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Problems of Visually Impaired Students: A Bibliometric Analysis

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Abstract

The article presents a bibliometric analysis of publications on problems faced by visually impaired students. The data has been collected from Scopus with articles ranging from 1959 to 2022. The analysis has been done using Biblioshiny in R Studio. The study revealed overview of research work on this topic, the most relevant authors, the most relevant sources, top 20 countries of publication, the most relevant keywords and a thematic map displaying the core themes. The analysis shows that USA has published the highest number of articles. The thematic map concludes that *anxiety* is a declining theme and there is further scope for research studies on *alternative math presentation, artificial intelligence, computer vision, speech recognition, speech synthesis, mental health,* and *myopia* as these are the niche themes.

Introduction

A majority of students with special education needs have visual impairment (Choi et al., 2022). Visually impaired students have to face numerous challenges in their academic journey (Ghorbaninejad et al., 2020; Heyl&Hintermair, 2015; Schnittjer&Hirshoren, 1981; Yoshida et al., 1998). Visual impairment has an impact on all the aspect including reading, writing, moving physical activities, social skills and it also gives rise to unique behaviors like blindism (Anwar et al., 2021; Griffin-Shirley et al., 2021). Holcomb et al., 1986; Mukhiddinov& Kim, 2021; Rosenblum et al., 2018; Spinczyk et al., 2019; Wei et al., 2019 have covered these issues. Several other studies have also been conducted in this domain.

The current study aims to present a bibliometric analysis of problems faced by visually impaired students.This will provide an overview of existing work in this area and scope for further research.

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Research Methodology

The paper has collected data from Scopus. The publications range from the year 1959 to 2022. The study uses bibliometric analysis. The analysis was done using Bibliometrix package in R Studio. A total of 203 documents were used for the study.

Results and Discussion

Overview

Description	Results
Main Information About Data	
Timespan	1959:2022
Sources (Journals, Books, etc)	151
Documents	203
Annual Growth Rate %	4.39
Document Average Age	9.1
Average citations per doc	4.32
References	4184
Document Contents	
Keywords Plus (ID)	1072
Author's Keywords (DE)	530
Authors	
Authors	582
Authors of single-authored docs	32
Authors Collaboration	
Single-authored docs	34
Co-Authors per Doc	3.05
International co-authorships %	10.34
Document Types	
article	116
book chapter	5
conference paper	76
conference review	3
note	1
review	2

Most Relevant Authors

582 authors have studied the problems of visually impaired students. The 10 most relevant authors among these have been shown in figure 1. BEAL CR, Bernareggi C, Jaafar A,

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Maćkowski M, Miesenberger K, Nahar L, Rosenblum LP, Stöger B are the top authors in this field with 3 articles each. They are followed by Brzostek-Pawłowska J who has written 2 articles on this topic.

