International Journal for Multidisciplinary Research (IJFMR)
E-ISSN: 2582-2160 ● Website: www.ijfmr.com ● Email: editor@ijfmr.com

Smartphone Usages Among Students with Visually Challenged for Their Socio-Academic Life in Higher Education

Gitanjali Meher[1], Sarat Kumar Rout[2]

[1]M.A Scholar, Department of Education, Ravenshaw University, Odisha
[2]Associate Professor, Department of Education, Ravenshaw University, Odisha

Abstract
Smartphones are an important part of our daily lives for sighted people and those with visually challenged in India. This study aims to explore how higher education students use smartphones for their socio-academic lives. A descriptive research design was carried out with a participant of 19 students with visually challenged. The data was collected by using a self-made checklist, semi-structured interview, and questionnaire and the analysis was based on percentage analysis and content analysis. The findings of the study revealed that most of the students with visual challenges are using smartphones more than 7 hours per day. Smartphones facilitate performing daily activities, independent functioning, movement, social inclusion and participation, educational activities, accessing information of today's digital society, promoting their skills, and finally helping to improve the quality of life. The students with visually challenged are also distracted during their studies on smartphones, which affects their functioning capability. The integration of smartphones into the daily lives of students with visual challenges has a positive effect on their functioning.

Keywords: Smartphone Usage, Students with Visually Challenged, Socio-academic Life, Higher Education

Background of the study:
Students with visually challengeds have limited or no functional vision, ranging from partial sight to total blindness often rely on alternative methods to access information, such as braille, auditory cues, and assistive technology. Educational support for these students includes specialized instruction in orientation and mobility, daily living skills, and access to adapted materials (PWD, 1995, RPWD Act, 2016 and IEDA, 2004). Inclusive environments with accommodations (Salamanca Declaration, 1994, NPE, 1986), such as tactile graphics and verbal descriptions, aim to facilitate their learning experience. Collaborative efforts among educators, support staff, and families are crucial to ensuring a comprehensive and accessible education for students with visually challenged.
A smartphone is becoming a need in social, intellectual, professional, and everyday life. For both social and intellectual purposes, students rely on smartphones. It could be used as a dictionary, for browsing and searching information, or for social interaction with other people. Being partially or blind is referred to as being visually impaired. Students in VI have the same informational and social demands as those who are sighted. VI students are members of society and contribute equally to its social advancement

(PWD Act, 1995). Smartphones are helpful in the routine academic tasks and social activities of students (Zahra and Zia, 2019). Enhancing awareness along with training for teachers and caregivers would be helpful to improve access and skills among users with visual disabilities (Senjam, Manna & Bascaran, 2021). Moreover, social integration is facilitated through communication apps and social media, enabling students to connect with peers, share experiences, and build a supportive network. However, challenges may arise, such as ensuring app accessibility (Williamson et al., 2001; Gerber, 2003) and addressing potential isolation due to reliance on virtual interactions. The primary goal of this research is to explore smartphone usage among students with visually challenged for their socio-academic life in higher education.

Review of Related Literature

For visually challenged students who have some useable vision, Khan and Fitzpatrick (2023) describe an e-learning platform intended to increase the accessibility of smartphone applications. The findings demonstrated that, in comparison to the original form, our recommended design enhances work completion time. Additionally, participants reported feeling more satisfied after utilizing this platform's updated design.

Abraham et al., (2022) investigated how people living with severe visually challenged and blindness utilize smartphones. The study's findings showed that the majority of participants were not aware that 90% of their functionality requirements were already met by cell phones as of right now. Although cell phones were used by a sizable portion of the study's participants with SVIB, the majority of users are not aware of all of its features and assistive possibilities.

Park (2021) studied how using a smartphone affected the negative feelings of visually impaired individuals. The study's findings demonstrated that for visually impaired people, using the Internet can lead to more opportunities for engagement and a decrease in negative feelings.

Lopez et al., (2021) investigated how families view their kids' use of ICTs, identifying usage patterns and how they affect emotional regulation in social and academic contexts. The results demonstrated that, when used sparingly, mobile phone use directly influences their levels of irritation and annoyance, but has no negative impacts in social or academic contexts.

