Exploring Learners' Experiences with Tactile and Interactive Materials in Mandarin Language Learning for Visually Impaired Students

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ABSTRACT

Visually impaired students continue to encounter persistent barriers in foreign language learning because instructional practices often rely heavily on visual input, which limits their motivation and equitable participation in the learning process. This study addressed this gap by exploring whether multisensory Mandarin lessons could enhance engagement and motivation among visually impaired learners. A qualitative descriptive design was applied with 24 students at SLB A YAPTI Makassar. Data were collected through participant observation, semi-structured interviews, and a motivation questionnaire, then analysed thematically using Braun and Clarke's framework with triangulation to ensure credibility. The findings revealed three major outcomes: students expressed heightened interest and enjoyment, describing the lessons as novel and stimulating; they reported an increased sense of competence and confidence, though many requested slower pacing and more practice to master tonal distinctions; and they showed greater participation and peer interaction, fostering a more inclusive classroom environment. These results highlight the potential of multisensory approaches to reduce barriers in foreign language education, emphasising the need for teachers and

policymakers to design adaptive strategies that support both accessibility and sustained motivation for visually impaired learners.
Keywords: Visually Impaired Students; Mandarin Language Learning; Tactile Materials; Inclusive Education

INTRODUCTION

Motivation remains a central determinant of success in foreign language learning, influencing learners' engagement, persistence, and achievement outcomes. Studies consistently demonstrate that motivated students are more likely to participate actively, overcome learning difficulties, and sustain effort over time (Alamer & Lee, 2019; Derakhshan & Fathi, 2023). In contrast, low levels of motivation often result in reduced participation, limited exposure to the target language, and weaker performance. Motivation is therefore not only an affective factor but also a key predictor of long-term language learning success.

For students with visual impairments, however, language learning opportunities are often restricted by systemic barriers in instructional design. Foreign language instruction continues to depend heavily on visually oriented methods, including printed texts, written recognition of symbols, and teacher-centred demonstrations. These practices pose significant challenges for visually impaired learners, limiting their comprehension, eroding their confidence, and diminishing their motivation to participate fully (Agustin et al., 2022; Soviyah, 2023). Such barriers not only restrict learning outcomes but also hinder equitable access to the benefits of multilingual education.

Mandarin Chinese has become increasingly important as a global language due to its rising use in international communication, trade, and cultural diplomacy. In Indonesia and many other countries, Mandarin proficiency is considered a strategic skill that enhances both educational and professional opportunities (Crystal, 2020; Fang, 2018). Despite this growing global relevance, visually impaired students remain largely excluded from Mandarin instruction. While inclusive education research has highlighted literacy development and English as a foreign language, little attention has been paid to accessible approaches for teaching Mandarin to blind and low-vision learners (Elpasari & Kheryadi, 2025; Subtiara, 2025). This gap highlights the urgent need to develop and evaluate instructional strategies that make the Mandarin language accessible and engaging for students with visual impairments.

Addressing this challenge is not only a pedagogical concern but also part of the global agenda for equity and inclusion in education. Sustainable Development Goal 4 (SDG 4) emphasises inclusive and equitable quality education for all learners, regardless of disability or background. Ensuring that visually impaired students have equal access to foreign language learning, including Mandarin, contributes to the realisation of this goal by promoting participation, reducing systemic inequalities, and preparing learners for global citizenship (UNESCO, 2017;

Srimalee et al., 2025). Inclusive approaches in language teaching are therefore critical to both local educational policy and international commitments to social justice.

One promising response to these challenges is the use of multisensory and tactile-based instructional strategies. Multisensory learning engages multiple sensory channels, including hearing, touch, and movement, to support comprehension and retention, thereby reducing reliance on visual input (Mayer, 2021; Teng, 2022). In language classrooms, this may involve integrating braille-based resources, auditory models, tactile representations of tones, and interactive activities such as role-plays or collaborative games. These strategies enable visually impaired students to engage with language content in meaningful ways, while also enhancing their enjoyment and motivation.

