation and classroom interactions over the course of the intervention. The success of the classroom action was measured by process and outcome indicators. The process indicator was deemed achieved if the observation checklist showed teacher performance and student learning activities to be good or very good. The success of the outcome indicator is if the students' mastery of vocabulary reaches the Minimum Mastery Criterion (MMC) of 70 with an increase in classical learning mastery in each research cycle. Reflection at the end of each cycle provided a basis for revising instructional strategies and improving the implementation of the next cycle.

RESUL AND DISCUSSION

Initial Condition

This research was conducted in the SDN 004 Teluk Pandan, Suka Rahmat Village, Teluk Pandan District, East Kutai Regency, East Kalimantan Indonesia. SDN 004 Teluk Pandan as a public elementary school provides inclusive education for students with special educational needs and those who are typically developing. In the school year 2025/2026 the school had 14 classes with the total number of pupils being 337. The study was conducted in one fifth-grade classroom with 23 students (10 boys and 13 girls). The intervention was done to one student with severe hearing impairment who had serious problems in learning Indonesian vocabulary. This study was done in the second semester of the academic year 2025/2026 in two research cycles, each cycle comprised two instructional sessions. The researcher served as the classroom action practitioner who designed and applied the instructional intervention, and another teacher served as an observer to observe and record the teaching and learning process in the study. The school has adequate educational facilities and the school community provides strong support to implement inclusive education at SDN 004 Teluk Pandan. The school has not yet employed a special education teacher, but it aims to meet the learning needs of students through adaptive instructional practices, extracurricular activities, and collaborative efforts of classroom teachers and school administrators. These conditions made SDN 004 Teluk Pandan the right place to implement the illustrated module based on Discovery Learning to improve the Indonesian vocabulary mastery of a student with hearing impairment.

Before conducting the intervention, the researcher conducted the preliminary observation by giving pre-test to find the initial vocabulary mastery of the fifth grade students. The assessment included 10 multiple-choice questions at different cognitive levels (C1-C4) of Bloom's taxonomy. This instrument was given before the implementation of the Discovery Learning-based illustrated module to find out the students' preliminary vocabulary knowledge and as a comparison to assess the students' vocabulary mastery after the intervention at the end of each cycle of the research. The results of classroom observation in one instructional session on May 4, 2026, showed that several students had difficulties in understanding Indonesian vocabulary, especially the student with severe hearing impairment, whose score was below the school's Minimum Mastery Criterion (MMC) score of 70. In the pre-test, the hearing impaired student took a statistically longer time to complete the assessment and had trouble identifying the meanings of unfamiliar vocabulary words. These findings indicated the student's limited vocabulary knowledge and his need for instructional support according to his learning needs.

Table 1. *Percentage of Students Achieving Mastery in the Pre-cycle Vocabulary Test*

Test Results	Frequency	Percentage	Category
Score $\geq$ 70	8	35%	Mastery
Score < 70	15	65%	Not Yet Mastered
Class Average	65		
Classical Mastery	35%		
Performance Category	Very Low		

Based on Table 1, only 8 students (35%) out of 23 students who reached the Minimum Mastery Criterion (MMC) of 70 in Indonesian vocabulary learning while 15 students (65%) did not reach the required standard. One student who did not master the material was the one with a severe hearing impairment, who scored 30, which shows very limited mastery of vocabulary. The results show that many students had difficulty in understanding the meanings of newly introduced vocabulary. The first observation also showed that the use of visual learning media in classroom teaching was limited and the sources of information were textbooks and oral explanations. As a result, students, especially the hearing impaired

student, had difficulty associating new vocabulary words with meaningful contexts. The results show that the vocabulary mastery of student with hearing impairment was very low. It shows the importance of visually supported instructional media that actively involve students in constructing vocabulary knowledge through authentic contexts. Thus, the use of illustrated modules based on Discovery Learning is considered an appropriate instructional strategy to facilitate meaningful vocabulary learning and enhance students' vocabulary mastery.

