

# UNIVERSAL DESIGN FOR LEARNING TOWARDS ACHIEVING INCLUSIVE HIGHER EDUCATION IN TANZANIA

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# Dedication

To

My children, Stanford, Shivonne, and Stasius

Quality education is a tool for change

To

The grateful and blessed memories of my parents, Emil and Lucy, and my parents-in-law,  
Boniface and Radegunda

May their memory be eternal

To

My grandmother Rosa

Endless love, prayers, and motivation



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None of those mentioned above are responsible and accountable for this study. I alone am responsible and accountable.

Oslo Science Park, 2018  
Suitbert Emil Lyakurwa



# Summary

## **Background of the problem**

Traditionally framed within the perspective of the medical model, disability has been viewed as an individual's problem. The medical model focuses more on an individual's deficit and functional limitations and less on contextual barriers. As a result, the Salamanca Statement and other United Nations agreements on human rights call for a shift in the public mindset from the medical model perspective to that of the social model, which calls for inclusion. In education systems, it is inclusive education which purports to shift the focus from individuals' functional deficits to the contexts and practices which exclude and discriminate against students and impair their engagement and participation in the learning process. In this light, it is particularly important to explore how schools promote inclusive education. Some studies have reported that teachers can effectively promote inclusive education by making use of the principles and guidelines of universal design for learning (UDL).

## **Argument and purpose of the study**

Although inclusive education is supported in Tanzania, the training of teachers regarding UDL is limited, foregrounding the need to investigate in depth the inclusion of students in higher education in this setting. The inclusion of students is framed as an activity necessitating barrier-free mediating tools that ensure equal learning opportunities. This thesis explores how inclusive education is conceptualized by teachers, students, and special needs education staff and investigates their perceptions of the institutional practices related to promoting inclusive education. Additionally, this thesis explores which instructional pedagogical practices teachers implemented in classrooms and whether these practices were universally designed to promote inclusion of students, particularly of blind students. Lastly, this thesis also takes into consideration the learning experiences of those students.

## **Setting and methodology**

A case study was conducted at the University of Dar es Salaam (UDSM), the first public university in Tanzania, while Cultural-Historic Activity Theory (CHAT) and UDL formed the guiding theoretical framework for the study. Data were collected from teachers, students, and Special Education Unit (SEU) staff mainly through interviews and observations. A questionnaire, group discussions, and document reviews complemented the data collection. Data analysis was mainly qualitative and was supported by HyperRESEARCH computer-assisted data analysis software.

## **Conclusions**

The study found that inclusive education was diversely conceptualized by teachers, students, and SEU staff but was mainly confined to disabled and other minority social groups. Likewise, the UDSM public university was perceived to be inclusive but challenged by a lack of universally designed mediating tools to support equal opportunity for engagement and access to knowledge and skills of equal quality. Students with visual impairment mostly perceived that mediating tools such as assistive technology devices, instructional methods, and assessment tools and procedures were not universally designed to support different means of engagement, access to information, and demonstration of their abilities and that a retrofitting approach was necessary in some contexts. Overall, despite the fact that the practices of this university were perceived to be inclusive by both teachers and students, data related to the students' experiences also showed that more opportunities are required to support their inclusion. The study concludes that UDL knowledge was not among the approaches explicitly advocated in the studied higher education institution in Tanzania. Hence, the study calls attention to the need for a discussion about UDL and how it can be advocated in higher education in Tanzania.



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## **List of Acronyms/Abbreviations**

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CHAT	Cultural-historical activity theory
CLT	Computer Literacy for Teachers (course title)
EDSP	Educational Development Sectoral Programme
EFA	Education for all
EMT	Educational Media and Technology (course title)
HEDP	Higher Education Development Programme
HESLB	Higher Education Students' Loan Board
ICT	Information and communications technology
MKO	More knowledgeable others
NSD	Norsk Senter for Forskningdata [Norwegian Social Sciences Data Services]
PEDP	Primary Education Development Programme
SEDP	Secondary Education Development Programme
SNE	Special needs education
SEU	Special Education Unit
UDL	Universal design for learning
UDSM	University of Dar es Salaam
UN	United Nations
UNESCO	United Nations Educational, Scientific and Cultural Organization
URT	United Republic of Tanzania
WHO	World Health Organization
ZPD	Zone of proximal development

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# 1 Introduction and Background to the Problem

The General Conference of the United Nations Educational, Scientific and Cultural Organization Meeting in Paris from 14 November to 15 December 1960, at its eleventh session, recalling that the Universal Declaration of Human Rights asserts the principle of non-discrimination and proclaims that every person has the right to education, Considering that discrimination in education is a violation of rights enunciated in that Declaration, Considering that, under the terms of its Constitution, the United Nations Educational, Scientific and Cultural Organization has the purpose of instituting collaboration among the nations with a view to furthering for all universal respect for human rights and equality of educational opportunity, ... (UNESCO, 1961, p. 119).

## 1.1 Introduction

The excerpt above reflects the worldwide assertion that education is one of the fundamental human rights. Yet, discriminatory practices in the provision of education, particularly against individuals with disabilities, still occur. Globally, several efforts have been made to address this problem. One of these efforts has been the establishment of inclusive education, which advocates education for all. In recent years, there has been a shift from special education to inclusive education. As opposed to special education, in which students with disabilities have been segregated from the regular education system, inclusive education supports the enrolment of students with disabilities in the regular education system. However, the inclusion of such students does not guarantee equal access to learning (skills and knowledge). Thus, necessary and sufficient learning materials and facilities that enable students with special needs to access skills and knowledge of equal quality should be accessible. Furthermore, there is a consensus among education stakeholders that higher education has a role in developing expertise in particular professions. For this reason, students require access to skills and knowledge to become competent in their professions, while inadequate access to skills and knowledge in a profession can have an adverse impact on the future of students in the labor market. It was therefore necessary to investigate the issues of engagement and access to knowledge and skills for students with visual impairment in higher education. The insights gained will likely be significant for higher education management, teachers, and other related stakeholders in education. The focus of the study was on students in the teaching profession, and its aim was to examine whether students with visual impairment have equal opportunities in accessing knowledge and skills of equal quality compared to their colleagues without visual impairment.

This thesis is organized into nine chapters. Chapter 1 presents the background information and research objectives. Chapter 2 contains a review of the relevant literature and studies within the area of inclusive education and universal design for learning (UDL). Chapter 3 presents the theoretical framework of the study. Chapter 4 outlines the research methodology and describes the case-study research design as applied in the study. The research findings in Chapter 5, Chapter 6, and Chapter 7 have been organized around three themes that emerged during data collection and analysis. Chapter 5 describes how teachers, students, and Special Education Unit (SEU) employees conceptualized inclusive education and describes how they perceived institutional practices to promote inclusive higher education in Tanzania. Chapter 6 focuses on how teaching pedagogies observed in inclusive classes enhanced equal opportunities for students' engagement and access to knowledge and skills of equal quality. Chapter 7 presents the voices of students, particularly of visually impaired students, with regard to the inclusion of students in higher education. Chapter 8 presents the interpretation of the study findings. Finally, Chapter 9 includes a summary of the study together with the conclusions and recommendations based on the study's findings.

## **1.2 Background to the research problem**

Discrimination in education is clearly a violation of human rights, as legally and internationally framed in the Universal Declaration of Human Rights and reaffirmed by the World Declaration on Education for All (UNESCO, 1994). The United Nations (UN) conventions and declarations emphasize that every person has a right to education in two ways: first, the right to attend school, and second, the right to quality education regardless of an individual's social, political, physical, or intellectual differences. To be against discrimination in education is to be inclusive, and one tool introduced to eliminate exclusion in education globally is termed "inclusive education" (UNESCO, 2009). The intended outcome of inclusive education is to enable all members of society to realize the potential they possess by improving effective participation (UNESCO, 2009). The emphasis has been shifted from "special needs education," in which students with disabilities were excluded from regular education systems, to inclusive education, which promotes the inclusion of such students with disabilities in regular education systems. The idea is that through new approaches to education, the public has started to shift their mindset from that of a medical model of disability to perceiving the school context as a disabling condition, representing a shift from addressing students' disability to addressing the disability of schools (Hehir &

Katzman, 2012; Meyer, Rose, & Gordon, 2014). Social policy promotes integration and participation so as to combat exclusion (UNESCO, 1994). Inclusive education advocacy is a worldwide effort to fight against discrimination in education by promoting inclusion strategies to achieve the goal of education for all (UNESCO, 1994, 2001).