Research has shown that multisensory approaches can significantly enhance learner engagement and outcomes across disciplines. For instance, Laili (2023) and Guo (2023) reported that combining digital and tactile media increased participation and improved pronunciation in second-language learning. Similarly, Ibrahim and Shiring (2022) found that integrating multimodal resources into language instruction boosted motivation among Malaysian students. In inclusive classrooms, multisensory activities also promote interaction among peers, fostering a sense of belonging and reducing isolation (Halwatun, 2023). Despite these encouraging findings, few studies have applied multisensory strategies to Mandarin instruction for visually impaired learners, particularly in the context of foreign language motivation.

Another significant contribution of this study is its focus on motivation rather than achievement alone. While many studies measure learning success primarily through proficiency tests or vocabulary scores, affective variables such as confidence, enjoyment, and persistence are equally critical for sustainable learning (Shin & Kim, 2023; Kaphle, 2024). For students with visual impairments, previous experiences of exclusion or frustration in visually dependent classrooms may lower their willingness to engage. By focusing on the motivational dimension, this study emphasises the importance of creating learning environments that not only transmit knowledge but also inspire learners to continue their language journey.

Against this background, the present study explores how multisensory Mandarin instruction influences the motivation and classroom experiences of visually impaired students. Specifically, it examines learners' perceptions of engagement, enjoyment, and confidence when Mandarin is introduced through accessible and interactive strategies. By emphasising learners' experiences, the research highlights how inclusive practices can reduce barriers and foster positive attitudes toward foreign language learning.

The significance of this research lies in three contributions. First, it addresses a critical research gap by focusing on Mandarin instruction for visually impaired

learners, an area that is rarely explored in the current literature. Second, it provides evidence-based insights into how multisensory strategies can enhance motivation, offering practical recommendations for teachers and curriculum designers. Third, it contributes to broader educational policy by aligning with SDG 4 and demonstrating how inclusive practices can promote equitable participation in foreign language learning. Ultimately, the study highlights that accessible language classrooms can foster both competence and confidence, enabling visually impaired learners to participate in the benefits of multilingual education.

LITERATURE REVIEW

Inclusive education for students with visual impairments has become a growing focus of educational research, particularly in efforts to achieve equal access to quality learning opportunities. (Wu et al., 2024) Noted that the lack of accessible and high-quality resources continues to be a barrier to participation for visually impaired learners, often resulting in unequal academic outcomes and feelings of marginalisation. Their development of the Vision-Braille model demonstrated a significant improvement in the accuracy of braille-to-Chinese translation, allowing learners to access and produce written materials independently. This advancement is critical for language learning, where literacy and written output are central components of curriculum design. Similarly, Chen et al. (2023) examined braille reading accuracy among 121 students with visual impairments. They reported that congenital blindness was associated with lower reading accuracy and a higher frequency of repetition errors. These findings suggest that educators should consider learners' reading patterns and provide differentiated instructional support to enhance comprehension and fluency.

Previous research has also emphasised the importance of designing multimodal and inclusive pedagogies that engage multiple senses. (Belova, 2017) argued that language classrooms often rely excessively on visual cues, which creates barriers for students with visual impairments. Her work advocates for integrating braille-based materials, tactile aids, and auditory input to ensure that learners receive comprehensible input through alternative modalities. (Chaudhari, 2025) extended this perspective by showing that tactile and 3D resources promote deeper conceptual understanding by enabling learners to explore linguistic elements kinesthetically. Such approaches are particularly relevant in the context of Mandarin Chinese, where tonal distinctions and character recognition are visually demanding for sighted learners and must therefore be adapted for non-visual access.

