



## **Identifying and Addressing the Challenges Faced by Students with Visual Impairments in Accessing Education and Learning Contents in Relation to ICT: The case of the Tertiary Education in Bangladesh**

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### **Abstract**

Though Information and communication technology (ICT) has a great potential in providing a fair and equitable education for students with visual impairments, they face several challenges in accessing and using ICT for education and learning purposes. Empirical studies exclusively focusing on visually impaired students in accessing and using ICTs in higher educational institutions are scarce. The current study aims to fill the research gap by identifying the needs of and challenges faced by visually impaired students in accessing ICT to avail educational and learning contents in higher education institutions in a developing country context like Bangladesh. The findings of the study indicate that the major challenges faced by visually impaired students include inadequate arrangements for visually students in universities, difficulties in hiring underwriters, lack of compatible assistive technology, teaching incompetency to design accessible content, unaffordable ICT and assistive technology devices. The study recommends establishment of disability support centre in every university, reasonable adjustments in learning and assessment tasks, organising institution level learning supports, strengthening knowledge and skills of teaching staff, and designing disability specific apps particularly for visually impaired students in order to promote inclusive learning environment in tertiary education in Bangladesh.

**Keywords:** Information and Communication Technology, Visual Impairment, Tertiary Education, Bangladesh.

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### **Introduction**

According to recent statistics, about 15% of the world's population suffers from some form of disability (WHO, 2011). According to the source, 80% of disabled people live in developing countries (WHO, 2011). This figure is projected to rise in many societies with a growing proportion of aging population. Due to several reasons, for example, overpopulation, illiteracy, extreme poverty, lack of awareness, and deficiency of medical care and services the prevalence of disability in Bangladesh is believed to be high. To be specific, the prevalence of overall disability is reported to be 9.07% of total population in Bangladesh (BBS, 2015).

Though, a number of countries have incorporated the principles of the movement of Education for All (UNESCO, 2009), a significant portion of disabled people still experience obstacles in accessing education including inaccessibility or partial accessibility of learning environments (WHO, 2011) due to lack of implementation capacity, absence of comprehensive legislative framework (Forlin & Lian, 2008), inadequate financial support (Hernandez, 2007) and negative attitude of teachers (McGrew & Evans, 2004). Students with disabilities are underrepresented further in higher education (Konur, 2006). As a result, their performance in terms of scores in the examination is comparatively poor (Fuller et al., 2004). This eventually leads to reduced employment opportunities (Szeto, 2012).

Nowadays, information and communication technologies (ICT) are widely used in education sector. ICT can enhance the learning process by enabling new tactics (Sanyal, 2001), reduce geographical (Mooij, 2007) and communication barriers (Lim & Chai, 2004). However, if the design of ICT goods is not appropriate for visually impaired people or if it does not meet the needs of a wide range of visual impaired people, it may lead to increased digital divide. This might exacerbate the extensity of digital exclusion (Hersh & Leporini, 2012). Therefore, providing fair and equitable education needs of visual impaired people to access to education and vocational training in relation to ICT with pedagogy is inevitable for promoting inclusive education.

Given this backdrop, the present study aims to identify the challenges faced by students with visual impairment to access to ICT for education and learning. In addition, this study explores the way forward to overcome the challenges faced by the visually impaired students. The study starts with a review of the literature. Second, the methodology of the study is narrated in detail. Third, the findings of the study are explained. Fourth, the recommendation section offers policy prescriptions. The concluding section summaries the study, the limitations of current research and offer some suggestions for further research.

## **Review of literature**

Very few visually impaired students (ViS) across the world can progress to higher education as they face a number of barriers while exploring diverse educational structures from lower levels. However, a few among them confront those challenges and progress towards advanced education (Collins et al., 2019; Fernandes et al., 2016; Jayus & Khan, 2019; Mutanga, 2018). Although, there are wide commitments in strategies and legislation to ensure equal access of visually impaired students in higher education institutions, numerous are still confronting difficulties in higher education (Howell & Lazarus, 2003). The primary shortcoming of current comprehension about inclusion and exclusion is the incapability to involve with social equity concerns (Sayed, 2003).

