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SELF-EFFICACY OF VISUALLY IMPAIRED STUDENTS: A COMPARATIVE STUDY OF SMART ASSISTIVE DEVICE USERS AND NON-USERS

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Abstract

The present study investigated the self-efficacy of visually impaired students regarding the use of smart assistive devices. A descriptive comparative research design was employed to compare self-efficacy between smart assistive device users and non-users. The sample consisted of 62 visually impaired students aged 12–16 years selected from inclusive schools and special institutions, including 30 smart assistive device users and 32 non-users. Data were collected using the Self-Efficacy Scale developed by Mathur and Bhatnagar. Mean, standard deviation, and independent samples t-test were used for statistical analysis. The findings revealed that visually impaired students who used smart assistive devices had significantly higher self-efficacy scores than non-users. The calculated t-value indicated a statistically significant difference between the two groups, leading to the rejection of the null hypothesis. The study concludes that the use of smart assistive devices positively influences the self-efficacy of visually impaired students. The findings highlight the importance of integrating assistive technologies in educational settings to promote confidence, autonomy, and independent functioning among visually impaired learners.

Keywords: *Self-Efficacy, Visually Impaired Students, Smart Assistive Devices, Assistive Technology, Comparative Study, Inclusive Education.*

Introduction:

Self-efficacy refers to an individual's belief in their capability to organise and execute the actions required to manage prospective situations effectively. According to Albert Bandura (1997), self-efficacy influences how people think, feel, motivate themselves, and behave. In educational settings, students with high self-efficacy tend to demonstrate greater persistence, resilience, motivation, and academic achievement. For students with visual impairment, self-efficacy is particularly important because they frequently encounter barriers related to mobility, communication, independent learning, and social participation. These barriers may restrict

opportunities for mastery experiences and independence, which are central to the development of self-efficacy.

Research has shown that visually impaired students often report lower self-efficacy than their sighted peers, especially in domains involving academic tasks, independent mobility, and social interaction (Pinquart & Pfeiffer, 2012). Limited access to resources, dependence on others, and societal attitudes may further weaken their confidence in performing everyday and educational tasks independently. However, self-efficacy is not a fixed trait and can be enhanced through environmental support, successful experiences, and assistive interventions.

In recent years, smart assistive devices such as screen readers, Braille displays, AI-based navigation systems, smart canes, OCR readers, and voice-enabled educational applications have emerged as transformative tools for students with visual impairment. These technologies improve access to information, independent mobility, communication, and academic participation. By enabling visually impaired students to perform tasks autonomously, smart assistive devices may foster mastery experiences and strengthen beliefs in personal competence.

Empirical evidence suggests that assistive technology contributes positively to psychological empowerment and functional independence among persons with disabilities. For example, Kelly and Smith (2011) found that assistive technology enhances academic engagement and confidence among students with visual impairment. Similarly, Shinohara and Wobbrock (2016) reported that technology use improves perceptions of competence, independence, and social confidence among visually impaired individuals. Muhsin et al. (2024) also concluded that modern assistive technologies significantly improve autonomy and psychosocial well-being among people with visual impairment.

Despite the growing adoption of smart assistive technologies, limited research has directly examined whether the use of such devices is associated with differences in self-efficacy among visually impaired students. Most existing studies focus on accessibility, usability, or academic performance, while psychosocial outcomes such as self-efficacy remain underexplored. Understanding the relationship between smart assistive device usage and self-efficacy is important because stronger self-efficacy may enhance students' academic persistence, independent functioning, and long-term adjustment.

Therefore, the present study aims to compare the self-efficacy of visually impaired students who use smart assistive devices and those who do not. The findings are expected to contribute to the growing body of literature on assistive technology and psychosocial development, while

also informing educators, rehabilitation professionals, and policymakers about the broader developmental benefits of technology integration for visually impaired learners.

Review of Literature:

Khodabakhshi-Koolaee & Malekitabar (2024) investigated psychosocial interventions among visually impaired students and found that supportive interventions significantly enhanced self-belief, confidence, and personal competence. The study highlighted that self-efficacy among visually impaired learners can be strengthened through structured support and empowerment-based strategies.