The potential of technology-based interventions for language education has also been documented in recent studies. (Young & Wang, 2023) created a cloud-based literacy platform that improved the independent learning skills of visually impaired students learning Chinese. Participants reported higher satisfaction and confidence, suggesting that technology can reduce dependency on instructors and foster learner autonomy. These results align with those of Niez et al. (2025), who demonstrated

that active learning models, such as ICARE (Introduction, Connect, Apply, Reflect, Extend) and project-based learning, significantly improve engagement and communicative competence. The combination of accessible resources and active learning frameworks can therefore create a more inclusive and empowering learning environment for language learning.

In the context of Mandarin learning, learners' motivation is strongly shaped by their ideal L2 self, which serves as a central anchor that inspires positive attitudes and sustained learning effort(Wen, 2024). Dörnyei's L2 Motivational Self System further emphasises the role of learners' vision of their "ideal L2 self" and the perceived support from their learning context (Dörnyei, 2009) For visually impaired students, the accessibility of instructional materials shapes these motivational components, the inclusivity of classroom practices, and the emotional support offered by teachers and peers (Uyu Mua'wwanah, 2015). (Belova, 2017) This argues that reducing anxiety through adaptive teaching strategies and fostering positive affective experiences can strengthen students' willingness to communicate and sustain their long-term engagement.

Theories of multisensory learning offer a crucial framework for designing effective language learning interventions for students with visual impairments. (Zhan & Cheng, 2025)demonstrated that engaging multiple sensory modalities enhances memory consolidation and deepens cognitive processing. In Mandarin language instruction, this translates into strategies such as tactile tone-marking, audio-supported character drills, and interactive speaking tasks, all of which create embodied learning experiences that can strengthen comprehension and retention. These findings collectively underscore the need for more research that investigates how tactile and interactive methods influence both cognitive outcomes and affective factors such as motivation. Despite the growing literature on inclusive education, a notable gap remains in empirical research specifically focused on introducing Mandarin Chinese to visually impaired learners as a means of enhancing their motivation for foreign language learning. Addressing this gap is critical not only for advancing theory but also for informing practice in inclusive foreign language education.

METHOD

Design and Sample

This study employed a qualitative approach with a descriptive exploratory design to gain an in-depth understanding of the learning experiences and motivation of visually impaired students during introductory Mandarin lessons. The aim was to capture learners' subjective perceptions of the lessons, the inclusivity of classroom practices, and their motivational responses to foreign language learning. The participants were 24 visually impaired students (12 males and 12 females) enrolled at SLB A YAPTI Makassar. Purposive sampling was employed using three criteria: (1) total or severe visual impairment, (2) regular attendance in the school's foreign

language enrichment program, and (3) willingness to participate as indicated by informed consent from students and school administrators.

Instruments and Procedures

Three instruments were utilised to collect data:
1. Observation Checklist. It consists of 10 items that measure student engagement, classroom participation, and affective responses (e.g., attention, enjoyment, persistence).
2. Semi-Structured Interview Guide. It comprises eight open-ended questions that explore students' perceptions of the Mandarin lessons, the challenges they encountered, and suggestions for improving the instructional approach.
3. Learning Motivation Questionnaire. A 20-item scale using a 5-point Likert format (1 = strongly disagree to 5 = strongly agree), covering four domains: interest in learning, self-confidence, perceived relevance of Mandarin, and willingness to pursue further foreign language study.

The Mandarin lessons were designed to introduce students to basic tones, vocabulary, and simple sentence structures. Instruction was delivered through multisensory strategies, including Braille vocabulary cards, textured tone markers, and oral practice activities. Participant observations were conducted during each session to document engagement, peer interaction, and affective responses. At the end of the instructional sequence, the motivation questionnaire was administered, followed by individual semi-structured interviews with all participants and the classroom teacher. All interviews were audio-recorded with consent and later transcribed verbatim. Field notes complemented the transcripts, providing additional detail about classroom dynamics.