According to Senjam et al. (2021), the majority of users train alone. To increase access and capabilities among users with visual difficulties, it would be beneficial to raise awareness and provide teachers and caregivers with training.

Mardiana and associates (2020) revealed that smartphones are utilized in everyday learning activities to do homework, discover information about the subject matter, take notes and record during class, communicate through social media, and produce original content for platforms like YouTube.

According to Bakhtiarvand et al. (2020), teachers using virtual networks can improve the learning rate of visually challenged children.

Zahra and Zia (2019) investigated the use of Android smartphones and their applications for social growth and academic purposes. The study's findings demonstrate that smartphone accessibility remains a problem and that better applications would enable VI students to use their phones more effectively while also becoming more social and engaging.

Deshpande (2017) studied the Impact of Cell Phone Dependency on Aspects of Cognitive Functioning among College Students. It concluded that participants with high dependence on their smart cell phones performed considerably worse on all the cognitive tasks as compared to those with lesser dependence.

Ismaili & Ibrahimi (2017) looked into the possibilities of adopting tablets and smartphones as substitutes for assistive technology in both formal and informal learning settings for students with special needs. The findings showed that the applications are relevant to both mental and physical disabilities, including autism, vision impairment, hearing impairment, and speech articulation difficulties.

Retort & Cristovão (2017) investigated the role of smartphones in teaching the English language. Results show that mobile-assisted language learning (MALL) helped students enhance their social and cultural capital.

Akcil (2017) investigated how visually impaired students view digital citizenship and how mobile learning tools might improve their education using an action-based learning approach. It becomes clear that the impact of management and technology can spread the message that tolerance education is crucial.

Rationale of the Study

Smartphones play a crucial role in the lives of students with visual challenges, affecting both academic and social aspects. Accessible features, like screen readers and voice commands, empower them to access information, read textbooks, and navigate educational apps independently, fostering academic inclusivity. The use of mobile technologies as a tool for providing support for students in mainstream learning or working environments (Pal & Lakshmanan, 2015) independent learning, or unique learning settings (Campana & Ouimet, 2015). Professionals recommending smartphones as assistive technologies need to have access and training programs to meet the specific needs of the person with visual challenges (Senjam et al., 2021). A lack of awareness of how smartphones can be used for daily independent living activities is a major barrier to access (Senjam et al., 2021). The investigator has gone through many reviews of related literature and has found that many studies have been conducted on academic life (Deshpande, 2017; Khan & Fitzpatrick, 2023; Lopez, et al., 2021; Ismaili & Ibrahimi, 2017; Retorta & Cristovão, 2017) and also school education students as sample (Khan & Fitzpatrick, 2023; Lopez, et al., 2021; Ismaili & Ibrahimi, 2017; Retorta & Cristovão, 2017). So, the researcher felt that there is a need for conducting a similar kind of research in higher education. The majority of studies were conducted on smartphone use and the social life of normal students (Karabey et al., 2023).

However, very less or negligible studies were found on the socio-academic life of students with visual challenges. From the review of related literature, there are eleven studies are conducted internationally (Khan & Fitzpatrick, 2023; Lopez et al., 2021; Ismaili & Ibrahimi, 2017; Retorta & Cristovão, 2017; Park, 2021; Abraham, 2022), and only two studies conducted on India. This study is also unique to its variables such as socio-academic life. Hence, smartphone usage among students with visual challenges for their socio-academic life in higher education needs to be studied. It is important to understand the level, pattern, benefits, and challenges of using smartphones among students with visually challenged in their socio-academic lives.

Research Question

Based on the above literature and rationale following research questions have been formulated;

1. How frequently the students with visually challenged use smartphones?
2. For what purposes students with visually challenged are using smartphones?
3. How smartphones are facilitating students with visually challenged in their socio-academic life?

4. What are the challenges faced by students with visually challenged in using smartphones for their socio-academic life?

Objectives

From the above research questions following objectives have been formulated;

1. To find out the frequency of Smartphone usage among students with visually challenged.
2. To find out the pattern/domains of smartphone usage by students with visually challenged.
3. To explore the role of smartphone usage in facilitating the socio-academic life of students with visually challenged.
4. To examine the challenges faced by students with visually challenged in utilizing smartphones for socio-academic purposes.

