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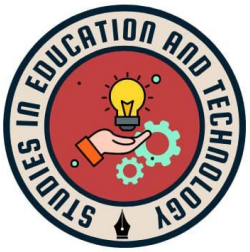

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RESEARCH ARTICLE

Strengthening the Learning Outcomes of SPED Learners in Agricultural Crop Production through GROW-SPED Inclusive Teaching Strategies in Technology & Livelihood Education (TLE)

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Abstract

Learners with special educational needs (SPED) often face persistent barriers to meaningful participation and skill mastery in technical and livelihood education, particularly in practice-oriented subjects such as Agricultural Crop Production. Inclusive teaching strategies are therefore critical in ensuring equitable learning opportunities and improved outcomes for SPED learners. This qualitative case study examined the implementation of GROW-SPED Inclusive Teaching Strategies in Agricultural Crop Production under the Technology and Livelihood Education (TLE) curriculum and explored their influence on the learning outcomes of SPED learners. Data were collected through classroom observations, focus group discussions with learners, and semi-structured interviews with teachers. Thematic analysis revealed four major findings: (1) guided and structured tasks supported skill acquisition, (2) routine-based and scaffolded instruction enhanced learner confidence and independence, (3) hands-on and contextualized activities improved engagement and retention, and (4) collaborative and supportive learning environments fostered social participation and positive attitudes toward learning. Learners' accounts highlighted increased competence and motivation, alongside challenges related to pacing and resource availability. The study concludes that GROW-SPED strategies effectively strengthen learning outcomes when inclusive practices are systematically embedded in TLE instruction. Implications for inclusive teaching, curriculum design, and future research are discussed.

Keywords: SPED learners; inclusive education; Agricultural Crop Production; Technology and Livelihood Education; GROW-SPED strategies (GROW-Guided Responsive Outcomes for Work Skills)

INTRODUCTION

Technology and Livelihood Education (TLE) plays a vital role in equipping learners with practical skills, work habits, and competencies essential for independent living and employability. For learners with special educational needs, particularly those enrolled in Special Education (SPED) programs, TLE subjects such as Agricultural Crop Production offer meaningful opportunities to develop functional, vocational, and life skills. However, SPED learners often encounter challenges in TLE classrooms due to cognitive, sensory, or physical differences that may limit access to traditional instructional approaches.

Inclusive education frameworks emphasize the need to adapt teaching strategies, learning environments, and assessment practices to accommodate learner diversity and promote equitable participation (UNESCO, 2017). In skills-based subjects, inclusive teaching requires deliberate scaffolding, structured routines, and contextualized tasks that respond to learners' strengths and needs. Without such adaptations, SPED learners may struggle to achieve intended learning outcomes, leading to reduced engagement and limited skill mastery.

In response to these challenges, the GROW-SPED Inclusive Teaching Strategies were developed as a structured approach to support SPED learners in Agricultural Crop Production. Grounded in inclusive and learner-centered pedagogy, GROW-SPED emphasizes guided instruction, routine-based learning, opportunities for work-related practice, and supportive learning environments. Despite growing advocacy for inclusive TLE instruction, empirical studies examining the implementation and impact of structured inclusive strategies on SPED learners' learning outcomes remain limited.

This study addresses this gap by examining how GROW-SPED Inclusive Teaching Strategies were implemented in Agricultural Crop Production and how these strategies influenced the learning outcomes of SPED learners in TLE.

Research Questions

1. How are GROW-SPED Inclusive Teaching Strategies implemented in Agricultural Crop Production classes?
2. How do SPED learners experience these inclusive teaching strategies?
3. In what ways do GROW-SPED strategies influence the learning outcomes of SPED learners in TLE?