The efforts made by the UN to devise these agreements on inclusion and non-discrimination implicitly suggest the presence of discriminatory practices in education. This suggests that the resulting conventions and declarations were likely a response to the observed conditions of marginalized social groups in different social services including education. Exclusionary practices within education indicate the influence of social classes and an unbalanced power dynamic within and between groups. Naturally, education is argued to be socially inclusive, but it is the unequal exercise of power which can make inclusion fail (Connell, 2013). The issue of social class as a factor in the failure of inclusion in education has demanded proper tools to advocate for inclusive education, one of which, importantly, is policy. Policy guides operations in a given sector and reflects national concerns. The same can be said for the establishment of inclusive education: it has been globally framed within a policy as well, and thus, different countries and regions speak about inclusion in education. However, the policies on inclusion in education can possibly be traced back to the UN Universal Declaration on Human Rights of 1948. Despite the many policy documents that can be used to shed light on the issue of inclusion in education, it is not possible to review them all. Instead, I selected those policies relevant to the discussion and problematization of my research project.

### **1.3 Global policies on inclusive education**

Educational inclusion is the biggest challenge facing school systems throughout the world (Ainscow & César, 2006, p. 231). Worldwide, the concept of inclusion in a social context has a long history. Several international conventions and declarations have reflected and emphasized the need for inclusion. The same applies to education, in which efforts began as early as 1960 and persisted until the 1990 World Forum for Education for All, which likewise focused on educational opportunities for all. There have been several UN conventions regarding human rights and education, going back to 1948 when the United Nations Declaration of Human Rights was established. In 1960, an important UN convention on education was established, named the United Nations Convention against Discrimination in Education (UNESCO, 1961, p. 120). Two important articles of the convention, Articles 3 and

4, are worth mentioning here. Article 3 sets obligations for state parties to eliminate discrimination in education, and Article 4 mandates the following:

The States Parties to the Convention undertake furthermore to formulate, develop and apply a national policy which, by methods appropriate to the circumstances and to national usage, will tend to promote equality of opportunity and of treatment in the matter of education and in particular:

- a. To make primary education free and compulsory; make secondary education in its different forms generally available and accessible to all; make higher education equally accessible to all on the basis of individual capacity ...;
- b. To ensure that the standards of education are equivalent in all public educational institutions of the same level, and that the conditions relating to the quality of the education provided are also equivalent. (UNESCO, 1961, p. 120)

In this convention, we can see that state parties are obliged to eliminate and prevent discrimination in education and to promote equal access to quality education that meets equivalent standards. These were the international agreements made by state parties. Several efforts were made thereafter to amend the UN agreement. Later, concerns were raised over access for individuals with special educational needs. In response, in 1993, the UN developed standards for the provision of education to people with disabilities. Thus, standard rules for the equalization of opportunities for persons with disabilities were established. At this time, state parties were obliged to ensure that the education of persons with disabilities was an integral part of the education system (UNESCO, 1994). This was followed by a conference conducted in Salamanca, Spain on 7–10 June 1994, which produced The Salamanca Statement on Principles, Policy and Practice in Special Needs Education (UNESCO, 1994). The main emphasis of this statement was on access and quality. The issues of access, accommodation, and quality were also presented and emphasized in the UN Convention against Discrimination in Education. The concern over engaging persons with special needs in an integral education system therefore led to inclusive education being featured in headlines worldwide. In 2000, the Education for All (EFA) agenda, a formal policy of inclusive education across the boundaries of the geopolitical North and South, was introduced in Dakar, Senegal. The most important aspects of these new international policies included the use of learner-centered pedagogies to include individuals with special educational needs, flexibility in curricula in order to accommodate the needs of learners, a friendly learning environment, and the training of teachers to meet the EFA requirements. In particular, universities were given a major role in the development of special needs education via research, evaluation, preparation of teacher trainers, and the design of training programs and materials (UNESCO,



1994, p. 28). Furthermore, many practitioners both inside and outside the field of education have a role to play in ensuring the achievement of the inclusive education agenda to realize education for all. Inclusive education has been reported to have led to some achievements not only in Northern countries but in Southern countries as well.

In the United States, for example, an average of 51.9% of students with disabilities receive education in a general education setting, while some states were reported to support more than 70% of such students in general education classrooms (Ferguson, 2008). Even larger proportions of students with disabilities have been reported in general education settings in Europe. Reports show that 80% to 90% of identified students are in inclusive environments in countries such as Italy, Lithuania, Greece, Norway, Portugal, Estonia, Spain, and Luxembourg (Ferguson, 2008, p. 111). Ferguson (2008) also reported that in countries such as Finland, some students with special needs receive their education without being officially labelled as such. This means that countries differ in their provision of education to students with disabilities. Some countries officially identify students with disabilities, while other countries do not.

I understand inclusive education to be a perspective that is framed globally in relation to the provision of education but interpreted differently from country to country. Some countries consider it as an approach to serve children with disabilities within the general education setting (Ainscow & César, 2006). This is a traditional definition of inclusive education. In the wider view, inclusive education is concerned with the inclusion of students from different linguistic, racial, and ethnic backgrounds (Hehir & Katzman, 2012, p. 19). Thus, inclusive education is an approach intended to support and welcome all learners, including the ones who have been traditionally excluded from educational opportunities (UNESCO, 2001). Thus, inclusive education is about embracing and accommodating students from various backgrounds.

In Africa, some countries have either managed or are still in the process of developing an inclusive education policy. A survey of the policy documents, drafts, and/or education ministry websites of each country shows that a significant number of African countries indicate a concern for and awareness of inclusion, inclusive education, and efforts to promote equal access to education for students, with a greater focus on individuals with disabilities. Such countries include Rwanda, Uganda, Kenya, South Africa, Namibia, Ghana, Botswana, Gambia, Tanzania, and Ethiopia. These countries, as mentioned on their education ministry

websites or in available policy documents, have indicated that the issues of inclusion and access to equal opportunities in education are an important area of concern. Accordingly, I direct my focus to Tanzania, my home country, in which this study on the inclusion of students in higher education was conducted. In Tanzania, the education policy is not specifically named as an “inclusive education” policy; rather, it is called the “education and training policy”. However, when one reads the content, the presence of inclusive education ideologies is apparent and an emphasis on the provision of educational opportunities is evident in the policy.

#### **1.4 Inclusive education policy in Tanzania**

As in many other countries, Tanzania has worked on improving education for its citizens. It should be noted that Tanzania is among the countries that ratified the United Nations Convention against Discrimination in Education (UNESCO, 1961). At the time, the country was not yet independent, but was instead a British territory called Tanganyika. The records of the general conference resolutions reported how the admission of Tanganyika to associate membership in the organization occurred:

The general conference considering Article II, paragraph 3, of the constitution, considering the request presented on 16 September 1960 by the Government of the United Kingdom, decides to admit the Trust territory of Tanganyika to associate membership of the United Nations Educational, Scientific and Cultural Organization. (UNESCO, 1961, p. 14)

In other words, Tanzania thus became a member of the global effort against discrimination in education. Further records show that Tanganyika became a member of UNESCO on 6 March 1962 ([www.unesco.org/eri/](http://www.unesco.org/eri/)), and the independent nation of Tanzania was ratified on 3 January 1979. The union of Zanzibar and Tanganyika on 26 April 1964 brought into existence the United Republic of Tanzania (URT), which in this study can simply be referred to as Tanzania. Thus, as a member of UNESCO, Tanzania has participated in the ongoing debate on inclusive education, which requires state parties to promote EFA. That is, education must be inclusive, and every person deserves equal access to quality education. Soon after independence, Tanzania was guided by a philosophy of self-reliance, with the purpose of changing the colonial education mentality. However, I will not trace that far back when discussing educational policy; rather, I will discuss the education policies established from 1995 to 2014.

