



Empowering Vision Beyond Sight: A Study of Arunodaya Program (Sun Rise for the Blind) in Coastal Andhra Pradesh.

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Abstract

Children with visual impairments face unique challenges that extend across education, social integration, and independent living. In the coastal districts of Andhra Pradesh, these challenges are shaped not only by disability but also by geographic remoteness, limited access to adaptive learning technologies, and socio-economic constraints. This paper examines the impact of visual impairment on children's educational outcomes, cognitive development, and psychosocial well-being. Drawing on field data, program documentation, and case profiles from the Ek Kadam Aur Foundation for Education and Health (EKAF) and its Arunodaya Program, we explore how adaptive learning tools, digital navigation training, and tactile logic interventions affect academic achievement and independence. The findings highlight significant gains in cognitive skills, self-confidence, and social participation among children exposed to inclusive education models reinforced with technology-assisted learning.

Key words: Adaptive learning, Visual impairment, Educational outcomes, Assistive technology, Digital navigation, Social inclusion

1. Introduction

Visual impairment in childhood presents complex educational and developmental challenges. While children with visual disabilities often demonstrate strong potential for academic and cognitive achievements, their progress is frequently hindered by inadequate access to quality education, lack of assistive technology, and insufficient social support structures. In Andhra Pradesh's coastal districts characterized by fishing communities, rural hamlets, monsoon hazards, and limited schooling infrastructure these challenges multiply.

This study investigates the lived experiences of visually impaired children in this region, focusing on how adaptive digital learning, tactile logic tools, and community-based support influence educational outcomes and psychosocial development. Particular attention is paid to programs implemented by the Ek Kadam Aur Foundation, whose initiatives seek to bridge gaps in both learning access and confidence building.

2. Literature Review

2.1 Education and Visual Impairment

Research consistently shows that children with visual impairments are at risk of lower academic achievement compared to their sighted peers largely due to lack of resources, inclusive teacher training, and accessible learning materials (UNESCO, 2021). Early intervention and assistive technologies are identified as critical determinants of educational success (Warren, 2015).

2.2 Assistive Technologies

Assistive technologies such as screen readers, braille displays, and adaptive educational software improve classroom participation and cognitive development (Cole & Meyer, 2020). Digital literacy combined with tactile learning enhances memory retention and logical reasoning among visually impaired learners (Smith & Grawford, 2018).

2.3 Socio-Economic Barriers in Coastal Regions

Coastal districts often face infrastructure limitations including unstable electricity, limited internet penetration, and seasonal displacement due to cyclones or flooding. These factors contribute to educational disruption for children with disabilities (Andhra Pradesh Education Commission, 2019).

3. Ek Kadam Aur Foundation for Education and Health & Arunodaya Programme

The Ek Kadam Aur Foundation for Education and Health (EKAF) is a non-profit organization focused on uplifting visually impaired and underprivileged children, particularly those from economically disadvantaged and rural backgrounds. Their core mission is to provide educational support, instil basic life skills, Orientation and Mobility, and help these children develop confidence, independence, and the necessary tools to succeed academically and socially. By empowering these children, EKAF aims to foster the development of independent learners, ensuring they can thrive despite the challenges posed by visual impairments.

Arunodaya Program

The Arunodaya Program is designed to support visually impaired children by providing a structured and comprehensive approach to learning. The programme is divided into three phases, each of which builds upon the previous one to gradually increase the child's independence, academic abilities, and confidence. Each phase is carefully crafted to address different aspects of learning and personal development, ensuring that the children receive a holistic education, by assimilating them in mainstream school. The three phases are as follows:

Phase 1: Foundation Building

Objective: To introduce students to essential life skills and provide a strong foundation for their academic journey.

In this phase, students are focused on building basic, practical skills necessary for everyday life. These foundational skills are essential for the children's ability to navigate the world around them independently. The primary goals of Phase 1 are:

Daily Living Skills: Students are taught important tasks like personal hygiene, dressing, and managing daily activities. These skills allow children to live more independently and participate fully in their communities.

Sensory Training: Children learn to rely on their other senses, such as touch and hearing, to process information and navigate their environment. This helps them adapt and make the most of their abilities.

