



Reading Practices among Visually Impaired

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Abstract

Approximately three thousand years ago alphabets came into use after many years of search and experiments. By contrast, a tactile version of the alphabet which could be read by blind people was not invented until just over around two hundred years ago and a means of writing was not evolved until 1821 (Irwin, 1970). Among many scripts Braille is the most accepted scripts but unfortunately reading rate of this script is slowing down. The present paper was an attempt to find out the problem areas and to develop a program for improving reading speed of Braille.

Key Words: *Braille, reading behavior, tactile script, teaching-learning Braille, proper Braille reading.*

Introduction

Through various sensory systems, one gain vital information about the surroundings, which results in all one's decisions and actions. All the information which is received by sensory organs tells not only about the world around and how it is changing, but also about what is happening and what one is going to do in the world. Contact with the surface of an object can provide important information about the object such as size, surface, texture, shape, orientation etc. This is due to forces arising from contact deforming a matrix of small sensors in the outermost (epidermal) layer just below the outer surface of the skin.

One uses his/her the alternative sense organ, in place of right one, when he/she determines that the information received from the sensory source is unreliable or information is not available by that particular sensory source. In case of any type of visual impairment, the affected person cannot rely only on the information received from the visual sense so the person switches over to his/her other remaining senses for getting appropriate and reliable information.

Touch plays an important role in getting information from the surroundings for a person with visual impairment. Touch is considered a very important source of information for the person with visual impairment but touch input cannot be used as a substitute for vision. It cannot allow the visually impaired to experience spatial relations which mediated by vision. Information from touch has its own limitation as direct contact between object and the body is must to get information, which is not possible all the times. In order to adapt to the environment, one should need to know what is happening at the surface of their bodies. The skin sense provides this information, and the skin can be taught of as a giant sense organ that covers the human body. Four skin senses are usually distinguished, pressure or touch, cold, warmth and pain. Much of what people receive from the skin sense results in such simple sensations of injury. The skin sense, however, is capable of telling much more, one can identify objects by touch or even learn to read tactile script.

Investigations revealed that the skin has punctuate sensitivity which means that it is sensitive to some points and not so sensitive at others or in other words one can say that the skin is not uniformly sensitive. The sensations which receive by a light touch on his/her skin are called pressure or touch. The amount of physical pressure required to produce this experience varies greatly for different parts of the body. The tip of body, the tip of the tongue, the tip of fingers and hands are the most sensitive areas. The arms and legs are less sensitive and trunk and calloused areas are least sensitive areas of all.

Braille: The Tactile Script

Braille reading is still the most widely used means of reading and writing for severely visually impaired and functionally blind individuals (Heinze, 1986). Braille represents to a blind child what print represents to a seeing child (Lowenfeld, 1967). It is thus essential for a blind child to acquire good reading and writing abilities in Braille during the initial years at school. It has been established that by the time a child reaches the fourth standard, he should develop effective reading and writing ability in Braille as a seeing child becomes thorough in print reading and writing. Lowenfeld stated that comprehension and rate of reading are the two main components which make up what could be termed reading efficiency. An effective reader is, therefore, one who reads with good comprehension and at a good speed.

The first half of the 19th century saw the advent of Braille as a staple medium of reading and writing for the visually impaired persons in Europe and United States and it had become quite popular in these continents by the mid-19th century. This has revolutionized the education of the visually impaired children. Louis Braille used six dots, arranged as two dots in width and three dots in height. The standard measurements of these 6 raised dots in inches are base diameter of dots is 0.060 inches, height of dot is 0.017 inches, distance between the centre of adjacent dots within a cell is 0.090 inches, distance between the centers of adjacent dots between cells is 0.016 inches and the distance between the centers of adjacent dots in adjacent lines is 0.220 inches.

Development of Braille in India

In India, there are a large number of regional languages due to diversified condition of the Country. Because of lack of agreement and/or proper communication with one another,

almost every new school that started functioning adopted its own Braille script. And at some places in one city, two different Braille codes were in use. (Chauhan, 1990) The visually impaired persons could not use the material prepared by another institutions. No efforts at developing a common code for Indian languages were made until 1941. It was in 1941 when the then Government of India set up a committee to go in to the problem of multiplicity of Braille codes in this country. During this period, approximately ten codes were in use in various parts of the Country like Shirref Braille, Indian Braille of Dr. Nilkanthrai, Tamil Braille of Miss Askwith, Mysore & Kannada code, Chatterjee code, Oriental Braille, Shah Braille, Sindhi Braille, Uniform Indian Braille by the expert Braille committee of the Central Advisory Board of Education, Standard Indian Braille framed by an informal committee under and chairmanship of Lt. Col. Clutha Mackenzie etc. All these different scripts created problems specially for those who migrate from one place to another. At new place, the visually impaired children/person was bound to learn a different type of Braille script, which was a hindrance for the academic achievement for the migrant. Such adhocism was a big reason for battle among different Braille users and inventor of different Braille scripts in India as no one was interested to minimize the importance of his/her Braille script. Because of this, interest of Braille was decreased among visually impaired persons in India.