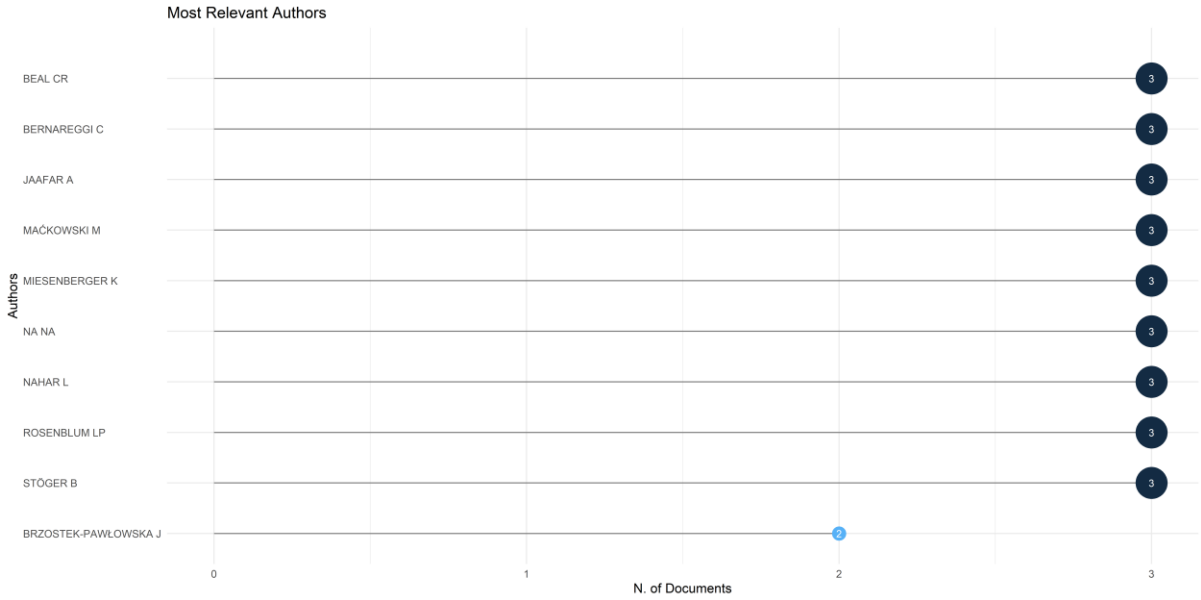

Figure 1: Most Relevant Authors

Most Relevant Sources

Lecture Notes in Computer Science (Including Subseries Lecture Notes in Artificial Intelligence and Lecture Notes in Bioinformatics) is the most relevant source for research studies related to problems in visually impaired students. It has published 23 articles in this area. *Journal of Visual Impairment and Blindness* has published 12 articles making it the second most relevant source. The 10 most relevant sources have been shown in figure 2 below.

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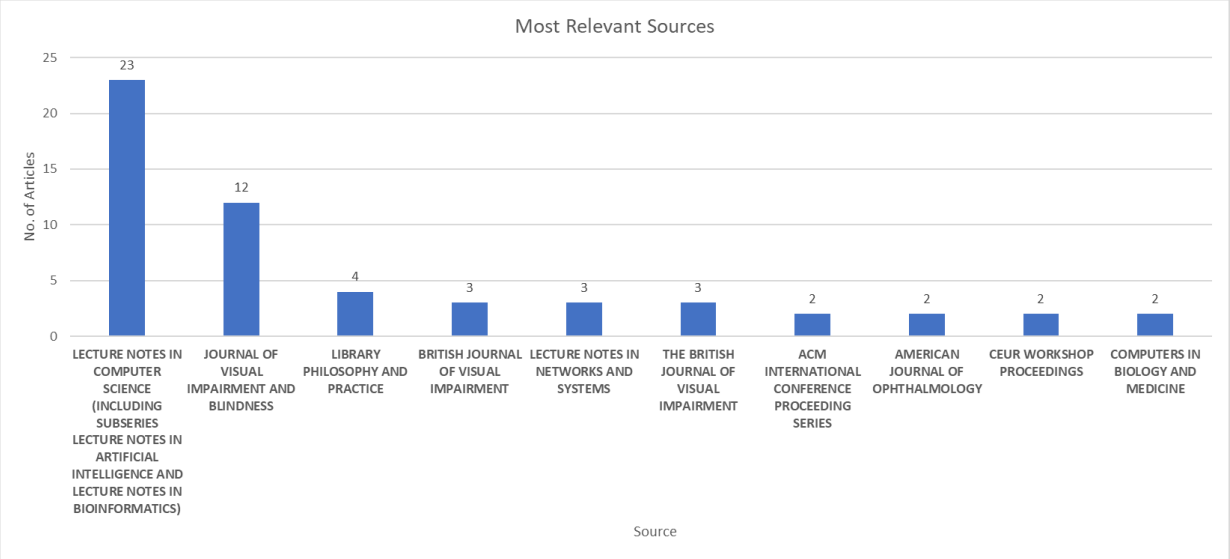

Figure 2: Most Relevant Sources

Countries of Publication

USA is the leading country in publishing research work for problems among visually impaired students. USA has published 21 articles, 17 are single country publication (SCP) and only 4 are multiple country publications (MCP). It is succeeded by India and Malaysia, with 8 and 7 articles published, respectively. All the research studies by India and Malaysia are SCP. Figure 3 exhibits the top 20 countries on the basis of number of articles published.