There is no doubt that ICT is one of the major forces that driving learning and literacy for visually impaired students. For example, electronic interactive whiteboards can be effectively used to facilitate group learning of visually impaired students. Technology can help visually impaired students in every aspect of their life as ICT enables them to access and use contents in different formats through multiple media. In addition, visually impaired students can also use a number of tools including cellular phones, land phones, television, SMS, Email, Voice over Internet Protocol services, web conferencing, and social media to access educational and learning contents (Hersh & Mouroutsou, 2019; Mavrou & Loizou-Raouna, 2017; Raja, 2016; Tom et al., 2018). Moreover, nowadays, users can activate both Microsoft Windows and Mac OS with built-in accessibility settings like text-to-speech, voice recognition, preferences for mouse and keyboard navigation, contrast settings, and magnification. These features are particularly designed for students with visual impairment. Interestingly, to use those features users need not to bear any extra cost (Learson, 2014). Besides, apps such as TapTapSee assist users with visually impaired people in recognizing objects by taking a photo and identifying them through a database of crowd sourced images. There are also apps to scan barcodes and identify the product, read aloud menus through optical character recognition, and pull up Braille keyboards (Foley & Ferri, 2012).

However, often visually impaired students cannot access those ICTs due to some obstacles. In a cross-country study, Hersh and Mouroutsou (2019) found factors including language, costs, lack of funding mechanisms, lack of awareness and lack of compatible assistive technology inhibits accessing ICTs. According to another report, visually impaired people in low- and middle-income countries face significant challenges especially in acquiring assistive devices because of the cost and availability of specialized equipment (Ali et al., 2019; ITU, 2013; Monaco et al., 2019). Segers (2014) argued that in low and middle-income countries, the state funding for supporting the acquisition of assistive technology is low. For this reason, the cost of assistive technologies in those countries are higher. Therefore, affordability is a major barrier in ICT use in those countries. Several studies emphasized the integration of ICT and assistive technology in the social integration of visually impaired people (Agree, 2014; Katerina Mavrou et al., 2017). Several studies also cautioned that the effectiveness of ICT on the betterment of life of visually impaired people is subject to compatibility of assistive technology with ICT devices (Archer et al., 2014; Hakobyan et al., 2013; Hollier, 2017; Mancioffi et al., 2019). These factors exacerbate the digital divide among the students with visual impairment. The consequence of digital divide on visually impaired students is that they cannot access the contents or materials that have been delivered by different organisations which is particularly designed for students with visual impairment.

From the above discussion of literature, it is evident that previous studies sporadically explored the challenges faced by students with visual impairment in accessing and using ICT. In particular, to the best of author's knowledge, no studies exclusively studied the challenges faced by visually impaired students in accessing and using ICTs in higher educational instructions. Given these limitations, the current study aims at identifying the needs of and challenges faced by visually impaired students in accessing ICT to avail education and vocational training in higher education institutions in a developing country context like Bangladesh. In addition, the findings of the study can potentially prescribe policy recommendations to harness the digital inclusion by identifying obstacles faced by students with visual impairment in accessing and using ICT with regard to education, pedagogy and vocational training.

## **Methodology**

In this study, the convenience sampling method has been used. Convenience sampling is also known as availability sampling. This is a specific type of non-probability sampling method that relies on data collection from population who are conveniently available to participate in study. In this study, 20 respondents participated. Most of the participants of this study are the current students of Dhaka University. All of them are visually impaired. Among these 20 respondents, 18 are fully blind and 2 respondents are partially blind (i.e. low vision).

The study mainly focused on primary data. To collect data, a structured questionnaire is devised. Based on this questionnaire the interviews are conducted. A workshop has also been arranged. In that workshop, a round table focused group discussion has been conducted. Their stories are recorded reflecting their day-to-day life, their access to education, challenges that they are facing in every aspect of their life and which types of solutions they required. For collecting secondary data, the author relied on different relevant reports published by World Bank, UNESCO, and latest scholarly peer-reviewed articles. Frequency distribution analysis is used to represent the demographic characteristics of the respondents.

In this study, the current status of the visually impaired student is represented. The study mainly focused on their access to ICT for education purposes and recommended some solutions. About 70% respondents are male and 30% are female (Table 1). Majority

of them (75%) belongs from the age group of 21-30. Most of the respondents are studying at the graduate level.

**Table 1: Demographic profile of the respondents**

<b>Demographic Characteristics</b>	<b>Frequency</b>	<b>Percentage</b>
<b>Gender</b>		
Male	14	70%
Female	6	30%
<b>Age</b>		
Below 20	3	15%
21-30	15	75%
31-40	1	5%
41- above	1	5%
<b>Educational Background</b>		
Graduation	13	65%
Post-graduation	6	30%
Others	1	5%

## **Findings**

### **Access to education for visually impaired students**

In Bangladesh, visually impaired students' access to education is still now limited. Especially people who are living in rural areas and financially insolvent are not aware of their education. In every district of Bangladesh there is one special school dedicated to them. Some schools have residential facilities also. But inclusive schools are very rare in Bangladesh. In schools they get the primary knowledge about Braille. After completing secondary school these students face more challenges in continuing their education. Because there are no special arrangements of education for them at higher-secondary level. Brailed books are also scarce at higher education level. Given these limitations, they completely depend on audio recording. Scarcity of study materials hampers their study a lot.

