ISSN: p-2540-8763 / e-2615-4374
Vol: 11 Number 2, June 2026
Page: 369-395

Teacher Strategies for Tactual Atlas-Based Social Studies Learning

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Abstract. The urgency of this study arises from the persistent difficulty experienced by visually impaired students in accessing Social Studies content that is commonly presented through visual representations, particularly maps, regional forms, directional orientation, and spatial relationships. This study aims to analyze teacher strategies in implementing Tactual Atlas-based Social Studies instruction and to examine visually impaired students' responses to the learning process. A qualitative case study was conducted at SLB-A Budi Nurani involving one fourth-grade teacher, two visually impaired students, and the school principal as a supporting informant. Data were collected through classroom observation, semi-structured interviews, and documentation of learning activities, instructional media, and field notes. The data were analyzed using Miles and Huberman's interactive model, consisting of data reduction, data display, conclusion drawing, and verification, while data credibility was strengthened through source triangulation, methodological triangulation, and member checking. The findings show that the teacher implemented adaptive, multisensory, and experiential learning strategies by integrating the Tactual Atlas with verbal explanations, audio media, guided tactile exploration, and concrete simulations. These strategies enabled students to understand geographical concepts more concretely, including landforms, regional boundaries, cardinal directions, geographical locations, and spatial relationships. Students responded positively to the use of the Tactual Atlas, although differences in comprehension and learning support needs were observed between students. This study concludes that Tactual Atlas-based instruction can enhance the accessibility and meaningfulness of Social Studies learning for visually impaired students. The novelty of this study lies in its analysis of teacher-mediated integration of the Tactual Atlas within actual classroom practice. The study contributes to inclusive education by offering practical insights for designing adaptive, multisensory, and accessible Social Studies instruction.

Keywords: *Social Studies Teaching Strategies; Tactual Atlas; Multisensory Learning; Inclusive Education*

INTRODUCTION

Education is a fundamental right of every citizen, regardless of their physical, social, or economic circumstances, or their individual characteristics. The principle of inclusive education affirms that every student has the right to equal, meaningful learning opportunities that are tailored to their needs and characteristics. In the context of special education, visually impaired students require educational services that not only provide access to education but also accommodate visual impairments through appropriate learning strategies and media. Therefore, the provision of education for visually impaired students cannot be equated with that for regular students, as it requires a more adaptive, flexible approach focused on optimizing the functions of remaining senses, particularly the sense of touch and hearing (Fitria, 2025). According to Miyauchi (2020), inclusive education is the right of every student, including those with visual impairments.

In line with this view, Marito et al (2024) emphasized that inclusive education aims not only to place students with special needs in the school environment but also to ensure that they

ISSN: p-2540-8763 / e-2615-4374
Vol: 11 Number 2, June 2026
Page: 369-395

have equal access, participation, and learning opportunities. In the context of students with visual impairments, learning accessibility is a critical component in determining the success of inclusive education implementation because students' presence in school does not necessarily translate into optimal engagement in the learning process. This underscores the argument by Diasse dan Kawai (2024)that true inclusion requires schools to actively dismantle barriers to learning by reshaping teaching methodologies, ensuring that curriculum delivery matches the sensory capabilities of every learner.

However, the presence of visually impaired students in educational settings does not automatically guarantee the creation of an inclusive education system if access to learning and academic participation are not optimally fulfilled. In line with this, Ngwarati and Muchemwa (2024) explain that the implementation of inclusive education for students with visual impairments still faces various obstacles, such as limited learning resources, a lack of teacher competence, and minimal social support within the school environment. These findings are reinforced by Laksana et al. (Laksana et al., 2025), who explain that the success of inclusive education for students with visual impairments is greatly influenced by the school's readiness to provide an accessible learning environment, adequate teacher support, and the availability of learning resources appropriate to students' needs. Therefore, the implementation of inclusive education requires systemic support and goes beyond policy-based aspects.

The importance of providing accessible learning for visually impaired students is increasingly relevant in today’s era of inclusive education. Various educational policies prioritize equal access as one of the core principles of education. However, equal access is not merely about the presence of visually impaired students in the school environment, but also about how the learning process can help them understand the material effectively. In practice, much learning material is still designed with a heavy reliance on visual elements, making it difficult for students with visual impairments to access. This situation has the potential to create gaps in conceptual understanding, engagement in learning, and academic achievement if not balanced with appropriate learning strategies. Antoninis et al (2020) emphasized that one of the main obstacles still faced by blind students in learning is the dominant use of visual media that is difficult to access directly. This condition requires teachers to make various learning adaptations so that the material presented can be understood through other sensory channels that are still functioning optimally.

The findings of Connor et al. (2025) indicate that students with visual impairments still frequently face difficulties in gaining equal access to academic and social activities in inclusive school settings. These barriers have the potential to affect learning engagement and academic achievement if not offset by adequate educational support.

ISSN: p-2540-8763 / e-2615-4374
Vol: 11 Number 2, June 2026
Page: 369-395

One of the subjects that poses significant challenges for visually impaired students is Social Studies (IPS). Social Studies is a subject that integrates various disciplines, such as geography, history, economics, and sociology, to help students understand society and their surrounding environment. In social studies, students are not only required to master factual knowledge but also to understand spatial relationships, social phenomena, and the dynamics of human life in various contexts. However, most social studies material, particularly that related to geographical aspects, is presented through visual media such as maps, globes, diagrams, regional illustrations, and other spatial representations. Riswana et al. (2024) explain that social studies material related to geography is one of the most challenging for blind students because it requires the ability to understand location, direction, shape, and relationships between spaces. Therefore, social studies learning requires a more concrete approach so that these concepts can be understood more meaningfully.

The prevalence of visual media has made it difficult for visually impaired students to grasp abstract and spatial geographic concepts. Geographic concepts such as the shape of a region, cardinal directions, the location of an area, spatial relationships, and the characteristics of the geographic environment are topics that require spatial representation skills. For sighted students, this information is relatively easy to understand through visual observation of maps or images.

Conversely, for visually impaired students, these concepts are often conveyed solely through verbal explanations, which can potentially lead to misconceptions and limited understanding. Therefore, social studies instruction for visually impaired students requires strategies that can transform visual information into more concrete learning experiences accessible through other senses. In this regard, teachers play a crucial role as facilitators responsible for designing instruction that bridges students' learning needs with the characteristics of the subject matter. Widiastuti (2023) emphasizes that instruction for visually impaired students must be tailored to students' characteristics and learning needs through the use of appropriate strategies and instructional media. In line with this, Dermawan (2018) explains that the development of learning programs for children with special needs must consider the students' sensorimotor, cognitive, language, social skills, and academic abilities. Handayani et al. (2024) stated that learning for students with visual impairments needs to be designed based on their sensory characteristics. Utilizing media that can be touched, heard, and explored directly will help students gain a more concrete learning experience than learning that relies solely on verbal explanations.

