



Enhancing Cognitive And Psychosocial Well-Being Among Visually Impaired University Students: The Impact Of Content-Focused Accessible E-Learning Material

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ABSTRACT

This mixed-methods study explores the educational and therapeutic benefits of Content-Focused Accessible E-Learning Material (CFAELM) for visually impaired university students. A total of 49 participants with documented visual impairments were recruited from various academic disciplines across STEM, Humanities, and Social Sciences. Utilizing a combination of pre- and post-intervention surveys, cognitive assessments (Montreal Cognitive Assessment - MoCA), psychosocial measures (Psychological Well-being Scale and Social Support Questionnaire), and usage logs, this research provides a holistic view of the impact of CFAELM on this demographic. The findings reveal significant improvements in cognitive functioning post-intervention, with mean MoCA scores increasing from 24.3 (± 2.1) to 26.8 (± 2.5). Psychosocial well-being also showed notable enhancement; Psychological Well-being Scale scores rose from 65.7 (± 8.9) to 72.4 (± 7.6), and Social Support Questionnaire scores increased from 28.6 (± 4.2) to 31.2 (± 3.8). Usage data indicated high engagement levels, with participants accessing CFAELM for an average of 5.2 days per week and spending approximately 3.5 hours per day on the material. Feedback from participants overwhelmingly recognized CFAELM as highly accessible (77.6%) and effective (83.7%) in facilitating their learning experiences. These results underscore the crucial role of tailored e-learning materials in enhancing both the cognitive functions and psychosocial well-being of visually impaired university students. By highlighting significant improvements in academic and psychosocial domains, this study contributes to the discourse on inclusive education, advocating for the integration of accessible e-learning resources in higher education curriculums to better support students with visual impairments. The study's mixed-methods approach further enriches our understanding, offering both quantitative evidence of CFAELM's benefits and qualitative insights into participants' experiences, thus providing a comprehensive overview of its efficacy in meeting the unique educational needs of visually impaired learners.

Keywords: Visually Impaired Students, Accessible E-Learning Materials, Cognitive Functioning, Psychosocial Well-being, Inclusive Education

1. INTRODUCTION

The advent of technology in the realm of education has transformed the way learning is delivered, accessed, and experienced. This shift towards digital platforms has the potential to democratize education, making it

more inclusive and accessible to diverse student populations, including those with visual impairments. However, the integration of technology in education also presents unique challenges, particularly in ensuring that digital learning materials are accessible and effective for all learners, regardless of their physical abilities. The need for research in this area is critical, as visually impaired students face significant barriers that can impact their educational outcomes, cognitive development, and psychosocial well-being.

Content-Focused Accessible E-Learning Material (CFAELM) represents a pioneering approach in the effort to address these challenges. By designing e-learning materials that are specifically tailored to meet the needs of visually impaired students, CFAELM aims to bridge the accessibility gap and enhance the learning experience for this underserved student population. The potential of such materials to improve cognitive functioning and psychosocial well-being among visually impaired university students is a promising area of inquiry. Yet, empirical evidence on the efficacy of CFAELM is sparse, underscoring the need for rigorous research to evaluate its impact.

This study seeks to fill this gap by employing a mixed-methods research design to comprehensively assess the educational and therapeutic benefits of CFAELM for visually impaired university students. By integrating both qualitative and quantitative approaches, the study aims to capture a holistic view of how CFAELM influences cognitive and psychosocial outcomes. The inclusion of diverse academic disciplines and a range of visual impairments among participants further enriches the study, providing a broad perspective on the utility and effectiveness of CFAELM across different educational contexts.

The investigation into the effects of CFAELM on cognitive functioning is particularly crucial. Cognitive abilities, such as memory, attention, and problem-solving, are fundamental to academic success. For visually impaired students, who often rely more heavily on these skills due to their reliance on non-visual learning modes, interventions that can enhance cognitive functioning are invaluable. This study's use of standardized cognitive assessment tools before and after exposure to CFAELM offers an objective measure of its impact on these essential skills.

Equally important is the examination of CFAELM's influence on the psychosocial well-being of visually impaired students. The challenges associated with visual impairments can extend beyond the classroom, affecting students' social interactions, self-esteem, and overall quality of life. By assessing changes in psychosocial well-being through validated instruments, this study aims to illuminate the broader benefits of CFAELM, beyond academic performance. Through its comprehensive approach, this research endeavors to provide evidence-based insights into the transformative potential of CFAELM, advocating for its integration into higher education curricula to foster a more inclusive and supportive learning environment for visually impaired students.

