Enhancing Critical Thinking Skills for Visually-Impaired Students: Insights from Tanzanian University Tutors

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Abstract
This study explores strategies for enhancing critical thinking skills among visually impaired university students, aiming to empower them with essential competencies for academic success and future employment. By fostering greater independence and confidence, the study contributes to more inclusive higher education practices. A qualitative research approach, guided by a phenomenography design, was employed. Using criterion purposive sampling, seven university tutors from a special education unit within the Department of Educational Psychology and Curriculum Studies were selected. Data were collected through a focus group discussion (FGD) and analysed using the Miles and Huberman model. The findings highlight key strategies to support critical thinking development, including the use of assistive technologies, multisensory learning approaches, individualized support, and adapted instructional methods. Creating accessible learning materials and offering opportunities for collaborative learning with sighted peers were also noted as effective. The study recommends that higher education institutions provide professional development workshops to equip tutors with inclusive teaching strategies. Additionally, diverse assessment methods—such as oral presentations and project-based tasks—should be employed to enable visually impaired students to demonstrate their critical thinking skills. The study further advocates for continuous research into best practices for supporting critical thinking among students with visual impairments.

Keywords: *Visual impairment, critical thinking, university tutors, visually impaired student*

INTRODUCTION

This study seeks to answer the research question: What are the tutors' strategies for enhancing critical thinking skills among visually impaired

students at the University of Dodoma? Globally, education is recognised as a fundamental human right for all individuals, regardless of disability status, and serves as a key vehicle for acquiring essential 21st century skills (Indriastuti, Sugini, & Anwar, 2020). According to the rights-based approach to education, visually impaired students are entitled to quality learning experiences that equip them with competencies such as critical thinking (UNESCO, 2007). In the context of higher learning institutions, students with visual impairments should have equitable opportunities to develop critical thinking skills, supported by their tutors and inclusive educational environments. Afzal, Kamran, and Naseem (2023) emphasise that higher education institutions are committed to advancing knowledge and fostering intellectual growth, including critical thinking, among all students. They further assert that university tutors serve in multiple roles instructors, mentors, and facilitators and are instrumental in shaping the cognitive development of students, including those with disabilities. Critical thinking skill is a vital skill in the 21st century; however, educational programs for visually impaired student have not adequately focused on fostering this ability (Indriastuti et al., 2020). Furthermore, Indriastuti et al. (2020), confirm that people with visual impairment are individuals who have limitations in visual acuity and visual field. This implies that the limitations of visual acuity and visual field possessed by visual-impaired students cause them to demand special treatment from people surrounding them. The special treatments include special techniques and methods as well as certain aids to be followed by visually impaired students in the learning process. This implies that the higher-learning institutions in Tanzania should have specialized services, books, teaching-learning materials, and equipment that are easily available and accessible to all students.

The concept of critical thinking is interpreted differently by scholars, psychologists, and philosophers. For instance, Bassham, Irwin, Nardone, and Wallace (2011) define critical thinking as the process of thinking clearly and intelligently. They describe it as a broad term encompassing various cognitive skills and intellectual dispositions essential for effectively identifying, analysing, and evaluating arguments and truth claims. It also involves recognising and overcoming personal biases, formulating and presenting sound reasoning, and making rational decisions about beliefs and actions. Similarly, Murawski (2014) defines critical thinking as “the art of thinking about thinking,” highlighting its metacognitive nature. In the context of this study, critical thinking is

understood as the cognitive abilities and dispositions of visually impaired students to analyse, evaluate, and synthesise information effectively.

Visually impaired individuals are those with significant vision loss that limits their ability to perform tasks requiring sight (Kachweka & Rupia, 2022). Visual impairment is commonly categorised into two types: blindness and partial sight (Kimoka, 2014). According to Naipal (2018), visual impairment refers to a reduction in visual performance that cannot be corrected through spectacles, contact lenses, surgery, or medical intervention. In the context of this study, visually impaired students are defined as learners with severely limited light perception who are unable to read print or enlarged fonts, even with magnification or optical aids.

Visual impairment can hinder students' ability to acquire knowledge, as they struggle to interpret their surroundings through limited sensory input. Kizilaslan (2020) asserts that reduced visual perception makes it difficult for visually impaired students to form meaningful connections between experiences, as the mind cannot process information it does not receive through the senses. One of the persistent challenges faced by visually impaired students in higher education both globally and in Tanzania is limited access to educational materials (Butler, Holloway, Marriott, & Goncu, 2016). These include braille materials, talking books, styluses, embossed maps, and abacuses, all of which are essential for developing critical thinking skills (Akakandelwa & Munsanje, 2011; Butler et al., 2016). However, recent advancements in digital technologies have increased the availability of accessible learning materials in electronic formats, enabling visually impaired students to access content through screen readers and braille displays (Butler et al., 2016).