Only a handful of Bangladeshi Universities including Dhaka University, Chittagong University, Khulna University, Rajshahi University and Jahangirnagar University have arrangements for visually impaired students. In 2018-19 session, Noakhali Science & Technology University denied their enrolment because of their limitation of proper arrangements. Dhaka University admitted 8 visually impaired students at various department in 2018-19 session. About 15, 6 and 14 visually impaired students were admitted in Dhaka University in 2017-18, 2016-17 and 2015-16 session, respectively. At present, there are 3 low vision students in Dhaka University. Although a decent number of students with visual impairments studying in DU, no special arrangements are available here to facilitate and enhance their learning.

### **Challenges Faced by Visually Impaired Students Regarding Access to Education and Training**

Visually impaired students of different educational institutions experience a number of challenges and problems which adversely affect their academic performances. They face problems in writing during their exams as they have to hire writers who can write on their

exam papers on behalf of them. Specifically, visually impaired students find it more difficult in managing underwriter at college and university level than that of school level. A third-year student of the Department of Political Science of Dhaka University said:

*I have to depend on underwriter for our examinations. Sometimes it becomes very difficult to manage underwriter. Moreover, some people denied participating in the examination because of their personal problems just before the night of examination. It's really a great challenge for me. In such a situation I can't concentrate on my study which impacts my academic performance.*

Very often, female students face more challenges than male students in managing underwriter. Besides, sometimes visually impaired students have to pay the underwriters for helping them in the examination which is a financial burden for the disabled students. One student from Department of Islamic Studies of Dhaka University stated:

*I have to pay BDT 3000 for final examination and BDT 1500 for midterms.*

There are also a few administrative hurdles in managing underwriters. Another participant, studying in Department of Bangla of Dhaka University reported:

*According to the rules of examination of Dhaka University, we have to select underwriter from other disciplines, and that student must be academically junior to us. I think this policy deprives us. Because all subjects have their own theories. Sometimes, it becomes very difficult to make underwriter understood what we think or want to express in the exam paper. For this reason, it becomes next to impossible for the underwriter who is from another discipline, to write the discipline-specific terms and spell them correctly in the exam paper. As a result, most of the time we don't get the result that we expected.*

In addition, students with visual impairments don't get any extra time in their examination. One student from the Department of Social Science of Dhaka University said:

*If we get at least 10 minutes extra time per hour then it will be a great help for us.*

Visually impaired students also do not have access to the class lectures or books required for their courses. In addition, study materials for visually impaired students are very limited. Academic books are not available in a suitable format which matches their needs. In Bangladesh, books at HSC level are not available in Braille. Some audio records are available but these are not sufficient. They have to record class lectures by themselves. However, some faculty members do not allow them to record class lectures. As a result, visually impaired students have to depend on other students to compile class lecturers.

Although Dhaka University has a library for visually impaired students, this library is not up to date. There is no separate reading room designated for the students with visual impairment. Collection of Braille books are very limited and obsolete. There is a Braille printer in this library. But, most of the time students cannot use it as there is lack of trained staffs. Moreover, teachers of our country are not well trained on how to deal with visually impaired students.

In Bangladesh, students with visual impairments can study only arts. Another respondent of our study who is studying in the Department of Management and Information Systems of Dhaka University stated:

*Although we have the desire to study science and commerce, we have no other option to take arts. But in abroad visually impaired students can study any subjects if they have the potentiality.*

Visually impaired students also face difficulties in preparing assignments and in taking exams. In Bangladesh, the university faculties working with visually impaired students do not consider the special conditions of those students while planning and designing the course materials. As the learning environmental conditions are not fully supportive of them, their learning gets interrupted. Besides, visually impaired students also face challenges in reading printing materials (e.g., textbooks, instructions, documents). It is also difficult for them to access visual information in print or audio-visual media (for example, warnings and information in text scrolls on television). Another major problem faced by visually impaired students is the lack of assessment of their learning needs. There is no university in Bangladesh with individualised education plan for visually impaired students. On top of that visually impaired students often harassed and abused by their friends or classmates.