All the scripts, which were in use by visually impaired in India, were based on three divergent and mutually conflicting principles. (Sharma, 1992). These principles were:

Traditional Braille: Scripts based on the principle of traditional Braille assigned, as far as possible, common Braille symbols to common sounds between English and Indian languages.

Concurrent sequences: Scripts founded on the principle of concurrent sequence simply took the seven line system of Louis Braille and used these symbols sequentially for the letters of the alphabet of a given Indian language. As a result of this first letter of a language came to be represented by the first letter of the Louis Braille's first symbol, second by the second symbol and so on.

Related symbols: This principle assigned related Braille symbols to phonetically related letters. One example of related symbols can be the pairs of reversed Braille characters. Phonetically related letters are those with soft sound and their aspirates. Thus, related Braille symbols can also be formed by adding a particular dot to a Braille character representing soft sounds to from the aspirates.

Teaching of Braille in India: Present Scenario

Braille is a surpassed tactile medium for the visually impaired people even after a variety of technological equipments have been developed for the access to the information for the visually impaired persons but it does not mean that Braille is absolutely convenient and easy system like other visual scripts. There exist a number of difficulties like slow reading rate, cumbersome process of manual writing, storage and expensive production of Braille literature etc. in Braille. These difficulties were further evident by John Lorimer (1990). Lorimer reported that slowness in reading Braille is generally due to the inefficient methods used in teaching reading, and he claimed that most readers can be taught to read much faster. In the schools for the blind, Braille is a staple medium of instruction in India, as our economy is not so much

sound as to afford the cost of equipments developed in the developed countries in the area of information.

For the last few years, this has come in to notice that the Braille is going to be on the way in terms of its use and application by the visually impaired people. The use of audio form materials is a factor responsible for decline of Braille among visually impaired people. At the same time, the proper training and techniques of teaching Braille to the beginners is not a negligible cause for the set back to the Braille. In most of the schools for the blind in the Country, Braille is being taught with absolute and out-dated methods, which is characterized as letter-by-letter approach use of un-psychological techniques.

Louis Braille developed the Braille script approximately 175 years back and still Braille is recognizing as the only best script for the blind. Many science and technological devices have been developed in last 20-25 years. But none of these developments can be a substitute of Braille. In spite of this reading and writing speed of Braille is coming down from last few years. In January 2002, on 'Louis Braille Day', a competition was conducted for reading Braille in National Institute for Visually Handicapped, Dehradun. None of the participants could read more than 70-75 words per minute. This result is due to lack of interest in reading and writing Braille because there are so many technological devices like computers, tape recorders, etc. which are being used. Many blind people depend on these devices for their studies from the early years of schooling.

Need of the study

Since India is a developing country, where population is quite high and to overcome its implications is challenging in many forms. Now aim is not limited to teach only Braille but to give necessary input for learning Braille in such a manner so that proper comprehension can be ensured. Unfortunately visually impaired students who opt for higher education and taking literature or descriptive subjects are not very well versed with Braille and have no clear vision of basic concepts of reading Braille at required speed so that they can comprehend.

The study was an attempt to apply technology in the field of special education. This educational technology instruction is a new way to revitalize teaching learning process through a definite program. It is an outline theory of operant conditioning that results into better learning by way of reinforcement and drill.

Since visually impaired students at senior level are found to make mistake in reading Braille, it becomes inevitable for new investigator to tackle this task and to make it easy to learn Braille and comprehend the matter written in Braille. Therefore, the purpose of the study is to prepare program in Hindi language for class one, which is surely a crucial and appropriate time for learning Braille.

Objectives of the study

Following were the objectives of the study:

- 1) To study the reading behavior of the visually handicapped students.
- 2) To identify deviant Braille reading behavior of visually handicapped children.
- 3) To develop program for studying Braille reading behavior of visually handicapped students.
- 4) To study the effectiveness of prepared material for teaching desirable Braille reading behavior in order to develop appropriate reading behavior.

