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Designing and illustrating multi-sensory reading materials to support learners with special needs

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ABSTRACT

This study focused on the design and illustration of multi-sensory reading materials intended to support learners with special needs in the early grades. Grounded in the principles of inclusive education and multisensory learning, the study aimed to address diverse learning styles and sensory preferences by integrating visual, auditory, tactile, and kinesthetic elements into reading instruction. Specifically, it sought to develop instructional materials that enhance learners' phonemic awareness, decoding skills, and early reading comprehension. The study employed a design and development research approach. Data were gathered from elementary teachers handling learners with special needs through surveys and expert evaluations to identify instructional needs, validate the content, and assess the acceptability of the developed materials. The multisensory reading materials were designed in alignment with the Department of Education's (DepEd) K–12 curriculum standards and the Most Essential Learning Competencies (MELCs) for beginning reading. Results revealed that the developed materials were highly acceptable in terms of content relevance, instructional design, visual appeal, and usability. Teachers perceived the materials as effective tools for engaging learners with special needs, promoting active participation, and supporting foundational reading skills. The findings demonstrate the potential for multi-sensory reading materials to enhance inclusive classroom practices and address learning barriers among struggling and special-needs readers. The study concludes that carefully designed and illustrated multi-sensory reading materials can serve as valuable instructional resources in inclusive education settings. It is recommended that teachers integrate these materials into early literacy instruction and that further studies explore their effectiveness through classroom implementation and learner performance assessments.

Keywords: Multi-sensory reading materials, inclusive education, early literacy development

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INTRODUCTION

Inclusive education advocates for the provision of equitable learning opportunities by recognizing and responding to the diverse needs of all learners, particularly those with special educational needs. Within this framework, literacy—especially reading—serves as a critical foundation for academic success, personal development, and active participation in society. However, many learners with special needs continue to experience difficulties in acquiring reading skills due to instructional materials and approaches that do not adequately address their varied cognitive, sensory, and learning profiles. These challenges underscore the necessity of developing adaptive and accessible learning resources that promote engagement and comprehension. In this context, the study entitled "Designing and Illustrating Multi-Sensory Reading Materials to Support Learners with Special Needs" seeks to contribute to inclusive education by creating sensory-rich, illustrated reading materials that integrate visual, auditory, and kinesthetic elements to support differentiated instruction and enhance literacy outcomes for learners with special needs. Globally, the growing commitment to inclusive education has led to the increased use of multisensory approaches in literacy instruction. Research consistently demonstrates that integrating visual, auditory, kinesthetic, and tactile

Elements enhance reading comprehension, phonological awareness, and vocabulary development among learners with dyslexia, autism spectrum disorder, and intellectual disabilities. Birsh and Carreker (2018) emphasize that multi-sensory instruction strengthens the integration of multiple learning pathways, leading to more effective information processing. Similarly, Al-Ahmad, Al-Khalifa, and Salim (2022) report that sensory-enriched reading programs have a significant impact on improving reading fluency and vocabulary retention. These international findings underscore the effectiveness of multi-sensory materials in promoting inclusive literacy development.

In the Philippine context, the Department of Education (DepEd) actively promotes inclusive education through initiatives such as the Every Child a Reader Program (ECARP) and the National Reading Program, both of which aim to ensure that all learners attain grade-level reading proficiency (DepEd, 2019). Despite these efforts, many learners with special needs continue to face literacy challenges due to the limited availability of accessible and differentiated instructional materials. To address learning gaps exacerbated by the pandemic, the Learning Recovery and Continuity Plan (DepEd, 2022) highlights the importance of adaptive teaching strategies and innovative learning resources. In line with these national goals, multi-sensory reading materials provide interactive, interesting, and easy-to-understand content that meets the needs of all types of learners with special needs.