2. Review of Related Literature

Inclusive education is grounded in the principle that all learners, regardless of disability, have the right to equitable access to meaningful and high-quality learning experiences through appropriate support, adaptation, and responsive instructional practices (Ainscow, 2005). Rather than viewing disability as a deficit located within the learner, inclusive education reframes diversity as a normal feature of classrooms and emphasizes the responsibility of schools and teachers to design learning environments that accommodate varied needs. Research has consistently shown that inclusive instructional practices benefit learners with special educational needs not only by improving academic performance but also by enhancing social participation, self-confidence, and a sense of belonging outcomes that are particularly critical for SPED learners who are at risk of marginalization (Florian & Black-Hawkins, 2011). Within this inclusive framework, Technology and Livelihood Education (TLE), particularly Agricultural Crop Production, holds significant potential for SPED learners because it emphasizes hands-on learning, routine-based tasks, and real-life applications that align with functional skill development and everyday living. Vocational and agricultural education contexts allow learners to engage in concrete, observable tasks, making learning more accessible and meaningful for those who struggle with abstract instruction. Studies suggest that such practical and work-oriented learning experiences are especially beneficial for learners with disabilities when instruction is structured, repetitive, and aligned with learners' abilities and interests (Billett, 2011). However, meaningful learning in these contexts does not occur automatically; it requires intentional differentiation and carefully scaffolded instruction. Scaffolding plays a central role in SPED instruction by providing guided support that enables learners to successfully perform tasks they could not accomplish independently, while gradually fostering autonomy and independence. Through strategies such as task analysis, modeling, guided practice, and consistent routines, teachers can reduce cognitive load and support learners' progression toward mastery. Empirical research confirms that structured routines and scaffolded instruction significantly enhance skill acquisition, retention, and functional competence among learners with disabilities, underscoring the importance of deliberate instructional design in inclusive SPED-TLE settings (Friend & Bursuck, 2019).

3. Methodology

This study employed a qualitative case study design to explore the implementation of GROW-SPED Inclusive Teaching Strategies and their influence on SPED learners' learning outcomes in Agricultural Crop Production. The study was conducted in a public secondary school offering SPED and TLE programs. Participants included ten TLE-SPED teachers and fifteen SPED learners enrolled in Agricultural Crop Production classes. Learners were selected through purposive sampling to represent varied ability levels and learning needs.

Data were collected over one academic term using multiple qualitative methods. Classroom observations documented instructional strategies, learner participation, task performance,

and engagement during agricultural activities. Focus group discussions with learners explored their experiences, challenges, and perceptions of learning tasks. Semi-structured interviews with teachers examined instructional planning, adaptation strategies, and reflections on learner progress. All data were transcribed verbatim and analyzed using thematic analysis following Braun and Clarke's (2006) six-phase framework. Trustworthiness was ensured through triangulation, peer debriefing, and member checking. Ethical approval was obtained, informed consent and learner assent were secured, and pseudonyms were used to maintain confidentiality.

4. Results and Findings

Theme 1: Guided and Structured Tasks Supported Skill Acquisition

Classroom observations revealed that the GROW-SPED Inclusive Teaching Strategies placed strong emphasis on guided instruction and systematic task structuring in Agricultural Crop Production activities such as soil preparation, seed planting, watering schedules, weeding, and harvesting. Teachers consistently applied task analysis by breaking down complex agricultural procedures into clear, sequential steps and modeling each stage before learners attempted the task independently. Visual cues, pictorial charts, and demonstrations were frequently used to reinforce understanding, particularly for learners with cognitive and communication difficulties. This structured approach reduced task ambiguity and enabled SPED learners to follow routines with greater clarity and consistency, resulting in more accurate task performance and improved adherence to agricultural procedures.

Learners explicitly acknowledged the value of step-by-step guidance in supporting their learning. One learner shared, *"Its's easier when the tasks are done consecutively.","* indicating that clear sequencing helped them understand what was expected. Teachers likewise observed notable improvements in learners' task completion, reduced errors, and increased willingness to attempt tasks independently. However, some teachers noted that providing intensive guidance required additional preparation time and individualized attention, particularly for learners with more complex needs. Overall, these findings suggest that guided and structured tasks are critical for skill acquisition among SPED learners, as they provide clarity, reduce cognitive load, and support successful task execution. This aligns with existing research demonstrating that task analysis and guided practice significantly enhance functional skill development among learners with disabilities (Friend & Bursuck, 2019).

