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REDEFINING INCLUSIVE EDUCATIONAL PRACTICES THROUGH THE SETT FRAMEWORK: ADAPTIVE AND ASSISTIVE TECHNOLOGIES FOR SUSTAINABLE QUALITY

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Abstract:

The transformation of educational systems in the twenty-first century demands inclusive, flexible, and technology-enabled approaches capable of addressing diverse learner needs. Adaptive and Assistive Technologies (AT) have emerged as powerful tools for promoting equitable participation and improving learning outcomes for students with disabilities and diverse learning profiles. However, ineffective selection, inadequate contextual analysis, and lack of systematic implementation often lead to device abandonment and limited educational impact. The Student–Environment–Tasks–Tools (SETT) framework, provides a structured decision-making model that supports collaborative, need-based, and context-sensitive selection of assistive technologies. It highlights the importance of student-centred planning, environmental analysis, layered technology solutions ranging from low-tech to AI-enabled tools, and data-based evaluation in ensuring effective AT integration. The study concludes that systematic application of the SETT framework significantly enhances accessibility, learner independence, and sustainable quality improvement in inclusive education systems.

Keywords: *Assistive Technology, SETT Framework, Inclusive Education, Adaptive Learning, Educational Technology*

Introduction:

Education plays a central role in national development and human wellbeing, making equitable access to learning opportunities a global priority. Rapid technological advancement, globalization, and changing workforce demands have compelled educational systems to shift from teacher-centred instruction toward learner-centred, inclusive, and skill-based approaches. In this transformation, adaptive and assistive technologies (AT) have emerged as essential tools for addressing learner diversity and ensuring meaningful participation for students with disabilities and learning differences. Rather than functioning merely as supplementary devices, modern assistive technologies operate as integrated learning supports that enable students to access curriculum content, demonstrate knowledge, and participate independently in classroom activities.Recent technological developments have significantly expanded the scope and effectiveness of assistive technology. Artificial-intelligence-enabled tools such as speech-to-text transcription, real-time captioning, predictive text writing systems, AI-based reading assistants, and adaptive learning platforms now allow personalized learning experiences tailored to the cognitive, sensory, and linguistic needs of learners. Cloud-based accessibility features embedded within everyday digital devices—including screen readers, magnifiers, translation tools, and voice assistants—have reduced dependence on expensive specialized hardware, making assistive technology more user-friendly and pocket-friendly even in resource-constrained educational environments. These developments reflect a broader transition from device-centric approaches toward ecosystem-based accessibility, where

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mainstream technologies are designed to be inherently inclusive.

At the classroom level, assistive technology adoption has evolved into a continuum of no-tech, low-tech, mid-tech, and high-tech solutions selected according to learner needs, environmental conditions, and curricular demands. Cost-effective examples include visual schedules, graphic organizers, laminated cue cards, pencil grips, and slant boards (low-tech), as well as audiobooks, word-prediction software, and digital organizers (mid-tech). Advanced solutions include AI-enabled speech-to-text writing tools, text-to-speech reading applications for learners with dyslexia, augmentative and alternative communication (AAC) devices for students with communication challenges, and adaptive mathematics software that converts symbolic expressions into visual representations. Such tools enhance academic participation while promoting independence, confidence, and self-regulated learning.Despite increasing technological availability, many educational institutions continue to face challenges such as inappropriate device selection, insufficient needs assessment, inadequate teacher training, and lack of follow-up evaluation, often resulting in ineffective resource utilization and discontinuation of technology adoption. These challenges highlight the importance of structured decision-making frameworks that guide collaborative and context-sensitive technology implementation.

Furthermore, the growing emphasis on inclusive pedagogy underscores the need for assistive technologies that are culturally adaptable, economically feasible, and scalable across diverse educational settings. Pocket-friendly mobile applications offering reading assistance, multilingual translation, voice-based navigation, and organizational reminders have emerged as powerful supports, particularly in developing educational contexts where high-cost technologies may not be feasible. When integrated with teacher training, collaborative planning, and systematic evaluation, these technologies can substantially enhance learning access, participation, and educational equity.In this evolving educational landscape, adaptive and assistive technologies—guided by systematic frameworks such as SETT—play a crucial role in redefining inclusive educational practices for quality sustenance. They not only support learners with disabilities but also advance universal design for learning (UDL) by providing flexible pathways for accessing information, expressing understanding, and engaging in learning processes, thereby contributing to inclusive, resilient, and learner-centred educational systems.