Data Analysis

Data were analysed using Braun and Clarke's (2021) six-phase thematic analysis procedure: (1) familiarisation with the data, (2) generating initial codes, (3) identifying potential themes, (4) reviewing themes, (5) defining and naming themes, and (6) producing the final report. Triangulation was conducted by comparing and integrating findings from the three instruments — observations, interviews, and questionnaires — to ensure credibility and trustworthiness. This process allowed the researcher to validate emerging themes and provide a holistic account of students' experiences and motivational responses.

RESULT AND DISCUSSION

Table 1. Thematic Analysis of Students' Experiences in Multisensory Mandarin Lessons

Theme	Description	Quote (from Students)	Observation Evidence

Increased Interest and Enjoyment	Students found Mandarin lessons engaging and novel, reporting high levels of enjoyment when using tactile materials.	"It is fun because I can touch the cards and feel the tones." "This class feels different; I want to do it again."	Students smiled frequently, leaned forward during activities, and requested to repeat tone practices. Active listening and verbal responses increased across sessions.
Sense of Competence and Confidence	Learners experienced a sense of pride and achievement after successfully pronouncing the words, although some required additional time for mastery.	"I am happy I said it right!" "Please repeat slower; I want to get it correct."	Students clapped for peers who pronounced correctly, showed excitement when receiving feedback, and asked for additional practice opportunities.
Participation and Social Interaction	Classroom dynamics shifted from passive to active, with greater collaboration and peer support.	"Can we try saying this together?" "I can help my friend read the card."	Students initiated questions, collaborated in small groups, and assisted peers in locating Braille cards, creating a more inclusive and lively atmosphere.

Note: Quotes are translated from the original interview language and slightly edited for clarity.

Increased Interest and Enjoyment

The thematic analysis revealed a dominant theme of increased interest and enjoyment in the Mandarin lessons. More than 80% of participants used words such as "fun," "interesting," and "different" to describe their experience. Students reported that the lessons felt engaging due to the integration of tactile learning media, which allowed them to interact with the language input physically. This multisensory experience appeared to transform what is typically a visually demanding subject into an accessible and stimulating activity. Observation data corroborated these reports, as students consistently displayed positive affective behaviours, including smiling, leaning forward during activities, and voluntarily answering questions. Several students expressed excitement verbally, often requesting to repeat specific tone practice activities. This behavioural evidence

indicates that the tactile and interactive approach successfully elicited intrinsic motivation, consistent with Deci and Ryan's Self-Determination Theory (Dunn & Zimmer, 2020), which posits that autonomy and novelty in learning tasks enhance intrinsic engagement.

Moreover, the repeated use of Braille vocabulary cards encouraged exploratory behaviour, as students were often asked to touch and read them again after the teacher's instructions. This finding suggests that tactile resources not only facilitated comprehension but also served as motivators, making the learning process more playful and curiosity-driven.

Figure 1. Visually impaired students engaged in reading Mandarin tones through tactile-based learning activities

Sense of Competence and Confidence

A second key theme identified was the emergence of a growing sense of competence among participants. Several students reported feeling "proud" or "accomplished" after correctly pronouncing tones or completing oral practice. This was frequently accompanied by positive verbal affirmations such as "I can do it" or "I got it right." Such expressions indicate that students experienced moments of mastery, which are crucial in building self-efficacy.

However, not all participants reported the same level of confidence. Approximately one-third of the students reported that distinguishing between the four Mandarin tones remained challenging and that they required more practice time. This finding highlights the cognitive load associated with auditory discrimination tasks for visually impaired learners and points to the importance of providing scaffolding through slower pacing, repetition, and individualised support.

These results align with Vygotsky's concept of the Zone of Proximal Development (ZPD) (Dunn & Zimmer, 2020), which suggests that learners require guided support to progress from initial difficulty to independent mastery. Providing additional time and structured feedback helps students transition from hesitation to confidence, fostering a sustained willingness to communicate in Mandarin.

