

IMPACT OF ORBIT READERS ON SOCIO-ECONOMIC AND EDUCATION ACTIVITIES OF PERSONS WITH VISUAL IMPAIRMENT IN SELECTED STATE IN SOUTHWESTERN NIGERIA

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Abstract

This study investigates the Impact of Orbit Readers on Socio-Economic and Education Activities of Persons with Visual Impairment. It focuses on their influence on academic performance, access to opportunities, challenges in use, and ways to improve accessibility. A qualitative approach was adopted to understand participants' lived experiences. Eleven visually impaired individuals from Lagos, Ondo, Osun, and Ogun states, who had used Orbit Readers for at least six months, were selected through purposive sampling. Data were collected through semi-structured interviews, allowing for detailed and flexible discussions. The interviews were guided by research objectives, recorded, and transcribed word for word. The data were analyzed using thematic analysis, which involved coding and identifying patterns across responses. Findings show that Orbit Readers improved reading speed, comprehension, and exam preparation, leading to better academic performance. Participants also reported increased confidence, improved access to job opportunities, and greater involvement in skill development activities. Despite these benefits, challenges such as high device cost, limited training, and occasional technical issues were noted. Participants suggested financial support, better training programs, and accessible technical assistance as solutions. The study concludes that Orbit Readers support both academic progress and economic independence for persons with visual impairments, though affordability and training gaps remain key concerns. It recommends stronger collaboration among governments, NGOs, and educational institutions to improve access and support.

Keywords: Orbit Readers, Visual Impairments, Assistive Technology, Socio-Economic Empowerment, Education, Accessibility.

Introduction

Access to education and socio-economic opportunities for persons with visual impairments remains a pressing global issue, particularly in developing countries like Nigeria. The challenges faced by persons with visual impairment in these regions are deeply rooted in infrastructural deficiencies that limit their ability to fully participate in academic, professional, and social activities. Historically, persons with disabilities have been marginalized, facing systemic barriers and discrimination that exacerbate their exclusion from education and employment opportunities. This social exclusion perpetuates a cycle of poverty that is difficult to break, especially in countries with weak social support systems.

Developed nations have made significant strides in promoting the inclusion of persons with visual impairment through the implementation of robust policies, technological innovations and educational reforms. Countries such as the United States and the United Kingdom have adopted inclusive education frameworks that ensure persons with disabilities are integrated into mainstream schools. These efforts are supported by the availability of assistive technologies, including screen readers, refreshable Braille displays and other digital tools that enhance the learning experience for persons with visual impairment. Such advancements have significantly improved the educational and socio-economic outcomes for persons with visual impairment in these regions.

However, the situation remains challenging in Nigeria, despite being home to over 1.3 million persons with visual impairments (Eze et al., 2025), Nigeria continues to struggle with inadequate public awareness, insufficient policy enforcement, and a lack of accessible infrastructure. These factors contribute to the continued marginalization of persons with visual impairment in education and employment. Many schools lack the necessary resources to accommodate persons with visual impairment, while the limited availability of assistive technologies means that even those who attend school are often at a disadvantage compared to their sighted peers. Abodunrin & Abodunrin 2020 defines visual impairment as deficiency in the organ of sight which hinders individual capability from performing certain functions that require the use of sight.

Education is a cumulative process of development that helps in developing intellectual, skills, values, norms and culture which predisposes man to action later in life (Abodunrin & Lawal 2023). The educational barriers faced by persons with visual impairment in Nigeria are compounded by socio-economic challenges (Okonji et al., 2024). Limited access to quality education reduces their chances of securing meaningful employment, further entrenching them in poverty. The lack of government support and funding for assistive technologies, coupled with high costs, makes it difficult for many persons with visual impairment to access the tools they need to succeed academically or professionally. As a result, persons with visual impairment in Nigeria are often confined to low-paying jobs or remain unemployed, limiting their socio-economic mobility (Fontana & Mitra, 2023). Efforts to address these issues in Nigeria have been sporadic and largely inadequate. While there have been some initiatives aimed at promoting inclusive education, these programs often lack the funding and infrastructure needed to make a meaningful impact. Additionally, there is a shortage of trained educators who are equipped to teach persons with visual impairment using assistive technologies (Biswalo, 2024). This further hampers the ability of persons with visual impairment to receive a quality education that would enable them to compete in the job market.