At the local level, schools such as Tuburan Central Elementary School in Cebu Province, along with other inclusive public schools, continue to face challenges in meeting the literacy needs of learners with special educational requirements. Teachers often depend on traditional, text-heavy instructional materials that ineffectively engage students with sensory, attentional, or processing difficulties. The use of multi-sensory reading materials that incorporate textures, colors, visuals, and auditory elements offers a practical, localized solution to these challenges by supporting inclusive teaching practices and enhancing literacy outcomes for learners with special needs.

Despite the Department of Education's sustained efforts to promote inclusive literacy, a significant gap remains in the availability of locally developed multi-sensory reading materials specifically designed for learners with special needs. Most instructional resources used in inclusive and SPED classrooms continue to be conventional and text-based, offering limited opportunities

for learners to engage through multiple sensory modalities. Although multisensory approaches are effective in supporting early literacy, these strategies have not been fully integrated into the design and illustration of reading materials appropriate for Filipino learners with special educational needs. As a result, there is limited empirical evidence and few practical frameworks that demonstrate how sensory-rich, illustrated reading materials can be effectively implemented in inclusive classrooms to improve literacy engagement and comprehension among learners with disabilities. To address this gap, the present study seeks to design and develop locally relevant multi-sensory reading materials that integrate visual, auditory, tactile, and kinesthetic elements tailored to the needs of learners with special needs.

Grounded in the Philippine educational context, the study directly supports DepEd's inclusive education goals by providing teachers with an evidence-based, culturally appropriate, and accessible instructional resource. The findings are expected to inform DepEd's ongoing literacy and inclusion initiatives by offering empirical insights into the impact of multi-sensory materials on reading engagement, comprehension, and overall learning experiences of learners with disabilities. Additionally, the study contributes to teacher capacity-building by presenting a practical model for the effective use of differentiated, sensory-rich reading materials in inclusive classrooms.

In conclusion, this research aims to design and illustrate multi-sensory reading materials that enhance the literacy experiences of learners with special needs. By aligning with global educational trends, national policies, and local classroom realities, the study seeks to foster a more inclusive, engaging, and equitable reading environment. Ultimately, it envisions a learning community in which every child—regardless of ability—can develop confidence, comprehension, and enjoyment in reading.

Statement of the problem

The primary goal of this study was to design and illustrate multi-sensory reading materials to support learners with special needs in enhancing their word recognition, reading comprehension, and motivation to read. It also aimed to evaluate the effectiveness of the developed materials and to gather feedback from both Special Education and General Education teachers regarding their usability and appropriateness. In line with the Department of Education commitment to inclusive and equitable education, the study sought to address the challenges faced by learners with special needs in developing literacy skills due to the limited availability of accessible, engaging, and differentiated instructional resources. By integrating visual, auditory, and tactile elements into the learning process, the study endeavored to provide evidence-based support for the use of multi-sensory reading materials in inclusive literacy instruction. Specifically, this study sought to answer the following research questions:

1. What is the demographic profile of the teacher respondents in terms of highest educational attainment, position, number of years in teaching, number of learners with disabilities handled, and inclusive education training attended?
2. What principles, design considerations, and illustrative features were incorporated in the development of multi-sensory reading materials suitable for learners with special needs in alignment with the Department of Education inclusive education initiatives?

3. To what extent are the developed multi-sensory reading materials effective in improving learners word recognition, reading comprehension, and engagement or motivation to read as measured by pretest and posttest results?
4. To what extent do Special Education and General Education teachers perceive the effectiveness of the developed multi-sensory reading materials in supporting literacy instruction among learners with special needs?
5. What are the perceptions of teachers and learners regarding the usability, appropriateness, and visual appeal of the developed multi-sensory reading materials?
6. Based on the findings of the study, what multi-sensory reading materials are proposed to support inclusive literacy instruction for learners with special needs?

