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KNOWLEDGE MANAGEMENT STRATEGIES FOR VISUALLY IMPAIRED STUDENTS STUDYING IN THE SCHOOLS OF PUNJAB

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ABSTRACT

Knowledge management has appeared as a new discipline. This study was designed to explore the knowledge management strategies in the blind and low-vision students studying in the special education institutions of Punjab. The descriptive research design was used to conduct the study. A structured questionnaire was used as an instrument of the study. The population of the study comprised of students with visual impairment studying in the special education institutes in Punjab province at 6 to 10 grades level, in nine districts one district from all nine divisions (Blind = 88, Low vision=62). According to the study's findings, blind and low-vision students choose and employ a variety of knowledge management strategies. There is no substantial variation in the knowledge management strategies of blind students based on their location or gender. Availability and use of the latest digital tools to facilitate knowledge management skills of the visually impaired, provision of the latest technology and provision of qualified teachers are major recommendations of this study.

INTRODUCTION

Visual impairment has pervasive effects on the lives of persons with visual impairment (Ling, et. al., 2021). Students with visual impairment possess significantly more unique educational needs than sighted students. To meet their unique needs, students with visual impairment need a unique setup, teaching, and instructional material. Specialized equipment to ensure access and quality education, and to meet their educational need in school (Golledge, 2009).

Vision is the most essential sense to receive knowledge and information. There are different techniques used to impart knowledge to visually impaired students including, audio recorded, visual, tactile, or embossed material to compensate for visual limitations.

Persons with normal vision use the maximum level of their vision with the combination of their listening skills for purpose of knowledge management (understanding, remembering, and recalling when related information is required) (Torraco, 2000). Others have no accurate vision some are blind, and some may have low vision. Those who are with affected vision prefer and use different strategies for their knowledge management. Some rely on their tactile ability with listening and others with low vision usually adobe large prints and oral instructions to use their residual vision. Optical and non-optical devices are also used by visually impaired students according to their vision loss along with suitable assistive technology (Fruchterman, 2002).

According to the literature, persons with visual impairment face problems in knowledge management due to their limited visual perceptions. Particularly when they have different levels of vision loss (Khowaja & Fatima, 2020). Persons with total blindness face more problems in knowledge acquisition as compared to persons with low vision. This is due to the residual vision of low vision persons and a natural difference in the process and strategies of knowledge acquisition. The level of visual impairment impacts the strategies used in different facets of knowledge management. Low vision individuals prefer some strategies like the use of their residual vision along with a combination of assistive technology, large print or color contrast, etc. However, blind use some different strategies like they are good in the use of tactile and oral learning strategies, and some select a combination of assistive aid and assistive technology.

LITERATURE REVIEW

The concept of knowledge was discussed in ancient times in a document by Plato (369 BC), who theorized knowledge as a true idea, as the concept of reasonable true belief (Faucher, Everett & Lawson, 2008). Gradually the definition of knowledge has emerged and reshaped but the revolved around a basic understanding of complex ideas, concepts, and information (Sisson & Ryan, 2016). Vision is an essential skill for learning. 80% of learning is contributed by the vision and the visual framework. Vision is in charge of giving criticism about the world, it is likewise the bringing together sense enabling located individuals to coordinate their visual tangible encounters (Duvdevany, 2008). Vision is the major tactile methodology at the age of 3 months and a half years, it is the essential wellspring of life.

Low vision and blind people face great problems in learning due to many constraints. Restricted close or near vision, reduced visual field, weakened shading recognition or divided vision may independently or in blend cause various troubles for the visually impaired children for the learning (Teoh,2021). Learning procedures are fundamentally weakened by the Mistaken, fragmented, or misshaped data that were transmitted from the eye to the mind. Fragmented pieces of visual framework do not allow proper learning (Kavale & Mostert,

2004). Social signs which may demonstrate visual troubles include constant glaring, eye ache and rubbing, reading books with a minor distance from the face (eye), inappropriate body posture, poor eye-hand coordination, and ungainliness.

