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An Exploratory Study of Preferred Learning Styles of Visually Impaired Children

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Abstract

The research was designed to explore the learning styles preferred by the children with visual impairment. A survey was conducted to collect information from 50 males and 50 female students with visual impairment studying in grade six to ten at government special education schools for visually impaired in Rawalpindi and Islamabad, selected through simple random technique. The younger version of Visual, Aural, Read/write, and Kinesthetic (VARK) questionnaire containing four sub scales for each sensory modality was used as a research tool. The tool was administered after pilot testing. Results of this study showed that the reading/writing style of learning was the most preferred learning style by students with visual impairment. Gender differences were not found significant on visual and oral sub scales, whereas boys and girls were found significantly different on two learning styles; i) read/write, and ii) kinesthetic. The study concludes that reading/writing style of learning is the most preferred style by the visually impaired students and the visually impaired boys also take interest in kinesthetic style of learning. The study recommends the teachers of visually impaired students, to opt the teaching strategies as per their preferred style of learning; i.e. reading/writing style of learning.

***Keywords**:* preferred learning styles, children with visual impairment, VARK model of learning styles

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Introduction

Visual impairment is a malfunction of the eye that prevents a person from seeing normally. The visual impairment involves varying degrees of vision loss ranging from total blindness to partial sightedness. Usually the children with visual impairment try their best to learn whatever is taught at schools. The teachers at schools of visually impaired children deliver the academic concepts by using various teaching methodology and techniques but still they do not find the expected result from the students. These types of unsuccessful efforts result in disappointment and create a gap between teaching and students learning. Many efforts have been made by the educators to fulfill this gap and this point has led the researchers to gain knowledge about the individual's learning styles, so that the successful learning levels may be attained.

Nowadays technology is advanced to an extent that a child with total blindness can also perform academically well by going through certain levels in special schools. The children with visual impairment can learn the academic concepts as the sighted children learn. Learning is a way in which an individual gives response to the external stimuli such as social, emotional and physical environment in order to comprehend any new. The way in which the general information is processed is called the learning style of an individual. Each and every individual has his own learning style. Any learning style could not be taken as right or wrong.

The knowledge of a child's preferred learning style such as visual, oral, read/write & kinesthetic can help in developing the interest of a child in teaching and learning process / material. It also enables the children with visual impairment to comprehend the new concepts and help to retrain them. Keeping in view the need of knowledge of learning style of children with visual impairment, the present research was conducted to identify the learning styles which are preferred by children with visual impairment.

Objectives

Following were the objectives of this study:

i. To explore learning styles of children with visual impairment.
ii. To identify the most preferred learning styles of children with visual impairment.
iii. To point out the differences among learning style of visually impaired boys and girls.

Research Questions

The study responded to the following research questions:

i. To what extent do the children with visual impairment use their kinesthetic sense to learn?
ii. Does the learning style involving use of vision be useful for children with visual impairment?
iii. To what extent does the learning style involving auditory techniques give better results?
iv. Is read/write learning style being the preferable one?
v. How do visually impaired boys and girls learn?

Literature Review

The process by which people perceive and process the perceived information is distinctive person wise. Learning styles is simply the way in which the individual tends to learn best. It refers "individual's preferred method of noting, organizing, and making sense of the perceived information. Learning styles do not tell us anything about a person's abilities or intelligence, but these help us to understand why some tasks seem easier for us than others" (Tie &Umer, 2010).

There are many different ways for definition, classification, and an individual's learning style (LS) identification. According to Oxford's study (2003) "Learning styles are overall patterns that provide direction to learning and teaching process" (p.273). American Association of School Administrators defined learning styles as "Learning styles refers to the ways individual student learn best" (as cited in Dunn & Dunn, 2010, p.2). "An individuals' learning style is the way he or she concentrates on, processes, internalizes, and remembers new and difficult academic information or skills" (Shaughnessy, M. F. 1998, p.1)

Styles of learning are as important as intellectual ability. There is direct relationship between a student's learning styles and his/her achievement at school. Sternberg relates LS to the degree of their success. He says that the flexible use of different LS tells us the degree of success in a particular learning situation. It is observed that students perform good on those class or home assignments which are compatible to their particular preferred styles of thinking and learning. They take interest in those educational activities which match to LS (educational research newsletter and webinars, 2018).