Methodology of the Study

Design of the Study

In the present study, a Descriptive research design was adopted. Keeping in view the nature and objective of the study and based upon the nature of data and use of techniques (Koul, 2019) this study comes under qualitative descriptive research.

Population & Sample

The population for the study was all the higher education students with visually challenged at Ravenshaw University and Ramadevi University. A sample of 19 UG & PG students with visual challenges was selected using purposive sampling from Ravenshaw University and Ramadevi University.

Tools and Techniques

To explore the role and usage of smartphones among students with visually challenged in their socio-academic life, the researcher used self-developed instruments for data collection which were reviewed and verified by the experts.

A self-developed Questionnaire was used to find out the level of smartphone usage, a self-developed Checklist consisting of 38 items available in two responses (yes or no) to find out the pattern of smartphone usage, & self-developed Semi-structured interview for identifying the benefits and challenges faced by students with visually challenged in using smartphones for their socio-academic life.

Procedure of Data Collection

The researcher personally visited to sample college to collect data. Prior permission from the head of the department for the collection of data has been taken. The investigator met with the warden of hostels and was requested to extend their cooperation and assistance for the smooth collection of data. The sample students were asked to respond, and they were given the guarantee that their answers would be kept private. The researcher then meticulously stored the information that was collected.

Procedure of Data Analysis

The investigator has used Percentage analysis to find out the level and pattern of smartphone usage and content analysis for identifying the benefits and challenges faced by students with visually challenged in using smartphones for their socio-academic life.

Results

Objective-wise analysis and interpretation of data have been presented.

Objective 1: To find out the frequency of Smartphone usage among students with visually challenged.

Table 1 Years of Smartphone Usage

Time	Less than 6 month	6 months - 1 year	1year-2years	2 years-4 years	More than 4 years	Total no. of respondents
No. of Respondents	1	0	2	4	12	19
Percentage	5.26%	0%	10.52%	21%	63.15%	100%

Table 1, reveals that there are a total of 19 students responded regarding the year of smartphone usage. There are 63.15% of visually challenged students are using a smartphone for more than 4 years. 21% of visually challenged children are using the smartphone from 2 to 4 years. From the last 1 to 2 years 10.52% of students with visually challenged are using smartphones. Of the total respondents, 5.26% responded that they have been using smartphones for the last less than 6 months.

Table 2 Time Spent on Smartphones Per Day

Time	0-1hour	1-3 hours	3-5 hours	5-7 hours	More than 7 hours	Total no. of respondents
No. of respondents	0	0	3	4	12	19
Percentage			15.85%	21%	63.15%	100%

Table 2, indicates the time spent by visually challenged students on smartphones per day. Out of 19 students with visually challenged 12 (63.15%) students are using smartphones more than 7 hours per day. 21% of visually challenged students use the smartphone for 5 to 7 hours per day. 15.85%of visually challenged students use the smartphone for 3-5 hours per day.

Table 3 Continuous Use of Smartphones in a Day

Time	0-1hour	1-3 hours	3-5 hours	5-7 hours	More than 7 hours	Total no. of respondents
No. of respondents	3	7	6	1	2	19
Percentage	15.78%	36%	31.57	5.26%	10.52%	100%

Table 3, indicates the hours of continuous use of smartphones in a day by students with visually challenged. 10.52% of students with visually challenged are continuously using the smartphone for more than 7 hours a day. 5.26% of visually challenged students are using smartphones continuously for 5 to 7 hours. From 3 to 5 hours continuously used smartphone by visually challenged students which are 31.57% of all respondents. 36% of students with visually challenged are continuously using smartphones for 1 to 3 hours within a day. Only 15.78% of students are continuously using a smartphone for 0 to 1 hour in a day.

Objective 2: To find out the pattern/domains of smartphone usage by students with visually challenged.