Children with visual impairments receive education under the executive administrations from private and special schools explicitly established for them. They need resource rooms and specially designed and adapted classrooms as well (Tatlow-Golden, et. al., 2014).

Students with low vision are more challenging as compared to totally blind children. It implies that low-vision students require extraordinary material and hardware for learning. It is required for the use of residual vision in the instructive program as much as it is can be functional, enabling the visually challenged persons to function properly. It is explicit through research studies that every student needs unique surroundings to use their functional vision. Students' communication affects their vision loss about their environment. These visual and perceptual help low vision students in their optimal learning and knowledge management. So, it is emphasized to know those factors that limited the optimal learning of students (Vig, 2010).

Residual vision can be used effectively if it is accompanied by the use of optical and non-optical devices, a proper learning environment, and skilled teachers. The vision is effectively utilized when adaptive seating positions are arranged in such a fashion that increased the best field's view. Assistive aids minimize the hindrance of acquiring and managing knowledge (Kwanya, Kiplang'at, Wamukoya, & Njiraine, 2020). With the help of Braille, optical aid in print, vast prints, guidance, a logbook framework, sound materials, or combinations of the balance of stated methods can help the visually impaired in knowledge management (Kratchowill & French, 1984). In addition to this, for blind students, the use of sound recorders and players are the cheapest and most readily available source for listening to books, notes, and recorded lessons. Additionally, the braille writers provide access to reading material and chances to refresh braille over a printed copy.

In addition to the use of typical optical and non-optical devices, optimizing the learning environment is a basic requirement in the knowledge management of visually impaired students as every visually challenged student needs a barrier-free environment to use their functional vision. Exploring the factors that limited the optimal learning of students with visual impairment can enhance the knowledge management skills of such students (Vig, 2010).

Popper lighting arrangement, according to the needs of the low visual individual, is necessary to attain information with a better proficiency and it can be achieved through minor changes like limiting the glaring, considering eye level's need of light, angle of light about the 45-degree edge, and light centralization. Vision fatigue can be expanded by using lights from the PC's screen and contrast combination from the white print to dark foundation. Students may profit from the utilization of glare channels. For the individuals who are light touchy, brilliant, or coordinate characteristic light ought to be

separated through UV blocking film or tinted glass, more often than not of a reasonable, golden, or pink shading for visual solace and glare decrease (Umadevi & Sukumaran, 2012). The most important factor in acquiring knowledge from the surrounding is lightening (Dettmer, Simpson, Myles & Ganz, 2011). Visually challenged students to deal with lighting conditions within the premises of the school area like a staircase, locker zones, and strolling ways. In addition to light, glare cause problems in knowledge acquisition of visually challenged students. While working or playing, decrease glare in the classroom at that point utilize daze folds, shade, and notices to cover glare. Applying the proper color contrast in non-optical material e.g., enhancing and differentiating light color from dark (dark over light) increases the visual efficiency. Low vision students discuss the effect of less saturated color contrast greatly impacts the classroom., especially arithmetic work which is widely done on a whiteboard.

Drawing/Coloring

Saturated colors and hue contrast progressively increased the visual knowledge of low vision students. Hetherington's study deals with the instructions to teachers to use sharp colors implementation on roadside, walkways, ground boundaries, and entryways. He described that all the sharp painted clues are beneficial for visually impaired students as bright colors and well-designed dress attract attention. Well highlighted pathways help the visually impaired to become less dependent and the coloring of surroundings decreased hindrances (Hetherington, 2006).

Purpose of the study

The present study was conducted to know about knowledge management strategies for students with visual impairment. Visual impairment affects the abilities of the visual perceptual ability of visually impaired students. Visual limitation bound them to a limit to perceive things. Their functional domain which is affected by visual impairment is the social domain and cognitive domain. The visual interaction of students with visual impairment differs according to their different visual abilities. The nature of the educational problem also varies according to the level and type of impairment. The visually impaired students possess different learning, reading, and writing skills. This visual deficiency brings some diversity to them to acquire and perceive to manage that knowledge, memorize, recall, articulate, and perform and demonstrate. Therefore, the purpose of the study was to find knowledge management strategies for students with blindness studying in the regular schools of Punjab.