According to teach.com (2018) the term learning styles expresses "every student learns differently. Technically an individual's learning

style refers to the preferential way in which the student absorbs, processes, comprehends and retains information". The teachers should identify and understand different ways opted by their students to learn new information/concepts.

Sternberg refers his theory of LS as 'mental self-government, whose factors contribute to the student learning (educational research newsletter and webinars,2018). According to Sternberg the mind does the functions of legislation, execution and judicial just like any administration. Create, formulate, imagine and plan are the legislative function. Whereas doing or applying are the execution functions. Judging, evaluating and comparing are the judicial acts of the brain government. One function tends to be the dominant in each person that is preferred by the individual for learning. The students take interest and comprehend those learning activities which are in line with their LS. Therefore, as Sternberg, (1990) says "the teachers should be aware of their students' preferred styles in order to take advantage of opportunities for student's learning" (p.367).

LS can easily be understood if students' LS are studied as visual learners, auditory learners and kinesthetic learners. Neil Fleming's VARK model of Student Learning involves four types of LS. The VARK model involves four different LS; visual, auditory, reading/writing preferences, and kinesthetic adding reading and writing as a category (Fleming& Baume, 2006).

The reason to use learning style in a classroom is that it encourages variety. Across the literature it is true that multimodal (hearing, seeing, doing and feeling) in the learning process benefits everyone (study.com, 2018).

The understanding of learning style is necessary for teachers because;

- Preferred LS influence students' behavior and learning of new information.
- Learning of concepts through preferred styles enhances comprehension levels and motivation. (teach.com, 2018).

Therefore, the study was designed to identify visually impaired students' preferred LS so that teaching /curriculum may be aligned accordingly for the benefit of entire classroom. There are several models which describe the nature of learning styles in particular ways. One of them is Dunn and Dunn Model of Learning Style. According to this model learning styles is defined as, "The way in which each learner begins to concentrate process and retain new and difficult information. That interaction occurs differently for everyone" (Dunn & Dunn, 2010, p.4). The Dunn and Dunn Model indicates the individual's preference in learning. Another model of learning style is David Kolb's learning style

model which describes that learning styles of the individuals are forms of behavior based on the previous experiences of an individual (McLeod, 2017). The four learning styles given in Kolb's model (1984) are diverging, assimilating, converging and accommodating. After 1970, Peter, Honey and Alan Mumford (1995) adapted the David Kolb's model of Experimental Learning Style (1984). They made two adaptations and altered the names of the stages. According to experience of decision making and problem solving. The Honey & Mumford (2010) stages are; i) Having an experience, ii) Reviewing the experience, iii) Concluding from the experience, & iv) Planning the next steps.

One method which divides learning styles into two groups; analytical and relational of which favor left-brain mode functions and right-brain mode functions respectively. Some other researchers categorize as field independent and field dependent. These classifications have common factors; one group is logical and analytic and another group is relational and intuitive. Chiya (2003) also mentions that "perceptual learning style by Reid (1984) that divides LS into six groups; visual, auditory, tactile, kinesthetic, group and individual" (p.3). The VARK theory describes these four modalities: visual, aural, read/write, and kinesthetic sensory. According to the theory of VARK learning styles, every individual has a preferred learning style. "A learner process information most effectively by using a visual learning style, just as other prefer an auditory style, read/write learning style or kinesthetic style or kinesthetic style of learning" (Wither 2010). In 1995 Neil Fleming gave the idea of VARK learning styles (the theory) for the first time. Fleming and Mills (1992) present four types of learning preference; Visual (V), Aural (A), Read/Write (R), and Kinesthetic (K).

According to VARK model the four styles of learners are described as; "i) Visual learners prefer the use of images, maps, and graphic organizers to access and understand new information, ii) Auditory learners best understand new ideas through listening and speaking. They use repetition as a study technique, iii) Student's with a strong reading and writing preferences learn best through words, and iv) The kinesthetic learners best understand information through tactile representations of information. Such students learn best through figuring things out by hand" (teach.com).