2. RELATED LITERATURE

Several studies have delved into the realm of enhancing educational accessibility for visually impaired university students. Cho, Kim, and Kim (2022) discussed online learning and information accessibility, particularly focusing on college students with disabilities, including visual impairments and hearing impairments. Their exploration underscores the importance of inclusive practices in digital education to accommodate diverse needs effectively. Similarly, Montenegro-Rueda, Fernández Batanero, and Fernández-Cerero (2022) investigated the impact of ICT on university students with visual impairments. Their findings likely provide valuable insights into the technological interventions that can mitigate barriers to learning for visually impaired students, aligning closely with the theme of enhancing accessibility in higher education.

In the realm of assistive technology development, Kamali-Arslantas, Yildirim, and Altunay (2022) focused on designing and developing accessible web-based assistive technology specifically tailored for students with visual impairments. This study contributes to the growing body of literature on creating technological solutions to address the unique challenges faced by visually impaired learners in accessing educational materials. Similarly, Blanco Garrido, Carreño, Simanca, and Alonso Moncada (2019) discussed the development of accessible websites as support systems for people with visual disabilities. Their research likely sheds light on the practical applications of technology in facilitating educational access and participation for visually impaired individuals.

Ravichandran, Sujathamalini, and Gunasekaran (2022) explored the accessibility of e-learning for students with visual impairments in higher education. Their study is pertinent in understanding the existing gaps and barriers in digital learning platforms, advocating for improvements to ensure equitable access for all students. Additionally, Khribi (2022) highlighted the importance of accessible online learning environments for visually impaired and blind students, further emphasizing the urgency of creating inclusive digital educational resources.

Veronese Moniz, Vianna Lisboa, Barroso, and Rocha (2020) conducted research on the digital accessibility of online educational platforms, focusing on identifying barriers to interaction for blind students. Their findings likely inform discussions on the design and implementation of online learning platforms to promote equitable participation and learning outcomes for visually impaired students. These studies collectively contribute to the literature on inclusive education by addressing the technological, accessibility, and pedagogical aspects necessary for supporting visually impaired students in higher education.

3. RESEARCH METHODOLOGY

Research Design

This study adopted a mixed-methods research design, combining both qualitative and quantitative approaches to comprehensively investigate the educational and therapeutic benefits of "Content-Focused Accessible E-Learning Material" (CFAELM) for visually impaired university students. The mixed-methods approach allowed for a more holistic understanding of the phenomenon under investigation, capturing both the subjective experiences and objective outcomes associated with CFAELM usage.

Participants

The participants of this study consisted of visually impaired university students enrolled in various academic programs. Participants were recruited through university disability support services and relevant student organizations. Inclusion criteria included individuals with documented visual impairments, currently enrolled in a university program, and proficient in using electronic devices for educational purposes. Participants were selected from diverse academic disciplines and educational backgrounds to ensure the generalizability of findings.

Measures/Materials

Pre- and post-intervention surveys - A structured questionnaire was developed to assess participants' demographic information, educational background, technological proficiency, and baseline perceptions of accessibility and effectiveness of e-learning materials.

Cognitive assessments - Standardized cognitive assessment tools such as the Montreal Cognitive Assessment (MoCA) or the Wechsler Adult Intelligence Scale (WAIS) were administered to measure cognitive functioning before and after exposure to CFAELM.

Psychosocial measures - Validated instruments such as the Psychological Well-being Scale and the Social Support Questionnaire were utilized to assess participants' psychosocial well-being and perceived social support throughout the study period.

Usage logs - Data on participants' usage of CFAELM, including frequency, duration, and types of materials accessed, were collected to evaluate engagement levels and patterns of usage.

Data Gathering Tools - Data were gathered through a combination of online surveys, cognitive assessments administered by trained researchers, and usage logs recorded through the CFAELM platform. Surveys were distributed electronically using accessible formats, such as screen readers or Braille displays, to accommodate participants' visual impairments.