Access to education and socio-economic opportunities for persons with visual impairment remains an urgent issue, particularly in developing countries like Nigeria. While developed nations have made progress in promoting the inclusion of persons with visual impairment through legislation and technology, countries like Nigeria must overcome significant challenges to achieve similar outcomes. By investing in inclusive education, improving access to assistive technologies, and fostering greater social inclusion, Nigeria can create a more equitable society for persons with visual impairments.

Assistive technology plays a pivotal role in bridging the educational and social gap between persons with visual impairments and their sighted peers. Traditional tools like Braille have long provided a foundational method for persons with visual impairment to communicate, learn, and engage with the world. Braille, invented by Louis Braille in 1824, remains a cornerstone of literacy for persons with visual impairment by offering a tactile writing and reading system (Gurnani & Kaur, 2025). Despite its significance, Braille has its limitations, especially in a rapidly digitizing world where print-based Braille materials are often bulky, expensive, and slow to produce. This limitation underscores the importance of integrating modern assistive technologies to expand access and opportunities for persons with visual impairment.

The Orbit Reader, a refreshable Braille display, has emerged as a game-changer in this field due to its affordability and portability. Developed as a cost-effective alternative to more expensive Braille displays, the Orbit Reader has made assistive technology accessible to a broader audience. It allows persons with visual impairment to engage with digital content, from academic textbooks to work documents, without the financial burden typically associated with high-end technology. In educational settings, the Orbit Reader enables students to access the same digital textbooks and learning materials as their sighted peers, helping bridge the digital divide and fostering a more inclusive learning environment (Memon & Memon, 2025).

The importance of assistive technology in education extends beyond providing access to materials. Devices like the Orbit Reader also facilitate independence and self-reliance among persons with visual impairment (Lee, 2021). Screen readers, voice-operated tools, and refreshable Braille displays allow persons with visual impairment to perform tasks such as writing emails, conducting research, and creating presentations, which are essential in most modern workplaces. Despite these advancements, challenges remain in ensuring that assistive technologies are available and affordable for all who need them. In developing nations like Nigeria, access to high-end assistive devices is often limited by financial constraints, lack of public awareness, and inadequate government support.

Methods

This study employed a descriptive quantitative research design to explore the impact of Orbit Readers on the socio-economic and educational activities of persons with visual impairments. A purposive sampling technique was utilized to select participants for the study. This technique is appropriate as it allows for the selection of individuals who have specific characteristics relevant to the research topic. The sample consisted of a total of eleven participants, including six individuals from Lagos, two from Ondo, two from Osun, and one from Ogun. This distribution ensures a diverse representation of experiences across different states. The criteria for selection included: Individuals who are visually impaired and currently using Orbit Readers and Participants who have been using Orbit Readers for at least six months to ensure they have sufficient experience to provide valuable insights.

Data was collected through semi-structured interviews, which allow for flexibility in questioning while ensuring that key topics are covered. The interview guide was developed based on the literature review and research objectives, focusing on themes such as: Experiences with using Orbit Readers, Impact on educational performance and participation,

Socio-economic benefits associated with the use of Orbit Readers, Challenges faced while using assistive technology. The interview was conducted in a conducive environment to facilitate open and honest communication. A voice recorder was used to capture the interviews, ensuring accurate data collection for subsequent analysis. The interviews were scheduled at the convenience of the participants, in person and through virtual platforms. Each interview lasted approximately 15 to 20 minutes, allowing ample time for participants to share their experiences in detail. Following the interviews, the recordings were transcribed verbatim for data analysis.

The data collected from the interviews was analyzed using thematic analysis. This method involves coding the data to identify recurring themes and patterns related to the impact of Orbit Readers on the educational and socio-economic activities of persons with visual impairment.