#### 1.4.1 **Education and training policy**

The latest policies can be traced back to the Education and Training Policy (ETP) of 1995. The policy states that it intends “to promote access and equity through making access to basic education available to all citizens as a basic right” (URT, 1995, p. 18). The policy was clearly aimed at promoting access to education by focusing on the equity issue with respect to disadvantaged groups. Further, the issues of access and equity were given emphasis in the policy. For example, Chapter 3 of the policy was specifically titled “Access and Equity in Education and Training.” This chapter indicated the role of government in promoting access and equity for disadvantaged individuals. It was argued that disadvantaged individuals might be unable to access education due to liberalization and privatization policies. The policy mentioned a lack of qualified and competent teachers as a challenge to learners with special needs. Furthermore, the policy put forward the importance of science and technology as essential components in the education system of the country (URT, 1995). Recently, Tanzania established a new policy on education, which continued to emphasize aspects of access to quality education for all students. Also, the policy identified the challenges encountered by students. For example, the policy recognized challenges associated with the language of instruction media and the absence of proper ways to identify talented, gifted, and other students with special educational needs (URT, 2014). In this context, it is accurate to view Tanzania as being among the countries whose policies have attempted to address issues of inclusion and equal access to learning opportunities. Since in this study the focus is on higher education, it is also important to highlight two significant policy documents that have shaped the provision of higher education in Tanzania: the National Higher Education Policy of 1999 and the Higher Education Development Programme of 2010. However, these former education policies have been replaced by the new education and training policy of 2014.

#### 1.4.2 **The National Higher Education Policy**

After independence in 1961, there was only one university college in Tanzania. Having one university college was perceived to be a simple system; after 30 years, however, the system became more complex due to an increase in the number of higher education institutions. By 1992, there were about 20 tertiary learning institutions in Tanzania (URT, 1999). The complexity of the higher education infrastructure had several consequences. Access to higher education for marginalized social groups, including people with disabilities, was put at risk due to cost sharing. Cost sharing in education was a result of liberalization and privatization

policies, both of which influenced the nation’s socioeconomic and political practices. To ensure inclusion in education, the government of Tanzania enacted policies intended to address equity and cost sharing. It is claimed that talented individuals who were financially incapable of paying for higher education were supported by the government (URT, 1999).

### 1.4.3 The Higher Education Development Programme (HEDP) 2010–2015

Another source for insights on issues of inclusive higher education in Tanzania is the Educational Development Sector Programme (EDSP). The program outlines different developmental models in all levels of education. In Tanzania, the three levels of education are primary, secondary, and tertiary/higher education, and a special program was established to improve the quality of education provision at each level. These were, for each level respectively, the Primary Education Development Programme (PEDP), established in 2002, the Secondary Education Development Programme (SEDP), established in 2004, and the Higher Education Development Programme (HEDP), established in 2010. The EDSP reports document achievements relating to both the PEDP and the SEDP. These achievements mainly concern increases in the number of students enrolled, as shown for primary and secondary schools in Table 1 below.

**Table 1.** Increase in the number of students in primary and secondary schools.

Level of Education	Sex	Year		Increase in number of students
		1996	2012	
Primary Education	Boys	1,992,739	4,086,280	2,093,541
	Girls	1,950,149	4,160,892	2,210,743
	<b>Total</b>	<b>3,942,888</b>	<b>8,247,172</b>	<b>4,304,284</b>
Ordinary Secondary Education	Boys	98,435	954,961	856,526
	Girls	86,684	847,849	761,165
	<b>Total</b>	<b>185,119</b>	<b>1,802,810</b>	<b>1,617,691</b>
Advanced Secondary Education	Boys	9,597	55,512	45,915
	Girls	4,377	25,950	21,573
	<b>Total</b>	<b>13,974</b>	<b>81,462</b>	<b>67,488</b>

*Source: URT (2014, pp. 11-12)*

An outcome of the PEDP and SEDP programs was therefore a significant increase in the enrolment of students in primary and secondary education. The increase in students in primary education to secondary education has also impacted the provision of higher education. First, the number of higher education institutions has increased from 20 in 2005 to

50 in 2013 (URT, 2014, p. 15). Second, the number of students enrolled in higher education has (see Table 2) increased as a result of achievement via PEDP and SEDP.

**Table 2.** Increase in the number of students in higher education.

<b>Level of Education</b>	<b>Sex</b>	<b>2005</b>	<b>2013</b>	<b>Increase in number of students</b>
Higher Education	Male	25,061	105,381	80,320
	Female	12,606	57,129	44,523
	<b>Total</b>	<b>37,667</b>	<b>162,510</b>	<b>124,843</b>

*Source: URT (2014, p. 15)*

In terms of transition rates from primary education to secondary education, the rate rose from 36.1% in 2004 to 51.6% in 2009. The same pattern applies to secondary education, where enrolment increased from 432,599 in 2004 to 1,466,402 in 2009. The number of students in higher education also increased, from 37,667 in 2004–2005 to 95,525 in 2008–2009 (URT, 2010). The quantitative changes in primary and secondary education have impacted higher education in both quantitative and qualitative respects. Several studies have reported challenges to teaching and learning resulting from increasing class sizes and higher diversity among students (Alexander, 2000; Blatchford, Bassett, & Brown, 2011; Foley & Masingila, 2014; Kochung, 2011; Mino, 2004; Mulryan-Kyne, 2010).

The purpose of HEDP is to address the issue of equity and improve access for disadvantaged groups without any form of discrimination (URT, 2010, p. x). The objectives of HEDP include improving the delivery of higher education through increased access, equity, and quality (p. ix). This also means the program intends to improve non-discriminatory quality education. HEDP has also provided a framework for increasing enrolment and the use of information and communications technology (ICT) in education. In addition, HEDP intends to improve the quality of staff and infrastructure, including libraries, textbooks, and laboratories (pp. 23-24). More specifically, in terms of access, HEDP requires both “physical accessibility” and “access to knowledge and skills” as it regards access as a matter not just of physical presence but also access to knowledge and skills of equivalent quality and value (URT, 2010). This means that the learning environment of students with disabilities should meet their particular needs. The present study focused more on the second aspect of equal opportunity for engagement and access to knowledge and skills of equivalent quality and value. Several studies have discussed different challenges faced by students with special needs as well as by teachers in inclusive education (Kochung, 2011; López Gavira & Moraña, 2015).

## 1.5 What is the problem?

The policy documents described above recognize the problems in education as well as the need to address them. Accessibility is one such problem, not just in terms of physical presence but also with regard to skills and knowledge of equivalent quality and value (URT, 2010, pp. 23-24). The responsibility for ensuring the provision of opportunities for engagement of students and access to quality skills and knowledge rests with the higher learning institutions themselves. The increasing number of students in higher education in Tanzania (see Table 2) has led to a corresponding increase in the number of students with special educational needs as well. Higher education in Tanzania is thus “inclusive” in the sense that no one is denied the right to education due to disability. As described earlier, what constitutes “inclusive” education can be viewed in two ways: access to the physical environment and access to quality skills and knowledge.

In the present study, the focus is whether visually impaired students are provided equal opportunity for engagement and access to knowledge and skills of equal quality compared to their peers in the same regular classrooms. For analytical purposes, I selected two courses in which to examine the practices of inclusion for visually impaired students in higher education in Tanzania. The two selected courses are *Computer Literacy for Teachers (CLT)* and *Educational Media and Technology (EMT)*. The reason for selecting these courses was that they are aimed at orienting student teachers towards fundamental skills and knowledge in their teaching profession, and therefore it is important to explore their inclusiveness regarding students with visual impairment in terms of engagement and accessibility of the contents and ways for the students to demonstrate their understanding and knowledge during the courses.