The accessibility features of smartphones such as screen readers, magnification tools, and voice commands, enable them to access educational materials, communicate with peers and teachers, and

navigate their environment more independently. So, the study finds the purposes of smartphone usage in the following:

Table 4 Pattern/Domains of Smartphone usage by Students with Visually Challenged

Dimensions	Yes	No
Access to resources	77%	23%
Learning process	62%	38%
Independent functioning	45%	55%
Communication skills	84%	16%
Social networking	60%	40%
Promoting skills	28%	72%
Entertainment & reducing loneliness	74%	26%

Table 4, indicates that 77% of visually challenged students reported that they are using smartphones to access to resources. Regarding the learning process on their smartphones, 62% of visually challenged students reported that they are using smartphones for their learning process. 45% of visually challenged students respond that they are using their smartphone for independent functioning in their academic environment. For the development of communication skills, 84% of visually challenged students are using the smartphone. To establish social networking 60% of visually challenged students are using smartphones. 28% of visually challenged students use smartphones to promote skills in their socio-academic lives. For entertainment and reducing loneliness in socio-academic life, 74% of visually challenged students use smartphones.

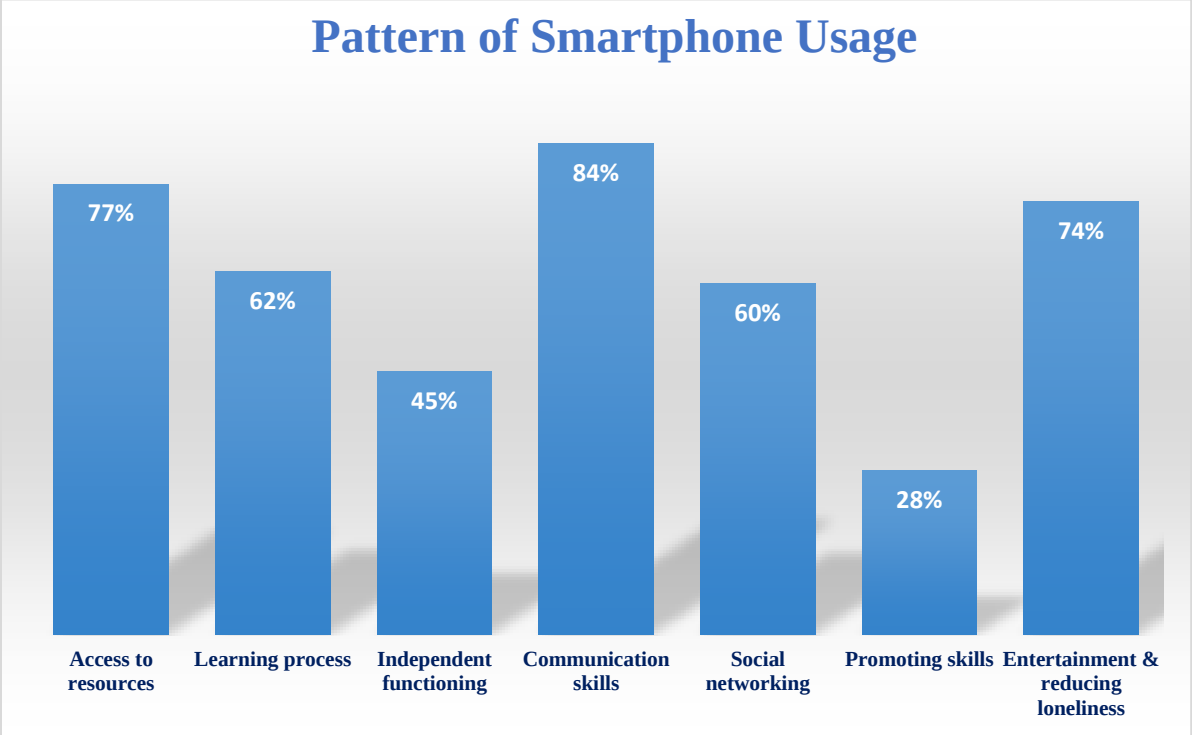

Figure- 1 Pattern of Smartphone Usage by Students with Visually Challenged

Objective 3: To explore the role of smartphone usage in facilitating the socio-academic life of students with visually challenged.