Result

Demographic Information of Respondents

Table 1: Demographic Characteristics of Respondents

Demographic Variable	Category	Frequency (n=11)	Percentage (%)
Gender	Male	7	63.6%
	Female	4	36.4%
Age Group	18-25	3	27.3%
	26-35	5	45.5%
	36-45	3	27.3%
Educational Background	Secondary Education	2	18.2%
	Tertiary Education	9	81.8%
Duration of Orbit Reader Use	6 months - 1 year	4	36.4%
	1-2 years	5	45.5%
	More than 2 years	2	18.2%

Table 4.1 provides an overview of the demographic characteristics of the 11 respondents who participated in the study. In terms of gender, the majority were male (7 respondents, 63.6%), while females accounted for 4 respondents (36.4%). This distribution indicates a higher representation of male participants, which could suggest a gender disparity in the access or use of assistive technology like Orbit Readers.

The age group analysis shows that respondents were fairly distributed across three age categories. The largest group was between 26-35 years (5 respondents, 45.5%), followed by the 18-25 years and 36 – 45 years' age groups, each with 3 respondents (27.3%). This suggests that most users were within their mid-20s to mid-30s, an age range typically associated with active academic pursuits or early-stage professional development.

Regarding educational background, the data indicates that most respondents had completed tertiary education (9 respondents, 81.8%), while a smaller portion had only secondary education (2 respondents, 18.2%). This trend highlights that the majority of Orbit Reader users are likely individuals with higher educational qualifications, potentially because of their

familiarity with or need for advanced assistive technologies to support higher learning or professional tasks.

In terms of duration of Orbit Reader use, the highest number of respondents had used the device for 1-2 years (5 respondents, 45.5%). This was followed by those who had been using it for 6 months to 1 year (4 respondents, 36.4%), and those with more than 2 years of experience (2 respondents, 18.2%). These findings suggest that while many users are relatively new to using Orbit Readers, there is also a notable proportion with more extended experience, indicating growing adoption over recent years.

Research Questions

Research Question 1: How do Orbit Readers influence the academic performance of persons with visual impairments in Western Nigeria?

Table 2: Impact of Orbit Readers on Academic Performance

Items	Frequency of Mention	Percentage of Respondents (%)
Improved Reading and Comprehension	9	81.8%
Increased Academic Participation	8	72.7%
Enhanced Exam Preparation	7	63.6%

Field survey, 2024

Table 4.2 highlights the significant impact that Orbit Readers have on the academic performance of persons with visual impairments (persons with visual impairment). The most frequently mentioned benefit was improved reading and comprehension, noted by 9 respondents (81.8%). This suggests that the majority of participants found that Orbit Readers greatly enhanced their ability to read Braille texts more efficiently and comprehend academic material better. This improvement in reading skills likely enables persons with visual impairment to engage more deeply with their studies and grasp complex concepts that are essential for academic success.

The second major theme, increased academic participation, was reported by 8 respondents (72.7%). This indicates that the use of Orbit Readers has facilitated more active engagement in academic settings, such as participating in class discussions, group work, and other collaborative educational activities. The ability to independently access academic content appears to empower students to contribute more meaningfully in their learning environments, which can foster a more inclusive educational experience.

Finally, enhanced exam preparation was cited by 7 respondents (63.6%), showing that Orbit Readers played a crucial role in helping users prepare for assessments. The device's ability to provide reliable access to academic materials and notes in Braille format allows persons with visual impairment to review and revise content effectively, ultimately boosting their confidence and performance in examinations. Collectively, these findings underscore the transformative academic benefits that Orbit Readers offer to visually impaired individuals, supporting their educational achievement and promoting academic independence.

Research Question 2: What is the impact of Orbit Readers on the socio-economic activities of persons with visual impairment?