Globally, there is recognition that visually impaired students possess varying levels of intelligence that can be nurtured through supportive environments (Al-Shenikat, 2022). Indicators of intelligence among these students include the ability to explore causal relationships, classify information, make inferences, and experiment. Additional traits involve identifying errors, organising information, and using abstract symbols effectively. Understanding these indicators is essential for university tutors to design appropriate educational programs and instructional strategies aligned with students' intellectual capabilities.

In Tanzania, there has been a notable increase in the enrolment of visually impaired students in higher education institutions such as the University

of Dodoma, the University of Dar es Salaam, and the Open University of Tanzania (Bhalalusesa, 2016). This trend reflects a broader global movement driven by anti-discrimination policies and expanded educational access for students with disabilities (Butler et al., 2016). In this context, it is imperative that university tutors actively foster critical thinking skills among visually impaired learners. As Al-Shenikat (2022) affirms, these skills enhance academic performance, encourage creativity and problem-solving, and improve students' ability to navigate academic and real-life challenges. Critical thinking also enables visually impaired students to regulate their thinking processes, make informed decisions, and respond effectively to new information and emergencies.

Students with visual impairments at higher-learning institutions in Tanzania face various barriers, including challenges in interaction with the physical and social environment, inadequate learning support services, and inaccessible information (Kija & Mgumba (2024). This implies that the existing challenges limit the ability to expand their critical thinking skills. Building on this context, the study sought to explore university tutors' insights on strategies for enhancing critical thinking skills among visually impaired students in higher-learning institutions. Despite the steady increase in the enrolment of visually impaired students at the tertiary level, there remains a notable gap in research regarding how these students are supported and motivated to develop critical thinking skills comparable to their sighted peers. To address this gap, the study focused on understanding the perspectives of tutors at the University of Dodoma, aiming to identify effective approaches for fostering critical thinking among visually impaired learners in inclusive academic environments.

MATERIALS AND METHODS

The study used qualitative research approach to explore tutors' insights in enhancing critical thinking skills among visually-impaired students at the University level. The study was guided by phenomenography design which aimed to understand varied experiences in which informants understand the phenomenon understudy. This study was undertaken at the University of Dodoma (UDOM) as a case study due to the fact that the university hosts large number of students with visual impairments. Also, the university under the college of education offer a programme on special needs education (i.e., bachelor of education in special needs). with purposive sampling procedure, a total of seven (7) tutors were selected from the Special Education Unit within the Department of Educational

Psychology and Curriculum Studies (EPCS). The participants included four male and three female tutors, all chosen for their extensive experience in supporting and facilitating the learning of students with visual impairments, both during lectures and practical sessions. Notably, these tutors are the only academic staff at the College of Education who specialise in special needs education. To gather insights into how critical thinking skills can be enhanced among visually impaired students at the university level, a focus group discussion (FGD) was conducted. This method was selected for its effectiveness in bringing together individuals with shared professional backgrounds and experiences. The FGD allowed tutors to engage in a dynamic and open conversation about their strategies, challenges, and recommendations. The session was guided by a moderator who introduced the topic and facilitated active participation, ensuring a lively and natural exchange of ideas among the tutors.

After data collection, the researcher analysed the data using the Miles and Huberman model (2014), which consists of three key stages: data reduction, data display, and conclusion drawing or verification. In the data reduction stage, the researcher organised, selected, and summarised the information gathered from the field. This included coding the data by categorising and labelling different segments to identify patterns, themes, and relationships. The second stage, data display, involved presenting the coded data visually, typically in the form of tables, which enabled the researcher to explore connections between various codes, categories, and themes. This visual representation provided a comprehensive overview of the data and supported the identification of emerging patterns. In the final stage, conclusion drawing and verification, the researcher interpreted the findings, made connections to existing literature, and developed evidence-based explanations grounded in the data analysis. To ensure ethical conduct, the researcher obtained informed consent from all participants, providing them with complete information about the study's purpose and procedures. The researcher also prioritised participants' well-being by adhering to the principle of beneficence and striving to maximise potential benefits. Furthermore, the researcher upheld honesty and integrity throughout the study by strictly following established research protocols.

RESULTS

From the study findings, five key themes emerged which were related to the research objective (see Table 1). The key themes include assistive

technologies, multisensory learning approaches, individualized support and feedback, creating accessible learning materials and adapting instructional methods.

Table 1
Major findings of the study

Key themes	Categories
Assistive Technology	Screen readers, digital note-taking tools, magnification software
Multisensory Learning Approach	Tactile and auditory learning materials, experiential learning
Individualized Support	Motivation, Guidance, and problem-solving skills
Instructional Methods	Class discussion, group activities, perspective sharing, guiding questions and prompts
Creating T/L Materials	Interests of visually-impaired students, tactual image design

Source: Field Data (2024)

From Table 1, the findings highlighted that university tutors enhance critical thinking skills in various ways. A further analysis of the emerged key themes is carried out in the subsequent sections.