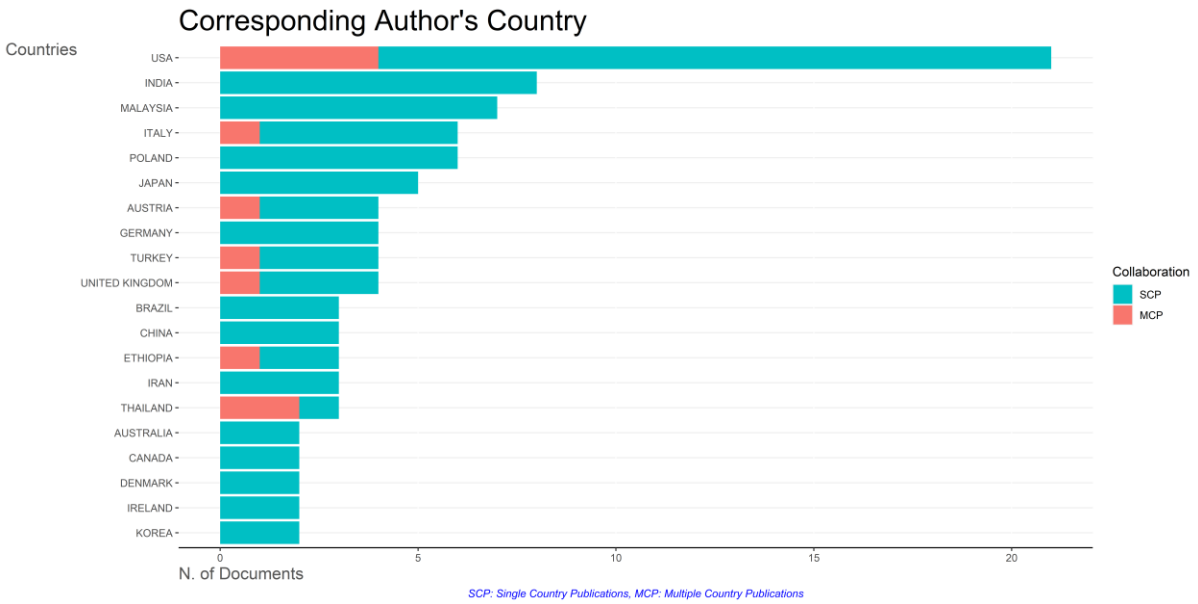

Figure 3: Countries of Publication

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Most Relevant Words

Figure 4 shows the most relevant authors' keywords used in research studies on problems faced by visually impaired students. *Visually impaired* is the most frequently used keyword which is an obvious result. *Accessibility, blind, visual impairment, mathematics, blind students, usability, assistive technology, braille, e-learning, inclusion, low vision,* and *visual impairments*are few other relevant keywords in this research domain.

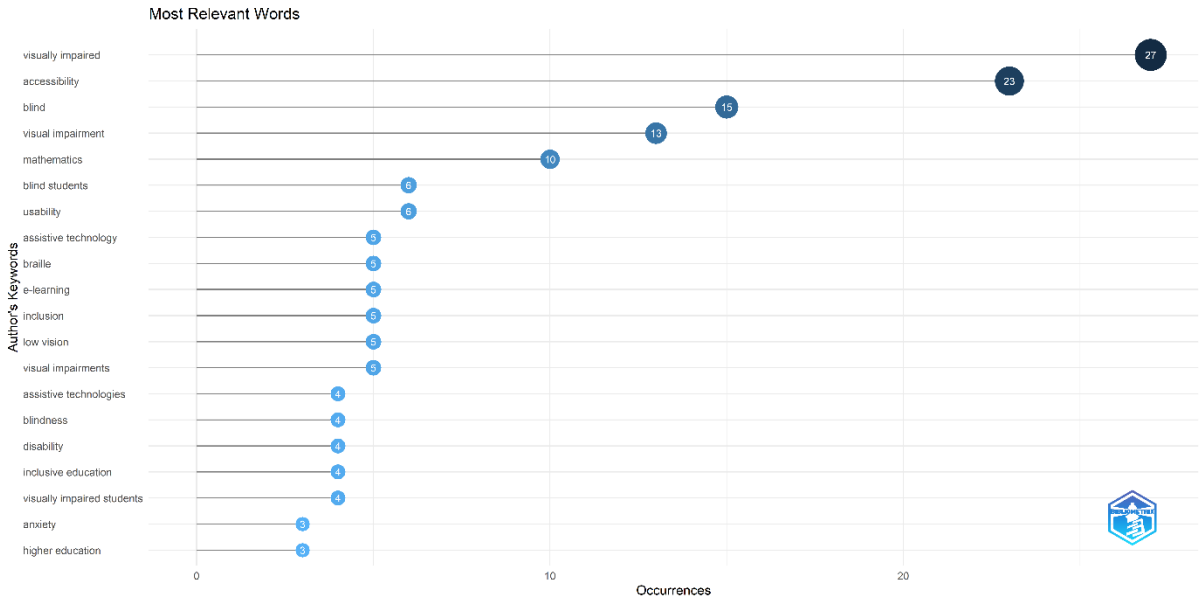

Figure 4: Most Relevant Words

Core themes

Figure 5 presents a thematic map for core themes of research in this area. The graph has 'relevance' on X-axis and 'development' on Y-axis. It is divided into 4 quadrants- basic themes, motor themes, niche themes, and emerging or declining themes. The 4 themes are categorized on the basis of relevance degree and development degree. Theauthors' keywords are classified into these 4 themes. Researchers can get an idea of the direction of research work and its scope through this graph.