### **Use of ICT to access to education for visually impaired students**

Students' productivity, academic success, creativity and engagement in classrooms can be improved using technologies, which allow for differentiated, explicit and individualised instruction. ICTs such as mobile devices and desktop computers offer enhanced functionalities which facilitate visually impaired students pursuing education. For example, ICT based features including text-to-speech, voice recognition, Braille displays, change contrast, colour schemes, screen magnification, optical character or image recognition and touch and gesture input etc. enable visually impaired students to receive information and content in the format that they can perceive and prefer. This helps them to go forward in the field of education (Raja, 2016).

In our country, some students with visual impairment can operate computers quite smoothly. They can use Microsoft office, google docs etc. Many of them can type Bengali using NBDA. Most of the blind students in our country use the app JAWS, which help them in the study purpose. After converting the PDF into a word file, they can read it with the help of talkback. However, there is no device or apps available for visually impaired students which help them to understand graphs and charts.

### **Challenges to use ICT**

Many visually impaired students use assistive technologies to help them access computers or other devices. ICTs needs to be compatible with suitable assistive technologies. Assistive technology might be physical pieces of equipment or software programs. In particular, visually impaired students have to face several challenges in using ICT. It is found that a combination of ineffective technology for accessing board-work and worksheets, lack of training on how to use the technology, incompatibility issues, scarcity of time, unskilled staffs, lack of training and the lack of expertise of teachers limits their use of technology. Although some schools and universities provide accommodations for

students including special equipment and assistive technology. However, accessing those special devices is often difficult for visually impaired students.

The poor provision of specialised vision aids and equipment to students has been attributed in part to the anxiety experienced by teachers in using the equipment. The lack of teacher proficiency with assistive technologies negatively impacts students who are vision impaired. All participants in our study experienced the lack of expert technical support, as teachers and aides had little knowledge of the technology. Some students were forced to try technologies without having any training or assistance. Even teachers who understand the value of ICT for students with visual impairment may lack sufficient knowledge and competency to design accessible content which may not support the use of accessible technology for learning. In furtherance, the cost of specialised assistive technologies continues to be high and could limit the impact of web and mobile-enabled development programs. Many families belonging from in middle- and low- income quartiles cannot afford these technologies without any state funding mechanisms or subsidies. In addition, in many cases ICT or technology solutions are not available in local language which appears as a major obstacle in using ICTs by visually impaired students.

Social exclusion is another big problem. Disabled people are more likely to be less well socially connected than others. Given that most new skills are learnt with assistance from peers including friends and colleagues, disabled people are typically less exposed to ICT, particularly those in older generations.

### **Review of Government Policy for visually impaired people**

Government of Bangladesh (GoB) has enacted a number of acts and policies to uphold the rights of visually impaired people. Most of these acts are administered by the Ministry of Social Welfare of GoB. In 2001, to ensure the overall welfare and ensuring other relevant issues, GoB enacted Disability Welfare Act 2001 (GoB, 2001). As per the act, a National Coordination Committee was formed. The responsibilities of the committee include reviewing the existing policies to safeguard the rights and dignity of physically challenged people, arranging different Skill Development Training for personnel working in disability sector, and establishing a Disability Information Center in order to provide information to media and disseminate that information for the welfare of the physically challenged people (GoB, 2001). In order to ensure the proper functioning of the act, GoB published a gazette in 2008 titled as Rules of Disability Welfare Act 2008 (GoB, 2008). In 2009, GoB enacted the Integrated Special Education Policy 2009 for people with disability. The aims of this policy are establishing and managing integrated special education centre, formulating balanced curriculum and allocating grants for special education centre, etc. (GoB, 2009).

However, with the advent of time, the concept of disability has changed a lot. Meanwhile, Bangladesh becomes one of the signatory countries of 2006 United Nations Convention on the Rights of Persons with Disabilities. In 2015, GoB published a gazette entitled “the Rights and Protection of Person’s with Disability Rules 2015” based on the clause no 41 of Disability Right and Protection Act 2013 (GoB, 2015). Apart from these acts and policies, the GoB is also vowed to ensure the rights of PwD in line with goals and targets set in United Nations’ Sustainable Development Goals.

## **Recommendations**

Based on the findings of the study, several key areas for action are identified in order to expand inclusive learning contexts in tertiary education in Bangladesh. The recommendations are described in the following:

### **Establishment of disability support centre**

To provide an equitable environment for students with visual impairment every higher education institution must set up a disability support centre. Abiding by the corresponding disability discrimination acts, every university in developed countries like Australia, USA and Canada, are bound to have a disability support centre. The disability support centre should provide a wide range of support for students including general support and advocacy, examination adjustments, assignment extension recommendations, study skills assistance, alternative formatting, and providing support assistive technology and equipment.