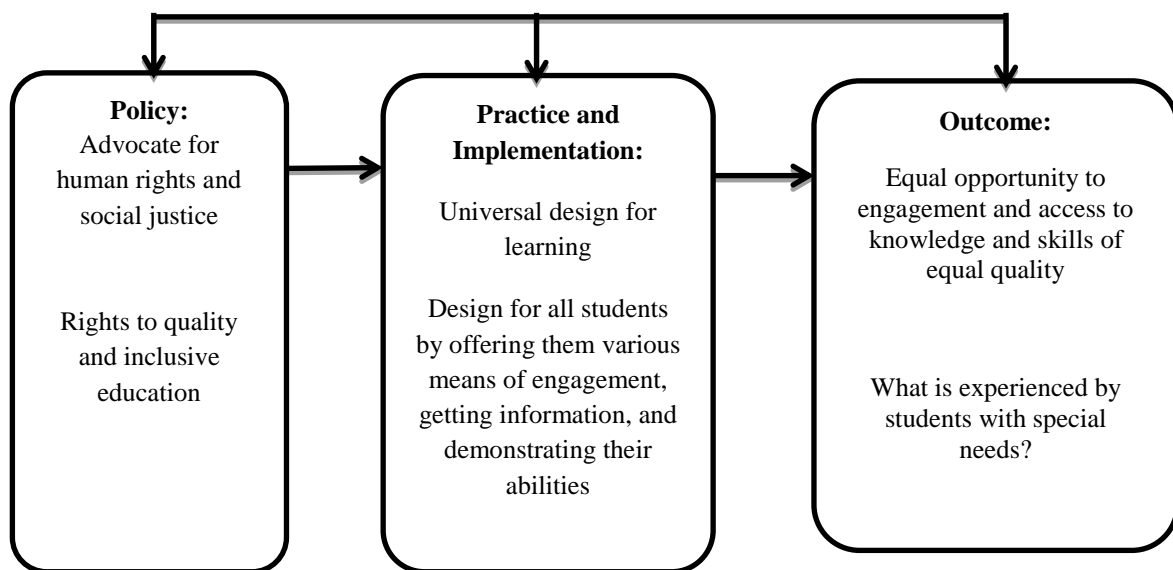
Resolving the problem of accessibility has been a challenge worldwide, with countries in both the South and North reporting such challenges not only in education but in other public services as well, as discussed in this chapter. Studies have been conducted to explore the issue of inclusion and accessibility in the designing and provision of different public services. People with disabilities have long faced challenges regarding access to designed artefacts and public services. In the 1970s, Ronald Mace coined the term “universal design” (UD), arguing together with Marc Harrison (1928–1996) for product and environmental design for average users. Initially, UD reflected concerns over architectural- and engineering-created barriers (Burgstahler & Cory, 2008), but the idea did not remain restricted to the architectural and engineering fields as it was extended later to include education as well. In the field of

education, the UD concept was expanded to become known as “universal design for learning” (UDL). Basic research on UDL is found in the literature of Rose and Meyer (2002), who laid the foundations for the principles of UDL. UDL assumes that all individuals can learn regardless of individual difference. Burgstahler and Cory (2008) describe how UD is intended to be proactive instead of reactive and argue further that UD in higher education can manifest in instruction, services, information technology, and physical space ( p.16). Instruction, teaching methods, learning activities, assessment methods, and use of media and technology should all consider the learner’s individual differences. The main principle of UDL is flexibility, which means no one size fits all (Meyer et al., 2014; David Rose & Meyer, 2002). Flexibility may also involve personalization. This means that UDL aims to overcome the challenge of providing opportunity for engagement and access to skills and knowledge based on individual differences.

The problem here is relational, between inclusive education as an ideology, UDL as a guiding tool for the inclusion of students, and access to skills and knowledge as an outcome. These relations are illustrated in Figure 1 below. The distance from inclusion to access to equal learning opportunities is unknown. However, UDL has been advocated as an approach for enhancing the inclusion of students and increasing access to skills and knowledge. Hehir and Katzman (2012) argued that teachers can collaboratively support inclusive education by implementing UDL principles in their classrooms.

UDL is a necessary but not sufficient process for promoting access to skills and knowledge of equivalent quality and value to all students including students with disabilities. Other factors to support inclusion of students include policy that advocates for human rights in relation to social justice. Inclusive education must therefore be supported with policies, constitutions, rules, and regulations governing human rights and social justice.

Figure 1 summarizes the relational process as conceptualized and used in this study. Policy can be viewed as a political tool to develop and implement practices based on a proper design-for-all approach, which can in turn lead to different experiences for individual students in their learning process. The three segments in Figure 1 represent three interrelated levels. The first level includes policies in education which guide institutional practices. The second level is mostly in the domain of practice and implementation of the policy. At this level, observation of teachers' practices in the classroom is important. The third level is that of individual students and the experiences of students with visual impairment in their learning in higher education. The challenge evident from Figure 1 is that it is not always the case that policies precede practices. I argue that some institutional practices may have existed before the development of a relevant policy, and that in such cases policy is developed to guide and regulate the existing practices. It is thus important to examine practices related to inclusion where no specific policy for inclusive education in higher education is in place.



**Figure 1.** Conceptualized, relational key concepts in this study

## 1.6 Justification for the study

This study was worth conducting because it generated knowledge about inclusion of students in higher education based on universal design for learning (UDL) and cultural-historical activity theory (CHAT) as will be described in chapter 3. This knowledge can be used by educational institutions to prepare teachers for inclusive classrooms. Furthermore, the results can inform researchers about how to enhance engagement and improve access to knowledge



and skills offered in higher education based on the principles of UDL and the qualities of mediating tools or materials used in the teaching and learning process.

Inclusive education has been emphasized both internationally and in Tanzania. However, the challenge is to train teachers to practice inclusion. I argue that training teachers with UDL will contribute to their awareness of diversity among students and the need to incorporate students' special needs in their teaching programs. Hence, the practical use of UDL in education is likely to promote equal opportunity for engagement and access to content and skills for all, including students with visual impairment.

As reported earlier, Tanzania is committed to all international conventions on the improved delivery of education to “all” without discrimination. However, the admission of students with special educational needs to a higher learning institution does not assure the students' engagement and access to the learning instructions, materials, and tools used to assess academic progress. I emphasize the difference between having access to higher education systems and having equal access to learning opportunities. Tanzania has no specific inclusive education policy – a general education policy is used. Therefore, it was important to investigate how, in the absence of a specific inclusive education policy, higher learning institutions enhance the inclusion of students with visual impairment and whether students with visual impairment were equally engaged and were equally able to access the learning materials, facilities, technologies, activities, and assessments provided in higher education.

## **1.7 Specific research questions**

The general purpose of the study was to examine the inclusion of students in higher education in Tanzania through the perspective of universal design for learning (UDL). The inclusion of students, in this study, is framed as a human activity, which can be influenced by different institutional, cultural, and historical perspectives. A view of inclusion of students in higher education as an activity calls for the use of CHAT to investigate the topic. CHAT indicates how different components (like mediating tools, subject, and community) in the activity interact and collaborate to accomplish the intended goal (object). In the context of this study, the intended goal of inclusion of students in higher education in Tanzania is to design a learning environment in which equitable and equal opportunity for students' engagement and access to knowledge and skills is granted. In addition to CHAT, the UDL theoretical framework was used to examine whether the mediating tools that were observed to be used in

higher education were universally designed to the extent of enhancing inclusion of students with visual impairment. The study thus aimed at answering the following research questions:

1. In what ways was inclusive education conceptualized by teachers, students, and Special Education Unit (SEU) staff in higher education?
2. What were the institutional practices perceived by teachers, SEU staff, and students with visual impairment to enhance inclusive education and were these universally designed?
3. What were the instructional pedagogies practiced in higher education and did these facilitate or inhibit equal opportunity of engagement and access to knowledge and skills for students with visual impairment in the learning process?
4. What were the learning experiences of students with visual impairment in inclusive higher education?

## **1.8 Definition of key terms**

***Inclusive education.*** Inclusive education is a process which intends to strengthen the capacity of education institutions to reach out to all learners. It is also regarded as a strategy to achieve education for all (EFA) as defined and adopted by member states in Jomtien, Thailand in 1990 and Salamanca, Spain in 1994, in which education is emphasized as a human right (UNESCO, 2009). In addition, inclusive education is termed as a vehicle for social equity (Hehir & Katzman, 2012, p. 36). In the present study, inclusive education in higher education refers to the understanding and practices available in the institution studied that aim to provide equal opportunity to students with disability, particular those with visual impairment.

***Students with special educational needs.*** Students with special educational needs refer to all children or youths whose needs arise from disabilities or learning difficulties (UNESCO, 1994, p. 6). It is clear that special educational needs may arise due to one disability or due to learning difficulties when interacting with the learning environment. In this study, students with special educational needs refer to students officially registered in the Special Education Unit (SEU) of the institution investigated. Such students are provided with different specified institutional equipment or services to support their learning process. Among these students with special educational needs, the study focused on visually impaired students, and in particular braille users, i.e., practically blind students.