Theme 2: Routine-Based Instruction Enhanced Confidence and Independence

Routine-based instruction emerged as a central component of GROW-SPED implementation in Agricultural Crop Production. Teachers intentionally repeated agricultural tasks across lessons, allowing learners to practice the same procedures consistently over time. Daily routines such as preparing tools, checking soil moisture, and following planting schedules were embedded into classroom activities, helping learners internalize processes and expectations. This consistency enabled learners to anticipate tasks, reduce anxiety, and gradually transition from guided practice to more independent performance.

Learners reported increased confidence as routines became familiar. One learner remarked, *"I can do it on my own when we do it repeatedly,"* reflecting growing self-efficacy and independence. Teachers similarly noted that learners who initially required constant prompting began performing tasks with minimal assistance as routines were reinforced. Nonetheless, some learners needed extended time to master routines, highlighting individual differences in learning pace and the need for patience and flexibility. These findings reinforce

prior studies emphasizing that repetition, consistency, and predictable routines are essential for fostering independence and functional skill mastery among SPED learners (Browder et al., 2006).

Theme 3: Hands-On and Contextualized Activities Improved Engagement and Retention

Hands-on and contextualized learning activities were integral to GROW-SPED strategies, anchoring instruction in real agricultural contexts that learners could directly observe and experience. Learners actively engaged in handling tools, preparing garden plots, planting seeds, watering crops, and monitoring plant growth. Observations indicated high levels of enthusiasm and sustained attention during these activities, particularly when learners could see tangible outcomes of their efforts, such as sprouting plants or harvested produce.

Learners expressed enjoyment and a sense of accomplishment, with one stating, *"It makes us happier when we see the plants growing."* Teachers reported that experiential activities improved learners' retention of skills and understanding of agricultural concepts, as learners were able to connect abstract instructions with concrete outcomes. However, teachers also noted challenges related to limited tools, weather conditions, and time constraints, which sometimes restricted the frequency of hands-on activities. Despite these challenges, the findings underscore the effectiveness of experiential and contextualized learning in enhancing engagement and retention, consistent with experiential learning theory, which emphasizes learning through direct experience and reflection (Kolb, 1984).

Theme 4: Supportive Learning Environments Fostered Social Participation

The implementation of GROW-SPED strategies cultivated supportive learning environments characterized by encouragement, patience, and positive reinforcement. Teachers consciously modeled inclusive attitudes, acknowledged learners' efforts, and promoted respectful interactions during agricultural tasks. Cooperative activities such as group planting and shared tool use were intentionally designed to foster teamwork, communication and peer support among SPED learners.

Learners highlighted the social benefits of working together, with one noting, *"It's enjoyable when we are planting together."* Teachers observed improvements in peer interaction, cooperation, and willingness to help one another, particularly among learners who were initially withdrawn or hesitant. Nevertheless, teachers also cited challenges related to limited resources and space, which sometimes affected group dynamics and task organization. These findings support inclusive education research emphasizing that emotionally supportive and socially responsive learning environments enhance participation, belonging, and social skill development among learners with special needs (Florian & Black-Hawkins, 2011).

5. Discussion

The findings demonstrate that the GROW-SPED Inclusive Teaching Strategies effectively strengthened the learning outcomes of SPED learners in Agricultural Crop Production by coherently integrating structured guidance, routine-based learning, experiential activities, and supportive learning environments. Guided and scaffolded instruction, grounded in task analysis and modeling, enabled learners to acquire essential agricultural skills by reducing cognitive load and clarifying task expectations. Through systematic sequencing and gradual release of responsibility, SPED learners were able to perform complex agricultural tasks with increasing accuracy and confidence. Repetition and routine further reinforced learning by

allowing learners to internalize procedures, anticipate task demands, and transition from teacher-supported practice to more independent performance, thereby fostering self-efficacy and functional independence.