### **Reasonable adjustments in learning and assessment tasks**

Considering the special condition of students with visual impairment, reasonable adjustments in learning and assessment tasks should be offered. To do so, the collaboration between the student, disability staff, and teaching staff is must. This collaboration can be done by sending emails, making phone calls or arranging face-to-face meeting.

### **Strengthening knowledge and skills of teaching staff**

Teaching staff usually shows a willingness to support students with disabilities, but they have inadequate knowledge about the effects of disability on the individual student's learning. The current study advocates strengthening knowledge and skills of teaching staff to work with students with disabilities individually. To do so, teaching staffs should be provided with the information on the nature of visual impairment of a particular student, its effects on the learning capacity of the student, and methods to implement specific reasonable adjustments for students with visual impairments.

### **Providing institution-level learning supports**

To enhance visually impaired students' learning experiences universities should extend institution-level learning supports. Based on the findings of the study, several key areas for institution-level action are identified. The key areas of institution-level action include dissemination and presentation of information through a wide range of modes, provision of flexible assessment and varied assessment tasks, initiating disability awareness training for teachers which will enhances their awareness of the impacts of disabilities on classroom participation and learning, and organising peer-mentoring programs that strongly involve students with visual impairment.

### **Promoting basic ICT literacy**

The capability to using ICT for a range of purposes persists as one of the major concerns for disadvantaged learners including PwD. In promoting basic ICT literacy 'universal design' appears to be critical. It involves a process of designing products, environments, services and programmes, etc. It involves designing of products, environments, services and programmes, in such a manner so that it can be accessed and used to the greatest level possible by everyone regardless of their disability. This concept is not only applicable to



the design and development of new ICT gadgets but also reinforce the pedagogy of using ICT in education for visually impaired students.

### **Designing disability-specific apps**

One of the major aims of this study is to suggest suitable technology which has the potential to support the students with visual impairments in their education purpose. Considering the challenges faced by students with visual impairments in using ICT, the current study recommends designing and installing two disability-specific apps. Firstly, tertiary education institutions should design an app for underwriter management for visually impaired students. A trial application of this app can be arranged with interested underwriters who provide assistance to the visually impaired students during exams. The blind students can select criteria given in the application which will be read out to them through technology like talk back and they can adjust the criteria according to their requirement. They will be able to select the qualifications, rate, time, date, location and examination details on the app. There will be two types of underwriters – volunteer and paid. The blinds can choose from the available ones. Secondly, another app should be developed to facilitate the visually impaired students in accessing learning materials. This app should be able to spell out any written text which will be a great help for visually impaired students. This app should also have the features of read out the written text on signboards. This app should be available in both English and Bengali language.

### **Disability Action Plan**

To support visually impaired students to achieve their full potential implementation of a Disability Action Plan (DAP) is a must. In particular, a DAP pivotal in assisting an educational institution to meet its legal obligations and policies under the Disability Right and Protection Act 2013. A DAP is a compact package to assist students with disability in a number of areas including learning and teaching, employment, support systems, research, environment and leadership.

### **Conclusion**

The study focused on the challenges faced by students with visual impairment in accessing education and learning in relation to ICT with pedagogy in tertiary education institutions in Bangladesh. The major challenges faced by visually impaired students include inadequate arrangements for visually students in universities, difficulties in hiring underwriters, lack of compatible assistive technology to use ICT, teaching incompetency to design accessible content, high costs of ICT and assistive technology devices, etc. The study also identified a number of key areas for action to overcome those hurdles. These actions include the establishment of disability support centre in every university, reasonable adjustments in learning and assessment tasks, strengthening knowledge and skills of teaching staff, organising institution-level learning supports and designing disability-specific apps, particularly for visually impaired students.

However, the present investigation has some limitations. First, the findings cannot be generalised as the study is based on primary data collected from one university. A detailed country-level study across the public and private universities of Bangladesh is required to assist in better policymaking. Secondly, the study focused only the visually impaired students. However, as it is well established that PwD is a heterogeneous group, and they face different types of barriers depending upon their type and severity of

impairment. Therefore, the way technology is utilised and its subsequent impact on learning among various groups of PwD should be heterogeneous. Therefore, further research can be conducted by administering a survey on students with different types of disability.

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