



Description of Effective Learning Strategies for Phase F Blind Students in Exceptional Schools

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ABSTRACT

This study aims to describe effective learning strategies for blind Phase F students at SLBN Gorontalo City, especially in constructing concept understanding in subjects with high levels of complexity such as Physics. The focus of this research is the implementation of the Independent Curriculum and the use of adaptive media in accommodating students' visual barriers. The method used is descriptive qualitative research with data collection techniques through non-participatory observation, in-depth interviews with teachers and students, and documentation. The results of the study show that an effective learning strategy for Phase F blind students is a multisensory approach that integrates the senses of touch (tactile) and auditory (auditory). The use of tactile media, such as embossed props and Braille systems, has been proven to be able to transform abstract concepts into concrete experiences so that they are easier to understand independently by students. In addition, the role of teachers as facilitators in designing inclusive and flexible learning according to the principles of the Independent Curriculum is an important factor in the success of learning. These findings confirm that the independence and higher order thinking skills of blind students can be optimized through the modification of media and methods that suit their sensory characteristics. This study recommends the development of more innovative tactile-based physics teaching aids to support the achievement of competencies in Phase F.

INTRODUCTION

Inclusive education in Indonesia is juridically affirmed through Permendiknas Number 70 of 2009 which states that every student, including persons with disabilities, has the right to receive educational services in a regular education unit without discrimination. This policy emphasizes the principle of equal access and quality of education for all students in the same learning environment. The implementation of the policy not only requires administrative commitment, but also the readiness of the education system as a whole, including the availability of competent educators, adequate facilities and infrastructure, and adaptive learning management. Thus, educational services for students with special needs, including visually impaired students, are expected to take place effectively and sustainably.

In practice, the implementation of inclusive education requires a learning strategy that is able to encourage the independence of students with special needs. For visually impaired students, the learning process must be adjusted to the characteristics of visual impairments so that they are not solely visually-oriented. Teachers have a strategic role in designing adaptive learning, including facilitating the use of Braille media and optimizing auditory stimulation as the main source of information. Through the right methods and structured mentoring, blind students can develop their ability to learn independently, both in academic aspects and daily life. Conceptually, education is a systematic process to develop individual potential through planned and continuous learning.

In the context of inclusive education, this process requires recognition of the diversity of student characteristics, both from cognitive, emotional, social, and sensory aspects. Therefore, the effectiveness of learning can no longer be measured through a uniform approach (one size fits all), but rather from the ability of learning strategies to provide accessibility and equality according to the specific needs of students. Furthermore, learning for blind students requires a holistic and student-centered approach.

Educational interventions focus not only on knowledge transfer, but also on the provision of environmental accommodations and adequate social support. The use of multisensory media and individualized instruction allows physical barriers to be bridged and other sensory potentials to be optimized, making the learning experience more meaningful.

The learning characteristics of visually impaired students who rely on the sense of hearing and touch require adjustments in the delivery of learning materials. The presentation of visual material without adaptation will cause difficulties in understanding concepts, especially abstract concepts. Therefore, a learning strategy that is in accordance with the sensory characteristics of students is needed so that the learning process can take place effectively (Rahmayani & Selian, 2025). In the Independent Curriculum, phase F includes students at the equivalent of high school level who have demands for abstract, reflective, and independent thinking skills. In this phase, students are expected to be able to understand concepts deeply and have readiness to face social life and the world of work. Therefore, the learning strategies applied must be adaptive and relevant to the development of students. The success of learning in this phase is determined by the modification of the appropriate curriculum, the use of accessible methods, and flexibility in the evaluation system without reducing competency standards (Zulpikar et al., 2025).

One of the relevant strategies in learning for visually impaired students is the multisensory learning strategy. This strategy involves the use of various senses, such as auditory, kinesthetic, and tactile, in the learning process so that it can help overcome the visual limitations that students have. The multisensory approach is considered to be able to increase student involvement and make it easier to understand the material presented (Shidqi & Budi, 2023). However, conditions in the field show that the implementation of learning strategies for visually impaired students still faces various obstacles.