Table 3: Socio-Economic Benefits of Orbit Readers

Items	Frequency of Mention	Percentage of Respondents (%)
Access to Employment Information	6	54.5%
Skill Development Participation	5	45.5%
Increased Confidence	7	63.6%

Field survey, 2024

Table 4.3 provides an overview of the socio-economic benefits of using Orbit Readers for persons with visual impairments (persons with visual impairment). One of the key themes highlighted was increased confidence, which was noted by 7 respondents (63.6%). This indicates that Orbit Readers play an essential role in boosting the self-assurance of persons with visual impairment. The improved access to information and the ability to engage more independently in various activities contribute to a sense of empowerment and self-reliance, enabling users to approach tasks and challenges with greater confidence.

Access to employment information was mentioned by 6 respondents (54.5%), illustrating that Orbit Readers help bridge the information gap for visually impaired individuals seeking job opportunities. By enabling easier access to job postings, training resources, and employment news in an accessible format, Orbit Readers facilitate better participation in the labor market and enhance employability among persons with visual impairment. This aspect underscores the role of assistive technology in supporting the economic inclusion of individuals with disabilities.

Skill development participation was reported by 5 respondents (45.5%). This shows that Orbit Readers encourage users to partake in skill-building activities, such as vocational training and educational programs. These activities are crucial for expanding the capabilities and professional qualifications of persons with visual impairment, which can lead to improved career prospects and economic stability. Overall, the findings from Table 4.3 highlight that Orbit Readers have a meaningful impact on the socio-economic well-being of persons with visual impairment by fostering independence, facilitating access to employment-related information, and supporting continuous skill development.

Research Question 3: What challenges do persons with visual impairment face in the adoption and usage of Orbit Readers?

Table 4: Challenges Faced in the Use of Orbit Readers

Items	Frequency of Mention	Percentage of Respondents (%)
High Cost of Purchase	8	72.7%
Limited Training Resources	6	54.5%
Technical Issues	4	36.4%

Field survey, 2024

Table 4.4 highlights the main challenges faced by persons with visual impairments (persons with visual impairment) when using Orbit Readers. The most frequently mentioned challenge

was the high cost of purchase, cited by 8 respondents (72.7%). This indicates that the financial burden associated with acquiring an Orbit Reader is a significant barrier to accessibility. The cost constraint limits the availability of this crucial assistive device, particularly for individuals in lower-income brackets or those without external financial support. This finding points to the need for initiatives such as government subsidies, grants, or partnerships with non-profit organizations to make these devices more affordable.

The second most commonly reported issue was limited training resources, noted by 6 respondents (54.5%). This suggests that, while Orbit Readers provide valuable functionality, many users struggle with inadequate training and support to maximize their use. A lack of proper training infrastructure can hinder users' ability to effectively operate the device, reducing its potential impact on their academic and socio-economic activities. Addressing this challenge could involve the establishment of more training programs, workshops, and user support services, ensuring that persons with visual impairment can fully benefit from the technology.

Lastly, technical issues were identified by 4 respondents (36.4%), indicating that malfunctions and device reliability problems are also notable concerns. Technical issues can disrupt users' productivity and lead to frustration, limiting the device's practical application. Regular maintenance services and user-friendly troubleshooting guides would be beneficial in mitigating these issues, ensuring that users can rely on their devices without frequent disruptions.

Overall, the challenges outlined in Table 4.4 emphasize the importance of addressing financial, educational, and technical barriers to enhance the accessibility and efficacy of Orbit Readers for persons with visual impairment.

Research Question 4: How can the adoption of Orbit Readers among persons with visual impairment in Western Nigeria be improved?

Table 5: Recommendations for Improving Adoption

Items	Frequency of Mention	Percentage of Respondents (%)
Government Subsidies	7	63.6%
Increased Training Opportunities	9	81.8%
Support Centers for Maintenance	5	45.5%

Field survey, 2024

Table 4.5 presents key recommendations for enhancing the adoption of Orbit Readers among persons with visual impairments (persons with visual impairment) in Western Nigeria. The most frequently suggested strategy was the provision of increased training opportunities, mentioned by 9 respondents (81.8%). This recommendation underscores the critical need for comprehensive training programs that can empower users with the necessary skills to operate the device effectively. Enhanced training would ensure that users maximize the benefits of Orbit Readers, improving their academic performance and socio-economic participation. Initiatives could include workshops, user tutorials, and structured support systems to cater to both beginners and experienced users.