OBJECTIVES OF THE STUDY

The objectives of the study were to

1. Highlight knowledge management strategies of students with visual impairment studying in the institutes of Punjab.

2. Know the difference in knowledge management strategies of students studying in rural and urban schools.
3. Compare the knowledge management strategies of students blind and low-vision students.

QUESTIONS OF THE STUDY

The research was conducted to answer the following questions.

1. What are different strategies of knowledge management used by students with visual impairment studying in institutes of Punjab?
2. What is the difference in knowledge management strategies for students with low vision and total blindness?
3. What is the difference in knowledge management strategies for students with visual impairment in urban and rural areas?

Significance of the Study

The study will highlight different knowledge management strategies that are used by the students with visual impairment in education in different grades and with different levels of visual impairment. The study will aware teachers of visually impaired students of different problems which are faced by students with visual impairment in knowledge management. The study will aware parents and other stakeholders about particle application and utilization of the knowledge by visually impaired students. This study will provide the basis for further studies on knowledge management strategies of visually impaired students.

RESEARCH METHODOLOGY AND PROCEDURE

The type of present research was survey-based descriptive research where the researcher surveyed with questionnaires to collect data from institutes of special education in Punjab. The population was comprised of all 2129 students with visual impairment enrolled in institutes of special education in Punjab province at 6 to 10 grades level, in nine districts one from all nine divisions of Punjab province.

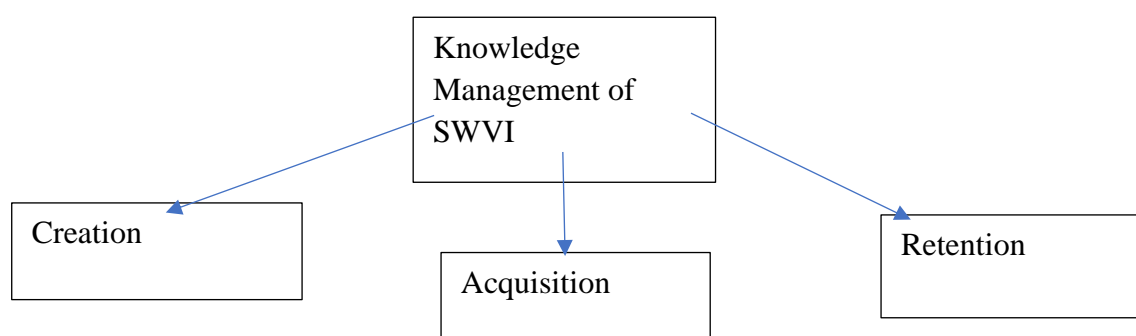
At first, the researchers selected nine districts from each division of Punjab by using a random sampling technique. Hence the researcher selected nine districts one from each division of Punjab. The researcher selected all students with visual impairment of 6 to 10 grades studying in institutes of nine districts one from all nine divisions of Punjab province by using the cluster sampling technique.

A structured instrument was used for the data collection. The reliability of the instrument was estimated with the help of Cronbach alpha. The content validity of the instrument was estimated by taking opinions from the experts related to the field of special education.

A survey was conducted, for the data collection, with the help of a questionnaire in Braille and large print form by visiting different institutes of special education in Punjab province. Data were analyzed by using SPSS' Parametric statistical analysis including an independent sample t-test to see the difference between knowledge management strategies of blind and low vision students and to explore the difference in knowledge management strategies among students of rural and urban areas.

The theoretical framework of the study

The theoretical underpinning of this study is driven by the different theories of knowledge management. Based upon these theories the current study explores knowledge creation, knowledge acquisition, and knowledge retention. The study has explored the three major facets of knowledge management by gathering the opinions of students with visual impairment.



Delimitation of the study

The study was delimited in the following ways:

1. Due to financial and time constraints, the study was delimited from grade 6th to 10th.
2. As a sample of the study, only students with visual impairment were taken and data were collected through questionnaires only. The other sources of data collection have not been used.