Efforts to make learning more accessible to visually impaired students have spurred the development of various adaptive learning approaches, one of which is multisensory learning. The multisensory approach is a learning method that involves more than one sensory channel in the

ISSN: p-2540-8763 / e-2615-4374
Vol: 11 Number 2, June 2026
Page: 369-395

process of acquiring and processing information. Through this approach, students have the opportunity to learn through a combination of touch, hearing, movement, and direct experience, making the information received easier to understand and remember. According to Chit et al. (2024), multisensory learning provides visually impaired students with the opportunity to have a richer learning experience because information does not rely solely on a single sensory channel. The integration of these various sensory experiences allows students to build stronger mental representations of the concepts being studied. Rahmayani and Selian (2025) explain that learning strategies involving hearing, touch, and hands-on experiences can help visually impaired students understand abstract concepts more effectively compared to learning that relies solely on verbal explanations. These findings are supported by Tsabita et al. (2024), who stated that a multisensory approach allows blind students to acquire information through various sensory pathways simultaneously. According to them, the integration of auditory, tactile, and kinesthetic experiences can strengthen the concept formation process because students have the opportunity to experience the learning material directly.

These findings are supported by Tsabita et al. (2024), who stated that a multisensory approach allows blind students to acquire information through various sensory pathways simultaneously. According to them, the integration of auditory, tactile, and kinesthetic experiences can strengthen the concept formation process because students have the opportunity to experience the learning material directly. Similar findings were also reported by Cosentino et al. (2025), who stated that multisensory learning environments contribute to increased student engagement, motivation, and understanding. Learning that involves various sensory experiences allows students to actively participate in the learning process and construct meaning based on their direct experiences. In the context of education for visually impaired students, a multisensory approach is particularly important because it reduces reliance on visual information and provides alternative access to learning materials that were previously difficult to understand. Thus, multisensory learning serves not only as an adaptive strategy but also as a means of creating a more inclusive and meaningful learning experience. Darmayanti et al. (2025)explain that multisensory learning not only improves conceptual understanding but also contributes to increased active participation of students with special needs during the learning process. This active engagement is important because it allows students to construct meaning based on their direct experiences.

Multisensory learning can be implemented through various learning materials specifically designed to meet the needs of visually impaired students. One such material considered to have great potential in social studies education is the Tactual Atlas. The Tactual Atlas is a touch-based learning tool that presents geographic information in the form of raised lines, textures, tactile

ISSN: p-2540-8763 / e-2615-4374
Vol: 11 Number 2, June 2026
Page: 369-395

symbols, and various spatial representations that students can directly touch. Through this medium, information that was previously only available in visual form can be transformed into a learning experience accessible through the sense of touch. Thus, visually impaired students have the opportunity to understand the shape of regions, cardinal directions, geographic positions, and spatial relationships between areas in a more concrete way. According to Suharsiwi et al. (2017) tactile-based media has the ability to transform visual information into sensory experiences accessible to individuals with visual impairments. Through tactile exploration activities, students can recognize the shape, pattern, and spatial relationships of an object, thus helping to form clearer mental representations.

The development of accessible media for visually impaired students is inextricably linked to advances in assistive technology in education. Heredia-Solorzano and Villafuerte-Holguín (2025) explain that the development of assistive technology has made a significant contribution to improving learning access for visually impaired students through the use of screen readers, digital Braille, artificial intelligence, and augmented reality technology. Meanwhile, Vouglanis (2024) states that assistive technology plays a crucial role in helping visually impaired students access information, communicate, and participate more actively in learning activities at school. The availability of these various technologies demonstrates that learning for visually impaired students is no longer solely dependent on conventional methods but can be enhanced through the use of more innovative and accessible media. Ibarra-cabrera et al (2025) explain that the development of assistive technology needs to be integrated with the use of appropriate learning media to provide visually impaired students with a more optimal learning experience. According to them, the combination of accessible technology and tactile media can help improve learning independence and expand access to previously inaccessible information.

The importance of tactile media in developing geographical understanding has been demonstrated in various studies. Gomes et al. (2025) found that the use of tactile maps supports geographical reasoning in visually impaired individuals by providing opportunities to explore spatial information through tactile exploration. Through this experience, students can develop a better understanding of regional shapes, geographical locations, and spatial relationships. These findings indicate that tactile media serve not only as learning aids but also as tools for developing geographical thinking skills, which is one of the primary objectives of social studies education. Pratiwi dan Ariningsih (2020) demonstrated that manipulative-based geospatial learning media can help students understand spatial concepts through hands-on exploration experiences. Through these activities, students have the opportunity to build a more concrete understanding of regional forms, locations, and spatial relationships.

ISSN: p-2540-8763 / e-2615-4374
Vol: 11 Number 2, June 2026
Page: 369-395

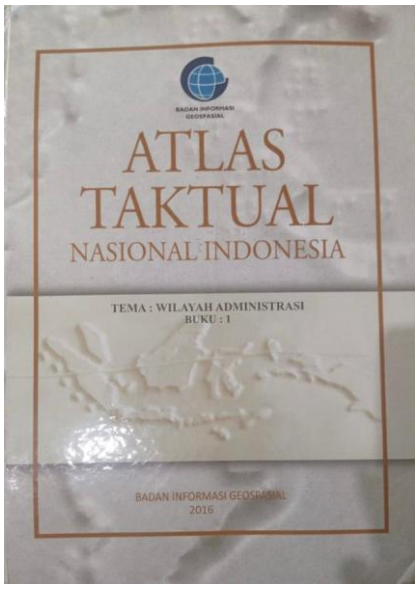

Figure 1. Tactual Atlas Book
(Badan Informasi Geospasial, 2016)

In addition to supporting the understanding of geographical concepts, touch-based media also plays a role in helping students construct mental representations of the objects being studied. He et al. (2026) explain that tactile representations enable visually impaired individuals to understand complex information that was previously available only in visual form. Through systematic tactile exploration, students can identify patterns, shapes, and relationships between objects, thereby enabling them to construct a clearer conceptual picture. In the context of social studies learning, the ability to build such mental representations is crucial because most geographic content requires an understanding of spatial relationships that cannot be directly observed.