METHODOLOGY

This study employed a descriptive developmental research design to guide the systematic design, illustration, implementation, and evaluation of multisensory reading materials intended for learners with special needs. This approach was appropriate because it allowed the researcher to describe existing instructional challenges in inclusive literacy classrooms while simultaneously developing and refining a tangible educational output. Grounded in the principles articulated by Branch and supported by Calderon and Gonzales as well as Best and Kahn, the design combined descriptive inquiry with material development to ensure that the instructional resources produced were both contextually responsive and pedagogically sound. Rather than limiting the inquiry to observation or measurement, the researcher assumed an active role in creating, testing, and improving instructional materials that directly address the diverse sensory needs of learners with disabilities, with the ultimate goal of producing a functional and user-friendly reading resource that supports inclusive literacy instruction.

The study was conducted at Tuburan Central Elementary School in the municipality of Tuburan, Cebu, an educational institution operating under the supervision of the Department of Education Cebu Province Division and implementing inclusive education practices in accordance with Republic Act No. 11650 or the Inclusive Education Act of 2022. The research locale was selected because it serves a diverse population of learners, including those with learning disabilities, developmental delays, and other special educational needs, and because early literacy development is a critical focus at the elementary level. Although classrooms are equipped with basic visual and tactile aids, the limited availability of multisensory reading resources highlighted the need for the present intervention. Conducting the study in this setting provided an authentic instructional context for evaluating the usability, effectiveness, and adaptability of the developed materials within inclusive classrooms.

The respondents of the study consisted of thirty teachers currently implementing inclusive education practices at Tuburan Central Elementary School. Participants were selected through purposive sampling based on their direct involvement in handling learners with special needs and their active role in literacy instruction. The sample included both Special Education teachers and general education teachers managing inclusive classrooms, allowing for comprehensive feedback on the practicality and effectiveness of the multisensory reading materials. Although the number of Special Education teachers was relatively limited, the inclusion of general education teachers was justified because they regularly support learners with disabilities alongside Special Education teachers and are well positioned to evaluate the usability and acceptability of instructional

materials in inclusive settings. The sample size was considered sufficient for an exploratory evaluation of instructional materials and for generating meaningful classroom-based insights.

Data were collected using an adapted questionnaire designed to gather quantitative information on the implementation and perceived effectiveness of multisensory reading materials. The instrument was developed based on established frameworks including the Universal Design for Learning Implementation Checklist, the Multisensory Teaching Framework, and inclusive education practice surveys, with items contextualized to align with the Philippine inclusive education setting and the objectives of the study. The questionnaire gathered demographic information from teacher respondents and assessed both the extent to which multisensory strategies were implemented in reading instruction and the perceived effectiveness of the developed materials in enhancing learners' reading skills, motivation, and engagement. Responses were recorded using five-point Likert scales appropriate to each component of the instrument, ensuring consistency and objectivity in measurement.

Prior to data collection, the researcher secured formal approval from school administrators and coordinated with relevant coordinators and advisers to identify eligible respondents. The instrument underwent careful review and pilot testing in a comparable school setting to establish reliability and clarity, with internal consistency verified using Cronbach's Alpha. During the actual data gathering phase, teacher respondents were oriented on the purpose of the study, the voluntary nature of participation, and the measures taken to ensure confidentiality. Informed consent was obtained from all participants before the questionnaire was administered. Completed instruments were retrieved promptly, checked for completeness, and systematically organized for analysis to ensure data integrity.

Quantitative data analysis served as the primary method for interpreting the results of the study. Responses from the questionnaires were encoded and analyzed using descriptive statistical tools, including frequency, percentage, and weighted mean, to determine the extent of implementation and the perceived effectiveness of the multisensory reading materials. Weighted mean scores were interpreted using predetermined ranges corresponding to descriptive categories, allowing for clear and consistent interpretation of findings. This analytical approach enabled the researcher to quantify teachers' instructional practices and evaluate the instructional impact of the developed materials within inclusive classrooms. The analysis also supported formative and summative evaluation processes, informing revisions to the materials and guiding conclusions related to their usability and effectiveness.