Limitations of the study

The study was limited in the following ways:

1. The study was limited to students with visual impairment in only nine selected districts of the Punjab province.
2. The study was limited to one district of each division of Punjab.

FINDINGS

Frequency along with percentage and standard deviation scores are used to find differences in knowledge management strategies of low vision and blind

students. Each statement's percentage and standard deviation scores depict the difference in knowledge management strategies in low vision and blind students.

The analyzed data is tabulated and presented below.

Table No.1: Frequency of the responses of blind students about Knowledge Creation.

Sr. No		Oral With Tactile	Oral With Non-Optical Devices	Tactile With Audio Aids	Tactile With Non-Optical Devices	Technology And Multimedia	All
1	Which strategy do you prefer to build any concept?	20.1%	3.8%	1.1%	27.3%	22.7	25.0%
2	Which strategy is more helpful to memorize instructions given in the classroom?	4.5%	19.3%	26.1%	19.3%	14.8%	15.9%
3	Which strategy do you select to share information with friends?	5.7%	22.7%	34.1%	20.5%	14.8%	2.3%
4	Which strategy is more useful for you to be aware of any object?	4.5	27.3%	35.2%	19.3%	13.6%	0.0%
5	Which strategy is easy to build a concept?	3.4%	33.0	28.4%	21.6%	11.4%	2.3%
6	Which strategy of learning is easy to explain and answer in your own words?	3.4%	33.0%	23.9%	28.4%	6.8%	4.5%

7	Which strategy of learning is more useful for practical work?	6.8%	28.4%	28.4%	29.5%	5.7%	1.1%
8	What strategy do you use to restore any concept?	6.8%	25.0%	27.3%	33.0%	8.0%	0.0%
9	Which strategy is easier for you to observe things?	4.5%	27.3%	33.0%	22.7%	12.5%	0.0%

Table no. 1 shows the responses of blind students on knowledge creation as 27.3% of the respondents responded that they prefer tactile with non-optical devices to build a concept and 3.8% responded to oral with tactile. 19.3% responded that they use tactile with non-optical devices and other 19.3% also responded for oral with non-optical devices to be helpful for them to memorize instructions given in the class and 4.5% responded that they use orally with tactile. 34.1% responded for tactile with audio aids that they select to share information with friends and 2.3% responded for all strategies. 35.2% of the respondents responded that tactile with audio aids are useful for them to be aware that they use an object and 4.5% said they use oral strategy with tactile.

28.4% of respondents responded that tactile with audio aids are easy for them to build a concept and 3.4% responded that oral with tactile is easy for them to build a concept. 33.0% responded that tactile with the non-optical device is an easy strategy for them to explain any answer in their word and 3.4% responded that they use orally with tactile. 29.5% of blind students responded that tactile with nonoptical devices are more useful for them for practical work and 1.1% responded that they use all of the strategies. 33.0% of the respondents responded that they use a strategy of tactile with nonoptical devices and 6.8% responded that they use orally tactile to restore the image of a concept.

Table No.2: Frequency of the responses of blind students on Knowledge Acquisition.

Sr. No		Oral With Tactile	Oral With Non-Optical Devices	Tactile with audio aids	Tactile With Non-Optical Devices	Technology And Multimedia	All
10	Which strategy is more useful for you to acquire information?	5.7%	25.0%	35.2%	15.9%	15.9%	2.3%
11	Which strategy is easy for you to acquire information?	9.1%	26.1%	36.4%	12.5%	13.6%	2.3%
12	Which strategy do you prefer to acquire information about an object?	12.5%	28.4%	33.0%	13.6%	9.1%	3.4%
13	Which strategy do you prefer to acquire information about a concept?	13.6%	28.4%	35.2%	9.1%	8.0%	5.7%
14	Which strategy do you prefer to acquire information on an abstract concept?	13.6%	22.7%	39.8%	9.1%	6.8%	8.0%
15	Which strategy is more useful to internalize information?	13.6%	28.4%	28.4%	10.2%	12.5%	6.8%