It is apparent from the figure that keywords like *visually impaired, accessibility, low vision, blindness, assistive technologies,* and *inclusive education* lie in the 'basic theme' category. Motor themes include- *disability, higher education, visually impaired people.* It indicates that people are working relatively more around these areas and there is good scope of development

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here.*Alternative math presentation, artificial intelligence, computer vision, speech recognition, speech synthesis, mental health*, and *myopia* are graded as niche themes. Niche themes are comparatively newer and they have scope of development but low relevance in current period as much work has not been done under this theme. *Anxiety* is a declining theme as per the analysis. It means that researchers have already worked a lot in this domain and its relevance and scope of development is fading.

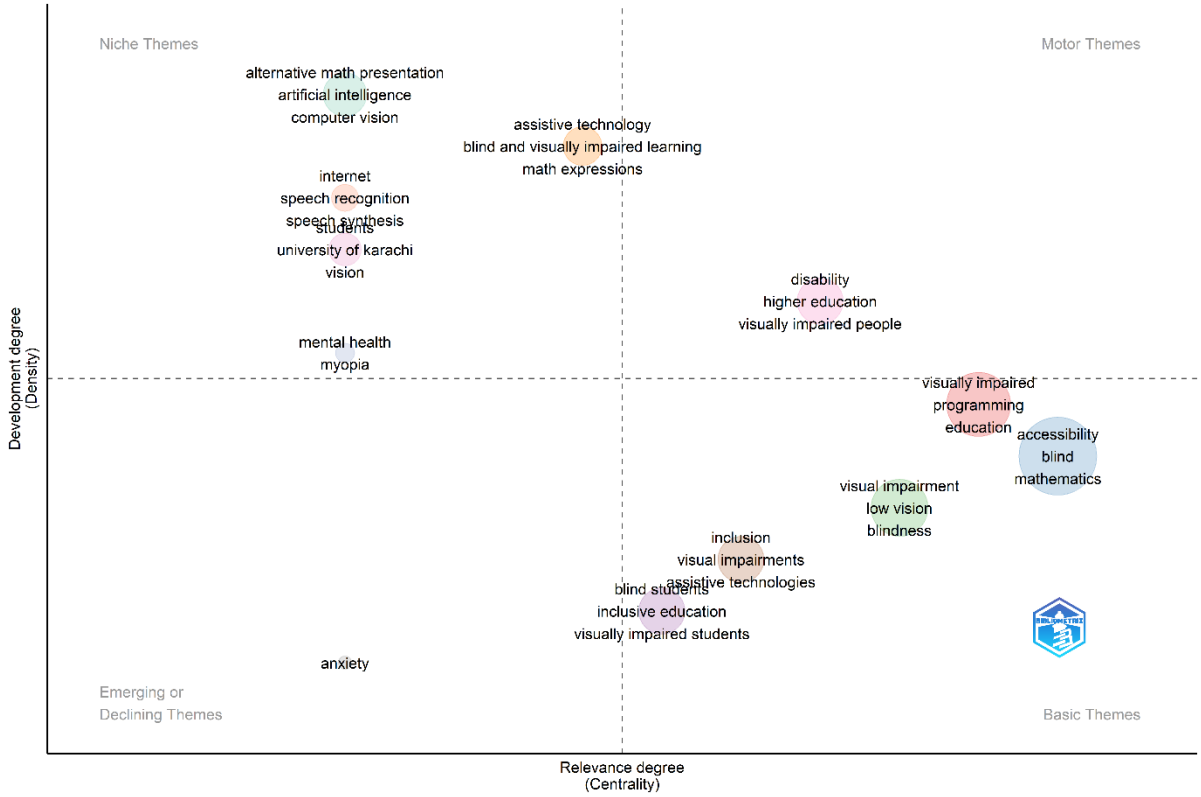

Figure 5: Thematic Map of core themes

Conclusion

The paper presents a bibliometric analysis of studies related to problems faced by visually impaired students. The results indicate that *Lecture Notes in Computer Science (Including Subseries Lecture Notes in Artificial Intelligence and Lecture Notes in Bioinformatics)* is the leading source for such studies and USA has published the highest number of articles in this domain. The most relevant authors and the most frequently used keywords provide a guidance

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for further studies in this domain. *Visually impaired* is the most frequently used keyword which is an obvious result. Researchers can use the other relevant keywords also like - *Accessibility, blind, visual impairment, mathematics, blind students, usability, assistive technology, braille, e-learning, inclusion, low vision, and visual impairments*. A thematic map presented in the study concludes that *anxiety* is a declining theme. People are currently working more on *Disability, higher education,* and *visually impaired students.* Further research studies can be conducted on *alternative math presentation, artificial intelligence, computer vision, speech recognition, speech synthesis, mental health,* and *myopia* as these are the niche themes.

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