Government subsidies were also highlighted, with 7 respondents (63.6%) emphasizing the importance of financial assistance in making Orbit Readers more affordable. This suggests that many individuals struggle with the initial cost of purchasing the device. Subsidies or financial aid from the government could help bridge this gap, ensuring that more persons with visual impairments have access to this essential technology. Reducing the cost barrier could significantly expand the reach of Orbit Readers, promoting their widespread use and fostering inclusivity.

Lastly, support centers for maintenance were recommended by 5 respondents (45.5%). The establishment of such centers would provide crucial technical support, addressing malfunctions and routine maintenance issues that users face. Reliable support services would help users maintain their devices in good condition, reducing downtime and frustration. This recommendation indicates that while access to the device is vital, sustained support is equally important to ensure long-term usability and satisfaction.

Together, these recommendations, training opportunities, financial subsidies, and maintenance support provide a comprehensive framework for improving the adoption and effective use of Orbit Readers, facilitating better educational and socio-economic outcomes for persons with visual impairments.

Discussion of Findings

Research question one examines how Orbit Readers influence the academic performance of persons with visual impairments in Western Nigeria. Findings in Table 2 reveal that the use of Orbit Readers significantly improved the academic performance of persons with visual impairments (persons with visual impairment) in Western Nigeria. The most prominent impact was improved reading and comprehension (81.8%), followed by increased academic participation (72.7%) and enhanced exam preparation (63.6%). The improvement in reading and comprehension underscores the role of Orbit Readers in enabling persons with visual impairment to access Braille texts more efficiently, enhancing their understanding of academic materials.

This finding aligns with Uwizeyimana and Mugiraneza (2024), who reported a statistically significant relationship between the use of assistive learning resources (including Orbit Readers) and improved academic performance among visually impaired learners in Rwanda. Similarly, Olayemi & Oluwaseun (2023) found that the integration of assistive technologies in Nigerian special education schools enhanced students' reading fluency and comprehension outcomes. Increased academic participation observed in this study suggests that the use of Orbit Readers enables students to engage more actively in classroom discussions and group activities. This mirrors the conclusion of Oyedokun (2025), who noted that assistive learning devices promote classroom inclusion by improving learners' confidence and participation. Furthermore, enhanced exam preparation implies that Orbit Readers support effective study habits by providing reliable access to academic materials in Braille format. According to Sharma et al., (2025), students who use digital Braille tools demonstrate higher exam readiness due to better information retrieval and revision opportunities. Collectively, these findings demonstrate that Orbit Readers not only bridge the accessibility gap but also foster academic independence, improved comprehension, and inclusive learning for persons with visual impairment. Also Abodunrin and Obianuka 2023 reported that meeting the educational needs

of students with visual impairment requires adequate and effective teaching methods coupled with instructional materials which bridges the gap that exist between their impairment and instructional task leading to their improved academic performance.

Research question two examined the impact of Orbit Readers on the socio-economic activities of persons with visual impairment. Table 3 shows that Orbit Readers have substantial socio-economic benefits for persons with visual impairment, particularly through increased confidence (63.6%), access to employment information (54.5%), and participation in skill development (45.5%). The increased confidence reported by respondents indicates that Orbit Readers foster a sense of self-efficacy and autonomy among users. This finding is supported by Lebona (2024), who found that visually impaired individuals with access to assistive technologies demonstrated higher levels of self-confidence and greater participation in socio-economic activities. Similarly, Undie (2025) emphasized that improved digital literacy through assistive devices strengthens self-esteem and enhances employability among visually impaired persons in Nigeria.