In SLB Gorontalo City, limited access to technology-based learning media, such as NVDA, audiobooks, and smart shoes, is an obstacle in supporting learning, especially in sound materials. In addition, the use of conventional learning methods and the limitations of teacher training in learning strategies specifically for the visually impaired also affect the effectiveness of learning. Communication barriers between teachers and students are also factors that slow down the learning process.

Although theoretically the multisensory learning strategy is considered to be in accordance with the characteristics of phase F blind students, in practice it is not known exactly how well it fits the learning needs of students in the field. This shows that there is a gap between theoretical concepts and learning implementation. Therefore, this study was conducted to describe the learning strategies applied and analyze their suitability with the learning characteristics of phase F blind students in SLBN Gorontalo City.

This research has a novelty in contextually examining the application of multisensory learning strategies to sound materials for phase F blind students at SLBN Gorontalo City, which was still limited in previous studies.

METHODS

This study uses a qualitative approach with a descriptive type, which aims to understand and describe in depth the application of multisensory learning strategies and their suitability with the learning characteristics of phase F blind students. The research was carried out at the State Special School (SLBN) of Gorontalo City, which is a special educational unit for visually impaired students and has implemented the Independent Curriculum in phase F. The selection of locations is based on the consideration that the school has implemented various learning strategies, including a multisensory approach, so it is relevant to assess the suitability of learning strategies with the characteristics of students. The research was carried out from March to May 2025 by adjusting the academic calendar and learning activities at school.

The research subjects consisted of teachers who taught phase F blind students as the main informants, and phase F blind students as supporting informants. The data collected were in the form of descriptive qualitative data which included learning planning, learning implementation, student response and involvement, as well as supporting data in the form of learning documents and activity recordings.

Data collection techniques are carried out through observation, interviews, and documentation. Observation is carried out in a non-participatory manner to directly observe the learning process, especially the application of multisensory strategies, student involvement, and interaction between teachers and students. Interviews are conducted in a semi-structured manner to teachers and students to explore information related to planning, implementation, constraints, and student learning experiences in multisensory learning. Documentation is used as supporting data in the form of learning tools, teaching materials, photos of activities, and other relevant archives.

The main instrument in this study is the researcher himself, who plays a direct role in the data collection and analysis process. Supporting instruments in the form of observation guidelines, interview guidelines, and documentation are used to help direct the data collection process to remain in accordance with the research focus.

Data analysis is carried out qualitatively through the stages of data reduction, data presentation, and conclusion drawn. Data reduction is carried out by selecting and simplifying data that is relevant to the focus of the research. Data presentation is carried out in the form of a systematic descriptive description to facilitate understanding of the research findings. Furthermore, conclusions are drawn by interpreting the data that has been

analyzed and verifying its truth through data obtained in the field.

The validity of the data in this study is tested through credibility, transferability, dependability, and confirmability tests. The credibility test is carried out through repeated observation and triangulation of sources and techniques, namely comparing data from observations, interviews, and documentation. The transferability test is carried out by presenting data in detail and systematically so that it can be understood and applied in similar contexts. The dependency test is carried out by documenting the entire research process consistently, while the confirmability test is carried out by ensuring that all research findings are based on valid and accountable data.

RESEARCH RESULTS

The results of this study are compiled based on empirical data obtained through learning observations, interviews with teachers, and interviews with visually impaired students in phase F. The data presented reflect the real conditions of the implementation of sound material learning in the classroom, including learning characteristics, strategies applied, media use, student responses and involvement, and obstacles faced during the learning process.

Learning Characteristics of Visually Impaired Students Phase F

The results showed that learning in phase F blind students has a distinctive characteristic, namely relying on the sense of hearing (auditory) and touch (tactile) as the main channels in receiving information. The teacher conveys the material verbally in simple, clear, and structured language, and uses the right intonation to help students understand. In addition, students need repeated repetition of the material and a more flexible learning tempo. Direct involvement through touching activities and trying learning media is an important factor in helping students understand concepts concretely. The physical and emotional condition of students also affects the learning process, where students are more responsive when they are in good condition.