Participation and Social Interaction

The third major finding was a marked increase in classroom participation and peer interaction. Observational field notes recorded frequent student-initiated questions, spontaneous group discussions, and collaborative problem-solving during pronunciation practice. Students also demonstrated a willingness to assist peers, such as helping them locate Braille cards or repeating tones together until the correct pronunciation was achieved.

Teachers reported that the classroom atmosphere became more lively and inclusive compared to previous lessons. Instead of being passive recipients of teacher input, students actively co-construct knowledge, aligning with social constructivist theories of learning. This shift toward collaborative engagement suggests that the tactile and interactive nature of the lessons created a psychologically safe environment where students felt encouraged to take risks, make mistakes, and learn from one another.

This participation has heightened implications for inclusive education, as it demonstrates that accessible teaching methods can reduce barriers to social interaction and foster a sense of belonging in the classroom. Such a climate is crucial for promoting not only language acquisition but also socio-emotional development, which is a key goal of holistic education. The third major finding was a marked increase in classroom participation and peer interaction. Observational field notes recorded frequent student-initiated questions, spontaneous group discussions, and collaborative problem-solving during pronunciation practice. Students also demonstrated a willingness to assist peers, such as helping them locate Braille cards or repeating tones together until the correct pronunciation was achieved.

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This participation has heightened implications for inclusive education, as it demonstrates that accessible teaching methods can reduce barriers to social interaction and foster a sense of belonging in the classroom. Such a climate is crucial for promoting not only language acquisition but also socio-emotional development, which is a key goal of holistic education. The findings suggest that introducing Mandarin through a multisensory approach effectively enhances engagement and motivation among visually impaired students. These results align with Belova (2017), who argued that providing non-visual learning resources promotes inclusivity and fosters classroom participation.

Students' active involvement with tactile materials supports Chaudhari's (2025) claim that tactile and three-dimensional instructional resources facilitate deeper comprehension and encourage kinesthetic learning. However, the relatively lower confidence scores reflect the cognitive load commonly experienced by Braille readers, as noted by Chen et al. (2023). This implies that gradual instruction, extended practice, and repeated exposure are crucial in helping students develop stronger self-efficacy over time. These findings underscore the importance of designing inclusive curricula that integrate tactile resources, teacher scaffolding, and interactive activities to support language learning outcomes for students with special needs. This study provides empirical evidence that Mandarin, often perceived as visually demanding due to its logographic writing system and tonal nature, can be made accessible and motivating for visually impaired learners through carefully structured multisensory strategies.

CONCLUSION

This study examined the experiences and motivations of visually impaired students participating in introductory Mandarin lessons that incorporated tactile and interactive learning strategies. The findings provide compelling evidence that such multisensory approaches can successfully stimulate interest, enhance engagement, and create a more inclusive learning environment for students with visual impairments. First, students reported high levels of enjoyment and curiosity, demonstrating that Mandarin, which is often perceived as a visually challenging language, can be made accessible and appealing when presented through Braille vocabulary cards, textured tone markers, and interactive speaking activities. Second, the lessons fostered a growing sense of competence and confidence. However, the results also highlight the need for slower pacing and increased opportunities for practice to fully support learners in mastering tonal distinctions. Finally, classroom participation and peer interaction improved significantly, suggesting that inclusive teaching strategies not only support linguistic outcomes but also strengthen social bonds and classroom cohesion. This study confirms that carefully designed, multisensory instructional methods can reduce learning barriers and serve as an effective entry point to foreign language education for visually impaired learners. Pedagogically, the findings underscore the importance of integrating tactile, auditory, and interactive resources into language curricula and providing teachers with training on inclusive teaching strategies. Future research should examine the longitudinal effects of tactile-based Mandarin learning on language proficiency, explore its scalability across diverse educational settings, and investigate its impact on additional variables such as self-efficacy, learner autonomy, and intercultural awareness. Such work will contribute to building a more comprehensive evidence base for inclusive foreign language education and advancing the goals of equitable access to multilingual learning opportunities.

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