Although various technological innovations and learning media have emerged, their implementation in schools still faces numerous challenges. Zaini et al. (Zaini et al., 2026) noted that the main obstacles to the use of assistive technology among visually impaired students include limited access to devices, a lack of training in technology use, and insufficient technical support within the educational environment. Similar findings were presented by Rahmayani and Selian (2025), who stated that teachers still face limitations in learning media, a lack of assistive technology, and a lack of training in inclusive education to support the learning of visually impaired students. These conditions indicate that learning success is determined not only by the availability of media but also by the readiness of teachers and the school environment to utilize these media optimally.

Furthermore, Holloway et al. (2023) assert that tactile media serve as a bridge connecting visual information with touch-based learning experiences. The process of transforming visual information into a tactile form enables visually impaired students to gain more equitable access

ISSN: p-2540-8763 / e-2615-4374
Vol: 11 Number 2, June 2026
Page: 369-395

to various types of information that were previously difficult to access. In other words, tactile media not only serve as learning aids but also as pedagogical instruments that support the realization of inclusive education. In social studies instruction, the use of media such as the Tactual Atlas allows teachers to present abstract concepts in a more concrete manner, enabling students to better understand the material.

In addition to assistive technology, the provision of appropriate learning materials is also a key factor in improving access to visual and abstract content. Awini (2026) explains that technology and media specifically designed for visually impaired students play a crucial role in helping them understand concepts that are typically presented visually. Therefore, the use of tactile media such as the Tactual Atlas is a promising alternative for supporting more accessible and meaningful social studies learning. Afrian et al. (2025) explain that the use of media that combines audio and tactile elements provides a more appropriate learning experience for blind students compared to learning that relies solely on verbal explanations. According to them, the combination of these two modalities can increase student engagement, motivation, and ease in understanding abstract material. This is placed before the sentence, although various definitions have proven the benefits of multisensory learning.

Although various studies have demonstrated the benefits of multisensory learning and tactile media for visually impaired students, research specifically examining teachers' strategies for integrating the Tactual Atlas into social studies instruction remains relatively limited. Most previous studies have focused on media development, the general effectiveness of media use, or the learning experiences of visually impaired students in various educational contexts. Meanwhile, how teachers design, implement, and adapt Tactual Atlas-based learning strategies to help students understand social studies concepts has not been explored in depth. Furthermore, previous research has not extensively discussed visually impaired students' responses to the use of Tactual Atlas media in social studies learning within the context of special education schools.

This research gap highlights the need for a more in-depth study of the relationship between teachers' instructional strategies, the use of the Tactual Atlas, and the responses of visually impaired students in social studies instruction. Understanding this aspect is crucial because the success of a learning medium is not solely determined by the medium's characteristics but is also influenced by how teachers integrate it into the learning process. Thus, research focused on actual teaching practices in special education schools can provide a more comprehensive contribution to the development of effective teaching strategies for visually impaired students.

Based on the above description, this study was conducted at SLB-A Budi Nurani, focusing on social studies instruction that utilizes the Tactual Atlas. The novelty of this study lies in the analysis of the integration of multisensory learning strategies with the use of the Tactual Atlas to

ISSN: p-2540-8763 / e-2615-4374
Vol: 11 Number 2, June 2026
Page: 369-395

help visually impaired students understand geographical and spatial concepts in social studies. This study aims to analyze teachers' strategies in enhancing students' understanding of social studies concepts through the use of the Tactual Atlas and to identify students' responses to the implemented learning strategies. Specifically, this study seeks to answer two research questions, namely:

1. What strategies do teachers use to implement Social Studies instruction based on Tactual Atlases for visually impaired students?
2. How do visually impaired students respond to the use of Tactual Atlases in Social Studies instruction?

The findings of this study are expected to make a theoretical contribution to the development of research on special education and inclusive education, while also serving as a practical guide for teachers in designing social studies lessons that are more accessible, adaptive, and meaningful for visually impaired students.

LITERATURE REVIEW

Inclusive education has become a central principle in contemporary educational policy and practice because it affirms the right of all learners, including students with visual impairments, to participate meaningfully in learning activities. In special education contexts, inclusion is not limited to school placement but requires accessible instructional design, adaptive learning environments, and pedagogical strategies that respond to learners' sensory, cognitive, and social characteristics. Students with visual impairments require learning services that optimize nonvisual sensory channels, particularly touch and hearing, because conventional classroom instruction frequently depends on visual representations that are not directly accessible to them (Fitria, 2025; Miyauchi, 2020). Therefore, inclusive education for visually impaired students must be understood as a systemic effort to remove barriers to access, participation, and learning achievement rather than as the mere physical presence of students in the classroom (Diasse & Kawai, 2024; Marito et al., 2024).

Previous studies have consistently shown that visually impaired students continue to encounter substantial barriers in educational settings. These barriers include limited instructional resources, inadequate teacher preparation, insufficient assistive technology, and low levels of environmental support within schools (Laksana et al., 2025; Ngwarati & Muchemwa, 2024). Connor et al. (2025) further emphasized that students with visual impairments often experience restricted access to academic and social participation, which may affect engagement and learning outcomes. These findings indicate that inclusive education requires not only policy commitment

ISSN: p-2540-8763 / e-2615-4374
Vol: 11 Number 2, June 2026
Page: 369-395

but also practical instructional strategies that enable visually impaired students to access curriculum content in formats aligned with their learning characteristics.

Social Studies is one subject area that presents significant challenges for visually impaired students because it contains numerous visual and spatial concepts. In Social Studies, particularly geography-related content, students are expected to understand landforms, regional boundaries, maps, locations, directions, and spatial relationships. For sighted learners, these concepts are commonly accessed through visual observation of maps, diagrams, globes, and illustrations. However, for visually impaired students, such materials may become inaccessible when they are not transformed into tactile, auditory, or concrete learning experiences (Antoninis et al., 2020; Riswana et al., 2024). Consequently, Social Studies instruction for visually impaired students requires adaptive strategies that can translate visual information into meaningful nonvisual representations.

Teacher strategy is a critical factor in determining the accessibility and effectiveness of learning for students with visual impairments. Instruction for these students must be designed by considering their sensorimotor, cognitive, linguistic, social, and academic abilities (Dermawan, 2018). Widiastuti (2023) argued that the selection of teaching strategies and learning media for visually impaired students must be based on their specific learning needs and sensory characteristics. Similarly, Handayani and Haryati (2024) emphasized that instructional media should provide opportunities for students to touch, hear, and directly explore learning objects. These perspectives suggest that teachers must act not only as information providers but also as learning mediators who adapt abstract content into accessible and meaningful experiences.