Review of Literature:

Research on assistive technology integration consistently highlights the importance of systematic planning, contextual decision-making, and teacher preparedness for effective inclusive education. Early work by Joy Zabala (1995, 2005) emphasized collaborative decision-making and introduced the Student–Environment–Tasks–Tools (SETT) framework, demonstrating that technology selection guided by learner needs leads to improved independence, participation, and long-term sustainability of interventions. Dave L. Edyburn (2004, 2013) argued that assistive technology should be understood as a continuum of supports—from low-tech to high-tech—designed to enhance access, participation, and academic performance when aligned with functional learning requirements. Empirical studies by Sandra Alper and Sonia Raharinirina (2006) demonstrated that structured assistive technology planning significantly improves student independence and classroom engagement.

Cynthia M. Okolo and Emily C. Bouck (2007) reported that systematic teacher training in assistive technology enhances instructional effectiveness and inclusive classroom practices. Amy Dell, Deborah Newton, and

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Jerry Petroff (2017) emphasized that effective integration of assistive technologies requires continuous monitoring, teacher preparedness, and institutional support systems.Recent scholarship extends these foundational perspectives by linking assistive technologies with Universal Design for Learning (UDL). Alaa Al-Azawei, Fabio Serenelli, and Karin Lundqvist (2016) demonstrated that digitally supported flexible instructional environments reduce learning barriers for both students with disabilities and mainstream learners. Moreover, Min Wook Ok and Kavita Rao (2019) highlighted that contextual planning and teacher preparedness significantly determine the success of assistive technology implementation. Without structured frameworks such as SETT, institutions often experience inappropriate device selection and underutilization of technological resources.In the Indian educational context, policy initiatives such as the National Education Policy (2020) emphasize digital inclusion, equitable access, and technology-enabled learning, reinforcing the relevance of structured assistive technology frameworks for sustainable educational transformation.

Research Gap:

Although extensive literature acknowledges the importance of assistive technologies in inclusive education, limited research has examined the systematic implementation of structured decision-making models such as the SETT framework within teacher education programmes and institutional policy planning, particularly in developing educational contexts. Much of the existing research emphasizes technological availability rather than contextual suitability, learner-centred assessment, long-term monitoring, and sustainability.

Additionally, empirical investigations focusing on the integration of AI-enabled, low-cost, and mobile-based assistive technologies within inclusive classrooms remain insufficient. There is a need for research that bridges theoretical frameworks, classroom practices, policy directives, and emerging digital innovations to ensure effective and equitable assistive technology adoption.

Need and Significance of the Study:

The increasing diversity of learners, coupled with rapid technological advancement, necessitates structured and evidence-based frameworks for assistive technology implementation. Improper selection and lack of systematic monitoring often lead to device abandonment, financial inefficiency, and reduced learner independence.

Understanding and applying the SETT framework can assist educators in:

- Ensuring appropriate technology selection
- Enhancing learner independence and participation
- Reducing misuse and abandonment of devices
- Strengthening inclusive education policies
- Promoting sustainable quality assurance mechanisms

The study contributes to educational policy formulation, teacher professional development, and inclusive classroom practices by advocating structured and collaborative assistive technology planning.

Scope of the Study:The study focuses on the conceptual understanding, structured implementation process, and educational implications of the SETT framework within inclusive classroom settings. It examines adaptive and assistive technology integration across academic and functional domains.

Objectives of the Study:

1. To examine the role of the SETT framework in systematic assistive technology decision-making.
2. To analyze the impact of adaptive and assistive technologies on inclusive learning, accessibility, and quality sustenance.

SETT Framework:

A collaborative decision-making model involving systematic analysis of Student, Environment, Tasks,

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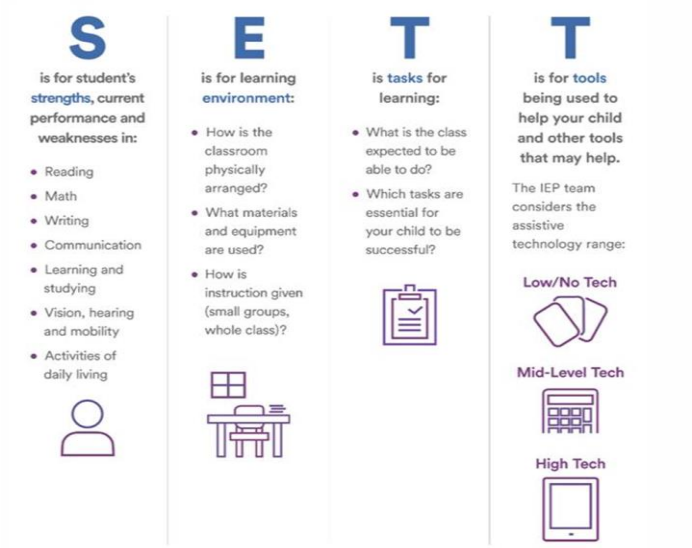
and Tools to ensure context-appropriate assistive technology selection and implementation.