Cycle I

Cycle I was accomplished within two instructional sessions referring to the four stages of the Kemmis and McTaggart Classroom Action Research model namely planning, acting, observing and reflecting. In the planning stage, the researcher prepared an illustrated module based on Discovery Learning, lesson plans, instructional materials based on narrative texts with the theme of environmental awareness, observation sheets, and vocabulary mastery assessment instruments. The learning materials were developed to cater for the learning characteristics of students with hearing impairments, which aided the vocabulary acquisition by means of the visual representations and structured discovery activities. In the action stage, the instructional activities were conducted based on the six phases of the Discovery Learning model, namely: stimulation, problem identification, data collection, data processing, verification, and generalisation. The lesson was given to the students through pictures and small videos as visual stimuli. Then, they identified unknown words, explored the meaning of words through the illustrated module, processed information through guided activities, checked their answers with the help of visual resources based on QR Code, and then they made simple sentences using the new words. The teacher provided visual scaffolding and individualised assistance during the learning process for the student with hearing impairment so that the student could participate actively and understand vocabulary.

During the observation stage the observer observed the teacher's performance and student participation through the structured observation sheets. The observations were made on the implementation of Discovery Learning, classroom interaction, student's participation, and the effectiveness of the illustrated module to facilitate vocabulary learning. The reflection stage was performed after the implementation of Cycle I, by analysing observation record, students' learning result and classroom documentation. The results of the reflection were used to determine the strengths and weaknesses of the intervention and to formulate improvements in Cycle II. Cycle I showed an observable improvement from the pre-cycle situation, but the set success criteria were not yet fully met. Students were more interested in looking at illustrations, talking about vocabulary, matching words to pictures and using QR Codes to check their answers. Despite these positive developments, some students still needed teacher help with unfamiliar vocabulary and were not yet confident to use the illustrated module as an independent learning tool. Consequently, more visual supports and more intensive instructional supports were planned for the next cycle.

Table 2. Vocabulary Mastery Test Results in Cycle I Following the Implementation of the Discovery Learning-Based Illustrated Module

Test Results	Frequency	Percentage	Category
Score $\geq$ 70	14	61%	Mastery
Score < 70	9	39%	Not Yet Mastered
Class Average	71		
Classical Mastery	61%		
Performance Category	Fair		

The use of the illustrated module based on Discovery Learning improved vocabulary mastery compared to the pre-cycle condition as presented in Table 2. Average scores in the class increased from 65 to 71 and the percentage of mastery in classical increased from 35% to 61%. Of the 23 students, 14 students (61%) met the Minimum Mastery Criterion (MMC) of 70 and 9 students (39%) did not meet the standard required. What is interesting is the student with severe hearing impairment also demonstrated significant progress with vocabulary scores increasing from 30 during the pre-cycle to 60 in Cycle I. Although the student had not achieved the Minimum Mastery Criterion yet the improvement indicated that the illustrated module and Discovery Learning activities were starting to facilitate vocabulary acquisition. The student was more involved in visual exploration activities, more confident in matching vocabulary with illustrations, and more capable of checking answers using QR Code-supported learning resources.

Table 3. Teacher Observation Results in Cycle I

Observation Results	Score	Percentage	Category
Meeting 1	36	82%	Very Good
Meeting 2	40	91%	Very Good
Average	38	86%	Very Good

The outcome of the teacher's observation showed that the implementation of cycle I was done effectively. The average observation score was 86% which is classified as Very Good, going from 82% during the first meeting to 91% during the second meeting. The teacher always applied Discovery Learning syntax, used visual media effectively, invited students to participate and linked classroom learning with QR Code-based activities. However, observations revealed that more support was still necessary in leading students to work independently on exploring the illustrated module, providing visual scaffolding and helping students to draw conclusions about the newly acquired vocabulary.

Table 4. Observation Results of the Student with Hearing Impairment in Cycle I

Observation Results	Score	Percentage	Category
Meeting 1	30	50%	Fair
Meeting 2	36	60%	Fair

Average	33	55%	Fair
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There was gradual improvement throughout Cycle I as the student with hearing impairment was observed. Student participation went up from 50% in the first meeting to 60% in the second meeting. Overall the average was 55% which was rated as Fair. There were positive developments in the student's enthusiasm to visual learning materials, willingness to explore the illustrated module independently and ability to use QR Codes to verify vocabulary meanings. These improvements did not do away with a number of problems. The student continued to struggle with asking questions, identifying cause-and-effect relationships within narrative texts, and constructing simple sentences with newly learned vocabulary. These results suggested that additional instructional support was still needed to strengthen higher-order vocabulary skills and language production.