One instructional approach that has been widely recommended for visually impaired learners is multisensory learning. Multisensory learning involves the simultaneous or complementary use of several sensory channels, such as touch, hearing, movement, and direct experience, to support concept formation and memory retention. Chit et al. (2024) explained that multisensory learning frameworks can provide richer learning experiences for visually impaired learners because information is not restricted to one sensory modality. This view is supported by Rahmayani and Selian (2025), who found that learning strategies involving auditory, tactile, and hands-on experiences help visually impaired students understand abstract concepts more effectively than verbal instruction alone. Similar conclusions were reported by Tsabita et al. (2024), who stated that the integration of tactile, auditory, and kinesthetic experiences strengthens the construction of conceptual understanding among students with visual impairments.

Recent empirical literature also demonstrates that multisensory environments can improve engagement, motivation, and learning outcomes. Cosentino et al. (2025) found that students' learning experiences in multisensory environments are shaped by the interaction modalities

ISSN: p-2540-8763 / e-2615-4374
Vol: 11 Number 2, June 2026
Page: 369-395

provided during instruction. Darmayanti et al. (2025) further showed that multisensory media can support cognitive functioning and active participation among visually impaired students. In the context of special needs education, multisensory learning is particularly important because it reduces dependence on visual information and allows students to construct meaning through direct sensory experiences (Shidqi & Budi, 2023; Ummah & Rahman, 2024). Thus, multisensory learning can be regarded as both an adaptive instructional strategy and a practical pathway toward more inclusive classroom participation.

Tactile media have become an important component of multisensory learning for visually impaired students. Tactile media transform visual information into raised lines, textures, symbols, or three-dimensional forms that can be explored through touch. Suharsiwi (2017) explained that tactile-based media can convert visual information into sensory experiences that are accessible to individuals with visual impairments. In geography and Social Studies education, tactile media are particularly relevant because they allow students to recognize patterns, spatial arrangements, regional shapes, and relationships between objects. Pratiwi and Ariningsih (2020) demonstrated that manipulative geospatial learning media support students' understanding of spatial concepts through direct exploration. Similarly, Gomes et al. (2025) found that tactile maps contribute to geographical reasoning among visually impaired individuals by enabling them to explore spatial information through touch.

The Tactual Atlas represents one form of tactile learning media that is highly relevant for Social Studies instruction. The Tactual Atlas presents geographic information through raised surfaces, tactile symbols, textures, and spatial representations that visually impaired students can explore directly. Through this medium, abstract and visual concept such as landforms, regional boundaries, cardinal directions, and geographical positions can be transformed into concrete learning experiences. The Atlas Taktual Nasional Indonesia developed by Badan Informasi Geospasial (2016) illustrates how tactile geographic representations can support access to map-based information for visually impaired learners. In this regard, the Tactual Atlas functions not only as an instructional aid but also as an accessibility medium that enables students to construct spatial knowledge through tactile exploration.

Research on tactile maps and tactile representations supports the pedagogical relevance of the Tactual Atlas. Holloway et al. (2023) stated that tactile media serve as a bridge between visual information and touch-based learning experiences. He et al. (2026) further explained that tactile representations help blind and low-vision individuals understand complex visual information by supporting systematic exploration of patterns, forms, and relationships. In addition, Trinh et al. (2023) found that tactile maps can help users construct more accurate cognitive maps and improve spatial orientation. These findings are consistent with Bleau et al. (2025) and Nemargut (2025),

ISSN: p-2540-8763 / e-2615-4374
Vol: 11 Number 2, June 2026
Page: 369-395

who showed that tactile map use can contribute to navigational independence, orientation, and spatial understanding among individuals with visual impairments.

The development of tactile media is also closely related to advances in assistive technology. Assistive technologies, including screen readers, digital Braille, artificial intelligence, haptic devices, and augmented reality, have expanded learning access for visually impaired students (Heredia-Solorzano & Villafuerte-Holguín, 2025; Vouglanis, 2024). Ibarra-Cabrera et al. (2025) argued that multisensory tangible devices can improve inclusive learning experiences when they are designed according to learners' sensory needs. Awini (2026) similarly emphasized that assistive technology can support instruction for visually impaired students, particularly when teachers are able to integrate it meaningfully into classroom activities. Nevertheless, the effectiveness of assistive technology and tactile media depends on accessibility, teacher competence, training, and technical support within the educational environment (Rahmayani & Selian, 2025; Zaini et al., 2026).

Several studies have examined the effectiveness of tactile and audio-tactile media in supporting conceptual understanding. Nashiruddin et al. (2021) found that tactile-based adaptive learning media improved conceptual understanding among visually impaired students because the media enabled direct tactile interaction with learning objects. Afrian et al. (2025) reported that contextual learning media can bridge accessibility gaps for visually impaired learners, particularly in content areas that require concrete representations. Sofiana et al. (2025) also showed that audio-tactile media can enhance conceptual understanding, motivation, and active participation because they combine auditory and tactile modalities. These findings indicate that tactile media become more effective when they are supported by verbal explanation, audio reinforcement, and teacher-guided exploration.

Despite these contributions, previous studies have tended to focus on media development, general effectiveness, or the broader role of assistive technology. Limited attention has been given to how teachers actually integrate tactile atlases into Social Studies instruction for visually impaired students in classroom practice. This issue is important because the success of tactile media is not determined solely by the availability or design of the media, but also by the teacher's ability to mediate exploration, provide verbal scaffolding, adapt instruction, and respond to individual differences among students. Existing literature also provides limited discussion of visually impaired students' responses to Tactual Atlas-based Social Studies learning in special education school contexts. Therefore, further investigation is needed to understand the relationship between teacher strategy, tactile media use, multisensory learning, and student engagement in Social Studies instruction.

ISSN: p-2540-8763 / e-2615-4374
Vol: 11 Number 2, June 2026
Page: 369-395

Based on the literature reviewed, Tactual Atlas-based Social Studies learning can be positioned as an adaptive and multisensory pedagogical approach that addresses the accessibility barriers faced by visually impaired students in understanding geographic and spatial concepts. The integration of tactile exploration, auditory support, verbal explanation, and concrete simulation offers a promising instructional pathway for transforming visual geographic content into accessible learning experiences. Accordingly, this study focuses on teacher strategies in implementing Tactual Atlas-based Social Studies instruction and on visually impaired students' responses to the learning process. The study contributes to inclusive pedagogy by examining how tactile media are mediated by teachers in actual classroom practice and how such strategies support students' conceptual understanding, engagement, and participation.

