

# Self-Concept of Visually Impaired Students: A Comparative Study of Smart Assistive Device Users and Non-Users

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## ABSTRACT

The present study examined the self-concept of visually impaired students in relation to the use of smart assistive devices. A descriptive comparative research design was employed to compare self-concept between smart assistive device users and non-users. The sample consisted of 67 visually impaired students aged 12–16 years selected from inclusive schools and special institutions, including 32 users and 35 non-users of smart assistive devices. Data were collected using the Self Concept Questionnaire developed by Saraswat. The mean, standard deviation, and an independent-samples *t*-test were used for statistical analysis. The findings revealed that visually impaired students who used smart assistive devices scored significantly higher than non-users across all dimensions of self-concept, including physical, social, temperamental, educational, moral, and intellectual. The null hypothesis was rejected as significant differences were found between the two groups. The study concludes that the use of smart assistive devices positively influences the self-concept of visually impaired students. The findings highlight the importance of integrating smart assistive technologies in educational settings to promote holistic development and psychosocial well-being among visually impaired learners.

**Keywords:** Self-Concept, Visually Impaired, Smart Assistive Device

## INTRODUCTION

Self-concept refers to an individual's perception, evaluation, and understanding of oneself, which plays a crucial role in psychological adjustment, academic performance, and social participation. For students with visual impairment, the development of a positive self-concept is often influenced by personal, environmental, educational, and technological factors. Visual impairment may create barriers in mobility, communication, academic engagement, and peer interaction, which can negatively affect students' perceptions of competence and self-worth. Research has consistently shown that students with visual impairment tend to experience challenges related to self-esteem, self-confidence, and social identity when compared with their sighted peers (Hurre & Aro, 2000).

In recent years, smart assistive devices such as screen readers, smart canes, Braille note-takers, AI-based navigation tools, OCR scanners, and voice assistants have transformed the educational and social experiences of visually impaired students. These technologies promote independence, enhance academic accessibility, improve mobility, and facilitate social participation. Studies indicate that the use of assistive technology significantly improves autonomy and confidence among students with disabilities (Kelly & Smith, 2011). Smart assistive devices not only support learning but also reduce dependence on others, thereby fostering feelings of competence and self-reliance.

According to Shinohara and Wobbrock (2016), technology adoption among visually impaired individuals positively contributes to identity formation and empowerment by enabling independent task performance. Similarly, Hersh (2013) reported that access to modern assistive technologies improves psychosocial well-being and social inclusion among persons with visual impairment. The increasing integration of smart technologies in inclusive education settings suggests that the use of assistive devices may meaningfully influence the self-

concept of visually impaired learners. However, despite growing emphasis on assistive technology, limited empirical research has directly compared the self-concept of visually impaired students who use smart assistive devices with that of those who do not.

Therefore, the present study aims to compare the self-concepts of visually impaired students who use smart assistive devices and those who do not, to determine whether technology use contributes to enhanced self-perception and psychosocial development. The findings may have valuable implications for educators, policymakers, rehabilitation professionals, and families in promoting the adoption of assistive technology for the holistic development of visually impaired students.

## REVIEW OF LITERATURE

**Khodabakhshi-Koolae and Malekitabar (2024)** investigated the effectiveness of positive psychology interventions on self-concept among visually impaired female students in Tehran. Using a quasi-experimental design, the study found significant improvements in self-concept and social adjustment among participants following the intervention. The findings indicate that psychosocial support can enhance self-perception in visually impaired students, highlighting the modifiable nature of self-concept.

**Muhsin et al. (2024)** conducted a comprehensive review of recent assistive technologies for persons with visual impairment and concluded that smart assistive tools significantly enhance independence, accessibility, and functional autonomy. The review emphasised that increased independence through assistive technology may positively influence psychosocial variables such as confidence and self-worth.

**Vouglanis (2024)** examined the use of assistive technology among visually impaired students and reported that it improves participation in educational activities, access to information, and academic engagement. However, the study also noted barriers, including inadequate training and limited accessibility. The findings suggest that technology use can support academic and psychosocial development when effectively implemented.

**Okolo, Althobaiti, and Ramzan (2024)** reviewed smart navigation and assistive systems for visually impaired persons and found that modern AI-enabled assistive technologies substantially improve independent mobility and environmental interaction. Improved mobility was associated with greater autonomy and enhanced user confidence, both of which are closely related to positive self-concept.

**Alnajdi, Salem, and Elshaer (2025)** examined the acceptance and use of AI-based assistive technologies among university students with visual disabilities and found that students with higher physical self-esteem were more likely to adopt these technologies. The study suggests a reciprocal relationship between self-perception and assistive technology use, indicating that technology adoption may reinforce positive self-beliefs.

**Szekely, Holloway, and Bandukda (2025)**, in their psychosocial review protocol, highlighted growing evidence that assistive technologies affect emotional well-being, self-esteem, social participation, and quality of life among people with visual impairments. Their review underscores the need for more empirical studies that specifically examine psychosocial outcomes, such as self-concept, among assistive technology users.