Why Does the SETT Framework Still Matters?

Despite rapid technological advancement, many schools continue to struggle with ineffective assistive technology implementation. Common challenges include:

- Tool-first thinking (selecting devices before identifying needs)
- Device abandonment due to poor contextual fit
- IEPs listing tools without meaningful implementation plans
- Over-reliance on high-tech solutions
- Lack of follow-up, monitoring, or data collection

The SETT framework addresses these concerns by ensuring that tools are selected only after comprehensive analysis of the learner, environment, and required tasks. It prevents premature product identification and encourages need-based, sustainable decision-making.

Principles of Assistive Technology:

1. **Sensory Substitution** – Replacing one sensory input with another (e.g., text-to-speech for visual reading challenges).
2. **Multi-Sensory Approach** – Combining visual, auditory, and tactile supports to enhance comprehension and retention.

Concept and Components of the SETT Framework:

The SETT framework consists of four interdependent components:

1. **Student :** The first component of the framework focuses on a comprehensive understanding of the learner. It involves identifying the student's strengths and abilities, along with functional challenges that may influence participation in learning activities. Consideration is also given to sensory, cognitive, and communication factors that affect performance, as well as the learner's preferences, motivation, and readiness to use assistive supports. Evaluating the level of independence the student currently demonstrates helps determine the degree and type of technological assistance required to enhance access, participation, and achievement.
2. **Environment :** Assistive technology must function effectively within the learner's actual educational and social contexts. Environmental assessment includes examining classroom setup, daily routines, curriculum expectations, instructional materials, and the technological resources already available. It also involves analyzing support systems such as teachers, peers, family members, and related service providers, as well as the broader home and community context. Understanding these factors ensures that selected tools are practical, usable, and sustainable within the environments where learning and daily activities occur.
3. **Tasks :** The third component emphasizes identifying the specific tasks the learner needs to perform, viewing tasks as observable and measurable expectations rather than deficits. These include academic activities such as reading, writing, mathematics, and communication, as well as non-academic responsibilities like organization, mobility, self-care, and behavior regulation. Tasks

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are also linked to individualized educational goals and curriculum access requirements, ensuring that assistive technology supports meaningful participation and measurable educational outcomes.

4. **Tools :**The Tools component of the SETT framework includes devices, strategies and services selected only after thorough analysis of the Student, Environment and Tasks components. Tool selection is always needs-based and context-driven rather than product-driven. The purpose is to identify supports that enhance independence, accessibility and task completion while remaining flexible and sustainable within the learning environment. Tools are broadly categorized into No-Tech/Low-Tech, Mid-Tech and High-Tech options, allowing teams to select appropriate solutions based on student needs and available resources.

- ***No-Tech / Low-Tech (Pocket-Friendly and Reusable)*** *:No-tech and low-tech tools are simple, cost-effective, portable and easy to implement. They are often reusable and require minimal training, making them highly practical in inclusive classrooms. Examples include visual schedules to support routine and predictability, graphic organizers to assist with idea organization, laminated cue cards for prompts and reminders, pencil grips to improve handwriting control and checklists to enhance task completion and executive functioning. These tools are particularly valuable because they provide immediate support without heavy financial investment.*
- ***Mid-Tech*** *:Mid-tech tools involve basic electronic or battery-operated devices that offer more structured support while remaining relatively affordable. These include audio recorders for capturing lectures, word processors for written expression, digital dictionaries for vocabulary assistance, talking calculators for mathematical computation and digital organizers to assist with planning and memory. Mid-tech tools bridge the gap between simple supports and advanced technological systems.*
- ***High-Tech*** *:High-tech tools involve advanced digital or computerized systems designed to provide personalized and adaptive support. Examples include speech-to-text software for students with writing difficulties, text-to-speech readers for learners with reading challenges, augmentative and alternative communication (AAC) devices for students with communication needs, AI-based adaptive learning platforms that tailor instruction and real-time captioning systems that enhance accessibility for learners with hearing impairments. These tools often require training, monitoring and ongoing technical support.*
- Importantly, product-specific naming is intentionally avoided during the early stages of decision-making to maintain flexibility, prevent premature selection and ensure that tool choice remains aligned with student needs rather than brand availability.