RESEARCH METHODS

Research Type and Approach

This study employs a qualitative approach using a case study design to gain an in-depth understanding of teachers' instructional strategies for enhancing students' conceptual understanding of Social Studies through the use of Tactual Atlases with visually impaired students. The qualitative approach was chosen because this study focuses on understanding the learning process, students' experiences, and the interactions that occur during learning activities. Creswell (2014) explains that qualitative research is used to explore and understand the meanings that individuals or groups ascribe to a social or educational phenomenon.

This approach allows researchers to gain a comprehensive understanding of how learning strategies are applied in real-world learning contexts. A case study design was used because the research focused on a specific phenomenon: the application of social studies learning strategies using the Tactual Atlas at SLB-A Budi Nurani in Sukabumi City. According to Yin (2017), a case study is a research method used to deeply understand a phenomenon in a real-life context. Through this design, researchers can examine in detail the learning process taking place, the strategies implemented by teachers, and students' responses to the use of the Tactual Atlas during learning activities.

Research Subjects

The research subjects were selected using purposive sampling because they were directly involved in the phenomenon under study. According to Creswell (2014), purposive sampling allows researchers to select participants who are considered most capable of providing information relevant to the research objectives. The research participants consisted of one social studies teacher who also served as a fourth-grade homeroom teacher, two visually impaired fourth-grade students aged 10–12, and one school principal as a supporting informant.

ISSN: p-2540-8763 / e-2615-4374
Vol: 11 Number 2, June 2026
Page: 369-395

Teachers were selected as the primary informants because they play a direct role in designing and implementing learning strategies. Two visually impaired students were selected because they are directly involved in social studies learning using the Tactual Atlas and can provide information about their learning experiences. The principal served as a supporting informant, providing information regarding school policies and learning facilities for visually impaired students.

Research Implementation Procedures

The study was conducted at SLB-A Budi Nurani in Sukabumi City during the second semester of the 2025/2026 academic year. Data collection took place from April to May 2026. The research was carried out in three phases: the preparation phase, the implementation phase, and the research report writing phase.

During the preparatory phase, the researcher conducted preliminary observations, identified research problems, reviewed the literature, developed research instruments, and obtained research permits. The implementation phase included classroom observations, interviews, and documentation. Observations were conducted once during a Social Studies lesson and lasted approximately 30 minutes. Interviews were conducted using a semi-structured format with the teacher and two visually impaired students. Each interview lasted about 20–30 minutes and was recorded using a voice recorder to facilitate the data transcription process. In addition, the researcher also collected documentation in the form of photos of learning activities, learning tools, the Tactual Atlas, and field notes. The final stage consisted of data analysis, interpretation of research results, and the systematic preparation of a research report.

Materials and Instruments

In qualitative research, the researcher serves as the primary instrument (human instrument), directly conducting data collection, analysis, and interpretation (Sugiyono, 2023). To support the data collection process, several research instruments are used, including observation guidelines, semi-structured interview guidelines, and documentation.

The observation guide was used to observe teachers' instructional strategies, student activities, teacher-student interactions, and the use of the Tactual Atlas during instruction. The interview guide was used to gather information regarding lesson planning, the strategies used by teachers, the objectives of using the media, students' learning experiences, and students' responses to the instruction.

Documentation was used to collect supporting data in the form of photos of activities, teaching materials, and field notes. All instruments were designed based on the research focus and reviewed with the supervising instructor before being used in the field.

ISSN: p-2540-8763 / e-2615-4374
Vol: 11 Number 2, June 2026
Page: 369-395

Data Collection

Research data were collected through observation, interviews, and documentation. Observations were conducted directly in the classroom during social studies lessons. The researcher acted as a non-participant observer, observing the learning process without directly participating in the teaching and learning activities. The results of the observations were recorded in observation sheets and field notes.

The interviews were conducted using a semi-structured approach. Interviews with teachers focused on teaching strategies, the use of the Tactual Atlas, and the challenges encountered during the learning process. Interviews with students aimed to identify their learning experiences, their level of interest in the resource, and their understanding of the material studied. All interview recordings were transcribed to facilitate the data analysis process. The documentation serves as supporting data, including photos of learning activities, the Tactual Atlas, learning materials, and other documents relevant to the research focus.

Data Analysis Techniques

Data analysis was conducted using Miles and Huberman's interactive analysis model, which includes data reduction, data presentation, and drawing conclusions. After the data was collected, the interview results were transcribed verbatim and then combined with observational notes and documentation.

During the data reduction phase, the researcher coded the data relevant to the study's focus. Data sharing similar meanings were grouped into specific categories and then developed into research themes. The next step was to present the data in the form of a narrative description organized according to the study's focus: teachers' instructional strategies and students' responses to the use of the Tactual Atlas.

The final stage involves drawing conclusions and verification. Researchers identify patterns, relationships, and themes emerging from the data to arrive at conclusions that answer the research questions. The verification process is conducted continuously throughout the research to ensure that the conclusions drawn align with the data collected in the field.

Data Validity

Data validity is ensured through source triangulation, methodological triangulation, and member checking. Source triangulation is conducted by comparing information obtained from teachers, students, and the school principal. Methodological triangulation is conducted by comparing data from observations, interviews, and documentation.

ISSN: p-2540-8763 / e-2615-4374
Vol: 11 Number 2, June 2026
Page: 369-395

In addition, member checking was conducted by reconfirming the interview results and data interpretations with the teachers-the primary informants-to ensure consistency between the researcher's interpretations and the information provided by the participants. The credibility, reliability, and confirmability of the study were maintained through systematic documentation of the entire research process, from data collection to the drawing of conclusions.

Research Ethics

This study adhered to the ethical principles governing research involving human participants. Before the study began, the researcher obtained permission from the school and explained the study's objectives to all participants. Because the study involved visually impaired students who were minors, consent was also obtained from the school and the students' parents or guardians.

RESULT

Overview of Findings

The results of the study indicate that the social studies teaching strategies implemented by teachers at SLB-A Budi Nurani are adaptive and tailored to the needs of visually impaired students. Instruction is conducted using the Tactual Atlas as the primary teaching aid, supplemented by verbal explanations, audio materials played on a laptop, and concrete aids such as balls and strings to illustrate geographical concepts

Based on the observations, the teacher not only presented the material verbally but also guided the students in exploring the Tactual Atlas through tactile activities. Throughout the learning process, the teacher actively provided guidance, asked questions, and helped the students understand the information contained in the atlas. The interactions that took place indicated that the students were actively engaged in the learning activities.