Smartphones offer a range of accessibility features that make them invaluable tools for daily tasks. It helps students with Visually Challenged for independent living. So, the smartphones facilitate independent students with visually challenged in their socio-academic life in:

Table 5 Use of Smartphones for Academic Activities by Students with VI

Yes	No
100%	0%

From the above table 5, it is found that all the respondents reported that they use smartphones for academic activities. Further queries the participants revealed that they have been using smartphones for academic activities, namely:

- Preparation for the examinations such as entrance tests, mock tests, competitive examinations, semester examinations, etc.
- For reading audiobooks, listening to recordings, reading e-books and documents through talkback, listening to You Tube videos, knowing General Knowledge, use for translations
- In teaching-learning process used for clearing doubts, audio recording of class lectures, group discussion with friends, completing class assignments, participating in remedial classes, online classes, online courses by subscription from YouTube channels, online courses from agencies, online computer course
- To participate in online seminars, workshops, webinars,
- To learn about different cultures, historical places**,** different languages, new concepts, and subject content from YouTube.

From the respondents, some of the students with VI views that they use smartphones “to fill up Google form for class attendance”, “to convert images into pdf to store large information”, “to participate in online competitions”, “to learn the presentation skills from YouTube”.

Table 6 Apps or Features Accessible on Smartphones for Managing the Academic Tasks of Students with VI

Yes	No
100%	0%

From the above table 6, it is found that all the respondents stated that there are varieties of apps and features accessible on smartphones for managing their academic tasks. They are:

- Talkback – helps to operate the phone and speak out documents and texts or written information.
- Telegram – to store and retrieve large files of data
- YouTube and Google (voice assistance) – to make notes and learn new ideas, concepts, phenomena, etc.
- Insta-reader, Google lens, Audio Vision Beta, Envision AI, Kibo App, Apps reader, Autotatious app, Document reader– helps to read documents and texts by scanning and convert the texts into audio to listen it through talkback
- Dictionary – use for translation

And also, from the participants two of them commented that

“Envision AI helps a lot to know about my soundings by taking photo of and scan in this app, to read what object or colours does it”.

Table 7 Access to Course Materials through Smartphones

Yes	No
100%	0%

From the above table 7, it is found that all the respondents viewed that they have been using smartphones to access course materials. The sources to access the course materials as given by the respondents are:

- Receives audiobooks from NGOs by contacting them by phone,
- Access to resources from Google, YouTube, websites of open universities, social media groups, and friends
- Friends are sharing their notes in audio document files

From the respondents, one of the participants responded that
"Pocket FM, Kuku FM, Audicate app, and e-library (Sugamya Pustakalaya) mostly help me to access the course materials".

Table 8 Impact of Smartphones on Functioning in the Daily Life of VI Students

Yes	No
100%	0%

From the above table 8, it is found that all the respondents said that smartphones have a positive effect on their daily lives. Further, the participants narrated that smartphone helps them for their daily activities, namely –

- helps with cash identification with the Cash Reader app,
- Provides access to information (class information) and current affairs through NEWS, YouTube, social media, and the internet
- Helps for online payment and online shopping
- To improve academic life
- Helps to know about new objects, concepts or phenomena
- To read the notice, use notes and alarms for reminder
- to communicate with others at any time
- helps to know the time independently,

It also shows that out of all respondents, only 15% of students with VI commented that they use smartphones for online form applications and form fill up. And some students with VI narrated that "smartphone helps to develop public speaking skills", "to aware of health and yoga practices", "smartphone as a medium to make us independent", and "helps to learn the use of smartphone for various activities", "call to authority for helps when I face problems in hostel or universities".

Table 9 Applications or Features on Smart Phones Used for Navigation by VI Students

Yes	No
52.63%	47.37%

From table 9, it is found that out of 100% of respondents, 52.63% of students with VI are used augmented reality (AR) applications or features on your smartphone for navigation. These apps are

Google Maps, Mo-Bus app, Ola, and where is my Train application. It helps to know the information about time, location, directions, tickets, and for moving from one place to another independently. However, one of the participants narrated that "I call my friends on the phone to take me from one place to another".