The table shows the responses on the knowledge acquisition of students with visual impairment 35.2% responded that tactile with audio aids is more useful for them to acquire information and 2.3% responded to all of the strategies. 36.4% of the respondents responded that tactile with audio aids is easier for

them to acquire information and 2.3% responded for all of the strategies. 33.0% of the respondents responded that tactile with audio aids they prefer to acquire information about an object and 3.4% responded for all strategies. 35.2% of the respondents responded that tactile with audio aids they prefer to acquire information about the concept and 5.7% responded for all strategies. 39.8% of the respondents responded that tactile with audio aids they prefer to acquire information for an object and abstract and 6.8% responded for technology and multimedia. 28.4% of the respondents responded that they prefer tactile with audio aids strategies to internalize information and 6.8% responded to all of the strategies.

Table No: 3. Responses frequency of blind students about Knowledge Retention.

Sr. No		Oral With Tactile	Oral With Non-Optical Devices	Tactile with audio aids	Tactile With Non-Optical Devices	Technology And Multimedia	All
16	Which strategy of learning is more suitable to retain its information?	13.6%	26.1%	27.3%	13.6%	13.6%	5.7%
17	Which strategy of learning is more suitable to recall its information?	8.0%	22.7%	36.4%	18.2%	9.1%	5.7%
18	Which strategy of learning is more difficult to recall its information?	5.7%	17.0%	38.6%	26.1%	6.8%	5.7%
19	Which strategy of learning is more helpful to recall learned information after a long time?	4.5%	17.0%	34.1%	30.7%	9.1%	4.5%

20	Which strategy of learning is best to explain information after learning?	4.5%	19.3%	34.1%	33.0%	6.8%	2.3*
21	Which strategy of learning is more suitable to generalize its information in a similar situation?	4.5%	26.1%	23.9%	37.5%	5.7%	2.3%
22	Which is a more easy strategy to learn & recall abstract things after a long time?	4.5%	23.9%	20.5%	43.2%	5.7%	2.3%
23	By which strategy you can solve your problem on the base of past learning?	5.7%	12.5%	21.6%	51.1%	4.5%	4.5%
24	Which strategy is more suitable to recall information on the abstract concept?	6.8%	11.4%	26.1%	38.6%	13.6%	3.4%
25	Which strategy is more suitable to recall information	8.0%	22.7%	36.4%	18.2%	9.1%	5.7%

	about an object?						
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The above table comprises the questions on knowledge retention researcher got responses from blind students 27.3% of the respondents responded that the tactile with audio aids strategy is suitable for learning to retain information and 5.7% responded for all of the strategies. 36.4% of the respondents responded that tactile with audio aids are more suitable for learning to recall information and 5.7% of the respondents responded that they use all of the strategies. 38.6% of the respondents responded that tactile with audio aids are more difficult for learning to recall information and 5.7% of the respondents responded that they use orally tactile strategies. 34.1% of the respondents responded that tactile with audio aids are more difficult for learning to recall its information after a long time and 4.5% of the respondents responded that they use all of the strategies. 34.1% of the respondents responded that tactile with audio aids are best to explain information after learning to recall its information and 2.3% of the respondents responded for all strategies. 37.5% responded that the tactile with non-optical devices strategy is more suitable to generalize its information in a similar situation and 2.3% of the respondents responded for all of the strategies. 43.2% responded that the tactile with non-optical devices strategy is easier to recognize things after a long time and 2.3% of the respondents responded for all of the strategies. 51.1% responded that tactile with non-optical devices strategy they can solve based on past learning and 4.5% of the respondents responded for all strategies. 38.6% responded that the tactile with non-optical devices strategy is more suitable to recall information about an abstract concept and 3.4% of the respondents responded for all of the strategies. 36.4% responded that the tactile with audio aids strategy is more suitable to recall information about an object and 5.7% of the respondents responded for all of the strategies.

