

# A Learning Tool for Visually Impaired People

Anjali D. Kapadni  
S.N.J.B's Late Sau.  
KBJ COE,Chandwad

Bhagyashri S.  
Lalwani  
S.N.J.B's Late Sau.  
KBJ COE,Chandwad

Ravina S. Kotwal  
S.N.J.B's Late Sau.  
KBJ COE,Chandwad

Shraddha P.  
Fulfagar  
S.N.J.B's Late Sau.  
KBJ COE,Chandwad

Baheti M. J., Ph.D  
S.N.J.B's Late Sau. KBJ COE,Chandwad

## ABSTRACT

Now days, due to ease in usage of computers and its supporting accessories, researchers are being motivated towards developing tools for automation of a existing classical system. When a human being has a desire to learn something, generally he is expected to have reading skills and eyesight vision for the same. This can be improved by use of some audio-visual tools. This paper presents a bridging tool and a helping hand for teachers to deal with specially-able persons. An automated reading or talking tutor is presented here a programming language, Java, one of the hit listed languages, in demand in IT industry. A visually less-able person can easily learn and acquire good expertise on the same. This tool is found satisfactory for teachers to provide better knowledge for visually less-able students or learners.

**Keywords**— Reading tutor, Speech technology, Interaction design, Human-computer interaction, Educational technology, e-learning, Java.

## 1. INTRODUCTION

In traditional way, learning involved a teacher teaching the students in a bounded periphery called classroom. In this classical learning methodology, it was required for students to attend regular classes; this further involved navigation from their place to classroom for learning.

Among the normal students in a class there is a chance that there is visually impaired learner. Due to less available time in bounded duration in classical teaching-learning process, a visually impaired person may not acquire the complete contents of the session covered in classroom. Also for teachers, several times the repetition of the things is not possible. If for reason, one missed the class, then he/she may not get those concepts properly. In case of those having partial visual impairment, they may face the problems while reading. So, that they have to more concentrate on teachers' words when they are delivering the lecture. The variety of obstacles they may find on their way is quite large mainly because the term "visually impaired" encompasses a wide range of defects, ranging from blindness to a number of other many aspects, although less serious, visual impairments.

Charter of Fundamental Rights of the European Union (2000) [1] stated that, "The prejudice depend on any environment such as colour, cultural, femininity, race, society, status, genetic characteristics, language, religion, belief,

political or any other view, membership of a national marginal, birth, disability, property, age or sexual orientation could forbidden". In the education sector, the fundamental concept of "Non-discrimination" required the ability of all people to have "equal opportunity in education, without consideration of their ethnicity, social class, background or physical disabilities"[2]. Learners with impairments also have the right to expect the same standard of education as their college-mates, friends, etc. In this way of observation, they have the right to access and use conventional educational tools, which are generally referred to as "e-learning tools". This motivated us to propose a learning tool for specially-abled peoples. Now days, in most of the industries or companies the java programming language is in boom for industrial application. So we get motivated to develop an audio-visual learning tool on programming language like Java.

As per the reported work [3], most learners with disabilities in an inclusive educational setting are socially alone. This statement contributed towards question of this study, how learners with visual impairment experience the social aspects of their inclusion in society. It was found that the learners with disabilities and the able-bodied learners do not truly mix. We found that visually impaired experience, great difficulties with social interaction skills, which exclude them from the rest of another people's crowd. It often may be the case that learners with some disabling conditions, though included in the classroom, may remain outsiders. By social view, the aim of proposing this system was to provide a learning tool for learners with visual impairments. In modern era, visually impaired students can take advantage of a wide range of effective assistive technologies and while using electronic learning material, the learning process get easy to understand as if it is in audio-visual manner. Now days everyone has right of education, even if one has less eyesight and for this teachers and e-learning tools had given major contribution. These measures nevertheless, are still needed to foster the actual usability of such products by sight impaired people.