Overall, the Cycle I findings indicate that the implementation of the Discovery Learning-based illustrated module had a positive effect on students' vocabulary mastery and classroom engagement. Teacher performance was rated in the Very Good category and students demonstrated measurable progress in vocabulary learning. The predetermined criteria for success had not yet been fully met, as 39% of students including the student with hearing impairment were still below the Minimum Mastery Criterion. The reflection results brought some planned improvements for Cycle II. These included more intensive visual scaffolding, simplified instructional directions during exploration activities, increased teacher guidance during independent learning tasks, and additional guided practice in constructing simple sentences using newly acquired vocabulary. It was expected that these refinements would improve student engagement, enhance vocabulary mastery and allow all students to achieve the targeted level of mastery of classical learning.

Cycle II

Cycle II was carried out as a follow-up to the reflection results of Cycle I. The improvement is in the aspect that has not been fully optimised. The modifications to the instruction were mainly intended to boost student engagement, offer more intensive visual scaffolding, simplify learning instructions, and provide guided practice in building simple sentences with newly acquired vocabulary. The learning process continued to use the illustrated module based on Discovery Learning which was implemented in two learning sessions by following the six stages of Discovery Learning, namely stimulation, problem identification, data collection, data processing, verification using QR Code-based resources, and generalisation. In this cycle the teacher improved her instructional strategies by providing more explicit visual examples, more structured guidance in the independent exploration, more peer discussion and more immediate feedback during the learning activities. In addition, the student with hearing impairment was given more attention with the incorporation of visual clues, gestures and personalised support while exploring vocabulary and constructing sentences. These enhancements allowed students to be more actively and independently engaged throughout the learning process.

The implementation of Cycle II has improved the learning process and vocabulary mastery significantly. Students were more engaged during picture observation, vocabulary exploration, QR code verification, and contextual sentence construction. They were also becoming more confident in figuring out the meaning of unknown words and using their new vocabulary correctly in stories.

Table 5. Vocabulary Mastery Results in Cycle II

Test Results	Frequency	Percentage	Category
Score $\geq$ 70	23	100%	Mastery
Score < 70	0	0%	Not Yet Mastered
Class Average	89		
Classical Mastery	100%		
Performance Category	Very Good		

As shown in table 5, all 23 students (100%) were able to score above the Minimum Mastery Criterion (MMC) of 70, with a class average of 89 and 100% classical learning mastery. These findings show that the instructional improvements applied in Cycle II effectively improved students' vocabulary acquisition and overall learning achievement compared with Cycle I. The hard of hearing student also made significant progress. The student's vocabulary mastery score increased to 80, exceeding the Minimum Mastery Criterion for the first time. This enhancement shows that the combination of an illustrated module, Discovery Learning activities, verification through QR Code and intensive visual scaffolding effectively supported vocabulary learning in the face of restrictions in auditory input.

Table 6. Observation Results of the Student with Hearing Impairment in Cycle II

Observation Results	Score	Percentage	Category
Meeting 1	48	85%	Very Good
Meeting 2	52	92%	Very Good
Average	50	89%	Very Good

The observations showed that student's engagement was improved in Cycle II. Participation increased from 85% to 92% in the second meeting. The overall average participation was 89% with a category of Very Good. The student was more excited to look at the illustrations, explore the learning module independently, check the meaning of the vocabulary using QR codes, and make simple sentences using the new vocabulary. These improvements indicate that the revised instructional strategies have successfully stimulated active learning and learner autonomy. In addition to the improvement of students, the teacher performance also reached an optimal level in Cycle II. Observations in the classroom showed that the implementation of

learning was in the category of Very Good with an average score of 92%. The teacher did a good job with all the stages of the Discovery Learning model, used visual scaffolding, provided for independent exploration, included activities to check the work with QR Code, and also managed communication in the classroom well, including the use of visual cues and gestures suitable for the hearing impaired student.

The evaluation results of Cycle II show that the achievement of all indicators of research success is at the full level. The improved quality of classroom instruction, with excellent teacher performance and significantly improved student participation was directly related to students' vocabulary mastery. All students, including the student with hearing impairment, were successful in acquiring vocabulary as a result of intensive visual scaffolding, guided writing activities, simplified instructional directions, and QR Code-supported learning.