Although recent studies indicate that assistive technologies improve independence, autonomy, and psychosocial well-being among visually impaired individuals, very little empirical research has directly compared self-concept between visually impaired students who use smart assistive devices and those who do not. Therefore, the present study seeks to address this gap.

### Significance of the study

The present study is significant because it explores the relationship between the use of smart assistive devices and self-concept among visually impaired students. This area is receiving growing attention in inclusive education research. By comparing users and non-users of smart assistive devices, the study will provide empirical evidence regarding the psychosocial benefits of technology adoption beyond academic accessibility. The findings may help educators understand how assistive technologies contribute to students' confidence,

independence, and self-perception. The study can guide special educators and rehabilitation professionals in recommending appropriate assistive devices for the holistic development of visually impaired learners. It may assist policymakers in strengthening inclusive education policies related to the provision of technology in schools and higher education institutions. The results can help parents understand the broader developmental benefits of using assistive technology. Additionally, the study may encourage institutions to improve training and accessibility to enable the effective use of smart assistive devices. From a research perspective, it will contribute to the limited literature on psychosocial outcomes of assistive technology among visually impaired students. The study may also serve as a foundation for future intervention-based and longitudinal research in this field. Ultimately, it aims to promote evidence-based, inclusive practices to enhance the overall well-being of students with visual impairments.

### **Objectives of the Study**

1. To assess the level of self-concept among visually impaired students using smart assistive devices.
2. To assess the level of self-concept among visually impaired students not using smart assistive devices.
3. To compare the self-concept of visually impaired students who use smart assistive devices and those who do not use them.
4. To examine whether the use of smart assistive devices significantly influences the self-concept of visually impaired students.

### **Hypothesis**

H<sub>0</sub>1: There is no significant difference in self-concept between visually impaired students who use smart assistive devices and those who do not.

### **Variables of the Study**

#### Independent Variable

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

#### Dependent Variable

- Self-Concept of Visually Impaired Students

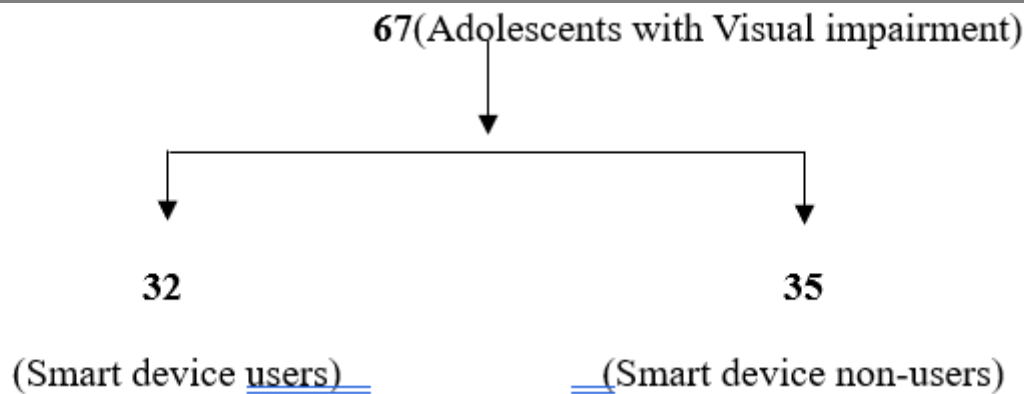
### **Research Design**

The present study employs a descriptive comparative research design to compare the self-concept of visually impaired students who use smart assistive devices with that of those who do not. This design is appropriate, as it facilitates comparison between two naturally occurring groups without manipulating variables. Quantitative data were collected using a standardised self-concept scale administered to visually impaired students.

### **Sample**

The sample for the present study consisted of 67 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 67 respondents were included in the final analysis. The sample was further classified into two groups: visually impaired adolescents, Smart Assistive Device Users (32) and Non-Users (35). The categorization was based on the type of children and relevant institutional records.



## Tool

**The Self Concept Questionnaire (SCQ)** developed by Dr. Raj Kumar Saraswat and published by National Psychological Corporation (NPC), Agra, was used to measure the self-concept of visually impaired students in the present study. The tool is a standardised psychological instrument designed to assess an individual's self-perception and evaluation across multiple dimensions. It consists of 48 items distributed across six dimensions of self-concept: Physical, Social, Temperamental, Educational, Moral, and Intellectual. The questionnaire provides scores for each dimension as well as an overall self-concept score. Responses are scored according to the manual guidelines, with higher scores indicating a more positive self-concept. The tool has been widely used in educational and psychological research in India due to its sound psychometric properties. The reported reliability coefficients of the scale range from 0.67 to 0.91, indicating acceptable to high reliability. Content validity of the instrument was established through expert judgment and item analysis during standardisation. Owing to its multidimensional assessment and established reliability and validity, the SCQ was considered appropriate for assessing self-concept among visually impaired students in the present investigation

## Data Collection Procedure

Data for the present study were collected from visually impaired students enrolled in various inclusive schools and special institutions. Prior permission was obtained from the heads of the respective institutions before administering the research tools. The researcher explained the purpose of the study to the participants and assured them of confidentiality and voluntary participation.