Interviews with teachers revealed that the use of the Tactual Atlas helps explain geographical concepts that students previously found difficult to understand when presented solely through verbal instruction. Meanwhile, interviews with students showed that this medium helps them recognize the shapes of regions, geographical locations, and spatial relationships through direct tactile experience. Overall, the research findings indicate that the use of the Tactual Atlas provides a more concrete learning experience for visually impaired students and supports their engagement during social studies lessons.

Results by Research Objective

Objective: Teachers' Strategies in Social Studies Instruction Using Tactual Atlases.

ISSN: p-2540-8763 / e-2615-4374
Vol: 11 Number 2, June 2026
Page: 369-395

Based on the observations, the teacher implemented learning strategies centered on students' direct experiences through a multisensory approach. The lesson began with an apperception activity to connect students' prior knowledge with the material to be studied. Next, the teacher introduced the Tactual Atlas as the primary medium for social studies instruction.

Throughout the learning process, the teacher guides students to explore the atlas using their sense of touch. Each part of the map with a different texture is explained step by step so that students can recognize the shape of regions, regional boundaries, and the geographical location of an area. The teacher also provides repeated verbal explanations when students have difficulty understanding the information in the atlas. In addition to the Tactual Atlas, the teacher uses a laptop as an audio aid to provide additional information about the lesson material. Teachers also utilize aids such as a globe and a string to explain the shape of the Earth and the equator. This combination of various media is used to help students gain a more concrete understanding of geographical concepts.

The interview results indicate that teachers chose this strategy because most social studies material contains spatial concepts that are difficult to understand when explained verbally alone. Teachers explained that the use of tactile media helps students form a clearer mental image of the objects or regions being studied. Observation findings also indicate that teachers provide opportunities for students to ask questions, express opinions, and restate the information they have learned. Thus, the learning process is interactive and involves active student participation.

Figure 2. Field Observation
Source Data by by the Author 2026

Objective: Student Responses to Learning Strategies Using Tactual Atlases

The results of the observations showed that both students responded positively to the use of the Tactual Atlas in social studies lessons. Both students actively participated in the learning activities and showed interest when asked to explore the atlas through tactile activities. Based on the learning activity observation sheet used by the researcher, student engagement was assessed through three main aspects: introductory activities, core activities, and concluding activities. The

ISSN: p-2540-8763 / e-2615-4374
Vol: 11 Number 2, June 2026
Page: 369-395

percentage of activity was derived from a comparison between the scores obtained by the students and the maximum score achievable during the learning process.

Table 1. Observation Results of Student A's Activities

No	Observed Aspects	Score
1.	Introduction	4
2.	Main Activities	15
3.	Closing	8
	Total	96,4%

Based on the observations, Student A demonstrated a very high level of engagement throughout the lesson. The student was able to follow all stages of the lesson, actively answered the teacher's questions, and was able to restate the information obtained through exploration of the Tactual Atlas. During the activity, the student appeared enthusiastic when asked to identify the shapes of regions through tactile exploration. In addition, Student A was able to recognize several regional shapes found in the atlas and explain the location of the region being studied. The student was also able to connect the information obtained through touch with the verbal explanations provided by the teacher.

Table 2. Observation Results of Student B's Activities

No	Observed Aspects	Score
1.	Introduction	4
2.	Main Activities	12
3.	Closing	6
	Total	78,6%

The observations showed that Student B was also engaged in the learning process, although he required more guidance than Student A. During the lesson, the teacher provided repeated explanations and additional guidance several times to help the students understand the information in the atlas. Student B took longer to recognize the shapes of the regions through tactile activities. However, after receiving guidance and repeated opportunities to explore, he was able to follow the entire learning sequence through to completion.

In general, both students showed a high level of interest in using the Tactual Atlas. The students appeared more active when asked to touch and explore the atlas than when they were simply listening to the teacher's explanation. Findings from observations and interviews indicate that this medium helps students understand the shapes of regions, cardinal directions, geographic locations, and spatial relationships in a more concrete way. Interview results with the teacher also showed that the use of the Tactual Atlas made it easier to convey abstract social studies material. According to the teacher, students found it easier to understand the material when given the

ISSN: p-2540-8763 / e-2615-4374
Vol: 11 Number 2, June 2026
Page: 369-395

opportunity to touch the objects being studied compared to when they only received verbal explanations.

In addition to supporting factors such as the availability of a Tactual Atlas and teachers' ability to provide verbal guidance, this study also found differences in students' ability to comprehend information through touch. Some students took longer to recognize the shapes of regions and understand the information contained in the atlas. Nevertheless, these challenges can be overcome through teacher guidance, repetition of the material, and providing repeated opportunities for exploration.

Conceptual Summary of Findings

Based on the overall research findings, it can be concluded that the learning strategies implemented by teachers focus on leveraging students' hands-on experiences through the use of the Tactual Atlas, combined with verbal explanations and audio media. These strategies provide students with the opportunity to acquire information through more than one sensory channel during the learning process. The use of the Tactual Atlas helps students understand geographical concepts related to landforms, cardinal directions, geographical positions, and spatial relationships. Through guided tactile exploration activities led by the teacher, students can gain a more concrete learning experience compared to learning that relies solely on verbal explanations.

Berdasarkan temuan penelitian secara keseluruhan, dapat disimpulkan bahwa strategi pembelajaran yang diterapkan oleh guru berfokus pada pemanfaatan pengalaman langsung siswa melalui penggunaan Atlas Taktil, yang dipadukan dengan penjelasan lisan dan media audio. Strategi-strategi ini memberikan kesempatan kepada siswa untuk memperoleh informasi melalui lebih dari satu saluran indra selama proses pembelajaran. Penggunaan Atlas Taktil membantu siswa memahami konsep-konsep geografis yang berkaitan dengan bentang alam, arah mata angin, posisi geografis, dan hubungan spasial. Melalui kegiatan eksplorasi taktil yang dipandu oleh guru, siswa dapat memperoleh pengalaman belajar yang lebih konkret dibandingkan dengan pembelajaran yang hanya mengandalkan penjelasan verbal.