Muhsin et al. (2024) reviewed recent assistive technologies for persons with visual impairment and concluded that smart assistive devices improve autonomy, independence, and daily functional competence. The authors noted that these improvements contribute positively to users' confidence and perceived self-capability.

Sharma and Nagle (2017) examined self-efficacy and academic adjustment among students with visual impairment in inclusive educational settings in India. The study reported that higher perceived independence and access to educational support were significantly associated with greater self-efficacy among visually impaired learners.

Kumar and Singh (2020) studied assistive technology usage among students with visual impairment in Indian special schools and found that students using digital assistive devices demonstrated higher confidence, greater classroom participation, and improved academic self-belief compared to non-users.

Okolo, Althobaiti, and Ramzan (2024) examined smart navigation and assistive systems for visually impaired individuals and reported that AI-enabled assistive technologies significantly improve independent mobility and environmental interaction, thereby enhancing users' confidence and task-related efficacy.

Alnajdi, Salem, and Elshaer (2025) studied acceptance of AI-based assistive technologies among university students with visual disabilities and found that students with stronger self-beliefs and confidence were more likely to adopt such technologies, indicating a reciprocal relationship between technology use and self-efficacy.

Although several international studies have examined the psychosocial benefits of assistive technology among visually impaired individuals, limited research in India has specifically investigated the relationship between smart assistive device use and self-efficacy among visually impaired students. Further, very few comparative studies have directly examined

differences in self-efficacy between users and non-users of smart assistive devices. Therefore, the present study aims to address this gap.

Significance of the Study

The present study is significant as it examines the influence of smart assistive device usage on the self-efficacy of visually impaired students, an important yet underexplored area in disability and inclusive education research. By comparing users and non-users of smart assistive devices, the study will provide empirical evidence regarding the role of assistive technology in enhancing students' confidence and perceived competence. The findings may help educators understand how access to assistive technology contributes to students' independent learning and task performance. The study can guide special educators and rehabilitation professionals in promoting assistive technology for psychosocial as well as academic development. It may support policymakers in strengthening inclusive education initiatives related to assistive technology provision and training. The results can help parents appreciate the broader developmental value of smart assistive devices beyond accessibility. The study may encourage educational institutions to improve technological accessibility and training opportunities for visually impaired learners. From a research perspective, it will add to the limited literature on self-efficacy and assistive technology among visually impaired students. The findings may also serve as a foundation for future intervention and longitudinal studies in this area. Ultimately, the study seeks to promote inclusive educational practices that enhance the confidence, autonomy, and holistic development of visually impaired students.

Objectives of the Study:

1. To assess the level of self-efficacy among visually impaired students using smart assistive devices.
2. To assess the level of self-efficacy among visually impaired students not using smart assistive devices.
3. To compare the self-efficacy of visually impaired students using smart assistive devices and non-users.
4. To examine whether the use of smart assistive devices significantly influences self-efficacy among visually impaired students.

Hypothesis:

(H_{01}) There is no significant difference in self-efficacy between visually impaired students using smart assistive devices and those not using smart assistive devices.

Research Design

The present study employs a descriptive comparative research design to compare self-efficacy between visually impaired students who use smart assistive devices and those who do not. This design is appropriate as it enables comparison between two naturally existing groups without manipulation of variables.

Variables of the Study

Independent Variable

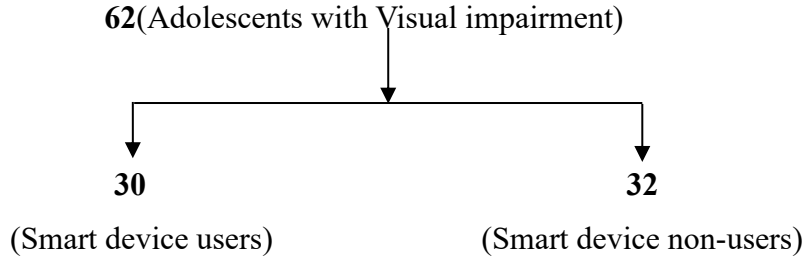
- Use of Smart Assistive Devices
    - Users
    - Non-Users

Dependent Variable

- Self-Efficacy of Visually Impaired Students

Sample:

The sample for the present study consisted of 62 visually impaired students, within the age range of 14 to 17 years. The participants were selected from various inclusive schools and special institutions. Initially, a larger sample was approached; however, due to incomplete responses, only 62 respondents were included in the final analysis. The sample was further classified into two groups: visually impaired adolescents, Smart Assistive Device Users (30) and Non-Users (32). The categorization was based on the type of children and relevant institutional records.