Application of Sound Material Learning Strategies

The learning strategy of sound material is carried out adaptively with an emphasis on direct experience. In the initial stage, the teacher conducts class conditioning and conveys learning objectives orally. In the core activity, the teacher uses a constructivist approach by involving students in the exploration of sound sources using concrete media such as musical instruments. The teacher provides repeated and descriptive verbal explanations, as well as provides opportunities for students to explore the media independently with mentoring. In the closing stage, the teacher evaluates through oral questions and answers and provides feedback and motivation to students.

Use of Learning Media

The learning media used is in the form of concrete objects that produce sound and are easily accessible to students, such as musical instruments. This media allows students to gain hands-on learning experience through the activity of touching and sounding objects. The use of media has been proven to increase students' attention, interest, and involvement in learning. Teachers also adjust the use of media to students' abilities and provide intensive assistance to ensure students' safety and understanding.

Student Response and Engagement

Students show a positive response to learning based on direct experience. This is shown through increased focus, attention, and active participation in learning activities. Student involvement can be seen from the activeness in trying media, following instructions, and providing verbal responses. Students also feel happier and easier to understand the material when learning involves direct activities compared to the lecture method.

Learning Barriers

The results of the study also show that there are several obstacles in learning, including:

1. Difficulty understanding abstract concepts in sound material
2. Limited concentration and rapid student fatigue
3. Limitations of learning media and clarity of sound
4. Limited learning time
5. Students' physical and emotional condition

These constraints affect the effectiveness of learning so that it requires continuous strategy adjustments.

Research Findings

Based on the results of data analysis, several key findings were obtained as follows:

Direct experiential learning makes it easier for visually impaired students to understand sound concepts because it involves direct sensory experiences.

Concrete learning media plays an important role in helping students understand, remember, and distinguish the characteristics of sounds.

Repetition of material is a major need in the learning of blind students to strengthen understanding and memory.

Student response and engagement are enhanced through learning that involves hands-on activities and concrete experiences.

The role of teachers is crucial as designers, facilitators, motivators, and evaluators in learning.

Learning obstacles can be overcome through adaptive strategies, repetition of materials, the use of concrete media, intensive mentoring, and effective time management.

DISCUSSION

This discussion interprets the research findings by relating them to relevant theoretical foundations, especially related to the learning characteristics of visually impaired students. The analysis is carried out to show the compatibility between empirical findings and learning concepts that have developed, as well as to answer the formulation of the research problem.

Hands-on Experiential Learning

The findings of the study show that direct experiential learning contributes significantly to the understanding of sound concepts in visually impaired students in phase F. This approach allows learners to build understanding through active involvement in sensory activities. In a constructivist perspective, learning is an active process of building knowledge through interaction with the environment (Piaget, 1952). Direct involvement in activities such as listening and palpating sound sources allows for the formation of more concrete representations of concepts. This is relevant to the characteristics of visually impaired students who rely on the auditory and tactile senses (Sari & Gunawan, 2023). In addition, these findings are in line with experiential learning theories that emphasize experience as the basis for knowledge formation. Direct experience allows learners to construct the relationship between sound sources and their characteristics in a more profound way. This approach also supports meaningful learning through the integration of experiences and concepts (Azzahra et al., 2024).

The Role of Concrete Learning Media

Concrete learning media has been shown to play an important role in facilitating the understanding of sound concepts. The use of tactile and sound-producing media allows learners to obtain a more representative learning experience (Indriyani, Herlina, & Wardani, 2024). In the perspective of multisensory theory, the involvement of various senses increases the effectiveness of information processing and learning retention (Nurjanah et al., 2024). For visually impaired students, the optimization of the auditory and tactile senses is key in understanding abstract concepts. Concrete media serves as a link between sensory experience and knowledge construction. From a constructivist perspective, direct interaction with media allows for the formation of understanding through active exploration. In addition, the use of concrete media also has implications for increasing engagement and interest in learning (Zuhairia et al., 2023).

Repetition of Material in the Learning Process

Repetition of material is an essential component in the learning of visually impaired students. Research findings show that repetition contributes to strengthening understanding and stabilizing memory. In behavioristic theory, repetition serves as a reinforcement of learning responses (Juraganda et al., 2024). Meanwhile, information processing theory explains that repetition helps transfer information from short-term memory to long-term memory (Zulpikar et al., 2025). In a cognitive perspective, repetition allows for the reorganization and reconstruction of knowledge (Syarifah et al., 2024). This is important considering that limited visual access in visually impaired students has an impact on the information processing process. Thus, repetition is not only repetitive, but also adaptive to the learning needs of learners.