Table 10 A Sense of Community Engagement through Smartphones

Yes	No
100%	0%

From the above table 10, it is found that all the respondents said that the smartphone helps to develop a sense of engagement with their community through various activities such as:

- Connected with the community through social media by making new friends,
- Interaction with teachers and peers by call, chat and text,
- Interact with teachers for guidance,
- Update about the present society through interaction by call or social media,
- Connect with the community through webinars, online workshop

Also, one of the participants said that "smartphone connects us with the community by social media and interact through comments and texts. It helps to connect with the world".

Table 11 Intimate Relationships with Smart Phone Buddies rather than Real-Life Friends

Yes	No
47.37%	52.63%

From table 11, it is found that out of 100% of respondents, 47.37% of students with VI feel that smartphone buddies are more intimate than relationships with real-life friends in an educational environment. The reasons given by the students are:

- Smartphones replace the friends
- The smartphone itself is a friend
- When friends do not like to interact with us in the classroom or campus but some friends interact through smartphones.

Table 12 Use Smart Phone for Entertainment

Yes	No
100%	0%

From the above table 12, it is found that all the respondents said that they use smartphones for entertainment. They used smartphones:

- To listen to radio channels, motivational videos, music, T.V., stories, comedy, cricket, movies, short videos,
- To watch historical events
- To take pictures
- To play games

However, one of the respondents stated that "I use the smartphone for blogging on YouTube".

Table 13 Use of Smartphones for Managing Stress

Yes	No
63.16%	36.84%

From the above table 13, it is found that out of 100% respondents 63.16% of students with VI said that the smartphone helps them to manage the stress by listening music, motivational videos and by talking with close friends or parents.

However, two respondents narrated that "Sometimes smartphones also create stress for pending study works due to spending more time on entertainment or other activities".

Table 14 Use of Smartphones to Learn or Promote New Skills

Yes	No
31.58%	68.42%

From table 14, it is found that out of 100% of respondents, only 31.58% of students with VI use smartphones to promote their skills such as cooking, face makeup, making phynile, wool weaving, and public speaking skills by learning the different languages (Bengali, Marathi, Hindi, Urdu).

Objective 4: To examine the challenges faced by students with visually challenged in utilizing smartphones for socio-academic purposes.

Every phenomenon has advantages with some limitations. Similarly, phones also have some limitations that may create challenges for students with visually challenged. The challenges faced by the respondents are discussed in the following:

Table 15 Creates Distractions during their Studies

Yes	No
47.37%	52.63%

From above table 15, it is found that out of 100% of respondents, 52.63% of students with VI are not distracted during their studies on smartphones, and 47.37% of students are distracted as instances given by the students are: (i) Spending more time for entertainment and (ii) check notifications frequently while studying.

However, one of the participants stated "The phone calls distract me while I study online".

Table 16 Limitations in Using Smart Phones for Mobility

Yes	No
5.26%	94.74%

From Table 16, it is found that out of 100% of respondents, 94.74% of the students with VI have not encountered any challenges for mobility whereas one of the participants stated that "She takes more time to learn the features of apps when it is updated".

Table 17 Impact of Smartphones on Functional Capability of Students with VI

Yes	No
26.31%	73.69%

From the above table 17, it is found that out of 100% respondents only 26.31% of the students with VI said that smartphone hampers their functioning capability. According to the respondents-
"Making notes during the class helps us to remember easily but due to recording of class lectures we give poor attention to class so that affects our memory".

Major Findings of the Study
Following is the summary of the overall findings of the study:

Frequency of Smartphone usage among students with visually challenged

- The year of smartphone usage among students with visually challenged revealed that out of 100% of respondents, 63.15% have used more than 4 years, 21% have using for 2 to 4 years, 10.52% are using from the last 1 to 2 years and 5.26% responded have been using smartphones for the last less than 6 months.
- Out of the 100 students with visually challenged 63.15% of students are using smartphones more than 7 hours, 21%students are using 5 to 7 hours and 15.85%students use the smartphone for 3 to 5 hours per day.
- 36% of students with visually challenged are continuously use smartphones for 1 to 3 hours within a day, whereas 31.57% of all respondents use using for 3 to 5 hours, 10.52% are using for more than 7 hours, 5.26% are using for5 to 7 hours and Only 15.78% are using for0 to 1 hours in a day.