Assistive technologies

This theme emerged from the data reflecting tutors' insights on enhancing critical thinking skills among visually impaired students. The findings revealed that tutors employ various assistive technologies such as screen readers, digital note-taking devices, and magnification software to support learning and promote critical thinking. Tutors reported using screen readers to enable visually impaired students to access learning materials and actively engage with the curriculum. These tools help cultivate essential critical thinking skills, including attentive listening and sustained concentration. Additionally, the use of note-taking devices, such as refreshable braille displays, was seen as instrumental in encouraging deeper engagement with course content, allowing students to reflect critically on what they have learned. Tutors also emphasised the role of magnification software in supporting students' ability to analyse and synthesise visual information, further enhancing their capacity for critical thought. One tutor had this view;

> In my lectures and practical with students with visual impairments, I prefer them to use electronic digital note-taking devices, such as refreshable Braille displays, and magnification software to facilitate

> active engagement within their learning process. I hope the electronic devices help them use their senses to expand their critical thinking skills.

The narrative above sheds light on the importance of utilizing assistive technologies in enhancing critical thinking skills among visually-impaired students at higher-learning institutions.

Multisensory learning approaches

Another key theme that emerged from the findings on tutors' insights into enhancing critical thinking skills among visually impaired students was the use of multisensory learning approaches. The data indicated that tutors employ a range of multisensory strategies, including tactile, auditory, and experiential learning methods, to foster critical thinking. Specifically, tutors reported using tactile and auditory materials such as 3D models, raised-line diagrams, and recorded lectures to support students' understanding and engagement with abstract concepts. These resources enable visually impaired learners to interact with content in ways that stimulate critical analysis and deeper reflection. Additionally, tutors emphasised the value of experiential learning, which encourages students to engage multiple senses in solving real-world problems. For example, one finding highlighted how visually impaired students rely on their sense of smell to distinguish between fruits with similar shapes and textures, illustrating the adaptive use of sensory input to develop problem-solving skills and apply critical thinking in practical contexts. A tutor remarked this;

> I use 3D models to assist students with visual impairments to lean contents which involves understanding of various diagrams such as geography and biology. I believe that the use of 3D for visually-impaired students to learn shapes in a virtual learning environment helps them motivate their critical thinking skills.

The above quotation regarding tutors' insights in enhancing critical thinking skills reveals the necessity of using multisensory learning approaches in promoting critical thinking skills among students with visual impairments at higher-learning institutions.

Individualized support

Another key theme that emerged from the data on tutors' insights into enhancing critical thinking skills among visually impaired students was the use of individualised support. The findings revealed that tutors employ a range of personalised strategies—such as encouraging reflective

thinking, assigning individual and group tasks, and offering one-on-one tutoring sessions—to nurture critical thinking skills. Tutors reported that they actively prompt visually impaired students to reflect on taught content by asking targeted questions during lessons, which helps deepen students' understanding and stimulates analytical thinking. Additionally, the assignment of individual and group-based tasks was highlighted as a means of fostering collaboration, independent reasoning, and critical engagement with academic material. The findings further indicated that tutors regularly provide personalised tutoring sessions to address specific learning needs. According to the tutors, these sessions create a safe space for visually impaired students to express difficulties, ask questions about challenging topics, and build self-confidence—an important foundation for developing critical thinking and problem-solving skills. One tutor had this to say:

> When I notice that in my class there is an individual visual-impaired student does not understand what was taught, I plan for an extra time to have a tutoring session with him or her to address the challenges he or she faces. I discuss with him or her, asking questions and I give him or her an opportunity to ask questions in area that are difficult for him and I give him or her time for reflection of what we have discussed I think this will help develop critical thinking skills.

The above statement portrayed that individualized learning is an essential tool for the promotion of the critical thinking skills among students with visual-impairments in higher-learning institutions.

Instructional methods

This was another theme that emerged from the findings on tutors' insights in enhancing critical thinking skills among visually-impaired students. It revealed that tutors use various instructional methods to foster critical thinking skills. The findings confirmed that tutors employ class discussion, group activities perspective sharing, critical discourse and guiding questions and prompts to enhance critical thinking skills among visually-impaired students. The findings revealed that tutors actively engage visually impaired students in class discussions and group activities as a means of enhancing their critical thinking skills. Tutors reported that creating opportunities for these students to express their perspectives and participate in critical discourse encourages deeper analysis and reflection. Through guided discussions and collaborative tasks, visually impaired students are supported in developing argumentation, reasoning, and the ability to evaluate diverse viewpoints core elements of critical thinking.