Tests Of Mean Difference

An independent sample t-test was used to differentiate knowledge management strategies in subscale scores. Knowledge management strategies were different in low vision and blind students. Blind students use tactile and low vision use large print. Blind students prefer optical devices and low vision prefer non-optical devices. However, the difference was not shown statistically.

The results revealed a significant difference in knowledge management strategies in students with visual impairment on basis of disability because braille is a teaching and learning method that is commonly used for blind students. Large print is commonly used for low vision.

An independent sample t-test was conducted to investigate the knowledge management strategies of students with visual impairment based in urban and rural areas. The results revealed no significant difference in knowledge management strategies in urban and rural areas.

Table No. 4: Independent sample T-Test was performed to see the difference between knowledge management strategies for low vision and blind students.

Disability	N	Mean	Std. deviation	P-value
Low vision	62	124.19	28.456	.939
Blind	88	124.55	27.009	

The above table shows that there is no significant difference in knowledge management strategies for low vision and blind students.

Table No. 5: Independent sample T-Test was performed to see the difference between knowledge management strategies of urban and rural areas students with visual impairment.

Disability	N	Mean	Std. deviation	P-value
Rural	29	121.14	28.302	.479
Urban	121	125.18	27.395	

Table no.5 shows that there is a difference in the mean of rural and urban area students but the difference is not significant as the alpha is $.479 > .05$.

Table No. 6: Independent sample T-Test was performed to see the difference between the knowledge creation strategies of low vision and blind students.

Disability	N	Mean	Std. deviation	P-value
Low vision	62	27.8710	8.60895	.181
Blind	88	29.7614	8.39128	

Table 6 shows that there is a difference in the mean of low vision and blind students but the difference is not significant as the alpha is $.181 > .05$.

Table No. 7: Independent sample T-Test was performed to see the difference between the knowledge acquisition strategies of low vision and blind students.

Disability	N	Mean	Std. deviation	P-value
Low vision	62	19.0968	7.64094	.329
Blind	88	17.9205	6.94680	

Table no. 7 shows that there is a difference in the mean of low vision and blind students but the difference is not significant as the alpha is $.329 > .05$.

Table No. 8: Independent sample T-Test was performed to see the difference between low vision and blind students on knowledge retention strategies.

Disability	N	Mean	Std. deviation	P-value
Low vision	62	32.2097	9.08636	.550
Blind	88	33.0909	8.73444	

Table no. 8 shows that there is a difference in the mean of low vision and blind students but the difference is not significant as the alpha is $.550 > .05$.

DISCUSSION

The first research objective deals with knowledge management strategies of visually impaired students. This question was addressed by getting the low vision and blind students' responses separately. Students with blindness are convenient in the use of braille and tactile and they prefer oral and listening strategies for learning. Low vision students use large prints and also prefer oral strategy for maximum use of their residual vision (Senjam, Foster, & Bascaran, 2021). Assistive technology and multimedia are not available for students with visual impairment even though technology has great importance in the knowledge acquisition of low vision students (Senjam, Foster & Bascaran, 2021). Blind students use Braille that always been and will always be more than a medium of literacy for students with visual impairments. Braille seems to represent competence, independence, and equality for them. An ophthalmologist's diagnosis of progressive vision loss is vital for performing normal activities so that student with low vision can use their residual vision for reading and daily living learning activities effectively. The use of large print material is also highlighted in this study by the low vision students for knowledge management. According to Hatlen (2000), large font-sized books are considered the easiest, cheapest, and closed to proximity to normal access for students who have low vision. In Punjab, there is also a braille printing press, printing and publishing braille books.

The second question was to compare knowledge management strategies in low vision and blind students. The difference has been present in means but it was not statistically significant. In, Pakistan the major issue for visually challenged people is that they are mostly taught within the same learning conditions and pedagogical practices. Practically, blind students have different learning strategies than low vision. The Blind students use tactile and braille while low visions use large prints. Braille is the sole source of communication for blind persons and it will remain until the latest software will not be available in Pakistan. For students with low vision who are dual-media readers, and independent readers, optical and electronic devices need to be used at a larger level. The provision of enlarged text sizes and large prints should be extended according to the needs of visually challenged students (Corn et al., 2002).