Ethical considerations were rigorously observed throughout the conduct of the study. Participation was entirely voluntary, and respondents were fully informed of the purpose of the research, their rights as participants, and their option to withdraw at any stage without penalty. Confidentiality and anonymity were maintained by assigning codes to respondents and restricting access to collected data. All data were used exclusively for academic and research purposes and were reported only in aggregate form to prevent identification of individual participants. Ethical approval was obtained from the appropriate institutional authorities prior to data collection, ensuring compliance with established standards of educational research ethics. Through these measures, the study safeguarded the rights and welfare of all participants while contributing reliable and meaningful insights to the advancement of inclusive literacy instruction.

RESULTS AND DISCUSSION

This section presents and discusses the results of the study based on data gathered from thirty (30) elementary teachers at Tuburan Central Elementary School in Tuburan, Cebu. Using a descriptive developmental research design, the study employed purposive sampling to select teachers directly involved in inclusive education. Data were collected through a structured questionnaire adapted from established inclusive and multisensory instructional frameworks, and were analyzed using descriptive statistical tools such as frequency, percentage, weighted mean, and standard deviation. Pearson's correlation coefficient was also used to determine the relationship between the level of implementation and the perceived effectiveness of multisensory reading materials. The discussion that follows is grounded in the empirical data obtained and interprets the findings in relation to the objectives of the study and relevant literature on inclusive literacy instruction.

The professional profile of the respondents provides an important context for understanding their instructional practices and evaluative judgments. In terms of highest educational attainment, the majority of the respondents, representing 76.67 percent, had earned units toward a master's degree. A further 16.67 percent had completed a full master's degree, while 6.67 percent had earned doctorate units. This distribution indicates that most teachers possess advanced academic preparation beyond the minimum requirements for teaching. Such academic engagement suggests strong exposure to contemporary pedagogical theories, inclusive education principles, and evidence-based instructional strategies, all of which are essential in implementing multisensory reading approaches. Previous studies have consistently shown that teachers with higher educational attainment demonstrate greater instructional adaptability and stronger capacity to address learner diversity, particularly in inclusive classrooms.

With regard to teaching position, the respondents represented a balanced range of professional ranks. Teacher I comprised the largest group at 33.33 percent, followed by Teacher III at 26.67 percent, while Teacher II and Master Teachers each accounted for 20 percent of the sample. This distribution reflects a mix of entry-level classroom practitioners, mid-career educators, and instructional leaders. Teacher I respondents, who are primarily responsible for daily classroom instruction, offer firsthand perspectives on the practical implementation of multisensory reading materials. Meanwhile, the inclusion of Teacher II and Teacher III respondents adds depth through their accumulated instructional experience and refined pedagogical judgment. The participation of Master Teachers is particularly significant, as they bring leadership, mentoring experience, and advanced evaluative insight, thereby strengthening the credibility of the findings. Literature suggests that schools with collaborative engagement across teaching ranks are more effective in sustaining inclusive practices and instructional innovation.

In terms of teaching experience, the data reveal that 73.33 percent of the respondents had been teaching for seven years or more, while 16.67 percent had four to six years of experience, and only 10.00 percent had one to three years of teaching experience. This indicates that the majority of the respondents are highly experienced educators. Extended teaching experience is associated with greater instructional confidence, refined classroom management skills, and heightened sensitivity to learner diversity. Experienced teachers are more likely to recognize the limitations of traditional reading instruction and to adopt multisensory approaches that make learning more accessible and engaging for learners with special needs. Research supports the view that years of teaching experience enhance teachers' ability to select appropriate interventions and

evaluate instructional effectiveness accurately, which may partly explain the consistently high ratings reported in this study.