Importance of the SETT Framework in Inclusive Education:

The SETT model ensures that assistive technology implementation remains student-centred, contextually relevant and continuously evaluated. By promoting collaborative planning among teachers, specialists, administrators and families, the framework strengthens accountability, reduces device abandonment and enhances learner independence. Furthermore, it aligns assistive technology practices with individualized education plans (IEPs), inclusive pedagogy and quality assurance mechanisms, thereby supporting sustainable educational transformation.

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Steps in SETT Implementation : Assistive technology decisions are dynamic and require periodic review.

1. Collaborative team discussion
2. Identification of student strengths and needs
3. Environmental assessment
4. Task analysis
5. Tool identification and trial
6. Baseline and progress data collection
7. Ongoing monitoring and evaluation
8. Continuous modification and refinement

Implementation Process of the SETT Framework:

The implementation of the SETT framework begins with collaborative team discussion, where teachers, special educators, therapists, parents and students collectively examine learner needs. This is followed by identification of student strengths and needs, focusing on functional abilities, learning barriers and preferences. An environmental assessment is then conducted to understand classroom conditions, available resources and contextual support. Next, task analysis determines the specific academic and functional activities the learner must perform. Based on these findings, tool identification and trial are conducted to test suitable assistive solutions. Baseline and progress data collection ensures evidence-based decision-making, followed by ongoing monitoring and evaluation to assess effectiveness. Finally, continuous modification and refinement ensures that assistive technology decisions remain dynamic and responsive, recognizing that AT implementation requires periodic review rather than one-time selection.

Practical Implementation Solutions:

Effective implementation requires introducing one tool at a time to prevent cognitive overload and allow accurate evaluation. Active involvement of students and parents in planning enhances acceptance and usability. Maintaining low-tech backup options ensures continuity of support when advanced tools are unavailable. Schools should conduct structured review meetings to evaluate effectiveness and make adjustments. Most importantly, implementation should emphasize promoting independence rather than dependency, while ensuring that all SETT-based decisions are properly aligned with Individualized Education Program (IEP) documentation.

Advantages:

- Structured and systematic decision-making
- Prevents tool-first selection errors
- Enhances collaborative planning
- Improves long-term effectiveness
- Promotes inclusive and equitable classroom practices
- Encourages cost-effective and context-appropriate solutions

Limitations:

- Requires trained personnel
- Time-intensive assessment process
- Resource constraints in underfunded schools
- Continuous monitoring demands sustained effort

Challenges :

Common challenges include lack of teacher training, insufficient funding and limited follow-up monitoring, which may reduce the effectiveness of assistive interventions. Schools may also experience resistance to technological change, along with digital accessibility disparities that restrict equitable implementation across regions and institutions.

Strategies for Effective Implementation :

Successful implementation can be strengthened through professional development programs that build teacher competence in assistive technology use. Establishing institutional AT planning committees encourages coordinated decision-making, while data-based monitoring systems ensure accountability and

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effectiveness. Integration of SETT processes directly with IEP planning further institutionalizes the framework within educational practice.

Common Misapplications of SETT

- Focusing on tools before identifying needs
- Ignoring environmental factors
- Treating assessment as a one-time event
- Viewing tasks as deficits
- Lack of teacher training
- Ignoring low-tech solutions

SETT and IEP Alignment : The SETT framework aligns naturally with IEP processes: Present Levels of Performance correspond to the Student and Tasks components, Accommodations relate to the Environment, Services and Supports correspond to Tools and Progress Monitoring aligns with data collection and evaluation, ensuring systematic implementation.

Role of Teachers :Teachers play a critical role in identifying learner needs, facilitating collaborative planning, monitoring tool effectiveness and promoting inclusive classroom practices. Their continuous observation and feedback ensure that assistive technology remains meaningful and functional in real classroom settings.

Ethical Considerations :Implementation of assistive technology must ensure equitable access to assistive tools for all learners while maintaining learner privacy and confidentiality. Educators must avoid technological bias, prevent over-dependence on devices and respect learner autonomy and informed consent, ensuring that technology supports empowerment rather than restriction.