Orientation and Mobility: Students are taught how to move around safely and confidently in their environment. This includes learning how to navigate their home, school, and outdoor spaces independently.

Parents' Sensitisation: In this module, parents and the community are trained on how to understand and effectively interact with children with visual impairments. This is a crucial component, as it ensures continued support beyond the intervention period. By equipping parents with the right knowledge and skills, they are empowered to guide their children toward independence and self-sufficiency, enabling them to lead confident and independent lives.

Phase 1 Focus Areas are Sensory Training, Activities of Daily Living, Orientation and Mobility, Parents' Sensitisation, and Primary Education. These skills serve as the foundation for more advanced learning in later phases.

Impact: At the end of Phase 1, the children showed tremendous improvement in these fundamental skills, as well as a basic introduction to the assistive tools such as smart phone and key board for digital literacy, cane and abacus. The baseline (Conducted during the enrolment of the program) average score for students was 2.8, which increased to 13.8 at midline (conducted after 3 months of the program initiation) and reached 17.9 at endline (After 6 months), showing a very progressive improvement in competency levels. This demonstrates the effectiveness of the program in equipping students with the essential abilities needed to progress in their learning journey.

Phase 2: Digital Literacy and Social Skills Development

Objective: To introduce students to digital tools and enhance their social interaction skills.

Phase 2 builds on the skills gained in Phase 1 and focuses on digital literacy and social skills. The aim of this phase is to prepare students for the modern digital world while helping them develop the social skills needed to interact with their peers and teachers.

Digital Literacy: Students are continued to introduced to digital tools, including computers, smartphones, and assistive technologies like screen readers, talk backs, assistive applications such as Seeing AI, Be My Eyes, and audio feedback systems. These tools enable them to access learning materials, educational apps, and online content, making it easier for them to participate in their education independently. Learning to use technology at an early stage empowers students to become self-reliant in their studies.

Social Skills: This phase also focuses on teaching students essential communication skills. They learn how to interact with their sighted peers, participate in group discussions, and understand social norms. This helps them form meaningful relationships with others, which is vital for their overall well-being and integration into the community. Also, focus is on training the mainstream teachers on how to make a classroom inclusive and teach a child with visual impairment, for which EKAF have a specially designed teachers' training sessions curriculum. Also, children are introduced to Self Learning Modules, and the purpose of SLMs is to make children self-sufficient in learning their academic curriculum without external guidance.

Impact: By the end of Phase 2, students had made significant progress in both academic and social areas, and were also able to participate in the school setup. For instance:

M. Vinay Kumar improved from a baseline score of 20 to 150 at midline and 410 at the endline, achieving a growth of +390 points. A few more impact numbers from the program are G. Joseph, who improved from 45 to 340 (+295 points), Sravani improved from 40 to 355 (+315 points), and M. Harika progressed from 60 to 320 (+260 points).

These improvements reflect the students' enhanced ability to use digital tools and engage confidently with their peers, demonstrating the effectiveness of Phase 2 in advancing both academic and social development.

Phase 3: Self-Learning Modules (SLM) and Independent Study

Objective: To foster self-reliant learning and academic independence among students.

Phase 3 is a critical turning point in the Arunodaya Programme. It focuses on helping students transition from guided learning to becoming independent learners. By this stage, students have acquired the foundational skills they need and are ready to take full ownership of their learning journey. Phase 3 is about implementing the Self-Learning Modules (SLMs), which are specially designed learning materials that encourage students to study on their own.

Understanding Academic Concepts: Students use SLMs to learn academic subjects at their own pace. These modules are structured and designed to be accessible, helping children grasp concepts independently, without needing constant teacher intervention.

Note-Taking and Exam Preparation: Students are taught how to take notes and prepare for exams on their own, building their organizational and time-management skills. This not only helps them with current studies but also prepares them for the future when they will need to manage their education independently.

Using Technology as a Learning Tool: In Phase 3, students continue to use digital tools to access learning materials, practice skills, and review content. This empowers them to take charge of their studies and review key concepts regularly, with minimal help from others.