The finding on access to employment information corroborates reports from the World Blind Union and National Industries for the Blind (2023), which revealed that assistive technologies, including Orbit Readers, improve access to employment-related information and enhance labor market participation. In the same vein, Kisanga (2025) observed that visually impaired graduates who use assistive technologies are more likely to identify and apply for job opportunities online. Participation in skill development activities also increased, suggesting that Orbit Readers promote continuous learning and vocational engagement. This supports the assertion of Yu (2024), who found that assistive devices expand the learning capacity of persons with visual impairment, encouraging them to participate in online courses and vocational programs that improve their career prospects. The socio-economic findings highlight the transformative role of Orbit Readers in empowering persons with visual impairment by fostering self-reliance, promoting economic inclusion, and supporting lifelong learning.

Research question three investigated the challenges faced by persons with visual impairment in the adoption and usage of Orbit Readers. Table 4.4 indicates that the major challenges include high cost of purchase (72.7%), limited training resources (54.5%), and technical issues (36.4%). The high cost of acquisition emerged as the most significant barrier. This finding agrees with the report by Premium Times Nigeria (2024), which noted that the high cost of assistive devices deepens exclusion among persons with disabilities. Likewise, Kisanga (2025) observed that financial constraints often prevent visually impaired individuals from acquiring high-quality assistive technologies, thereby widening the digital divide.

Limited training resources were also a major challenge, consistent with findings by Biswalo (2024), who reported that many visually impaired students and teachers lack adequate technical training to operate digital assistive devices effectively. Without proper training, users cannot maximize the full potential of Orbit Readers. Technical issues such as device malfunction and maintenance difficulties further limit sustained usage. According to Oldfrey et al., (2024), the absence of technical support and maintenance infrastructure contributes to high device abandonment rates among users of assistive technology. These challenges highlight the need for policy interventions such as subsidies, structured training programs,

and the establishment of local maintenance centers to ensure equitable and sustainable access to assistive devices.

Research question four explored how the adoption of Orbit Readers among persons with visual impairment in Western Nigeria can be improved. Table 4.5 identifies three key strategies for enhancing adoption: increased training opportunities (81.8%), government subsidies (63.6%), and support centers for maintenance (45.5%). The recommendation for increased training aligns with Uwizeyimana and Mugiraneza's (2024) suggestion that comprehensive training for both teachers and learners is critical to optimizing assistive technology use. Similarly, Gkiolnta et al., (2025) stressed the importance of continuous professional development programs to enhance users' competence and confidence in handling assistive devices. The call for government subsidies reflects widespread concerns about affordability. As noted by Reddy (2025), providing financial support or subsidized pricing for assistive technologies is essential to ensure accessibility and equity. This recommendation aligns with findings by Shabir et al., (2025), who advocated for policy-driven funding mechanisms to improve access to educational technologies for persons with disabilities.

The suggestion for establishing maintenance and support centers addresses the technical limitations noted earlier. Rudolf et al., (2022) reported that the availability of repair and support services increases user satisfaction and prolongs device lifespan. Taken together, these findings underscore the need for a multi-pronged approach that combines financial support, training, and technical infrastructure to ensure the sustained adoption of Orbit Readers and to maximize their academic and socio-economic benefits for persons with visual impairment.

Conclusion

The study concluded that Orbit Readers have a profound positive impact on the educational and socio-economic activities of persons with visual impairment in Western Nigeria. While the benefits of using Orbit Readers are evident, challenges such as financial constraints and limited technical training need to be addressed to enhance accessibility. The study confirms that assistive technology plays a crucial role in empowering individuals with visual impairments, enabling them to participate more actively in academic and socio-economic activities.

Recommendations

Based on the findings, the following recommendations are made:

1. Governments should provide subsidies and financial aid to make Orbit Readers more affordable for persons with visual impairment.
2. Non-governmental organizations (NGOs) and educational institutions should collaborate to create comprehensive training programs that teach users how to maximize the functionality of Orbit Readers.
3. Establishing local centers for maintenance and technical assistance will help users resolve issues promptly and reduce the barrier of technical malfunctions.
4. There should be campaigns to promote the benefits and usage of Orbit Readers among the visually impaired community and stakeholders.

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