**Universal design for learning.** Universal design for learning (UDL) has been defined by the Higher Education Opportunity Act (HEOA; Public Law 110-315, 14 August, 2008) as a scientifically valid framework for guiding educational practice that provides flexibility in the ways information is presented, in the ways students respond or demonstrate knowledge and skills, and in the ways students are engaged. The framework also reduces barriers in instruction, provides appropriate accommodation, support, and challenges, and maintains high achievement expectations for all students, including students with disabilities and students who have limited English proficiency (Hall, Meyer, & Rose, 2012; Rapp, 2014). Alternatively, UDL is referred to as an approach that addresses the disabilities of schools rather than of students (Meyer et al., 2014, p. 5). In this study, UDL is therefore regarded as any action reported or observed in teaching and learning practices that is intended to provide multiple ways for engagement, representations, or action and expression. In other words, UDL represents the available alternatives for visually impaired students to become engaged and remain motivated in the learning activities, the available ways in which information is provided, and the available alternatives provided for visually impaired students to demonstrate their skills and knowledge about the subject matter.

**Impairment.** An impairment is a limitation or decrease in body functions or structures, such as significant deviation or loss of body structure or ability to function (WHO, 2001, p. 10). In this study, the focus was on visual impairment.

**Visual impairment.** Ponchillia and Ponchillia (1996, p. 9) define visual impairment as any degree of vision loss including total blindness that affects an individual's ability to perform the tasks of daily life. Macfarlane (2008, p. 379) defines visual impairment as an impairment in vision that even if corrected adversely affects a child's educational performance and can include both partial and total blindness. In this study, students with visual impairment refer to students who were officially registered as such in the SEU and who were consequently receiving necessary services to support their learning. The focus was on students who used braille or typewriters for writing, PAC mate or audio gadgets for recording lectures, and readers or tactile devices for reading; practically, the study focused on the experiences of so-called "blind" students.

**Discrimination.** UNESCO (1961, p. 119) defines discrimination as any distinctions, exclusion, limitation, or preferences having a purpose or effect of nullifying or impairing equality of treatment in education. More particularly, it refers to depriving or limiting a

person or a group of persons regarding their access to education of any type or at any level, limiting such a person or group of persons to an inferior standard of education, or inflicting conditions which are incompatible with the dignity of man to any person or group of persons. It refer to the distinction, exclusion, limitation, or preference, which being based on language, religion, gender, race, political, or other opinion, social origin, economic or birth condition and color. In this study, discrimination refers to any inflicted condition(s) in higher education that limit or deprive students with visual impairment regarding their equal access to the learning process.

***Knowledge and skills.*** In this study, knowledge and skills refer to the intended course objectives articulated in the Computer Literacy for Teachers (CLT) and Educational Media and Technology (EMT) courses. In contemporary life, the use of computers and related technology plays a significant role in education. If teachers are well trained and facilities are both available and suitable, then computer skills, media, and technology can be successfully applied in their educational practices. In this context, knowledge and skills refer to what the CLT and EMT courses intended student teachers to attain.

***Higher education.*** Higher education refers to the knowledge and skills taught in the tertiary level of education; thus, higher education excludes primary and secondary education (URT, 1999). In the present study, higher education refers to the preparation of students for the teaching profession at university level.

***Assistive technology.*** United States legislation defines assistive technology as any item, piece of equipment, or product system, whether acquired commercially, modified, or customized, that is used to increase, maintain, or improve the functional capabilities of individuals with disabilities. In addition, the World Health Organization (WHO) defines assistive technology as any product, instrument, equipment, or technology adapted or specially designed for improving the functioning of a disabled person (Cook & Polgar, 2014, p. 2). In other words, assistive technology refers to an object or technology used by a person with a disability. In this study, assistive technology refers to any equipment or technology used by students with visual impairment in the inclusive learning environment in higher education.

## **2 Review of Literature and Related Studies**

### **2.1 Introduction**

Inclusive education is a varied and global concept, as are the meanings derived from it. Yet, although inclusive education can be influenced by various sociocultural, political and economic contexts worldwide, it is nonetheless still framed around human rights. Social forces brought the concept into practice, but different countries responded to international pressure to implement inclusive education differently due to various factors. This chapter is an attempt to highlight issues of interest to researchers in relation to inclusive education policy and practices. The review of the literature and other relevant studies demonstrates the struggle to develop and implement policies on inclusive education, including specific barriers to their implementation, as well as the mechanisms by which inclusiveness has been promoted in the provision of education.

### **2.2 Development and implementation of inclusive education policies**

In response to the UN call for education for all without any form of discrimination, some countries have established inclusive education policies. These countries include New Zealand (Kearney & Kane, 2006), South Africa (Mitchell, 2005; Naicker, 2005), Ghana (Kuyini & Desai, 2007), Lesotho (Johnstone & Chapman, 2009), the United Kingdom (Lloyd, 2000), India (Kalyanpur, 2008) and Nigeria (Garuba, 2003), to name just a few. In other countries, no policies for inclusive education explicitly exist; rather, some aspects of inclusive education are present in their general policies on education. Tanzania is one such country. However, the promotion of “education for all” is more evident in the nation’s education and training policy (URT, 1995, 2014). For that reason, I argue that the issue of inclusive education is promoted and accepted worldwide, but with country-specific limitations. The development of a policy and its effective implementation are separate processes. I will thus highlight some issues that have been reported in relation to the implementation and perceived or experienced outcome of inclusive education policies in higher education in different countries.

### **2.3 How disability is viewed: Medical and social models of disability**

The studies reviewed here suggest that policies and policymakers more often view disability according to a medical model than according to a social model (Kalyanpur, 2008; Kearney & Kane, 2006). In other words, challenges in education are mostly attributed to the disabilities of individuals rather than to their social and political environments. The medical-model view of disability has also been reported to cause problems accurately identifying and labelling learners; as a result, a significant number of disabled children remain unidentified (Kalyanpur, 2008). For this reason, it has been argued that policymakers should adopt a more socially and politically conscious view (Kearney & Kane, 2006) and refrain from defining students in terms of their individual disabilities (Thomas, 2013). Accordingly, it is also argued that significant barriers to the development and implementation of inclusive policies should be addressed from the perspective of their social, cultural, economic, and political dimensions.

Viewing disability based on either solely a medical or social model has been regarded as an old-fashioned approach. The International Classification of Functioning, Disability and Health (ICF), representing the medical model, is based on relative levels of functioning and disability, while the social model refers to contextual factors, including environmental and personal characteristics (WHO, 2001). It has been claimed that the *physical, social and attitudinal world* are basic constructs comprising environmental factors that can either facilitate or hinder an activity (WHO, 2001, p. 8). In the following discussion, I will demonstrate how having a disability as a personal factor is exacerbated by various socio-environmental factors that are developed within social contexts. Put another way, disability as a health condition is not a problem in and of itself; rather, the problem is the failure of society to develop a friendly and suitable environment to facilitate the functioning, participation, and performance of individuals with disabilities. Promisingly, Meyer et al. (2014) argued that there is a shift of public thinking from the medical model of disability to the social model of disability, in which a greater focus is put on contexts as either enabling or disabling conditions. Consequently, instead of seeing the condition of students as a problem, the public is urged to see the limitations erected within the traditional school curriculum. The institutions have a role of creating learning contexts that embrace all students, and in which no one is limited in their engagement, access to content, or self-expression. However, a better model of disability is one that is aware of the facts and potential information from both the medical and social models of disability. The synthesis of the two models has been termed the

“biopsychosocial” model (Üstün, Chatterji, Bickenbach, Kostanjsek, & Schneider, 2003). In the biopsychosocial model the view of disability combined both the medical and social models. This means, instead of viewing disability as an individual’s deficits or contextual disabilities. It is important to observe both medical model view of disability as well as social model view of disability. In several contexts, even persons with no disabilities find themselves impaired practically due to socially erected barriers. It is a fact that student’s engagement and participations in education settings are contributed by socially erected factors such as inaccessible learning designs, materials and environments.