According to Fleming (1995) people learn best by reading and writing the text material. The written form can easily be grasped by them. The text material is of more concerned for them rather the auditory information. Caspo & Hayen (2006) concludes that "when teachers and students understand how they learn and their preferred ways to learn, the

probability for learning" (p.132). The gender, race, and geographic location wise differences in LS were also found in Caspo & Hayen (2006). Caspo & Hayen's study (2006) suggested "a change in students' learning style type as they progress their education. This pattern could be interpreted as an adjustment, student make in order to accommodate how teachers are teaching" (p. 132). Caspo & Hayen (2006) also suggested that "the students may be forced to learn in more auditory ways as a result of the one-way teaching style of teachers" (p.133).

The LS theory is still controversial because research suggest there may be an optimum way to teach a particular topic instead of using the same LS for a particular student (study.com, 2018). If LS has flaws even then employing LS in the classroom will be beneficial to students with visual impairment.

Assessment of Learning Styles

The learning styles can be identified through various methods. The literature revealed that self-assessment questionnaires could be used to analyze most learning styles. Some of the most popular and well-known assessment measure are; i) Dunn and Dunn Learning Style Inventory, ii) Felder-Solomon Index of Learning Styles, iii) Kolb Learning styles Inventory, iv) Honey and Mumford's Learning styles Questionnaire HM-LSQ, & v) VARK Questionnaire. Since this study aimed at assessing the learning styles of children with visual impairment by using VARK model, therefore VARK Questionnaire was used to asses learning styles of visually impaired students. The VARK Questionnaire developed by Neil Fleming in 2006 provides information about the ways to take-in information. "VARK deals with only one dimension of complex amalgam of preference that makeup a learning style. The VARK questions and their results focus on the ways in which people like information to come to them and the ways in which they like to deliver their communication" (VARK, 2001-2009). Various version of VARK are introduced up till now. They deal with different age groups and languages. VARK questionnaire are based in different questions which have four different options which deal with the four modalities; i.e., "visual, aural, read/write and kinesthetic" (Fleming, 1995). According to Blerkom (2009) "by completing the VARK questionnaire developed by Neil Fleming, you can find out more about how you learn best. The VARK helps you to assess your preferred Learning style by looking at your different modalities Visual, Aural, Read/Write and Kinesthetic" (p.24).

Learning style of Visually Impaired Children

Imitation is the method by which a child learns speech, attitude, spatial layout, etc. a blind child learns easily the non-verbal things such as speech. But the things which require sight to learn such as hand coordination, an alternative mode would be required for its comprehension. Normally, children imitate at once as they see adults doing something, but in case of learning of visually impaired children we need to use tactual and kinesthetic preferences because they learn better by touching and doing. They learn best when they use their sense of touch so they need tactual material. They learn by listening and touching (Willoughby, 1985).

Students with visual impairment may use multiple learning styles or they may be restricted to only one. In case of multiple learning styles, the learners become more successful than the students who use limited LS as their preferences, because as Chiya (2003, p.5) says for limited LS users that "it is more challenging for them to adjust to teacher's teaching styles in teacher centered classroom". Chiya (2003) elaborates that 'in teacher-centered classes, auditory learners be evaluated as good learners and visual learners may take benefit from traditional method while tactile or kinesthetic learners may have strong disadvantage in such a class" (p.5).

Students with visual impairment learn best when instructions take place in natural situation. They require structured and well-organized learning environment. They prefer tactile and auditory cues to anticipate the transition from one activity to the next. They also attracted by the auditory cues.

If learning is preferred through physical touch and activities, spending all the day reading and writing or listening may make visually impaired students feel excited/interested in learning new concepts (study.com, 2018). According to Banner (2000) "in contrast to their sighted peers, students with visual impairments more frequently preferred practical, thinking or organized styles. The visually impaired students aged 10-15 generally displayed a preference for thinking styles, and those older than 15 preferred feeling styles".

It implies from the literature review that there are various models of learning styles which represent various categories of learners. The VARK model of learning styles reflects four types of learning styles Visual, Aural, Read/write and Kinesthetic. In order to assess these Learning styles the Neil Fleming designed VARK Questionnaire the same was used in the present study to explore the learning style of visually impaired students. The visually impaired students usually opt their kinesthetic sense and got the knowledge through tactual perception.