5) To suggest techniques for developing appropriate reading behavior of visually handicapped students.

Limitations of the study

Due to paucity and time and resources the effectiveness of the developed program could not be studied on a larger sample and hence the study was confined to a sample of 60 visually impaired students.

The Braille reading behavior teaching program learning Braille was limited to only of Hindi language.

Because of the paucity of time at the disposal of investigator, it was not possible to prepare program for every class of primary level hence program was prepared only for beginners of Braille reading i.e. class 1.

Method

The study was an experimental type of research as it dealt with evaluation of cause and effect relationship between different variables in controlled situations. Methods applied to conduct this research, experimentation, sample, and statistical techniques applied makes this research a quasi-experimental type among different types of experimental designs as it was a two group pre-test post-test design which provides control to when and to whom, the measurement was applied but, because, random assignment to experimental and control treatments have not been applied, the equivalence of the groups was not assured. Two different sections of class 1 were assigned as experimental and controlled groups. One group was taught Braille by using newly prepared program of teaching Braille and the other was taught by traditional method used in India to teach Braille.

Variables

For the research study, the independent variables were interventions in the form of the two different techniques, which were manipulated by the researcher and the dependent variables were Braille reading time, mistakes made while reading Braille, omission of words while reading Braille, scrubbing movement of finger while reading Braille and repetition of Braille word while reading, which were expected to vary due to independent variable. Tactile tolerance was thought to influence the Braille reading behavior and thus considered extraneous variable, which was controlled by equating the group on the basis of tactile tolerance. Intervening Variables like anxiety, fatigue, motivation, interest, and physical reasons were beyond the control of investigator or could not be controlled due to constraints. Situational variables like time, duration of treatment, content of Braille (open Braille), level of sample etc. were controlled administratively by keeping these situational variables alike.

In the study, for measuring the dependent variable, one Braille reading test was administered before and after the treatment and reading speed, occurrence of mistakes, scrubbing movements, omission and repetition of words were calculated. Scores of the tests were considered as pre-test and post-test scores.

Sample

There are 10 schools for the visually impaired children in the National Capital Territory of Delhi. In the study, visually impaired students studying in class 1 of these schools for the

visually impaired were considered as population of the study. To study whole population was not possible to draw valid inferences or generalizations. Hence, 60 visually impaired children from six special schools were selected. These children were divided in to two groups of 30 children each. At the time of selecting institution, the investigator considered the fact that whether institution head or administration would provide necessary facilities and co-operation for the administration of the prepared program for teaching Braille.

Matching

The development of pre-Braille reading skills such as, recognition of direction, discrimination between rough and smooth, making difference between small and big, counting dots etc are pre-requisite conditions for learning to read Braille. Therefore, the children of both the groups were matched on these skills as well as on age.

Table: 1
Calculation of 't' value for age and scores of pre-Braille reading skill test

Group	Controlled			Experimental			t-value
	N	Mean	SD	N	Mean	SD	
Age		5.72	0.38		5.62	0.37	1.68*
Pre Braille reading test scores	30	8.56	3.12	30	8.43	2.86	0.184*

*Not significant at 0.05 level

Table-1 shows the mean, SD and t value of the age of both the groups. It can be seen from the table that the difference between means of age of the children was statistically insignificant, hence on this variable both the groups were considered equal. The table also provides the means, SD and 't' value of the scores of pre-Braille reading skill test, which shows statistically insignificant difference. Therefore, on the basis of the pre-Braille reading skills also both the groups were equal.

After matching the two groups, one group was called control groups and the other group was called experimental group. The control group was taught Braille by using traditional method. The experimental group was taught reading Braille through newly prepared program. The institution authorities were requested to ensure the presence of all the selected students during the process of experimentation.

Tools

The researcher could not find any suitable tool, which could serve the purpose as the tools developed earlier were in English medium which was not felt suitable for the students of Hindi language background. Hence, the following tools were developed and used to collect the data.

Preliminary Data Blank: This was developed to collect the preliminary information about the, such as name of the visually impaired child, age, sex, exposure to training of pre-Braille skill, age at onset of blindness, cause of blindness etc. of children studying in the selected schools for the Visually Impaired children.

A **pre-Braille reading skill test** was developed to test the pre-Braille reading skills of the subjects of both the groups. This was needed to match the two groups on the identified Pre-Braille reading skills.