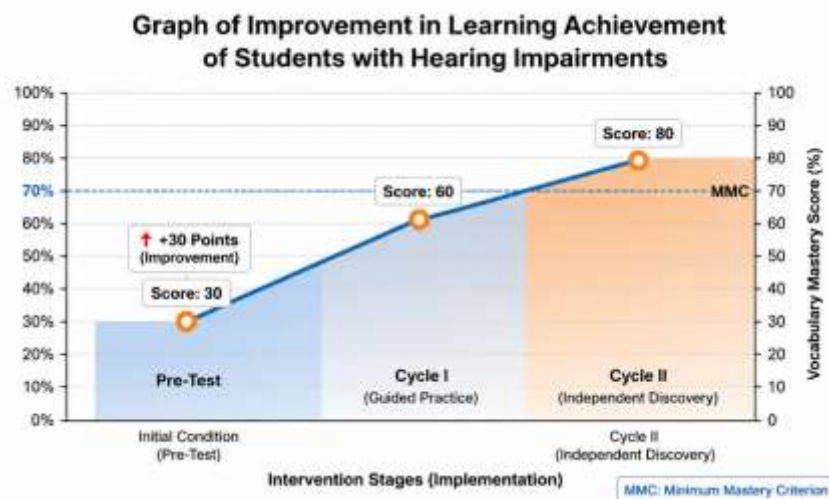
After the reflection of Cycle II, there was no need for another research cycle, because the objectives of the classroom action research had been achieved successfully. The instructional refinements have addressed the limitations identified in Cycle I as evidenced by the higher student engagement, enhanced independent learning, better ability to explore the illustrated module, efficient utilisation of QR Code resources and more competent construction of simple sentences using the newly acquired vocabulary. In addition, the teacher demonstrated a better ability to use Discovery Learning strategies that are appropriate to the learning characteristics of students with hearing impairment. The success of 100% classical learning mastery shows that the process and outcome indicators that have been set in this classroom action research have been successfully achieved.

Table 7. Vocabulary Mastery Scores of the Student with Hearing Impairment

No.	Assessment	Score
1	Pre-test	30
2	Cycle I	60
3	Cycle II	80

Table 7 shows that the student with hearing impairment consistently got a significant improvement of vocabulary mastery in the intervention. The initial score of the student's vocabulary pre-test was 30. It means the student had very limited knowledge of vocabulary before the instructional intervention. After the implementation of the Discovery Learning-based illustrated module in Cycle I, the student's score increased remarkably to 60 with an increment of 30 points. The intervention had begun to assist the student in acquiring vocabulary, although the Minimum Mastery Criterion had not yet been met.

Figure 1. Improvement in the Learning Achievement of the Student with Hearing Impairment



Cycle II also proved the good trend where the student's vocabulary mastery score increased again to 80 which was above the Minimum Mastery Criterion of 70. The steady improvement provides compelling evidence that the continued utilisation of the Discovery Learning-based illustrated module successfully converted constricted auditory input into meaningful visual learning experiences. The student was able to acquire and apply new vocabulary in a more independent and confident manner through the combination of visual illustrations, structured discovery activities, QR Code supported verification and intensive teacher scaffolding. The findings revealed that the instructional intervention was effective in improving the vocabulary mastery of students with hearing impairments in an inclusive elementary school setting.

Figure 1 presents the increasing mastery of the vocabulary of the student with hearing impairment in the classroom action research. The student's score improved consistently from 30 in the pre-test, 60 in Cycle I and 80 in Cycle II. The upward trend shows that the implementation of the module illustrated based on Discovery Learning was effective on vocabulary acquisition through meaningful visual learning and stimulating active discovery of concepts. The greatest increase was from pre-test to Cycle I, showing the success of the first intervention in improving the student's limited vocabulary knowledge. Cycle II improvement further suggests that the instructional enhancements like more intensive visual scaffolding, simplified

instructions, guided practice and QR Code-supported verification further reinforced the student's comprehension and application of newly learned vocabulary. The graph shows clearly that the intervention was effective in improving vocabulary mastery and allowing the student to reach the Minimum Mastery Criterion (MMC) by the end of the study.