Methodology

Design of the study

The present study was designed to explore the most preferred learning style of visually impaired children. The study was descriptive in nature. A survey was conducted to collect information about the learning styles of children with visual impairment.

Participants

The population of the study comprised all visually impaired children studying in class six to ten in the three schools of Rawalpindi and Islamabad:

i. Al-Makhdoom National Special Education Center for Blinds Islamabad.
ii. Government Shamasabad High School for Blinds Girls Rawalpindi.
iii. Government Qandeel High School for Blinds Boys Rawalpindi.

The sample for the study comprising 100 children with visual impairment (50 boys and 50 girls) was drawn from the population by using random sampling technique. The selection of students was made by taking five boys and five girls randomly from each class of grade six to grade ten.

Table 1

Sample of the Study

S/N	School	No. of Boys	No. of Girls	Total
1	Al-Makhdoom National Special Education Center for Blinds Islamabad	25	25	50
2	Government Shamasabad High School for Blinds Girls Rawalpindi	-	25	25
3	Government Qandeel High School for Blinds Boys Rawalpindi	25	-	25
Total		50	50	100

Tool of the Research

The VARK (Visual, Aural, Read/Write &Kinesthetic) questionnaire developed by Neil Fleming in 2006 was the research tool. The VARK Questionnaire has been used in many studies up till now. Neil Fleming introduced various versions of his questionnaire, i.e., for different ages and

in different languages. The younger version of VARK Questionnaire which was specific for people aged 12-18 years was selected to collect data for the present research. In this regard online copyright permission was taken from the designer of the said questionnaire.

The testing of VARK Questionnaire was initially conducted on 20 students (10 boys & 10 girls) in order to identifying any difficulties in administration, comprehension and language of tool for the present study. No adaptation was made as no problems of administration, comprehension and language of VARK Questionnaire was found.

Data Analysis

The data on learning style of visually impaired students (100) was collected through a standardized tool "VARK Questionnaire" developed by Neil Fleming (2006). The collected data was organized and analyzed to draw results by using statistical package for social sciences 16.0 version by computing frequencies, percentages and independent sample t-test was applied to observe the gender differences on the variables in collected data. Results based on data analyses are presented below.

Results

In order to describe the visually impaired individual's preferred learning style, frequencies and percentages of the four learning styles were calculated and presented as below;

Table 2

Frequencies and Percentages of VARK Questionnaire

S/N	Gender	VARK scores	Visual		Aural		Read/Write		Kinesthetic	
1	Overall	1600	50	3%	434	27%	599	37%	517	32%
2	Male	800	19	2%	212	27%	254	32%	315	39%
3	Female	800	31	4%	222	28%	345	43%	202	25%

The table 2 shows that overall percentage of visual, aural, read/write and kinesthetic learning styles are 3%, 27%, 37%, 32% respectively. The percentages of male's visual, aural, read/write and kinesthetic learning styles are 2%, 27%, 32%, 39% respectively and the percentages of female's visual, aural, read/write and kinesthetic learning styles are 4%,28%,43%,25% respectively. The results of this study showed that overall percentages value of Read/Write learning style was higher (37%)

so it is concluded that Read/Write style of learning was most preferred than that of other learning styles. It was found that the percentage value of Kinesthetic was higher (39%) in male's learning styles and in females the percentages value of Read/Write learning style was higher (43%). It showed that the preferred learning style of male was Kinesthetic and Read/Write style of learning was preferred by female students.

The percentages of visual learning styles were the lowest (2%) & (4%) in both males and female. It revealed that the visual style of learning was least preferred learning style of both male and female.

Table 3

Gender Wise Descriptive Statistics on Sub Scales of VARK Questionnaire.

Sr. No.	Sub Scales	Overall(N=100) Mean	S.D	V	Male(n=50) Mean	S.D	V	Female(n=50) Mean	S.D	V
1	Visual	.50	.64	.41	.38	.63	.40	.62	.63	.40
2	Aural	4.33	1.53	2.36	4.24	1.51	2.30	4.42	1.56	2.45
3	Read/write	5.99	2.09	4.37	5.08	1.86	3.46	6.90	1.91	3.68
4	Kinesthetic	5.16	2.04	4.17	6.30	1.87	3.52	4.02	1.50	2.26

The table 3 shows that overall mean, S.D and variance of visual learning style are (.50), (.64) and (.41) respectively. The mean, S.D and variance of aural learning style are (4.33), (1.53) and (2.36) respectively. The mean, S.D and variance of read/write style are (5.99), (2.09) and (4.37) respectively. The mean, S.D and variance of kinesthetic learning style are (5.16), (2.04) and (4.17) respectively.