The third research objective was to explore the difference in the knowledge management strategies of students with visual impairment in urban and rural areas. No difference has been seen in the knowledge management strategies of urban and rural area students with visual impairment. Although studies that have looked at the important role of Braille in the lives of blinds are limited, Braille has been recognized as a valuable and crucial tool for literacy for people with blindness, especially in course of education. Braille helps them to visualize text through feeling every word of it, learning how these words are written, and most importantly it gives blind students access to material on an equal level to their peers which simultaneously influences their educational achievement and establishes a platform for them to be on a competitive level with others. Indeed, many blind students relate their knowledge of Braille to their competence, independence, and equality in all cultures intended for studies (Schroeder, 1998). In contrast to this, low-vision students should be motivated and provided with optical and non-optical devices to get benefit from their residual vision.

CONCLUSIONS

Knowledge management strategies are different in students with visual impairment as there is a variety of disability levels in students with visual impairment. Students with blindness use tactile and braille in all institutes in urban and rural areas. Braille is the only available text media and reading writing strategy for blind students. That's why braille learning is signified for students with blindness. Low vision students use large print strategies for reading and writing purposes commonly to utilize their residual vision. Reading and writing in print are important to interact in the environment and low vision students are provided large prints according to their needs. Many assistive technologies and multimedia can help students with visual impairment in their education (Kwanya, Kiplang'at, Wamukoya, & Njiraine, 2020) but in our country, this trend is very rear due to multiple reasons. Perhaps, the cost is one of the prominent reasons. Being costly those media are not commonly available and some of those technologies are available, but teachers do not have the expertise to teach the use of these digital options for the knowledge management among visually impaired students.

RECOMMENDATIONS

Qualified teachers and professional expertise are essential to work with students with visual impairment to enhance their knowledge management skills. Government should avail related equipment to students with visual impairment to maximize their learning so that they can use their natural abilities with the help and combination of related aids. Latest technologies and multimedia are necessary to be provided to students as assistive technologies to meet the needs of the latest education competencies.

REFERENCES

- Torraco, R. J. (2000). A theory of knowledge management. *Advances in developing human resources*, 2(1), 38-62.
- Darroch, J. (2003). Developing a measure of knowledge management behaviors and practices. *Journal of knowledge management*.
- Sisson, P. W., & Ryan, J. J. (2016, January). Towards a unified theory of knowledge management (KM). In 2016 49th Hawaii International Conference on System Sciences (HICSS) (pp. 4313-4322). IEEE.
- Faucher, J. B. P., Everett, A. M., & Lawson, R. (2008). Reconstituting knowledge management. *Journal of knowledge management*.
- Khowaja, S., & Fatima, N. (2020). Knowledge Sharing Practices Among Visually Impaired Students at Aligarh Muslim University, Aligarh, India. *Library Philosophy and Practice*, 1-15.
- Kwanya, T., Kiplang'at, J., Wamukoya, J., & Njiraine, D. (2020). Digital Technologies for Information and Knowledge Management.
- Senjam, S. S., Foster, A., & Bascaran, C. (2021). Assistive technology for visual impairment and trainers at schools for the blind in Delhi. *Assistive Technology*, 1-5.

- Ling, C. N. Y., Seshasai, S., Chee, M. L., He, F., Tham, Y. C., Cheng, C. Y., ... & Sabanayagam, C. (2021). Visual Impairment, Major Eye Diseases, and Mortality in a Multi-Ethnic Asian Population and a Meta-analysis of Prospective Studies. *American journal of ophthalmology*, 231, 88-100.
- Teoh, L. J., Solebo, A. L., Rahi, J. S., Abbott, J., Abdullah, W., Adams, G., ... & Lomas, T. (2021). Visual impairment, severe visual impairment, and blindness in children in Britain (BCVIS2): a national observational study. *The Lancet Child & Adolescent Health*, 5(3), 190-200.