A preliminary list of visually impaired students aged 14 to 17 was prepared using institutional records. Information on the use of smart assistive devices was obtained from school records, teachers, and participant responses to classify students as Smart Assistive Device Users or Non-Users. The Self Concept Questionnaire, developed by Saraswat, was then administered either individually or in an accessible format, with necessary assistance to accommodate participants' visual needs. Initially, a larger number of students were approached; however, only completely filled and usable responses were retained for analysis. After screening for incomplete responses, data from 67 visually impaired students were included in the study, comprising 32 Smart Assistive Device Users and 35 Non-Users. The collected data were tabulated systematically for statistical analysis.

## Data Analysis Procedure

The collected data were coded, tabulated, and organized systematically for statistical analysis. Descriptive statistics, including mean and standard deviation, were computed to determine the level of self-concept among visually impaired students in both groups. An independent-samples t-test was conducted to compare the self-concept scores between Smart Assistive Device Users and Non-Users. The level of significance was set at 0.05. The analysis was carried out to determine whether a statistically significant difference existed between the two groups.

## RESULTS & DISCUSSION

**Table 1 Represents Mean, SD, and t-values between the self-concept 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
Physical	Smart Device Users	32	31	6.52	6.56
	Non-users	35	21	5.90	$p < .01$
Social	Smart Device Users	32	30	7.11	3.43
	Non-users	35	24	7.19	$p < .01$
Temperamental	Smart Device Users	32	33	8.19	5.02
	Non-users	35	24	6.24	$p < .01$
Educational	Smart Device Users	32	35	9.33	5.83
	Non-users	35	22	8.87	$p < .01$
Moral	Smart Device Users	32	29	5.50	2.69
	Non-users	35	25	6.65	$p < .01$
Intellectual	Smart Device Users	32	34	9.66	2.38
	Non-users	35	25	6.78	$p < .05$

Table 1 presents a comparison of self-concept between visually impaired students who use smart assistive devices and those who do not, across different dimensions of self-concept. For the dimension of Physical Self-Concept, the mean score of Smart Assistive Device Users ( $M = 31.00$ ,  $SD = 6.52$ ) is higher than that of Non-Users ( $M = 21.00$ ,  $SD = 5.90$ ). The calculated t-value is 6.56, which is greater than the critical value at the 0.01 level of significance with 65 degrees of freedom. This indicates a statistically significant difference between the two groups in physical self-concept.

For the dimension of Social Self-Concept, the mean score of Smart Assistive Device Users ( $M = 30.00$ ,  $SD = 7.11$ ) is higher than that of Non-Users ( $M = 24.00$ ,  $SD = 7.19$ ). The obtained t-value of 3.43 is significant at the 0.01 level, indicating a significant difference in social self-concept between the two groups. For Temperamental Self-Concept, Smart Assistive Device Users had a higher mean score ( $M = 33.00$ ,  $SD = 8.19$ ) than Non-Users ( $M = 24.00$ ,  $SD = 6.24$ ). The calculated t-value of 5.02 indicates a significant difference at the 0.01 level.

For Educational Self-Concept, the mean score of Smart Assistive Device Users ( $M = 35.00$ ,  $SD = 9.33$ ) is considerably higher than that of Non-Users ( $M = 22.00$ ,  $SD = 8.87$ ). The t-value of 5.83 reveals a statistically significant difference between the groups. In the dimension of Moral Self-Concept, Smart Assistive Device Users ( $M = 29.00$ ,  $SD = 5.50$ ) scored higher than Non-Users ( $M = 25.00$ ,  $SD = 6.65$ ). The obtained t-value of 2.69 is significant at the 0.01 level, indicating a meaningful difference between the groups. For Intellectual Self-Concept, the mean score of Smart Assistive Device Users ( $M = 34.00$ ,  $SD = 9.66$ ) exceeds that of Non-Users ( $M = 25.00$ ,  $SD = 6.78$ ), and the calculated t-value of 4.38 is significant at the 0.01 level. Overall, the findings indicate that visually impaired students who use smart assistive devices have significantly higher self-concepts than non-users across all measured dimensions.

The null hypothesis ( $H_{01}$ ), which states that there is no significant difference in self-concept between visually impaired students who use smart assistive devices and those who do not, was rejected. The findings revealed that users of smart assistive devices scored significantly higher on all dimensions of self-concept, indicating a positive psychosocial impact of technology use. The greater independence, academic accessibility, and functional autonomy provided by smart assistive devices may enhance users' self-perception and confidence. These findings are consistent with the work of Khodabakhshi-Koolae and Malekitabar (2024), who reported that self-concept among visually impaired students can be significantly enhanced through supportive interventions. The results also align with Muhsin et al. (2024), who found that assistive technologies improve independence and psychosocial well-being among persons with visual impairment. Thus, the use of smart assistive devices appears to play a meaningful role in strengthening self-concept among visually impaired students.

## Educational Implications

1. Educational institutions should promote the provision and effective use of smart assistive devices among visually impaired students, as their usage may enhance self-concept, independence, and academic engagement.
2. Teachers and special educators should provide structured training and support in the use of smart assistive technologies to maximize their psychosocial and educational benefits for visually impaired learners.

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