The pattern/domains of smartphone usage by students with visually challenged.
The students with visually challenged are use smartphones most of the time for Communication skills (84%), Access to resources (77%), Learning process (62%), Entertainment & reducing loneliness (74%), and Social networking (60%) whereas likely less time on Independent functioning (45%) and Promoting their skills (28%) for their socio-academic life in higher education.

The role of smartphone usage in facilitating the socio-academic life of students with visually challenged.

- The use of smartphones helps a lot to students with visual challenges in their socio-academic lives. Smartphones provide great opportunities to access resources, manage academic tasks, and teach the learning process for students with visually challenged.
- The integration of smartphones into the daily lives of students with visual challenges has a positive effect on their functioning. The use of smartphones facilitates independent living in that the students can know the time, read information through talkback, purchase online, know about new things from YouTube and Google, for mobility, communicate with others, and identify cash independently.
- Smartphones are helpful for students with visually challenged to live happy lives. It helps for managing stress and is always available for entertainment. Some of the respondents narrated that smartphone as a medium for us to connect with the world. By using smartphones, the students can engage with their community in academic life.
- In socio-academic life, the smartphone not only replaces friends but also becomes one of good friends.
- Smartphones are helping them to learn new skills or to promote their skills.

The challenges faced by students with visual challenges in utilizing smartphones for socio-academic purposes.

- Out of 100% of respondents, 47.37% of students with VI are distracted during their studies on smartphones but this does not affect 52.63% of students with VI.
- Very less (5.26%) students described that they were facing problems while they used the smartphone for mobility.
- Out of 100% of respondents, only 26.31% of the students with VI said that smartphone hampers their functioning capability.

Educational Implication of the Study

Implications for Teachers and administrators

Findings of the study will be helpful for teachers and administrators to understand the role of smartphones in the socio-academic life of students visually challenged and accordingly, they can guide the students.

Implications for Students with visually challenged

Findings of the study will be benefitted for students, by making them aware of the facilities and features available on smartphones for their social as well as academic life.

It is helpful for the students with visually challenged those who are unaware of the sources of materials accessible through smartphones.

Implications for tool developers related to education

The study will be helpful for the tool developer to enhance the features and apps of smartphones according to the feedback of the respondents.

Suggestion for Further Research

Smartphone is a crucial factor in the socio-academic life of students with visually challenged. The present study was conducted at Ravenshaw University, Cuttack, and Ramadevi University, Bhubaneswar which can be extended to other universities and colleges in Odisha and other states.

- The present study has been conducted over a sample of 19 students with visually challenged, this can be extended to a large number of samples.
- The present study was conducted on UG and PG students, it can also be conducted by other groups of students like secondary and higher secondary visually challenged students.
- The present study focuses on variables like socio-academic life which can be conducted on other variables.

References

1. Abraham C. H., Boadi-Kusi, B., MornyE., & Agyekum P. (2022). Smartphone usage among people living with severe visual challenged and blindness. *Assist Technol.* 34(5): 611-618. 10.1080/10400435.2021.1907485.
2. Akcil, U. (2017). The use of mobile learning for visually impaired learners school in tolerance education contents. *International Journal of Methodology*, 52(2), 969-982. 10.1007/s11135-017-0552-1
3. Allahi, Z., Bakhtiarvand, M., & Dehzireh, M.R. (2020). The Effect of Instruction Through Mobile Phone-Based Virtual Networks on the Learning Rate of Students with Visually challenged. *Randwick*

International of Education and Linguistics Science Journal, 1(2), 199-207. https://doi.org/10.47175/rielsj.v1i2.86.