The mean, S.D and variance of visual learning style of male and female are (.38), (.63), (.40) & (.62), (.40) respectively. The mean S.D and variance of auditory learning style of male and female are (4.24), (1.51), (2.30) & (4.42), (1.56), (2.45) respectively. The mean S.D and variance on read/write style of male and females are (5.08), (1.86), (3.46) & (6.90), (1.91), (3.68) respectively. The mean S.D and variance of kinesthetic learning style of male and female are (6.30), (1.87), (3.52) & (4.02), (1.50), (2.26) respectively.

Gender Differences on Learning Styles

In order to find out the gender differences on various Learning Styles the values of Mean, "*t*" and "*p*" were calculated as given below:

Table 4

Gender Differences on Sub Scales of VARK Questionnaire

Sr. No	Subscales	Mean (Male)	Mean (Female)	*t*	*p*
1	Visual	.38	.62	-1.88	.06
2	Aural	4.24	4.42	-.58	.56
3	Read/write	5.08	6.90	-4.81	.00
4	Kinesthetic	6.30	4.02	6.70	.00

Table 4 shows that the calculated values of "*t*" and "*p*" of read/write style and kinesthetic learning style were (-4.81), (6.70) and (.00), (.00). As "*p*" < .001 for only reading/writing & kinesthetic learning styles therefore gender differences were found only in read/write and kinesthetic learning styles. Values of "*t*" and "*p*" of visual and aural learning style were -1.88, -.58 and .06, .56. As "*p*"> .001, so gender differences on visual and aural learning style were not significant.

Discussion

The study was conducted in order to investigate the preferred style of visually impaired students and to find out the differences between learning styles of visually impaired girls and boys. The results of present study revealed that the Visually Impaired students prefer the read/write learning style and visually impaired boys also preferred the kinesthetic style of learning. Mostly visually impaired students got the learning opportunities when the teaching and learning material is provided to them in concrete/real, tactile form, hence they get knowledge through tactile perception, these results are in line with Banner's (2000) findings. Findings of Banner, Livingston, & Oakland's study (2000) indicated that students with visual impairments preferred kinesthetic style of learning. The results of present study contradict Banner, Livingston, & Oakland, (2000). Whereas these results are in support to the findings of Barbara

(2009) that the students with visual impairment require prefer tactile and auditory cues to anticipate transition from one activity to the next. The results revealed by present study are also in line with Willoughby (1985) who was of the view that in case of learning of visually impaired children, the tactual and kinesthetic preferences are used because they learn better by touching and doing.

The result of study conducted on sighted students by Dobson (2010) revealed that male have greater tendency to preferred kinesthetic learning style as compare to visual, aural and read/write styles of learning. Hence the results of present study support the Dobson study (2010).

Conclusions

In view of findings of the study following conclusions were drawn:

1. Visually impaired students prefer the reading/writing learning style as compare to visual, aural and kinesthetic style of learning.
2. The kinesthetic learning style is less preferred in comparison of reading/writing learning style and the least preferred learning style of visually impaired children is visual learning style.
3. There exists a significant difference between the learning styles of visually impaired girls and boys. The visually impaired boys prefer kinesthetic style of learning and the visually impaired girls prefer reading and writing learning style.
4. It can be concluded that visually impaired students learn through reading, writing and kinesthetic mode as they get knowledge through tactile perception therefore they prefer to take more information through the material presented in tactile form.

Recommendations

Recommendations based on findings of the study are follows:

1. Teachers of visually impaired students should opt the teaching strategies involving the material in the form of tactile because the visually Impaired students give more importance to their sense of touch.
2. The visually impaired students should be well trained at schools for tactual perception for concept learning in real sense.

3. Auditory material should be presented in interesting manner so that it appeals the sense of visually impaired Student.
4. Teachers should try to arrange some practical activities for visual impaired children so they got first hand experiences.

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