Impact of Phase 3: By the end of Phase 3, students are expected to be academically independent. They can understand academic concepts, take notes, and study on their own, demonstrating self-confidence and self-reliance. Teachers continue to offer guidance, but students are more capable of managing their academic journey independently.

The Role of Assistive and Digital Technologies

Throughout all phases of the Arunodaya Programme, the integration of assistive and digital technologies has been a crucial element in enabling students to succeed. These technologies allow students to access content, participate in learning activities, and interact with the world around them in ways that were previously difficult. Key tools include:

Screen readers that read out text on digital devices, allowing students to access books, assignments, and online resources independently.

Audio feedback systems that provide spoken instructions and guidance on digital platforms.

Other assistive technologies, such as magnification tools, that help students with visual impairments better access educational content.

These technologies ensure that visually impaired students are not left behind in a world that is increasingly dependent on digital tools, helping them participate fully in their education.

4. Methodology

To measure the effectiveness of the Arunodaya Programme, a mixed-methods approach was used. This approach included:

Quantitative Surveys: A structured questionnaire was administered to 120 visually impaired children, their parents, and teachers. The survey focused on areas such as academic progress, digital proficiency, self-confidence, and social participation.

Qualitative Interviews: In-depth interviews were conducted with EKAF educators, school disability support staff, and parents to gain deeper insights into the children's experiences, challenges, and progress.

5. Results: Impact across Phases

The Arunodaya Programme has led to significant improvements in the performance of visually impaired children. Here are some key findings:

Phase 1: Students demonstrated tremendous improvement in foundational skills, including daily living, sensory training, Orientation and mobility.

Phase 2: Students demonstrated rapid growth in digital literacy introduction and social skills. It reflect the programme's effectiveness in improving both digital and social competencies.

Phase 3: By the end of Phase 3, students were expected to be academically independent, capable of using Self-Learning Modules to manage their learning. The programme achieved its goal of fostering independence and self-reliance among students.

6. Discussion and Implications

The study confirms that adaptive learning technologies and tactile logic can significantly enhance the academic, cognitive, and psychosocial development of visually impaired children. Key findings include:

Increased independence in digital spaces: By mastering digital tools early, children can access learning resources independently, which levels the playing field with their sighted peers.

Improved confidence and engagement: The use of adaptive technologies empowers children, enabling them to take an active role in their education and social lives. However, to scale the impact of the programme, systemic barriers need to be addressed, particularly in the areas of:

Teacher training to ensure that mainstream educators are equipped to teach visually impaired students.

Infrastructure improvements, particularly in rural and remote areas where access to technology and consistent power supply can be challenging. Community sensitization to reduce stigma and promote inclusion of children with disabilities.

7. Recommendations for Future Action

The Arunodaya Program provides a powerful model for inclusive education, showing that with the right support and tools, Child with visual impairment can achieve academic success and lead fulfilling lives.

Based on the findings, the following recommendations are made to ensure the continued success and expansion of the Arunodaya Programme and to create a more inclusive education system:

1. Expand access to assistive technology in coastal and rural schools, ensuring that all children with visually impairment ed children have the tools they need to succeed.
2. Develop and implement comprehensive training programs for mainstream teachers to equip them with the skills required to teach students with visually impairment effectively.
3. Foster partnerships between government agencies, NGOs, and the private sector to increase resources and support for children with visually impairment.
4. Promote community awareness campaigns aimed at reducing stigma and raising awareness about the rights and capabilities of children with disabilities.
5. Establish monitoring and evaluation systems to assess the long-term impact of adaptive learning programs and to make data-driven improvements.

8. Conclusion

The success of the Arunodaya Programme showcases the transformative power of adaptive learning and tactile logic for children with visually impairment. With the right support, these children can achieve academic success, build confidence, and lead fulfilling lives. By addressing infrastructure gaps, enhancing teacher training, and promoting greater awareness, EKAF can ensure that the benefits of this initiative reach more children, improving educational outcomes and social integration on a larger scale.

By expanding access to adaptive technologies, providing targeted teacher training, and promoting community awareness, the Arunodaya Programme has the potential to set a model for inclusive education across the nation. The results of this study underline the importance of investing in specialized education and technology to create an equal educational landscape for all children, regardless of their abilities.

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