A **program for improving Braille Reading behavior**: This program was developed for teaching desired Braille reading behavior. Individuals' academic level of the visually impaired children of class 1 was kept in mind while developing this program. The principles mentioned above were also borne in mind in the development of this program. The following principles were considered relevant and in developing the Braille teaching material to develop desired Braille reading behavior:

1. Tactile attractiveness.
2. The words to be included in the text should be from the vocabulary of the child and of simple to complex nature.
3. Successive increase in number of the words in sentence.
4. Interesting content and the matter should be meaningful.

Besides these proper binding (section binding), size of the book etc. are also important guidelines which was followed in the development of the material.

Data collection procedure

To facilitate data collection, whole program was planned and organized in successive steps. For this, an action schedule was prepared and followed in both the group of class 1 level. The order followed in getting the relevant data was as follows:

1. Gathering basic information using preliminary data blank.
2. Administration of Pre Braille reading skill test
3. Administration of Braille behavior test. (as pre-test)
4. Gathering information about Braille reading behavior using observation schedule.
5. Teaching both the groups through two different methods.
6. Administration of the same Braille reading speed test, one day after the teaching is over. (as post-test)

Preliminary data blank: The basic information about the visually impaired students was collected by administering this preliminary data blank by the researcher before commencing the experimentation in the present research.

Pre-Braille Reading skill Test: Pre Braille reading skill test was administered to find out the level of pre Braille reading skills of both the groups i.e. control group and experimental group.

Identification of Braille reading behavior: At the time of using Braille reading speed test, Braille reading behavior was observed and recorded by the investigator by using observation schedule.

Program for Braille reading Behavior: After collection of pre-test scores of control group, the visually impaired students of this group were taught Braille through traditional method which was being used by the school authorities and the other group i.e. experimental group were taught Braille by researcher through newly developed program for 29 instructional weeks, which included practicing and revision of material.

Braille Reading Behavior test:

The experimentation started with the administration of Braille reading Behavior test. This behavior test was administered over 60 visually impaired students of class 1 level of control and

experimental group. The researcher administered the test individually and the used a stopwatch and score sheets for each child on which he will write the time taken to read correctly. All the students were instructed about the procedure to be followed. Time taken by each student in completing the whole story written in Braille was noted as pre-test scores. After completion of teaching through both the methods, same Braille reading behavior test was administered over them separately for each group and thus scores obtained on the test were used as post-test scores.

Analysis and interpretation

Table: 2
Comparison of control and experimental group before treatment

Dependent variable ↓	Controlled Group			Experimental Group			t-value
	N	Mean	SD	N	Mean	SD	
Braille Reading Speed test	30	10.42	3.25	30	10.13	3.08	0.304*
Mistakes while reading		17	6.42		16.33	6.06	0.361*
Scrubbing movement		9.43	2.41		9.16	3.16	0.17*
Omission of words		1.90	1.06		2.33	1.21	1.4*
Repetition of words		7.33	1.09		7.06	1.22	0.849*

*Not significant at 0.05 level.

The tables-2 clearly shows that the two groups i.e. Control and experimental groups did not differ significantly on all the parameters namely; reading speed, mistakes made by the subjects, scrubbing movement, omission and repetition. Therefore, simple ‘t’ calculation would have been very useful to suggest the impact of the effectiveness of the developed program in improving reading speed, reducing mistakes, reducing scrubbing movement reducing omission and avoiding repetition. It was hence thought appropriate by the investigator to apply ‘t’ test to determine the difference in reading behavior of Braille after using the program developed in the present study.

Table: 3
Comparison of control and experimental group after treatment

Dependent variable ↓	Controlled Group			Experimental Group			dF	t-value
	N	Mean	Variation	N	Mean	Variation		
Braille Reading	30	0.04	0.05	30	2.10	0.34	58	14.91*
Mistakes while		1.16	1.40		3.1	2.57		3.93*
Scrubbing movement		1.23	0.46		2.2	1.40		3.87*
Omission of words		0.9	0.36		1.93	0.40		6.41*
Repetition of words		0.9	0.98		1.46	0.87		2.27#

*Significant at 0.01 level. #Significant at 0.05 level.

Observations from the table-3 exposes the mean scores and t-values of differences between pre-test scores and post-test scores of controlled and experimental groups on variables like reading time, mistakes made while reading, scrubbing movements, omission of words and repetition of words. T-values of dependent variables observed were 14.91, 3.93, 3.87, 6.41 and 2.27

respectively. Hence, on the basis of these values, it can be stated that there were differences in time taken while reading Braille reading speed test, mistakes while reading the test, scrubbing movement, omission of words, and repetition of words and their differences were statistically significant. Experimental group showed higher improvement as compared than that of Control group. Based on the foregoing analysis and the interpretation, it can be inferred that the newly developed Braille reading behavior teaching program was found effective in improving the Braille reading behavior of the blind children of the experimental group in all dimensions i.e. reading speed, mistakes made by the subjects, scrubbing movement, omission and repetition.