## 2. LITERATURE SURVEY

In modern days, the World Health Organization (2004)[4] has laid stress on that "childhood blindness remains a significant problem, with an approximated 1.4 million blind children below age 15", the difficulty appears even more when we consider the learner with visual impairments other than blindness. The rate of low vision peoples being generally estimated three times greater than blindness. In the same

report, in fact, it was found that in 2002 there were 161 million people having less eye sight, about 2.6% of the world population were visually afflicted in the world, part of whom 124 million, about 2%, had low vision and 37 million, about 0.6%, were blind. Data of the World Health Organization seem to confirm, then sight impaired students are in a large percentage of the overall population of the students with disabilities[5].

### Types of E-learning tools for different visual aspect

While affording the choice of the e-learning tools to be used in educational sector by visually impaired students, from a coin of side, it is essential that the nature, the specific qualities and the functionalities of the technological tools at hand, and from the other side of coin, it is necessary to take into account the actual, specific needs of the potential users which are mainly related to their impairments.

#### 2.1 What is the term E-learning tool?

Anohina [6], [2005] defines “e-learning” as a learning process that “takes places via any e-media tools”. In Global scenario, these term refers to any educational process making use of different technological as well as electronic media and applications such as, “web-based teaching tools, blogs, wikipedia, multimedia, computer aided assessments, websites, discussion boards, collaborative software, games, learning management software, e-mail, educational animation, simulations, etc.”

- **Online learning:**

Those educational resources made available through computer networks, when used in an educational sector [7].

- **Computer-based learning:**

Those learning materials locally available on the user’s PC and used when the computer is not connected to a network [7].

- **M-learning:**

Those educational tools made available through mobile devices such as handhelds, smart phones, PDAs, tablets, mobile. Such tools, may also take advantage of the connection to the net via “wireless transmission” [7].

- **Distance-learning platforms:**

Those internet-based environments indicated to the delivery of integrated electronic educational contents and to the management of a variety of educational activities aimed at fulfilling specific educational objectives. All the digital contents made available through such platforms, are generally called “learning objects” [7].

- **Web based applications:**

Those applications designed for educational purposes and used to fulfil educational objectives which are directly accessible using any available browser and which don’t need to be installed on the user PC [7].

- **Standalone applications:**

Those products used for education which cannot be used directly via browser but that need to be installed locally, on the user machine, this category also includes products which are straightly downloadable from the internet, but that need to be installed on the personal computer [7].

#### 2.2 E-learning tools and Visually impaired students

Examples of what kind of accessibility and usability problems can be found in the different types of software applications, keeping aside all the possible problems relevant to the use of computers in their configuration and of other more hardware devices. While considering such barriers, it is important to

reflect on the fact that they are strictly related to the type of user impairment. Blind and low vision students faces various types of hurdles in order to fully access the contents, in fact, the first group needs essentially to depend on screen readers, while the second group, thanks to optical tools and/or to the specific user made options, may access a much wider variety of software applications, including, often, those with graphical interface featured with audio.

### Requirements of visually impaired students and E-learning platform.

An E-learning platform often arises a number of various obstructs to visually impaired students crowded pages, small characters, pop-up windows, iconic menus, complex form pattern to be filled in, etc. The availability of appropriate options could help to avoid such problems. From this reported review, we came to know that, the audio-visual tool can help in betterment of learning for visually impaired learners. This motivated us to develop an audio-visual learning tool.

## 3. PROPOSED SYSTEM

By taken in account the consideration of visually impaired learners we are motivated to propose an audio-visual learning tool. In this proposed system, a standalone audio-visual learning tool for a technical language Java would be developed that could be used for Personal PC’s. The overview of the system is shown in fig 1. This System will include the features in our learning tool like System’s audio voice, Printing facility, Play/Pause button, Program and examples related to each topic of Java, Next and Previous button for navigation between topics etc. The added feature of this system is that it does not require any media player and special sound driver to access the output of the system. Instead of user-recorded voice this system uses operating system’s audio sound known as Microsoft anna, to have better pronunciation while hearing. This system is easy to access and understand. User can navigate from any topic included in the system to any other topic.