Moreover, the findings showed that tutors provided guiding questions and prompts to help visually-impaired students to analyze and synthesize information as a way of fostering their critical thinking skills. One of the tutors commented this;

> I use different teaching strategies to enhance critical thinking skills for visually-impaired students during my lecture hours. The methods include engaging students with visual impairments in group discussions and various group activities such as group presentation during seminar sessions. I also allow them to share perspectives that allow them to engage in critical discourse. Furthermore, I provide guiding questions or seminar questions that help them in analyzing and synthesizing information to motivate their critical thinking skills.

The quotation above illustrates that tutors recognise the importance of using diverse instructional methods in the classroom. They view these approaches as effective strategies for enhancing critical thinking skills among students with visual impairments in higher learning institutions

Creating T/L materials

Creation of customised teaching and learning materials also emerged as a key finding on tutors' insights into enhancing critical thinking skills among students with visual impairments. The result revealed that tutors actively design and develop instructional materials tailored to the specific content and learning needs of visually impaired students. Tutors emphasised the importance of aligning these materials with both the subject matter and the interests of the students, enabling them to explore, test, and engage through touch. For instance, tutors reported designing tactile representations—such as a raised image of a triangle in mathematics to support students in conceptualising abstract ideas. These materials foster active learning and promote the development of critical thinking skills by encouraging exploration, analysis, and interpretation through tactile interaction. One of the tutors said the following:

> I design tactual materials by using textured materials that I incorporate different textures, including smooth, rough and soft to convey information to visually impaired students through touch. This practice helps them develop critical thinking skills.

The aforementioned quotation implies that tactile materials can capture the attention of visually impaired students more effectively than traditional teaching methods. This increased engagement leads to greater participation in learning activities and, consequently, fosters the development of critical thinking skills.

DISCUSSION

The findings from this study on tutors' insights into enhancing critical thinking skills among visually impaired students in higher learning institutions highlight the essential role of assistive technologies in supporting these learners. Tutors noted that developing critical thinking skills in visually impaired students requires more than curriculum content and teacher performance; the integration of assistive technologies is equally critical. This aligns with findings by Silman, Yaratan, and Karanfiller (2017), who observed that technology enhances the learning experiences of visually impaired students and improves their ability to develop essential skills, including critical thinking.

Additionally, the study reinforces the significance of multisensory learning approaches in fostering critical thinking. Tutors indicated that engaging students through multiple sensory pathways, such as tactile and auditory stimuli not only promote active participation but also facilitates long-term knowledge retention and deeper cognitive processing. These findings are supported by Manna and Dheesha (2017), who emphasised the impact of multisensory approaches on the learning outcomes of students with visual impairments. They advocate for the use of all available senses to enhance perception, concept formation, and ultimately, critical thinking skills. Similarly, Renelle and Jones (2022) describe multisensory learning as the use of sensory cues including visual, verbal, tactile, kinesthetic, auditory, and olfactory stimuli to create meaningful learning experiences that support critical thinking development.

The study also revealed that tutors utilise individualised learning to nurture critical thinking among visually impaired students. This finding echoes the research by Hathaway and Eriks-Brophy (2018), who concluded that personalised instruction is crucial for fostering both critical thinking and independence in visually impaired learners. Moreover, the findings showed that tutors promote independent problem-solving skills as a strategy to enhance critical thinking. This is consistent with Pratama, Saputro, and Riyad (2018), who emphasised that 21st century education requires students to engage in problem-solving to build analytical and reflective thinking capacities. In subjects such as mathematics, the problem-solving process comprising understanding the problem, devising a plan, executing the plan, and reflecting on the solution provides visually impaired students with structured opportunities to develop critical thinking skills. Also, the findings of the study indicated

that tutors deployed instructional methods and they create teaching and learning materials to enhance critical thinking skills among students with visual impairments at higher-learning institutions. This is consistent with the findings of Hill (2024), who confirmed that both tutors and students benefit from instructional methods and educational resources that support the development of critical thinking in students with visual impairments. These resources include screen readers, braille, magnification devices, and various accessibility tools such as voice recognition, audio descriptions, colour and font customisation, and intuitive interfaces (Hill, 2024).

Based on the study findings, it is recommended that higher-learning institutions offer professional development workshops to equip tutors with inclusive teaching strategies and a deeper understanding of the needs of visually impaired students. These workshops should cover the use of assistive technologies and methods for fostering critical thinking. Tutors should also create opportunities for visually impaired students to collaborate with sighted peers through group discussions and projects, promoting diverse perspectives and critical engagement. Additionally, institutions should encourage the use of varied assessment formats such as oral presentations and project-based tasks to allow students to demonstrate their critical thinking skills. Finally, universities should support ongoing research into effective strategies for enhancing critical thinking in visually impaired learners and provide hands-on training sessions involving assistive technologies and adaptive teaching practices.

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