Discussion

Since Braille reading is a slow means of obtaining information, some efforts should be made to increase the Braille reading speed and for improving Braille reading behavior of visually impaired persons. In this study it has been found that reading speed was increased after using the newly developed material for improving Braille reading speed, which indicates that proper methodology affect greatly in enhancing the reading speed. The findings of this research clearly indicate that faster Braille literacy can be developed in desired manner by using the developed material, which was designed to make for the same. **Christine, A.** (1998) also concluded that efficient Braille readers achieve higher Braille reading speed by using proper methodology. Another research of **Gayle, L.** (1998) examined the traditional theory and practice associated with concept of pre-reading for potential Braille users. He concluded that faster Braille literacy can be developed if one uses the familiar resources.

On the basis of the results of the present study the researcher can state that by usage of proper training material of Braille can overcome the frequency of mistakes in Braille reading. Usage of both hands and multi-fingered approach helped in identifying the Braille character well before. The results of the study shows that if visually impaired children divide their reading task between two reading fingers, best results can be achieved. Through this way Braille reader can eliminate the time that would occur if he/she find the beginning of the next line after finishing the previous line. **Trent, S.D. and Traun, M.B.** (1997) also reported the same findings that accuracy in reading Braille can be helpful in improving Braille reading speed.

Slow Braille reading rates also caused by undesired scrubbing movements as it takes time to identify Braille character while reading. Such type of scrubbing movements was minimized by using proper pre-Braille training as in case of the present study. Material prepared under present study used the principle of integrated approach of identifying a Braille word rather than reading Braille letter by letter which helped in reducing undesired scrubbing movements in reading Braille. **Simon, C. and Huertas, J.A.** (1998) came out with the same findings that Braille readers do not necessarily gather information in a sequential manner rather they integrate larger units of written information. Their research also reveals that perception and analysis of blind readers is limited to a succession of individual character.

At the time of Braille reading omission of words can greatly influence the reading speed as most of the time the succeeding words have relation with previous words which causes hindrance in establishing relationship among words in a sentence. In the present study the material was designed in a way by which omission rates were reduced. Reading speed is also influenced by consuming extra time to read a word in sentence. Placing the reading finger on a

word repeatedly causes unnecessary consumption of time. Appropriate reading-learning material can overcome such problems of repeating finger on words to be read. The material prepared under the present research reduced the rate of repetition of reading finger on Braille words. **John, G. and Rea, R.** (2000) also reported that visually impaired children experience considerable difficulties in learning to read Braille. They said that the identification of phonological weaknesses or labels such as dyslexia does not itself make any difference.

Program developed under the present study aroused the interest in Braille for improving reading speed of Braille, for this, few principles like simple to complex, tactile attractiveness of material etc. were kept in mind. For young visually impaired children simple to complex and tactile attractiveness are two very important aspects by which their intellectual capabilities can be used in an un-stretched manner. **Tin, H. and Heather, M.** (1995) also emphasized the development of tactile speed of information processing project, involving designing and standardizing a new set of pre Braille items of young visually impaired children.

In the present study desperate need was felt for giving proper training to Braille teachers. This need is based not only on methods of giving proper training of Braille but also to make the Braille teachers masters in preparing Braille learning material. Holbrook, M. C., & Koenig, A. J. (2000) came out with same suggestions and describes the importance of Braille refresher course for teacher. **Sheila, A.** (2002) also emphasized on competency in Braille literacy within teacher preparation programs.

CONCLUSION

Braille is the script used by visually impaired persons to read the text material through touch. One common fallacy was found that Braille training should be given to only poor Braille readers. But on the contrary such type of training should be given at a beginning level of Braille readers so that the Braille readers perform better in their Braille reading and desired outcome can be obtained through proper training of Braille reading at elementary level. The study suggested some measures to prepare Braille learning material for young visually impaired children. These methods and techniques suggested in the study can provide help in preparing Braille learning material and thus Braille reading speed can be improved. A number of new programs for instruction in reading Braille can be developed such as the Initial Teaching Alphabet. Such initial teaching alphabet can be very useful to begin the teaching of reading Braille to visually impaired children during elementary stage of schooling.

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