One study conducted in the context of the UK’s inclusive education policy indicated that although there was a desire to promote equal opportunity in education, important changes had yet to be made in the organization of schools, the curriculum, and assessment and testing (Lloyd, 2000). This highlights how even when policies are well written with very promising objectives, their implementation can be hindered by various factors. This discrepancy between policy and practice has attracted several researchers in the field. Indeed, most of the findings of the studies reviewed in this study have revealed problems in the implementation of inclusive education due to teaching and learning approaches and resources, unfavorable attitudes towards the practices, environmental problems, and a lack of trained and competent teachers.

Kuyini and Desai (2007) have indicated that attitudes towards inclusion and disability can affect, adversely or favorably, the implementation of inclusive education policies. For example, attitude (as well as the competency of teachers) in primary schools positively predicted effective teaching practices in Ghana. Furthermore, positive attitudes, for example, among teachers can strengthen efforts to ensure learners have access to learning. Similarly, teachers with inclusive education skills and knowledge were also more positive towards children with disabilities (Johnstone & Chapman, 2009). Conclusively, Johnstone and Chapman (2009) developed an association between attitudes, skills, knowledge, and practices. The possession of inclusive education skills and knowledge has been argued to create positive attitudes elsewhere (Bothma, Gravett, & Swart, 2000). In their study, Bothma, Gravett and Swart (2000) reported that teachers recommended in-service training to help them develop more positive attitudes and knowledge in the area of inclusion, as they otherwise held negative attitudes towards inclusive education. Furthermore, a study conducted in Nigeria also mentioned attitude as a problem hindering the implementation of inclusive education,

which, in this case, was the “lackadaisical” attitude of people and the government (Garuba, 2003, p. 198). Another study conducted in South Africa revealed a positive view of inclusive education based on philosophical, structural, and practical pedagogical aspects (Mitchell, 2005). In terms of philosophy, it was argued that South Africa has made definitive declarations and proclamations about inclusive education in both white papers and in its constitution. The white paper of inclusion in education and the constitution state the right of all children to obtain an education. Structurally, South Africa possesses a unitary education system, meaning that all children have the right to attend education institutions. Practically, the nation’s curriculum was adopted to meet the different needs of learners ( p.249).

The development and implementation of inclusive education policies have been hindered by different barriers affecting the process of teaching and learning. One study showed that inclusive education in most developing countries in Africa, Latin America, the Middle East, and the Caribbean has not been satisfactorily implemented due to a lack of supporting services, relevant materials, human resources, funding, infrastructure, and concrete legislation (Eleweke & Rodda, 2002). However, other studies have reported the existence of actionable legislation in terms of constitutional rights or proclamations, as just discussed for South Africa (Mitchell, 2005; Naicker, 2005) but also in New Zealand (Kearney & Kane, 2006), Nigeria (Garuba, 2003), Lesotho (Johnstone & Chapman, 2009), the UK (Lloyd, 2000), eastern Caribbean countries (Armstrong, Armstrong, Lynch, & Severin, 2005), and India (Kalyanpur, 2008).

## **2.4 Promotion of inclusive education practices**

The promotion of inclusive education relies on two bases: first, a child’s right to be included, and second, the proposition that inclusive education is effective (Lindsay, 2007). Yet, Lindsay (2007) has argued that there is no evidence for the proposition that inclusive education works. Accordingly, researchers must explore in greater depth the mediators and moderators of inclusive education to provide evidence to support the claim that inclusive education can indeed improve the provision of quality education.

Another category of studies has suggested that practitioners be aware of socially, politically, and environmentally created hurdles to realizing inclusive education. Such studies have reported the existence of a separate “curriculum with disabilities” which alienates learners from mainstream classes (Naicker, 2005). It has thus been suggested that the perspective on



disability be changed from one which favors a medical model to one which embraces a social model, in which barriers to learning are perceived as socially constructed. This would imply a shift from addressing students' disabilities to beginning to address the disabilities of schools (Meyer et al., 2014). For that reason, it is argued that understanding exclusionary forces within schools and society at large can contribute to improvements in the provision of inclusive education (Kearney & Kane, 2006). To address the issue of inaccessible curricula, teachers are advised to use UDL principles in their teaching (Hehir & Katzman, 2012, p. 122). However, disabled students can benefit more if disabling factors are addressed based both on medical and social models (i.e., using the biopsychosocial model as defined by (Üstün et al., 2003).

## **2.5 Inclusive education in higher learning**

In several of the reviewed studies, inclusive education is discussed mostly with respect to lower (primary and secondary) levels of education. Likewise, much of the literature has focused on students with special educational needs. Rarer are those studies that approach inclusion in higher education. For the purpose of this study, I will highlight in this section those studies which have explored inclusive education in higher education and, in so doing, have provided an overview of issues of interest to higher education researchers. It should nevertheless be stressed again that studies on the concept of inclusion in higher education in particular are limited. Instead, most studies in this area have examined the perceptions and learning experiences of disabled students in higher education institutions, and such studies have focused particularly students' perceptions and learning experiences regarding teaching, assessment, and access to information and available services (Borland & James, 1999; Fuller, Bradley, & Healey, 2004).

Some studies have also found that higher learning institutions are struggling to make higher education more inclusive. However, these were also limited to the perceived experiences of disabled students. In such studies it has been argued that although universities promote inclusion, challenges with respect to the learning process and environment persist (Morgado, Cortés-Vega, López-Gavira, Álvarez, & Moriña, 2016; Scott, Mcguire, & Shaw, 2003). Morgado et al. (2016) explored the question "How does the university, as an institution, open doors and/or put hurdles in the way of students with special needs?" (p. 639), and addressed further research questions based on students' views about the institutional barriers and aids as

identified by students with visual impairment themselves. Generally, the students reported being satisfied with how their educational institutions promoted inclusion, but they remained concerned over access to the learning process (Morgado et al., 2016). Another study highlighted the importance of an institution being aware of the characteristics and needs of students in order to properly address the persistence and retention of students with disabilities (Getzel, 2008). To overcome challenges related to accessing the learning process, the provision of assistive technologies and the incorporation of UD in instruction and in the curriculum were viewed as essential (p. 213). Getzel (2008) further reported UD to be an approach that incorporated the diversity of all learners in the learning process. As a result, I found it important to review studies on UD as a means to facilitate inclusive education.

## **2.6 Universal design in higher education**

UDL has received widespread support recently, but it has a long history. UDL is rooted in the field of learning sciences, including specific disciplines such as cognitive neuroscience, developmental psychology, education research, and cognition (Rappolt-Schlichtmann, Daley, & Rose, 2012; Rose & Meyer, 2002). Thus, the concept is not new in educational practices and research, yet it is new in the sense that researchers have obtained new insights from research and practice (Rappolt-Schlichtmann, Daley, & Rose, 2012). The meaning of UDL has gradually shifted in its focus from improving general learning practices to assisting students with special educational needs, and UDL now appeals to provision of equal learning opportunities to “all” due to advancements in science and technology. Unless universally designed, new technologies are not always user-friendly, that is, not all technological artefacts are suitable for all users. The same issue applies in education, where learning barriers can result from the very design of the curricula or instructional materials. At the core of UDL is the idea that rather than seeing disability as a problem with an individual, it should be viewed as a deficiency in the curriculum and/or pedagogies, which often do not equally support heterogeneous pools of learners in their attempt to learn at an optimal level (Rose & Meyer, 2002). Consequently, practitioners who apply UDL in their educational practices must work to eliminate barriers within both the practices and facilities. Learning situations, materials, pedagogies, and technologies not developed in a way sensitive to diverse learning needs create socially constructed barriers, especially for disabled students. In response, UDL promotes inclusive design as a proactive process for minimizing unnecessary learning barriers and hence improving engagement and accessibility in the learning process. UDL is based on

three principles which intend to explain how the materials should be presented to students in ways they know and are capable of doing and how the instruction should be (Hehir & Katzman, 2012). The three principles describe how the students should be engaged, how the information should be presented and how the students can demonstrate their understanding in the subject content. These principles of UDL and their guidelines are promising a space for improving inclusive education. Meyer et al. (2014) made it clear that UDL principles can guide the design, selection, and application of learning tools, methods, and environment (p. 88). Furthermore, the principles of UDL are based on the three-network model of learning, which comprises affective networks, recognition networks, and strategic networks, each addressing a specific question: affective networks addresses the *why* of learning, recognition networks addresses the *what* of learning, and strategic networks addresses the *how* of learning (Meyer et al., 2014, p. 90). From these three networks, three principles of UDL were then developed: provision of multiple means of engagement, provision of multiple means of representation, and provision of multiple means of action and expression (Meyer et al., 2014, p. 89). The primacy of learning based on the principles of UDL is on affective networks and the related *why* of learning and provision of multiple means of engagement.