Table 8. Teacher Observation Scores

No.	Meeting	Cycle I	Cycle II
1	Meeting 1	82%	93%
2	Meeting 2	91%	97%
3	Average Score	86%	92%

Table 8 indicates an increase in teacher performance from Cycle I to Cycle II. Teacher observation scores increased from 82% to 93% in the first meeting, and 91% to 97% in the second meeting. So the average observation score for all observations in Cycle I was 86% to 92% in Cycle II, both in the Very Good category. The findings indicated that the instructional change made after the reflection phase of Cycle I enhanced the teacher's effectiveness in applying the Discovery Learning model. The improvements were especially evident in the delivery of visual scaffolding, the assistance in independent learning activities, the integration of the QR Code-based verification and the support for the communication needs of the student with hearing impairment.

Table 9. Observation Results of the Student with Hearing Impairment

No.	Cycle	Meeting	Score	Percentage	Average
1	Cycle I	Meeting 1	30	50%	55%
		Meeting 2	36	60%	
2	Cycle II	Meeting 1	48	85%	89%
		Meeting 2	52	92%	

As shown in Table 9, the student with hearing impairment participated significantly more during the intervention. The observation score increased from 50% in Cycle I to 85% in Cycle II during Meeting 1. Similarly, participation during Meeting 2 improved dramatically from 60% to 92%. The average score of participation increased from 55% in Cycle I to 89% in Cycle II or an increase of 34 percentage points. These results indicate that the instructional changes implemented in Cycle II, especially the use of the Discovery Learning-based illustrated module, the extensive visual scaffolding, and the QR Code-assisted learning activities, have effectively enhanced the student's engagement, independence, and active participation in the classroom instruction. The effectiveness of the intervention was measured by testing the research hypothesis by comparing the students' vocabulary mastery in the pre-cycle, Cycle I, and Cycle II based on the class average scores and the percentage of students who attained the Minimum Mastery Criterion (MMC). The results showed that there was a consistent improvement after the application of the illustrated module based on Discovery Learning. The class average went from 65 with 35% classical mastery in the pre-cycle, to 71 with 61% classical mastery in Cycle I and significantly improved to 89 with 100% classical mastery in Cycle II. These results demonstrate that all the success criteria were reached pre-set. The class average is above the Minimum Mastery Criterion (MMC) score of 70. The mastery of classical learning is above the target of 85%. Also, the student with hearing impairment mastered it by the end of Cycle II. Thus, the action hypothesis of this classroom action research was proven. It can be concluded that the application of the Discovery Learning-based illustrated module is effective in improving the mastery of Indonesian vocabulary for fifth-grade students, especially the student with a hearing impairment in SDN 004 Teluk Pandan.

Discussion

The results of this classroom action research showed that the use of illustrated modules based on Discovery Learning has given positive impact on the process of learning and the mastery of Indonesian vocabulary for the fifth grade students, especially the student with hearing impairment at SDN 004 Teluk Pandan. The intervention resulted in consistent improvements between the two cycles of research. The vocabulary mastery score of the student with hearing impairment increased from 30 in pre-cycle, to 60 in Cycle I and 80 in Cycle II. Likewise the average value of the class increased from 65 in the pre-cycle to 71 in Cycle I and 89 in Cycle II. Classical learning mastery also increased significantly from 35% to 61%, with 100% mastery in Cycle II. Moreover, student participation increased from 55% to 89% and teacher performance from 86% to 92%. The findings suggest that the module presented improved vocabulary learning outcomes and provided a more engaging and student-centered learning environment. This is consistent with the research of Lederberg, Easterbrooks and Connor (2021), who argue that the absence of access to sound hinders vocabulary acquisition among students with hearing impairments and that the use of visually supported instruction is a critical factor in strengthening the semantic representation and language development.

The improvements observed during Cycle I suggest that the illustrated module successfully provided meaningful visual stimulation that enabled students to recognise and understand unfamiliar vocabulary through pictures, independent exploration and QR Code-supported verification activities. Student participation was at the fair level (55%); however, vocabulary mastery improved considerably to a class average of 71 and classical mastery to 61%. However, some students still had difficulties in asking questions, identifying cause-and-effect relationships, and constructing simple sentences by using newly acquired vocabulary. These results support Wahyuni (2022) who highlights that elementary school students, especially those who encounter language-related learning difficulties, need structured visual scaffolding and teacher guidance to construct conceptual understanding independently. The present findings also support the findings of Sari et al. (2022), who observed that visually illustrated learning modules help in vocabulary acquisition of students with hearing impairments by presenting learning materials in more concrete and accessible ways.