4. Alrefi, M.H.M., & Parween, S. (2022). Evaluation of the Mobile learning applications that can be used to develop English language skills among students with blindness in the Inclusive class. *Scholarly Research Journal for Interdisciplinary Studies*, 16478-16488. 10.21922/srjis.v9i69.10047
5. Campana, L. & Ouimet, D. (2015). iStimulation: Apple iPad Use with Children Who Are Visually Impaired, Including Those with Multiple Disabilities. *Journal of Visually challenged & Blindness.* 109. 67-72. 10.1177/0145482X1510900110
6. Covarrubias, C. M. (2022). Exploration of quality of life with the use of assistive technology for individuals that are visually impaired or blind. Available from Publicly Available Content Database. (2645173900). https://www.proquest.com/dissertations-theses/exploration-quality-life-with-use-assistive/docview/2645173900/se-2.
7. Deshpande, A. (2017). Impact of Cell Phone Dependency on Aspects of Cognitive Functioning among College Students. http://hdl.handle.net/10603/423896.
8. Gunal, Y. (2017). Academic and Social Problems Faced by Visually Impaired Students during University Education. *Journal of Education and Practice*, 8.
9. Ismaili, J., & Ibrahimi, E.H.O. (2017). Mobile learning as alternative to assistive technology devices for special needs students. *Educ Inf Technol* 22, 883–899. https://doi.org/10.1007/s10639-015-9462-9.
10. Karabey, S. C., Palancı, A., & Turan, Z. (2023). How does smartphone addiction affect the lives of adolescents socially and academically? a systematic review study. *Psychology Health & Medicine*, 1–24. https://doi.org/10.1080/13548506.2023.2229241
11. Komninos, A., Stefanis, V., & Garofalakis, J. (2023). A Review of Design and Evaluation Practices in Mobile Text Entry for Visually Impaired and Blind Persons. *Multimodal Technology Interact*. 7, 22. https://doi.org/10.3390/mti702002.
12. Kumar, V. (2015). Inclusive banking opportunity for visually impaired customers through Mobile banking channel an assessment using extended Technology Acceptance Model. http://hdl.handle.net/10603/171095.
13. López, I.G., Ordóñez, B.Q., Urbano, E.R, & Esparrell, J.F. (2021). Teenagers and ICT usage: analysis of its emotional, academic, and social effects. *Digital Education Review*. 10.1344/der.2021.39.159-171
14. Mardiana S., Suminar J. R., Suwatno, & Sugiana D. (2020). Communication Technology for Students With Visually Challenged: A Case Study of Smartphone. *Advances in Social Science, Education, and Humanities Research.* 10.2991/assehr.k.200818.012
15. Mulay, T. (2013). Access to information for visually impaired students in Mumbai and Pune region. http://hdl.handle.net/10603/31028.
16. Pal, J. & Lakshmanan, M. (2014). Mobile devices and weak ties: A study of vision impairments and workplace access in Bangalore. *Disability and rehabilitation*. Assistive technology. 10. 1-9. 10.3109/17483107.2014.974224
17. Park E.Y. (2021). Relation Between the Degree of Use of Smartphones and Negative Emotions in People with Visually Challenged. *Front. Psychol.* https://doi.org/10.3389/fpsyg.2021.653796
18. Retorta, M.S., & Cristovão, V.L.L. (2017). Visually-Impaired Brazilian Students Learning English with Smartphones: Overcoming Limitations. *Languages*, *2*, 12.

https://doi.org/10.3390/languages2030012.

19. Senjam, S.S., Manna, S., & Bascaran, C. (2021). Smartphones-Based Assistive Technology: Accessibility Features and Apps for People with Visually challenged, and its Usage, Challenges, and Usability Testing, Clinical Optometry, 311-322.https://doi.org/10.2147/OPTO.S336361.
20. Shoaib, M., Khan, S., Fitzpatrick, D. (2023). A mobile e-learning application for the enhancement of basic mathematical skills in visually impaired children. *Univ Access Inf Soc*. https://doi.org/10.1007/s10209-023-00990-3.
21. Singh, S. (2022). Smartphones for Vision Rehabilitation: Accessible Features and Apps, Opportunity, Challenges, and Usability Evaluation. *IntechOpen.*10.5772/intechopen.97703
22. Tan, H. L., Aplin, T., McAuliffe, T., & Gullo, H. (2022). An exploration of smartphone use by, and support for people with vision impairment: a scoping review, Disability and Rehabilitation: Assistive Technology. 10.1080/17483107.2022.2092223
23. Zahra, S. S. & Zia, M.W.S. (2019). Academic use of smartphones for social development of visually impaired students of University of Karachi: A study of android Smartphone applications by VI students. *Library Philosophy and Practice*: https://digitalcommons.unl.edu/libphilprac/3026