Student Response and Engagement

The research findings show that there is a positive response and increased student involvement in hands-on experience-based learning. This involvement is reflected in increased attention, participation, and enthusiasm. In active learning theory, student involvement is a prerequisite for effective learning (Putri et al., 2025). In addition, the learning motivation theory states that the relevance and meaningfulness of learning increases intrinsic motivation (Sitorus et al., 2024; Yunus & Syarif, 2024). Active involvement also has implications for increased confidence and focus on learning (Sarudin et al., 2024). Thus, student involvement can be seen as an indicator of the successful implementation of learning strategies.

The Role of Teachers in Learning

The role of teachers is a determining factor in the learning success of visually impaired students. Teachers function as facilitators in creating an inclusive and responsive learning environment to the needs of students (Mustika et al., 2025). From a pedagogic perspective, teachers' competence in designing, implementing, and

evaluating learning affects the effectiveness of learning (Zulpikar et al., 2025). Teachers also play a role as companions who provide scaffolding through guidance and reinforcement of materials. In addition, teachers function as learning managers who systematically integrate various learning components. Teachers' ability to respond to obstacles is an important aspect in maintaining learning continuity (Qomariah et al., 2025).

Obstacles and Efforts to Overcome Them

The research findings identified various obstacles, including differences in students' abilities, limited concentration, need for repetition, and limited time and resources. From an adaptive learning perspective, these constraints are responded to through adjustments to learning strategies, methods, and tempos (Agustina et al., 2025). The use of concrete media, repetition of materials, and intensive mentoring are forms of adaptive strategy implementation. The differentiation approach is also relevant in accommodating the diversity of student characteristics (Fauziah & Khoiriyah, 2024). In addition, direct experiential learning has proven effective in increasing student focus and engagement (Indriyani et al., 2024). Thus, learning barriers are not seen as absolute obstacles, but rather as variables that can be managed through adaptive and flexible learning strategies.

CONCLUSION

Based on the results of research and discussion, the multisensory learning strategy has proven to be appropriate and effective in learning sound materials for visually impaired students in phase F at SLBN Gorontalo City. This strategy is able to accommodate the learning characteristics of students who rely on non-visual sensory experiences.

Learning characteristics show that the understanding of sound concepts in visually impaired students is more optimal when learning emphasizes direct experience, the use of auditory and tactile senses, and the repetition of material. The presentation of concepts in a concrete way through listening, touching, and direct practice activities has proven to be more effective than the verbal approach alone.

The implementation of multisensory learning strategies is reflected in the use of concrete media, hands-on experience, and intensive mentoring by teachers. This strategy supports the formation of a more meaningful and sustainable understanding of concepts.

The response of teachers and students to the strategies applied showed a positive trend, which was characterized by increased student involvement, attention, and enthusiasm in learning. Teachers also assessed that the multisensory strategy simplifies the process of delivering material while adapting learning to the needs of students.

Although there are obstacles, such as limited facilities, differences in students' abilities, and time constraints, these obstacles can be overcome through the application of adaptive learning, flexible time management, and teachers' creativity in utilizing available media. Thus, multisensory learning strategies can be applied effectively and contextually in the learning of phase F blind students.

RECOMMENDATIONS

First, teachers are advised to optimize the application of multisensory learning strategies in learning sound and other abstract materials. The use of concrete media, direct experience, and repetition of material needs to be systematically designed to suit the sensory and cognitive characteristics of phase F blind students.

Second, schools need to support the provision of adaptive learning facilities and infrastructure, especially tactile and auditory-based learning media. This support is important to improve the quality of learning and facilitate the learning needs of visually impaired students optimally.

Third, it is necessary to improve teacher competence through continuous training related to multisensory learning strategies, the use of assistive technology, and adaptive learning management for students with special needs.

Fourth, it is recommended for future researchers to develop broader research related to multisensory learning, both in other physics materials and at different levels of education, as well as to examine the development of innovative learning media based on the needs of blind students.

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