Experiential and contextualized learning activities served as a critical mechanism for sustaining engagement and enhancing skill retention. By situating instruction within authentic agricultural contexts such as crop cultivation, plant care, and harvesting learners were able to connect abstract instructions to tangible outcomes, reinforcing understanding through direct experience. This alignment with vocational and experiential learning research underscores the value of hands-on practice in strengthening procedural knowledge and long-term retention, particularly for learners with special educational needs. Supportive learning environments further amplified these outcomes by promoting positive teacher-learner interactions, peer collaboration, and emotional safety, all of which contributed to increased participation, persistence, and social integration.

At the same time, the findings illuminate persistent challenges in the implementation of inclusive TLE practices. Issues related to pacing emerged as teachers balanced the need for individualized support with curricular time constraints, while limited resources such as tools, materials, and appropriate learning spaces sometimes restricted the frequency and depth of experiential activities. These challenges highlight the importance of institutional support in sustaining inclusive vocational education. Consistent with prior research, effective inclusive TLE instruction requires adequate planning time, sufficient instructional materials, and ongoing professional development to equip teachers with the skills and resources needed to adapt instruction to diverse learner needs (Billett, 2011). Addressing these structural constraints is essential to ensuring that inclusive strategies such as GROW-SPED can be implemented consistently and equitably across SPED contexts.

6. Conclusions and Implications

This study provides empirical evidence that the GROW-SPED Inclusive Teaching Strategies meaningfully strengthen learning outcomes for SPED learners in Agricultural Crop Production by systematically promoting skill mastery, sustained engagement, and social participation within Technology and Livelihood Education (TLE) classrooms. The findings demonstrate that inclusive, structured, and experiential instructional approaches enabled learners to acquire functional agricultural competencies through guided task execution, routine-based practice, and hands-on engagement with real-life farming activities. By reducing task ambiguity and aligning instruction with learners' cognitive and social needs, GROW-SPED strategies supported learners in developing practical skills essential for independent functioning and participation in future livelihood opportunities.

The study further illustrates that learning outcomes for SPED learners extend beyond technical skill acquisition to include increased confidence, persistence, and collaborative competence. Supportive learning environments fostered through GROW-SPED strategies encouraged positive peer interaction and a sense of belonging, which are critical components of inclusive education. These outcomes underscore the importance of designing SPED-TLE instruction that integrates structured guidance with opportunities for experiential learning and social interaction, ensuring that learners are not only able to perform tasks but also to engage meaningfully in shared work contexts.

The findings carry important implications for instructional practice in SPED-TLE settings. Teachers are encouraged to adopt guided, routine-based, and hands-on instructional strategies that emphasize task analysis, consistent practice, and experiential learning. Such

approaches can help SPED learners develop confidence and independence while maintaining high levels of engagement. Teachers may also benefit from professional development focused on inclusive pedagogical design, scaffolding techniques, and classroom management strategies that support diverse learning needs within skills-based subjects.

At the curricular level, the study highlights the need to embed inclusive teaching strategies such as GROW-SPED within TLE frameworks and learning standards. Curriculum planners and school leaders may consider integrating structured routines, performance-based tasks, and social participation goals into SPED-TLE curricula to ensure coherence between instructional objectives and inclusive practice. Aligning curriculum, assessment, and instructional design can further support equitable learning opportunities and meaningful skill development for SPED learners.

Directions for future research include examining the long-term effects of GROW-SPED Inclusive Teaching Strategies on employment readiness, community participation, and post-school outcomes for SPED learners. Longitudinal and mixed-methods studies may provide deeper insight into how sustained exposure to inclusive, experiential TLE instruction influences learners' transition to work and independent living. Future research may also explore the scalability and adaptability of GROW-SPED strategies across diverse SPED contexts, school settings, and agricultural specializations to inform broader implementation and policy development.

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