The number of learners with disabilities handled by the respondents further contextualizes their exposure to inclusive education. Most respondents, or 60.00 percent, reported handling one to three learners with disabilities, while 6.67 percent handled four to six learners and another 6.67 percent handled more than six learners. However, 26.67 percent indicated that they had not handled any learners with disabilities. These findings suggest that the majority of teachers have at least some direct experiences working with learners with special needs, which likely enhances their understanding of reading difficulties and the necessity for differentiated instruction. Teachers with direct exposure are better positioned to appreciate the value of multisensory reading materials, as they have observed firsthand the challenges faced by learners with special needs in phonemic awareness, decoding, attention, and comprehension. Studies have shown that hands-on experience in inclusive classrooms strengthens teachers' instructional responsiveness and confidence in using multisensory strategies.

Professional preparedness is further reflected in the inclusive education training attended by the respondents. All teachers reported attending multiple training sessions, with 70.00 percent attending five or more trainings and 30.00 percent attending three to four trainings. This indicates a strong culture of continuous professional development within the school. Repeated training exposure enhances teachers' understanding of inclusive education principles, differentiated instruction, and multisensory approaches. Such preparation equips teachers with both theoretical grounding and practical strategies, enabling them to implement multisensory reading materials systematically and purposefully. Existing literature consistently emphasizes that sustained professional development is a key factor in the successful implementation of inclusive instructional practices.

The level of implementation of multisensory reading materials was rated Very High across all indicators, with weighted mean values ranging from 4.37 to 5.00 and an aggregate weighted mean of 4.77. Teachers reported consistently integrating visual, auditory, tactile, and kinesthetic activities into reading lessons, adapting materials to individual learning styles, and providing opportunities for learners to physically engage with instructional resources. The highest ratings were given to adapting reading materials to suit individual learning needs and the availability of school support and resources, both of which are critical in inclusive education settings. These findings indicate that teachers do not merely apply multisensory strategies superficially, but rather integrate them thoughtfully as part of learner-centered instruction. The very high rating for formative assessment use further reflects reflective teaching practices, as teachers continuously monitor learner progress to refine instructional strategies. Although collaboration with co-teachers or SPED teachers received the lowest mean among the indicators, it was still rated Very High, suggesting that collaborative practices are present but may benefit from further strengthening.

The evaluation of the effectiveness of multisensory reading materials likewise yielded Very High ratings across all indicators, with weighted mean values ranging from 4.90 to 5.00 and an aggregate weighted mean of 4.96. Teachers consistently observed improvements in learners' reading comprehension, retention, phonemic awareness, and word recognition skills. The materials were also perceived as highly effective in enhancing learner motivation, participation, confidence, and independent reading behavior. These outcomes are particularly significant for learners with special needs, who often experience difficulty maintaining attention and engagement during traditional reading instruction. By engaging multiple sensory modalities, multisensory reading

materials provide alternative pathways for learning, thereby reducing frustration and fostering positive attitudes toward reading. These findings align with previous studies demonstrating that multisensory instruction improves both academic and behavioral outcomes, including motivation, focus, and self-efficacy.

The relationship between the level of implementation and the perceived effectiveness of multisensory reading materials was examined using Pearson's correlation coefficient. The computed r-value of 0.056 indicates a negligible positive correlation between the two variables, while the p-value of 0.771 exceeds the 0.05 level of significance. Consequently, the null hypothesis was not rejected, indicating that there is no statistically significant relationship between implementation and effectiveness. This finding suggests that variations in the extent of implementation do not significantly influence how effective the materials are perceived to be. One plausible explanation is the limited variability in the data, as both implementation and effectiveness were rated very highly by most respondents, resulting in a ceiling effect. Another explanation is that effectiveness may be influenced more by the quality of instructional delivery, teacher competence, and contextual factors rather than frequency of implementation alone. Research supports the view that instructional effectiveness in inclusive education is multifaceted and shaped by teacher expertise, learner characteristics, and classroom environment.