DISCUSSION

The research findings indicate that the teaching strategies employed by teachers in social studies instruction for visually impaired students at SLB-A Budi Nurani are adaptive, multisensory, and oriented toward hands-on experiences. Teachers do not rely solely on lectures as their primary teaching strategy but also combine the use of Tactual Atlases, audio media, concrete simulations, and descriptive verbal explanations to help students understand abstract geographical concepts. These findings indicate that teachers have made efforts to adapt the

ISSN: p-2540-8763 / e-2615-4374
Vol: 11 Number 2, June 2026
Page: 369-395

learning process to the characteristics of visually impaired students by providing more concrete and accessible learning experiences.

One of the key findings of this study is the role of the Tactual Atlas in helping students develop spatial understanding. In social studies education, concepts such as the shape of regions, cardinal directions, geographic locations, and spatial relationships are typically presented through visual media that are inaccessible to visually impaired students. Through the Tactual Atlas, this visual information is transformed into tactile representations that can be explored through the sense of touch. This process allows students to construct mental representations of objects and spaces that were previously difficult to imagine through verbal explanations alone.

These findings are consistent with the research by Bleau et al. (2025), which shows that tactile maps contribute to improved orientation, mobility, and spatial understanding in individuals

with visual impairments. These findings are also supported by Nemargut's (2025) study, which states that the use of tactile maps can improve spatial understanding and environmental recognition, as well as help visually impaired students conduct risk analysis more safely during orientation and mobility activities. In addition to helping build mental representations of the environment, tactile media also allow students to gain a more concrete learning experience through direct exploration of information that was previously only available in visual form. Hermanto dan Supena (2021) explain that tactile exploration experiences play a crucial role in helping individuals with visual impairments construct mental maps of the objects and spaces they are studying. Through systematic tactile activities, students can recognize patterns, shapes, and spatial relationships in a more structured manner. These findings reinforce the findings of this study, which demonstrate that the Tactile Atlas serves not only as a learning aid but also as a means to develop the spatial thinking skills of blind students.

The research findings also indicate that the effectiveness of using the Tactual Atlas is closely linked to the teacher's role as a learning mediator. Teachers actively provide guidance, verbal explanations, and support while students explore the atlas. This process demonstrates the integration of tactile experiences and auditory information, enabling students to gain a more comprehensive understanding of the learning material. This reflects the application of a multisensory approach that utilizes more than one sensory channel in the learning process. Khoirunnisa et al. (2024) explain that learning that integrates various sensory experiences can increase student engagement in building conceptual understanding. According to them, information received through multiple sensory pathways tends to be easier to process and remember because students gain richer and more meaningful learning experiences.

Chit et al. (2024) explain that multisensory learning enables visually impaired students to gain a richer learning experience through a combination of touch, sound, and hands-on

ISSN: p-2540-8763 / e-2615-4374
Vol: 11 Number 2, June 2026
Page: 369-395

experiences, thereby making the concept formation process more effective. The results of this study also reinforce the findings of Ummah and Rahman (2024), who explain that the multisensory approach is a learning strategy that simultaneously engages various senses-such as auditory, kinesthetic, and tactile-thereby enhancing engagement, understanding, and learning outcomes for students with special needs.

In this study, the use of a Tactual Atlas combined with the teacher's verbal explanations demonstrated the application of multisensory principles, enabling students to acquire information through more than one sensory channel. Another interesting finding was the students' ability to understand geographic concepts after exploring the Tactual Atlas. Results from observations and interviews indicate that students were able to identify regional shapes, determine cardinal directions, and explain the geographical location of an area after engaging in touch-based learning experiences. These abilities demonstrate that the learning process not only involves physical activities such as touching but also helps students build conceptual understanding of the material being studied.

These findings support the research by Yektyastuti (2026), which states that students with visual impairments require learning materials that allow for direct interaction with learning objects in order to understand abstract concepts. The findings of this study are also consistent with Nashiruddin et al. (2021), who state that learning media designed based on the tactile modality of visually impaired students has been proven effective in enhancing conceptual understanding because it allows students to obtain information through direct tactile experience. Students' ability to recognize the shapes of regions, compass directions, and geographical positions after exploring the Tactual Atlas indicates that tactile experiences play a significant role in the formation of abstract geographical concepts. Hayati et al (2024) explain that direct exploration-based learning media can help students connect concrete experiences with the abstract concepts they are learning. In the context of this research, Tactile Atlas exploration provides students with the opportunity to build geographical understanding based on their direct, tactile experiences.

The difference in responses between Student A and Student B is a finding that warrants special attention. The research results indicate that Student A exhibits a higher level of engagement compared to Student B. This difference does not merely reflect variations in learning success but rather highlights the diversity of learning characteristics among visually impaired students. Student A is able to explore the atlas more independently and quickly comprehend information obtained through touch, whereas Student B requires more time and more intensive guidance from the teacher. The positive responses demonstrated by both students during the learning process also support the findings of Ndia and Asmara (2025), which explain that tactile

ISSN: p-2540-8763 / e-2615-4374
Vol: 11 Number 2, June 2026
Page: 369-395

media effectively enhance sensory sensitivity, independence, social interaction, and the active participation of visually impaired children in learning activities. The high level of student activity indicates that the use of media aligned with students' sensory characteristics can enhance their engagement in the learning process. Shidqi dan Budi (2023) stated that active student involvement during learning is a crucial indicator of successful learning, particularly for students with special needs. High student participation indicates that they are not merely passive recipients of information but are also actively engaged in the process of building understanding of the material being studied.

These differences indicate that the effectiveness of instructional media is influenced not only by the quality of the media used but also by the individual characteristics of the students. In the context of this study, students with low vision demonstrated different learning needs compared to students who are totally blind. Students with low vision tend to divide their attention between using their residual vision and exploring through touch, whereas students who are totally blind rely more on information obtained through touch and hearing. These findings suggest that learning strategies for students with visual impairments cannot be applied uniformly but must be tailored to each student's visual characteristics and abilities. Therefore, a teacher's flexibility in providing guidance is a critical factor determining the success of learning. These findings demonstrate the importance of implementing student-centered learning principles. According to Khoirunnisa et al. (2024), students with special needs have diverse learning characteristics, so learning strategies need to be designed flexibly to accommodate each student's individual needs.