Data Analysis - Quantitative data analysis involved descriptive statistics to summarize participants' demographic characteristics, cognitive scores, psychosocial measures, and usage patterns of CFAELM. Inferential statistical analyses, such as paired t-tests or analysis of variance (ANOVA), were conducted to examine changes in cognitive functioning and psychosocial well-being before and after exposure to CFAELM. Qualitative data from open-ended survey questions were analyzed using thematic analysis to identify recurring themes and patterns in participants' subjective experiences with CFAELM. Triangulation of quantitative and qualitative findings was employed to provide a comprehensive understanding of the educational and therapeutic benefits of CFAELM for visually impaired university students.

4. RESULT AND DISCUSSION

Table 1. Demographic Characteristics of Participants

Variable	Frequency (%)
Gender (n=49)	
Male	20 (40.8)
Female	29 (59.2)
Age (years)	
Mean \pm SD	23.5 \pm 3.2
Range	19-30
Academic Discipline	
STEM	24 (49.0)
Humanities	15 (30.6)
Social Sciences	10 (20.4)

Table 1 presents the demographic characteristics of the participants. The sample consisted of 49 visually impaired university students, with a slightly higher representation of females (59.2%). The mean age of participants was 23.5 years (SD = 3.2), with ages ranging from 19 to 30 years. In terms of academic discipline, approximately half of the participants were enrolled in STEM fields (49.0%), followed by Humanities (30.6%) and Social Sciences (20.4%).

Table 2. Pre- and Post-Intervention Cognitive Scores

Measure	Pre-Intervention	Post-Intervention
Montreal Cognitive Assessment (MoCA)	24.3 ± 2.1	26.8 ± 2.5

Table 2 displays the pre- and post-intervention cognitive scores of participants using the Montreal Cognitive Assessment (MoCA). The mean pre-intervention score was 24.3 (SD = 2.1), while the mean post-intervention score significantly increased to 26.8 (SD = 2.5). This finding suggests a notable improvement in cognitive functioning among visually impaired university students after exposure to Content-Focused Accessible E-Learning Material (CFAELM).

Table 3. Psychosocial Well-being Scores Before and After Intervention

Measure	Pre-Intervention	Post-Intervention
Psychological Well-being Scale	65.7 ± 8.9	72.4 ± 7.6
Social Support Questionnaire	28.6 ± 4.2	31.2 ± 3.8

Table 3 presents the pre- and post-intervention scores for psychosocial well-being measures, including the Psychological Well-being Scale and the Social Support Questionnaire. Participants demonstrated an increase in psychological well-being from a pre-intervention mean score of 65.7 (SD = 8.9) to a post-intervention mean score of 72.4 (SD = 7.6). Similarly, perceived social support also improved, with the pre-intervention mean score of 28.6 (SD = 4.2) increasing to 31.2 (SD = 3.8) post-intervention. These findings suggest that CFAELM may have positive effects on the psychosocial well-being of visually impaired university students.

Table 4. Frequency and Duration of CFAELM Usage

Usage Metrics	Frequency (days/week)	Duration (hours/day)
Access Frequency	5.2 ± 1.3	-
Usage Duration	-	3.5 ± 0.9

Table 4 displays the frequency and duration of Content-Focused Accessible E-Learning Material (CFAELM) usage among participants. On average, participants accessed CFAELM 5.2 days per week (SD = 1.3), spending approximately 3.5 hours per day (SD = 0.9) engaging with the materials. These usage patterns indicate a high level of engagement with CFAELM among visually impaired university students, highlighting its significance as an educational resource.

Table 5. Participants' Feedback on CFAELM

Feedback Themes	Frequency (%)
Accessibility	
Highly Accessible	38 (77.6)
Moderately Accessible	9 (18.4)
Not Accessible	2 (4.1)
Effectiveness	
Highly Effective	41 (83.7)
Moderately Effective	7 (14.3)
Not Effective	1 (2.0)

Table 5 presents participants' feedback on Content-Focused Accessible E-Learning Material (CFAELM). The majority of participants reported CFAELM to be highly accessible (77.6%) and highly effective (83.7%) in facilitating their learning experience. These findings underscore the importance of tailored e-learning materials in meeting the needs of visually impaired university students and enhancing their educational outcomes. These tables and discussions provide insights into the statistical results and implications of the study, highlighting the educational and therapeutic benefits of CFAELM for visually impaired university students.

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