In education, efforts to remove barriers can be attributed to UD. At first, UD was developed to remove structural barriers that excluded certain people. The present focus, however, is on developing more inclusive design approaches (Ostroff, 2011). In an educational setting, some practitioners have attempted to apply the architectural-based principles of UD in classroom instructions. The UD principles developed by the Centre for Universal Design (1997) are as follows: (1) *equitable use*, which encourages designs to be useful and marketable to people with diverse abilities; (2) *flexibility in use*, which emphasizes that the design should be able to accommodate a wide range of individual preferences and abilities; (3) *simple and intuitive use*, which recommends that the design should be easy to understand regardless of the user's knowledge level, experience, or language skills; (4) *perceptible information*, which urges that the design be capable of communicating necessary information effectively to the user regardless of external conditions or a user's sensory abilities; (5) *tolerance for error*, which recommends that the design should minimize hazards and the adverse consequences of accidental or unintended actions; (6) *low physical effort*, which means that the design should be easy to use; and (7) *size and space for approach and use*, which argues that the design should provide an appropriate size and space for learning regardless of a user's body size, posture, or mobility (Burgstahler & Cory, 2008, p. 27). The seven UD principles can also be

applied in the teaching process. Despite the fact that the principles of UD are based in the learning sciences and not UDL, some of their aspects and guidelines can be used to create the contextual requirements for successful UDL in educational institutions.

UDL can properly facilitate teaching and learning practices based on the collected research data. Data from the learning sciences have suggested that the first thing to be considered in any effective learning design is not simply how information will be presented or expressed, but rather how learners will be engaged or motivated. For this reason the primacy of UDL has been revised and engagement has been placed as the first principle (Meyer et al., 2014).

Some studies on the usefulness of UDL in educational practices have reported improved access to the general curriculum and assessments for students with disabilities, alongside benefits for the student body as a whole (Ketterlin-Geller & Johnstone, 2006; Pliner & Johnson, 2004). In addition, UDL can create a more welcoming space for all students when applied both in educational practices and in curriculum design and implementation (Higbee & Goff, 2008). In one study, using UDL was reported to provide more opportunities for students to engage, express, and improve their academic performance (Schelly, Davies, & Spooner, 2011). Furthermore, researchers have also reported that UDL improves instruction. In a study of how student teachers used the UDL framework in lesson plan development, it was found that teachers' knowledge of UDL was positively correlated with an increasing availability of options related to educational practices (Courey, Tappe, Siker, & LePage, 2013). Another study conducted in South Africa reported that the training of teachers and therapists with UDL was perceived by the former as a useful means to overcome persistent barriers in the inclusive education policy system (Dalton, Mckenzie, & Kahonde, 2012).

UDL has also been associated with the use of assistive technologies in teaching and learning. However, while assistive technology is one important way to improve accessibility, there are other ways. For instance, it has been argued that UDL can be used in different instruction pedagogies to facilitate accessibility for students with diverse learning needs (Katz, 2013). In addition, without technology, teachers can still incorporate various other ways to facilitate access to learning, such as the provision of multiple ways for the representation of subject matter as well as multiple options for how students can express what they know; further, multiple options can be provided for students to engage in the learning process (Rose & Meyer, 2002). This does not mean that assistive technologies are not useful in facilitating access to learning, just that technology is not equally available everywhere; in such instances,

higher education practitioners can provide multiple other means of representation, expression, action, and engagement. Some studies have treated UDL and assistive technologies separately, showing how either application can be used to overcome barriers in education. Hence, teachers are urged to know how to integrate assistive technology into their existing teaching practices (Messinger-Willman & Marino, 2010). That said, the use of assistive technology has been reported to have occasionally created its own educational barriers, which can be grouped into three types: situational, institutional, and dispositional (Cross, 1981). Thus, while assistive technology is considered important for facilitating the teaching and learning process, it has its own limitations in certain contexts. The studies I have reviewed above on UDL are general insofar as they are not specific to higher education; accordingly, I will attempt to explain the position of UDL in higher education.

### 2.6.1 **Universal design for learning (UDL) in higher education**

The literature indicates that UDL has received significant recognition in the US. This is due to federal legislation that has both framed the definition of UDL and endorsed its application in the training of teachers at both pre-service and in-service levels. UDL has also been framed within US post-secondary instructional pedagogies via the 2008 Higher Education Opportunity Act (HEOA), which defines UDL as follows:

Universal Design for Learning (UDL) means a scientifically valid framework for guiding educational practice that —(A) provides flexibility in the ways information is presented, in the ways students respond or demonstrate knowledge and skills, and in the ways students are engaged; and (B) reduces barriers in instruction, provides appropriate accommodations, supports, and challenges, and maintains high achievement expectations for all students, including students with disabilities and students who are limited English proficient (Higher Education Opportunity Act of 2008)

Furthermore, different researchers have defined or framed the definition of UDL to suit specific goals. Some researchers have defined UDL as a set of principles for curriculum development that gives all individuals equal opportunities to learn (Berquist & Dalton, 2016). Others have viewed UDL as a pedagogical theory that plans ahead to ensure equitability among students (Rapp, 2014). Furthermore, UDL has also been defined as a solution to the problem of “one size fits all,” a perspective which has been accused of overlooking individual differences in learning (Hall et al., 2012; Izzo, 2012; Katz, 2013; Kurtts, 2006; Lopes-Murphy, 2012; D Rose, 2000; UNESCO, 1994). Thus, UDL advocates for flexible approaches that can meet the needs of all individuals (CAST, 2011). As a result, in higher education, studies have concentrated on introducing the UDL framework from the learning

sciences into higher education. The hypothesis behind this approach is that the results can be used to promote equal learning opportunities and thus equal engagement and access to skills and knowledge to all students. It has been argued that higher education is changing due to the increase in enrolment by students with diverse backgrounds and needs. In response, knowledge of UDL is perceived to be crucial so as to assist course structuring in order to meet the learning needs of all students (Jorgenson, Singleton, & Bennett, 2013).

## **2.7 Studies of inclusive education and UDL in Tanzania**

From the studies reviewed, it seems that the issue of access to education has focused more on gender than other sociodemographic factors. For example, in one study, the issue of equity based on socioeconomic background in private higher education institutions was framed in terms of access for female students (p. 69). The results showed that female access to private higher education was relatively and increasingly higher, growing from 36.5% in 2001–2002 to 40.5% in 2005–2006; likewise, in public institutions, female student enrolment increased from 25% to 32%. Another study (Bhalalusesa, 2011) explored barriers to the implementation of education for all, focusing on the rights of girls and women, particularly regarding access to education, and arguing that these have been denied due to social, economic, and cultural prejudices, as well as other social structural barriers. Again, the issue of access was framed around gender. Another study conducted on female students with disabilities in higher education explored the factors enabling access to and participation in educational success (Tuomi, Lehtomäki, & Matonya, 2015). The researchers reported that enabling factors included the presence of encouragement from family and previous teachers, financial support, and active self-engagement. However, the accessibility of campus facilities was reported to be poor; thus, structural modifications were needed in addition to the training of university staff (Tuomi et al., 2015). A study by Tungaraza (2010), also conducted at a university, examined the perceptions of students with disabilities about the university's achievements regarding access for students with disabilities and the problems they were facing. The results showed that the university succeeded in increasing the number of enrolled students with special needs as well as the number of staff catering to them; accessibility, however, remained a challenge (Tungaraza, 2010).

Despite the fact that the studies in Africa reported girls and women to be denied rights to education due to different sociocultural impediments (Bhalalusesa, 2011), a study by

Kafanabo (2011) focused on diversity among learner profiles to explore the relationship between learners' intelligence profiles and skills using computer applications while working. The study suggests using learner-centered instruction due to its emphasis on learners' differences; hence, such applications are likely to provide equal opportunities based on learners' own skills, talents, abilities, and task performance.