Application of Technology and AI for Children with Neurodiverse Needs :Emerging AI-enabled technologies provide personalized reading support, predictive writing assistance, adaptive mathematics tutoring, organizational reminders and communication aids for learners with neurodiverse profiles such as ADHD, autism spectrum conditions and dyslexia. These tools enhance customization, responsiveness and scalability.However, AI integration must be guided by structured frameworks like SETT to ensure contextual alignment, ethical use, data privacy protection and human oversight.

Assistive Technology Solutions by Learning Area

Assistive technology solutions can be effectively organized according to specific learning domains to ensure targeted support for diverse learner needs.

In the **reading domain**, tools such as text-to-speech applications enable learners with decoding or visual challenges to access printed content through audio output, while digital dictionaries support vocabulary development and comprehension. Online accessible libraries further expand learning opportunities by providing adjustable fonts, audio formats and multilingual resources that enhance inclusive reading experiences.

For **writing**, word prediction software assists learners in spelling and sentence construction by suggesting appropriate words during typing, thereby reducing cognitive load. Speech-to-text applications allow students with handwriting or motor difficulties to convert spoken language into written text, improving productivity and participation. Graphic organizers and structured templates support planning, idea organization and coherent expression, particularly for learners who struggle with sequencing and written structure.

In the **mathematics domain**, talking calculators help students verify calculations through auditory feedback, while visual mathematics applications convert symbolic representations into visual models, supporting conceptual understanding. Digital notation tools simplify mathematical writing and alignment and step-by-step solution platforms guide learners through

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procedural problem-solving processes, enhancing both accuracy and comprehension.

For **executive skills**, including memory and organization, time-management applications assist learners in scheduling tasks and managing deadlines. Digital planners and reminder systems provide prompts that improve task completion, while task-breakdown checklists help students organize complex assignments into manageable steps, fostering independence and self-regulation.Effective implementation of these assistive solutions requires practical strategies such as introducing one tool at a time to ensure proper adaptation, involving students and parents in decision-making to enhance acceptance and usability, maintaining low-tech backup options to ensure continuity of support, conducting regular review meetings for monitoring effectiveness and consistently focusing on increasing learner independence, ensuring that assistive technology functions as an empowerment tool rather than a dependency.

Future Directions:

- Integration of AI-enabled adaptive assistive tools
- Policy-level structured implementation frameworks
- Research on long-term educational outcomes
- Development of indigenous, low-cost accessibility solutions
- Expansion of universal design-based inclusive classrooms
- Integration of SETT training within teacher education curricula

Conclusion:

Adaptive and assistive technologies are essential for sustaining inclusive educational practices in rapidly evolving learning environments. The SETT framework provides a comprehensive, collaborative and context-sensitive model that ensures assistive technology selection remains student-centred and data-driven. Effective implementation requires teacher preparedness, institutional support, continuous monitoring and ethical accountability. When applied systematically, the SETT framework significantly enhances accessibility, learner independence, participation and overall educational quality, contributing to the broader goal of equitable education for all.

References :

1. *Alper, S., & Raharinirina, S. (2006). Assistive technology for individuals with disabilities. Journal of Special Education Technology, 21(2), 47–64.*
2. *Dell, A. G., Newton, D., & Petroff, J. (2017). Assistive technology in the classroom. Pearson.*
3. *Edyburn, D. L. (2004). Rethinking assistive technology. Special Education Technology Practice, 6(1), 16–23.*
4. *Okolo, C. M., & Bouck, E. C. (2007). Research about assistive technology. Journal of Special Education Technology, 22(3), 19–33.*
5. *Joy Zabala. (2005). Using the SETT Framework to Level the Learning Field for Students with Disabilities. Wisconsin Assistive Technology Initiative (WATI).*
6. *Dave L. Edyburn. (2004). Rethinking assistive technology. Special Education Technology Practice, 5(4), 16–23.*
7. *Marilyn Friend & William D. Bursuck. (2019). Including Students with Special Needs: A Practical Guide for Classroom Teachers (8th ed.). Pearson.*
8. *Rose, David H. & Meyer, Anne. (2002). Teaching Every Student in the Digital Age: Universal Design for Learning. ASCD.*

ISSN–2278-5655

AMIERJ Aarhat Multidisciplinary International Education Research Journal

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OPEN ACCESS Original Research Article

9. *UNESCO. (2020). Global Education Monitoring Report 2020: Inclusion and Education – All Means All. UNESCO Publishing.*

10. *Zabala, J. (1995). The SETT framework: Critical areas to consider when making assistive technology decisions. Closing the Gap, 23(6), 1–4*

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