Tool:

The **Self-Efficacy Scale** developed by G. P. Mathur and Rajkumari Bhatnagar and published by National Psychological Corporation (NPC), Agra**,** was used in the present study to assess the self-efficacy of visually impaired students. The scale is a standardized psychological instrument designed to measure an individual's belief in their capability to perform tasks effectively and manage challenging situations. It consists of statements related to confidence, perseverance, self-belief, and problem-solving ability, to which respondents indicate their level of agreement as per the prescribed response format. The scale provides an overall self-efficacy

score, with higher scores indicating greater perceived self-efficacy. The tool has been widely used in educational and psychological research in India due to its established reliability and validity. The reported reliability coefficient of the scale indicates satisfactory internal consistency and test–retest reliability. Content and construct validity were established during the standardization process by the authors. Owing to its psychometric soundness and relevance to adolescent populations, the scale was considered appropriate for assessing self-efficacy among visually impaired students in the present study.

Data Collection Procedure

Data for the present study were collected from visually impaired students studying in inclusive schools and special institutions. Prior permission was obtained from the heads of the concerned institutions before administering the research tool. The purpose of the study was explained to the participants, and confidentiality of responses was assured. A list of visually impaired students aged 12–16 years was prepared with the help of institutional records. Based on school records, teacher reports, and participant responses, students were classified into Smart Assistive Device Users and Non-Users. The Self-Efficacy Scale developed by Mathur and Bhatnagar was administered in accessible format with necessary assistance according to the needs of the participants. The completed responses were screened, coded, and tabulated systematically for statistical analysis.

Statistical Techniques

Mean, Standard Deviation, and Independent Samples *t*-test were used to analyse the data and compare self-efficacy between the two groups.

Results & Discussion:

Table 1

Represents Mean, SD, and t-values between the self-efficacy of visually impaired students using smart assistive devices and those not using smart assistive devices.

Measures	Groups of VI Adolescents	N	Mean	SD	't' Value
Self-efficacy	Smart Device Users	30	85.44	20.69	4.38
	Non-users	32	63.96	18.11	$p<.01$

Table 1 presents a comparison of self-efficacy between visually impaired students who use smart assistive devices and those who do not. The mean self-efficacy score of Smart Assistive Device Users (M = 85.44, SD = 20.69) is higher than that of Non-Users (M = 63.96, SD =

18.11). The calculated *t*-value is 4.38, which is greater than the critical value at the 0.01 level of significance with 60 degrees of freedom. This indicates a statistically significant difference in self-efficacy between visually impaired students who use smart assistive devices and those who do not. Therefore, visually impaired students using smart assistive devices demonstrate significantly higher self-efficacy than non-users.

The null hypothesis (H_{01}), which states that there is no significant difference in self-efficacy between visually impaired students who use smart assistive devices and those who do not, was rejected. The findings indicate that visually impaired students who use smart assistive devices possess significantly higher self-efficacy than non-users. This may be attributed to the increased independence, accessibility, and successful task performance facilitated by assistive technologies, which strengthen students' confidence in their abilities. The findings are consistent with Muhsin et al. (2024), who reported that assistive technologies enhance autonomy and functional competence among persons with visual impairment. The results also support the findings of Sharma and Nagle (2017), who observed that greater independence and educational support are associated with higher self-efficacy among visually impaired students. Thus, the use of smart assistive devices appears to contribute positively to the development of self-efficacy among visually impaired learners.

Educational Implications:

- Educational institutions should ensure the availability of smart assistive devices for visually impaired students, as their use may enhance self-efficacy and independent task performance.
- Teachers and rehabilitation professionals should provide systematic training in the use of assistive technologies to strengthen students' confidence and functional competence in academic and daily activities.

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