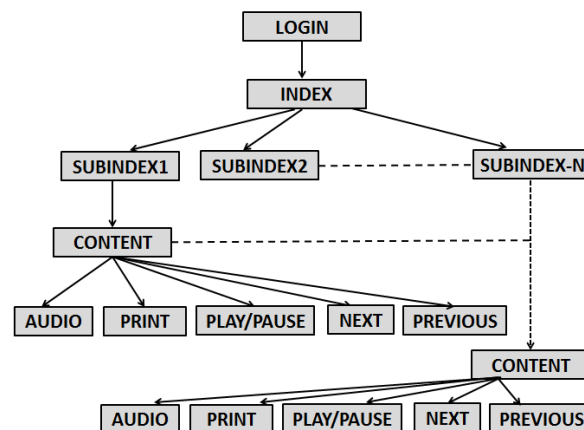


Fig 1. Overview of Proposed System.

#### 3.1 Audio voice:

For visually impaired peoples there should be a more need of audio, so that not to fully depending on reading, learners can only hear and learn the things. This system provides the system’s audio voice so that learners interestingly hear and learn the programming concepts.

### 3.2 Ease to navigate:

This system provides index access to search any topic, as this system includes index and sub-indexes so user can easily move between topics. It also has a good graphical user interface so learner's gets attracted to this tool. It also includes next and previous button so that learner can go to next and previous page.

### 3.3 Play-n-Pause:

This tool provides play-n-pause facility so as per learner's requirement they can hear and learn the java or can simply read.

### 3.4 Print:

This tool has the Printing facility so that if learner wants he/she can take the print out of screenshots, learners can also take the print out of programs.

### 3.5 Programs:

This tool includes programs related to their topic so that they can clear their concept, they can also run the program by just copying the code from a tool and can take print out of the programs.

### 3.6 Algorithm:

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**Input:** Valid username and password.

**Output:** Learn with audio.

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**Step: 1** Enter valid username and password on login screen

**Step: 2** if Invalid Username and/or Password then

```
{  
    Error  
    Go to (2)  
}
```

**Step: 3** Validations perform then Index appears.

**Step: 4** Select the topic and go to sub-index of that topic.

**Step: 5** Select the sub-topic from sub-index and get the details of that topic.

**Step: 6** If you want then you can hear by pressing the play button and stop it by pressing pause button, by pressing the print button you can take the print of the topic. You can also go to next and previous topic directly by pressing next and previous button.

**Step: 7** By pressing the sub-index button you can go to sub-index, from sub-index you can directly go to index and from main index you can directly exit from the system.

### 3.7 Mathematical Model:

This mathematical model represents the proposed system.

$Q = \{\Sigma, q, q_0, \delta, f\}$

$\Sigma$ : Set of Input {a,b,c,d}

Where,

a=User-name,  
b>Password,  
c=Login,  
d=Exit.

q: Set of States {q<sub>0</sub>,q<sub>1</sub>,q<sub>2</sub>,q<sub>3</sub>}

Where,

q<sub>0</sub>=Login,  
q<sub>1</sub>=Index,  
q<sub>2</sub>=Sub-index,  
q<sub>3</sub>=Study\_topic.

q<sub>0</sub>: Initial State {q<sub>0</sub>}

Where,

q<sub>0</sub>=Login.

$\delta$ : Delta Transition Function {i<sub>1</sub>,i<sub>2</sub>,i<sub>3</sub>,i<sub>4</sub>,i<sub>5</sub>,i<sub>6</sub>,i<sub>7</sub>,i<sub>8</sub>,i<sub>9</sub>}

Where,

i<sub>1</sub>=Validate,  
i<sub>2</sub>=Exit,  
i<sub>3</sub>=Audio/Play,  
i<sub>4</sub>=Pause,  
i<sub>5</sub>=Print,  
i<sub>6</sub>=Next,  
i<sub>7</sub>=Previous,  
i<sub>8</sub>=Sub-index,  
i<sub>9</sub>=Index.

## 4. CONCLUSION

In this paper the audio visual learning tool has been implemented with a motivation. From literature survey it state that there are very less number of e-learning tools are available for visual impaired learners, with audio-visual facility. Also this system would bridge the gap of visual impaired learners and IT industries, whom are having a desire to work on java technology or language. For visually impaired learner this tool has been found very effective to access and learn.

## 5. ACKNOWLEDGMENTS

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