In addition to enhancing student engagement, the use of Tactual Atlases also contributes to the development of students' spatial skills. Trinh et al. (2023) explain that tactile maps help users construct more accurate cognitive maps, thereby facilitating an understanding of spatial relationships and environmental orientation. In this study, students were able to understand the relationship between regional positions and compass directions through guided exploration of the Tactual Atlas by the teacher. These findings are also consistent with the research by Isnan and Benardi (2024), which showed that tactile maps are effective in improving spatial understanding, mobility orientation, and preparedness among visually impaired students through systematic familiarization with routes and the environment. In this study, students were able to understand the relationship between regional positions and compass directions through exploration of the Tactual Atlas, indicating that tactile media play a crucial role in developing students' spatial abilities. The ability to understand spatial relationships that emerged in this study indicates that tactile-based learning experiences can help students build cognitive structures regarding the location and position of an object. This understanding is important in social studies learning

ISSN: p-2540-8763 / e-2615-4374
Vol: 11 Number 2, June 2026
Page: 369-395

because many geographic concepts require the ability to understand spatial relationships and regional orientation (Ismaya & Sutono, 2025).

The results of this study also indicate that the success of using the Tactual Atlas is heavily influenced by the teaching strategies employed by teachers. Learning media will not provide optimal benefits if not integrated with an appropriate approach. In this study, teachers not only provided the media but also offered guidance, probing questions, concept reinforcement, and feedback throughout the learning process. The combination of tactile media and adaptive teaching strategies enables students to have a more meaningful learning experience. Furthermore, Muzakki and Wahyuno explain that raised-relief maps provide a more concrete representation of a region's conditions, thereby helping visually impaired students understand spatial concepts and the overall appearance of the environment. This reinforces the study's findings that the Tactual Atlas functions not only as a learning medium but also as a tool that helps students build a more tangible understanding of geography through direct tactile experience.

These findings demonstrate that effective learning media serves not only as a means of conveying information but also as a tool that helps students construct understanding independently. In this study, the Tactual Atlas enabled students to gain more concrete learning experiences, making the geographic concepts they learned easier to understand and remember (Orti et al., 2024). These findings are also supported by the research of Kankhar and Mahender (2025), which confirms that tactile-based education systems have great potential for improving learning accessibility for individuals with visual impairments. However, the success of their implementation is heavily influenced by educators' ability to facilitate the use of such media during the learning process.

These research findings are also supported by Sofiana et al (2025), who state that audio-tactile media can improve conceptual understanding, learning motivation, and active participation among visually impaired students because it utilizes two sensory modalities simultaneously: hearing and touch. This was evident in the observed lessons, where the teacher did not rely solely on the Tactual Atlas but also provided verbal explanations to help students understand the information obtained through touch. The combination of audio and tactile media in learning demonstrates that presenting information through various sensory modalities can complement each other. Information gained through touch helps students recognize the shape and position of objects, while verbal explanations help clarify the meaning of the information being explored, thus fostering a more comprehensive understanding (Hobson & Komeili, 2014).

From the perspective of inclusive education, the use of the Tactual Atlas demonstrates that the learning barriers faced by visually impaired students can be minimized through the provision of appropriate materials and effective learning strategies. Learning is no longer centered on

ISSN: p-2540-8763 / e-2615-4374
Vol: 11 Number 2, June 2026
Page: 369-395

students' limitations but focuses on providing access that enables them to have equal learning opportunities. These findings suggest that adapting learning through tactile media and multisensory approaches can be one solution to improve the accessibility of social studies learning for visually impaired students. Marriott et al (2025) emphasizes that inclusive education requires the provision of a learning environment that eliminates barriers to participation and learning for all students. In the context of this research, the use of the Tactual Atlas demonstrates how adapting learning media can help create more equitable learning opportunities for students with visual impairments.

The novelty of this study lies in its analysis of how teachers actually integrate the Tactual Atlas into their social studies teaching strategies in the classroom. Unlike previous studies, which have largely focused on developing teaching materials or testing their general effectiveness, this study demonstrates that the successful use of the Tactual Atlas depends heavily on the teacher's mediation process, the verbal interactions provided during instruction, and the adaptation of strategies based on each student's individual characteristics. These findings contribute to the development of social studies teaching practices that are more adaptive, contextual, and tailored to the needs of visually impaired students. However, the results of this study also indicate that the effectiveness of using a tactile atlas is influenced by students' visual characteristics, prior learning experiences, and the intensity of teacher support during the learning process. Therefore, the implementation of tactile media in social studies learning needs to consider students' individual needs to ensure optimal and sustainable benefits (Wijayanto et al., 2024).

Overall, the research findings indicate that the use of a Tactual Atlas combined with multisensory learning strategies can support the understanding of geographical concepts among visually impaired students. This success is influenced not only by the availability of tactile media but also by the teacher's ability to facilitate exploration, provide appropriate guidance, and adapt instruction to the individual characteristics of the students. Thus, accessible and meaningful social studies learning for visually impaired students requires a combination of appropriate media, adaptive learning strategies, and an active teacher role as a learning facilitator.

CONCLUSION

This study examined teacher strategies in implementing Tactual Atlas-based Social Studies instruction and explored visually impaired students' responses to this learning process at SLB-A Budi Nurani. The findings show that the teacher applied adaptive, multisensory, and experiential learning strategies by integrating the Tactual Atlas with verbal explanations, audio support, concrete simulations, and guided tactile exploration. These strategies enabled students to access geographical concepts that are commonly presented visually, including landforms, cardinal

ISSN: p-2540-8763 / e-2615-4374
Vol: 11 Number 2, June 2026
Page: 369-395

directions, geographical locations, regional boundaries, and spatial relationships. The study also found that students responded positively to the use of the Tactual Atlas, although their levels of engagement, comprehension, and need for instructional support varied according to individual learning characteristics.

The key finding of this study is that the effectiveness of the Tactual Atlas depends not only on the availability of tactile media but also on the teacher's pedagogical ability to mediate, scaffold, and adapt learning activities. This implies that accessible Social Studies instruction for visually impaired students requires the integration of appropriate media, teacher guidance, and multisensory learning principles. Practically, the Tactual Atlas can serve as an alternative instructional medium for improving learning accessibility, participation, and conceptual understanding in special education settings.

This study contributes to the existing body of knowledge by providing empirical insight into how teachers integrate tactile atlas media within actual classroom practice, particularly in Social Studies learning for visually impaired students. Unlike studies that focus primarily on media development or general effectiveness, this research highlights the instructional role of teacher mediation in transforming visual geographical content into accessible tactile learning experiences. Future research should involve more participants, different school contexts, and various educational levels to strengthen the transferability of the findings. Further studies are also recommended to examine the integration of audio-tactile media, digital tactile maps, and other assistive technologies to expand accessible learning alternatives for visually impaired students.

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Vol: 11 Number 2, June 2026
Page: 369-395

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