The reflection after cycle I resulted in some improvements in instruction in cycle II. The improvements in instruction were

intensive visual scaffolding, use of visual cue cards, simple instructional directions and guided writing activities in sentence construction. The changes resulted in significant improvements in teacher performance and student engagement. Teacher observation scores increased to 92% and student participation was 89%, both Very Good. Students paid more attention to the illustrations, explored the illustrated module by themselves, scanned the QR Code to check the meaning of vocabulary and revised their responses with little teacher help. These findings support Marschark and Knoors (2020) who argue that hearing-impaired students are mostly visual learners and learn better from visual information than spoken language. • Instructional materials that include pictures and symbols and hands-on exploration activities are particularly effective in enhancing learning engagement and promoting language acquisition.

In Cycle II, better learning outcomes were seen due to the better instructional process. All students got above Minimum Mastery Criterion (MMC) so that the class average was 89 with classical learning mastery of 100%. The results are in line with Dual Coding Theory that suggests that information presented through visual and verbal channels is more effectively processed and stored in long-term memory (Setyawan, 2020). The use of illustrations, written vocabulary and contextual learning activities enabled students to create stronger semantic links, and thus to enhance vocabulary acquisition and understanding. Moreover, the results of the study were in line with Lestari (2021) who found out that Discovery Learning improves the retention of students because the students build the knowledge actively through exploration rather than passively receiving information. Likewise, Mulyadi et al. (2024) noted that high-quality visual materials combined with independent verification activities led to a reduction in students' cognitive load and enhanced learning.

The study makes a notable contribution by integrating the Discovery Learning syntax with an illustrated learning module designed for students with hearing impairments. The teaching process was carried out based on the six phases of Discovery Learning which are stimulation, problem identification, data collection, data processing, verification and generalisation with visual supports incorporated in each stage of learning. Students were encouraged to look at the pictures, identify words they did not know, find out the meanings of words, check their understanding with QR Code-based resources, and use new words by making simple sentences. This sequence of activities helped students' conceptual understanding in a gradual way and decreased their reliance on verbal teacher explanations. Therefore, learning became more interactive, meaningful and consistent with the visual learning characteristics of students with hearing impairments.

The findings generally show that the illustrated module based on Discovery Learning is an effective instructional innovation for inclusive elementary education. Apart from enhancing mastery of vocabulary, the intervention also fostered more learner independence, classroom participation and confidence in using new vocabulary in meaningful contexts. The findings of this study indicate that the use of visual learning media and inquiry-oriented instructional approaches has a great potential for enhancing language learning for students with hearing impairments and may provide a feasible instructional model for inclusive classrooms.

CONCLUSION

Based on the results of the classroom action research that has been carried out in two cycles, it can be concluded that the implementation of the Discovery Learning-based illustrated module can improve the learning process and Indonesian vocabulary mastery in grade V students, especially the student with a hearing impairment at SDN 004 Teluk Pandan. The progress in the learning process can be seen from the increase in student participation from 55% in Cycle I to 89% in Cycle II and the increase in teacher performance from 86% to 92%. These improvements were directly related to better learning outcomes, as seen from the increase in the average score of the class from 65 in the pre-cycle to 71 in Cycle I and to 89 in Cycle II, reaching 100% classical learning mastery at the end of the study. The use of visual scaffolding and QR Code-based verification with the integration of illustrated learning modules and Discovery Learning model enabled students to understand, remember, and use the newly acquired vocabulary more independently. Therefore, the action hypothesis proposed in this study was supported. Based on these findings, the teachers are recommended to use the Discovery Learning-based illustrated modules as an alternative instructional strategy to teach Indonesian language in inclusive classrooms, especially for students with hearing impairments. Schools are encouraged to support the provision of visual and technology-enhanced instructional resources and to promote professional development of teachers through continuous training in inclusive education practices. Future researchers may be invited to investigate the use of this instructional method with different learning materials, levels of education or groups of students with different special educational needs. Further studies could also investigate its efficacy in enhancing other language skills such as reading comprehension, writing skills, and long-term vocabulary storage.

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