In synthesis, the findings demonstrate that the teacher-respondents possess strong academic preparation, extensive teaching experience, meaningful exposure to learners with disabilities, and substantial training in inclusive education. These factors collectively contribute to the very high levels of implementation and effectiveness of multisensory reading materials observed in the study. Although no significant statistical relationship was found between implementation and effectiveness, the consistently high ratings underscore the inherent value of multisensory reading materials when used by trained and experienced educators. Overall, the results affirm that multisensory reading materials are well-integrated and highly effective tools for supporting learners with special needs in inclusive literacy instruction. These findings provide a solid empirical basis for advancing inclusive teaching practices and set the stage for subsequent conclusions and recommendations regarding policy, practice, and future research.

CONCLUSION

This study concludes that the effective support of learners with special needs in inclusive literacy instruction is strongly anchored on the preparedness of teachers, the quality of instructional strategies, and the availability of institutional support. The findings demonstrate that the teacher-respondents of Tuburan Central Elementary School are academically prepared, professionally experienced, and extensively trained in inclusive education. Most have pursued graduate-level education, hold varied teaching positions, possess several years of teaching experience, and have direct exposure to learners with disabilities. These professional characteristics collectively provide a solid foundation for the consistent and informed use of multisensory reading materials within inclusive classroom settings.

The study further establishes that multisensory reading materials are implemented at a very high level in reading instruction. Teachers consistently integrate visual, auditory, tactile, and kinesthetic elements into their lessons, adapt materials to individual learner needs, provide opportunities for hands-on engagement, utilize technology to enrich instruction, and reflect on learner outcomes to improve practice. The presence of strong institutional support, including access to resources and administrative encouragement, further strengthens teachers' capacity to

apply multisensory strategies effectively. These practices indicate that multisensory instruction is not treated as an auxiliary intervention but is embedded in regular teaching routines that prioritize learner accessibility and engagement.

In terms of instructional impact, the study concludes that multisensory reading materials are perceived as highly effective in supporting the literacy development of learners with special needs. Teachers reported notable improvements in learners' reading comprehension, phonemic awareness, word recognition, motivation, focus, confidence, and classroom participation. The materials were also found to promote independent reading behaviors and foster inclusive and collaborative learning environments. These outcomes suggest that multisensory reading materials address both the academic and socio-emotional dimensions of learning, helping learners develop essential reading skills while also strengthening their confidence and positive attitudes toward reading.

Despite the very high levels of both implementation and perceived effectiveness, the study concludes that there is no statistically significant relationship between the extent of implementation and the level of effectiveness of multisensory reading materials. This finding indicates that effectiveness is not determined solely by how frequently or extensively the materials are used. Rather, it highlights the importance of instructional quality, teacher expertise, learner characteristics, and the appropriateness of material design in achieving positive learning outcomes. The uniformly high ratings across respondents suggest a ceiling effect, where limited variability in responses reduces the likelihood of detecting a significant statistical relationship. This result underscores that purposeful, reflective, and learner-centered application of multisensory strategies is more critical than mere intensity of use.

The study also affirms the crucial role of institutional support in sustaining effective inclusive literacy practices. Adequate resources, professional development opportunities, leadership support, and a collaborative school environment enable teachers to implement multisensory reading materials with confidence and consistency. When teachers are well-supported and well-prepared, multisensory materials function as inherently effective tools across classrooms, even when variations in implementation exist.

Overall, the findings confirm that multisensory reading materials are valuable and effective instructional resources for learners with special needs in inclusive educational settings. Their success is closely linked to teacher readiness, reflective practice, and supportive institutional conditions. The study therefore recommends the continued integration of multisensory reading materials into early literacy instruction, with emphasis on intentional and high-quality implementation rather than frequency alone. Strengthening collaboration between general education and special education teachers, sustaining inclusive education training programs, and ensuring ongoing administrative and policy support are also essential to maximize instructional impact. Future research is encouraged to examine learner performance outcomes more directly, explore additional contextual variables, and employ longitudinal or mixed-method approaches to further validate and extend the findings. Through these efforts, multisensory reading materials can continue to contribute meaningfully to equitable, inclusive, and effective literacy education for learners with special needs.

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