In contrast, Mmbaga (2002) investigated how inclusive education was being practiced at a classroom level in Tanzanian primary schools and reported that students were excluded in different ways due to the presence of anti-inclusive practices and the view that learning difficulties reside within the child and not within the system. However, in a later study, some inclusive practices were observed within the Tanzanian education system (Mmbaga, 2003). In addition, the medium of instruction is another aspect that has been reported to exclude learners in the learning process in Tanzania (Vuzo, 2010). The findings of this study demonstrate that the use of English as the medium of instruction in Tanzanian secondary schools acted as a barrier to learning and classroom interaction. As a result, the majority of students were excluded in classroom discussions.

While several studies have focused on students with disabilities, Possi (2003) directed her attention to gifted and talented students in education systems in Tanzania. The study expanded the meaning of special schools to include institutions for learners with special needs. Possi (2003) made it clear, however, that students with disabilities are often also gifted or talented in particular domains. Lastly, Lehtomäki, Tuomi, and Matonya (2014) presented an analytical overview of studies of education for people with disabilities in Tanzania for the decade between 1998 and 2008. Their analysis revealed that these studies covered a variety of issues, such as inclusive education policy and its implementation, accessibility to education, discrimination against females with disabilities in education, adverse social conditions and environments, and teaching and learning processes (Lehtomäki et al., 2014). The studies included in their analysis encompassed primary, secondary, and higher education; however, the majority gave voice to people with disabilities without giving the same level of attention to practitioners and policymakers. Consequently, more research is needed on practitioners and policymakers in the provision of higher education.

## 2.8 Knowledge gap

As can be observed, inclusive education has been discussed mostly in regard to people with disabilities (Tungaraza, 2010) and women (Bhalalusesa, 2011). In addition, the knowledge generated about inclusive education has mostly focused on lower levels of education (Mmbaga, 2003). The reason for this may be traced back to the Salamanca Statement, in which Principle 3 of the guidelines states that “in this *Framework*, schools should accommodate *all children* regardless of their physical, intellectual, social, linguistic or other conditions” (UNESCO, 1994, p. 6). My interest is on how the statement emphasizes “all children”; regardless of learning barriers embedded in education systems, some children with disabilities excel to higher education. In addition, the Salamanca Statement indicates “early childhood, girls’ education, and preparation for adult life” as priority areas (pp. 33-34). Higher education is thus only tacitly implied (I would argue that it is implied in the category “preparation for adult life”).

In my view, it is important to explore practices of inclusion of students in higher education, mainly because the global emphasis has been concentrated more on lower levels of education (i.e., of children) than higher education (i.e., of youths and adults). Students with disabilities can excel to higher education as well. Hence, it is important to investigate the inclusion of students with disabilities in higher education, particularly in developing countries. The present study is not assumed to be the first to examine inclusion in higher education. However, many pre-existing studies had a broader focus on general experiences of students with disabilities (Tungaraza, 2010), physical accessibility, and the importance of using information and communications technology (ICT) and assistive technology (Messinger-Willman & Marino, 2010). While the use of ICT and assistive technologies is indeed important, the data and findings yielded by previous studies were general and thus not specific to particular subjects. It was found, however, that ICT and assistive technologies in a classroom context can promote equal access to quality knowledge and skills for students with learning needs. They do so by overcoming barriers found in traditional course content and learning environment conditions. For this reason, I felt it useful to select specific subjects in teacher training programs in higher education to investigate the existing phenomenon in detail. It was also useful to study the perspectives of the institution, teachers, and students because each, consecutively, lays the groundwork for achievement by the next.



Furthermore, some studies have suggested learner-centered approaches as important models for inclusive classrooms (Kafanabo, 2011; Mino, 2004), a position also upheld in the Salamanca Statement, which claims that a child-centered pedagogy would benefit all children (UNESCO, 1994, p. 7). At the same time, other studies have indicated that most higher education institutions continue to use teacher-centered approaches, which are, unfortunately, regarded as poor-quality instruction with a “one size fits all” mentality towards education (UNESCO, 1994, p. 7). It is important to explore the institutional factors and pedagogical practices in higher education using UDL principles to determine whether they can actually promote access to skills and knowledge for all learners, especially those with visual impairment. The argument here is that institutions, teachers, students, and learning contexts differ, that is, they are not uniform and do not have similar conditions. Due to several efforts to promote access to education in lower levels of education, enrolment in higher education is inevitably increasing, leading to overcrowded classrooms (Alexander, 2000), while several studies have reported that class sizes influence teaching pedagogies (Blatchford et al., 2011; Foley & Masingila, 2014; Wimshurst, Wortley, Bates, & Allard, 2006). Despite these challenges, all learners should be able to learn equally, regardless of their individual differences or abilities. In this respect, UDL has been proposed as an approach that can provide opportunities for all learners to access quality skills and knowledge (Burgstahler & Cory, 2008; CAST, 2011; Dalton et al., 2012; Getzel, 2008; Hall et al., 2012; Jorgenson et al., 2013; Rapp, 2014; Rappolt-Schlichtmann et al., 2012; Schelly et al., 2011).

Of all the studies I reviewed in the context of Tanzania, none analyzed teaching and learning processes through the lens of UDL and none were particularly situated within cultural-historical activity theory (CHAT). The present study therefore adds knowledge to the existing literature on UDL, specifically with respect to institutional factors, instructional pedagogical practices, and the learning experiences of visually impaired students in higher education in Tanzania. To address the issue of inclusion, teachers’ knowledge on how impairment may affect learners and their learning process helps teachers in their development and use of different practical principles in their teaching (Ponchillia & Ponchillia, 1996). UDL is one recent approach that promises to enable teachers and practitioners to maximize opportunities for students to access the curricula. In this context, I find it valuable to examine the inclusion of students with visual impairment in higher education in Tanzania based on CHAT and UDL perspectives.



## 3 Theoretical Framework

### 3.1 Introduction

In this chapter, I present the theoretical framework used as an analytical tool in this study. The study focused on access to knowledge and skills among students with visual impairment in the context of inclusive higher education. Clearly, the study took place in a complex learning environment, that is, a “situation in natural settings where multiple individuals involved, and shared activities within a single or multi-organizational context” (Yamagata-Lynch, 2010, p. vii). It has been claimed that cultural-historical activity theory (CHAT) can guide studies of complex learning situations by examining issues related to real-world learning environments (Yamagata-Lynch, 2010). The inclusion of students, particularly visually impaired students, in a higher education learning environment calls for a theory that can examine its complexity in a real-world setting. Thus, CHAT was used for the analytical framework of the present study. In this chapter, I first describe the background of CHAT as well as its characteristics, principles, and significant analytical components, and subsequently I explain how I positioned my study within the context of the theory.

There was however a need to complement CHAT with UDL. Inclusion of students in higher education in this study is conceptualized as a mediated action, or more simply, as an activity. It is an activity in which the emphasis must embrace the use of accessible mediating tools to promote learning opportunities for all students in classes, including students with disabilities and particularly students with visual impairment. Therefore, based on cultural-historical perspectives, any mediating tools to be used must be barrier free to facilitate engagement, access to knowledge, and development of skills of all students regardless of their disabilities. UDL principles and guidelines emphasize different ways to embrace diversities among students in the learning process. This chapter concludes with a discussion of the study’s analytical framework based on the two important theoretical contributions provided by CHAT and UDL.

Issroff and Scanlon (2002) suggested that CHAT provides a language for describing and understanding the practices of participants in an activity. In addition, to guide the analysis of activities, CHAT also has the capacity to provide a framework for detecting, describing, anticipating, and considering their ramifications (DeVane & Squire, 2012, p. 258). The

development of CHAT is credited to School of Russian Psychologists, such as Lev Semyonovich Vygotsky, Alexei Nikolaevich Leontiev, and Alexander Romanovich Luria, in the 1920s and 1930s. CHAT theorization and research is also commonly known as “activity theory” (Engeström, Miettinen, & Punamäki, 1999, p. 1). Therefore, in this study, CHAT and activity theory are interchangeably used for the same analytical framework.

### **3.2 Cultural-historical activity theory (CHAT)**

The origin of CHAT is traceable to Russia in the early twentieth century, beginning with Lev Vygotsky, a Russian psychologist, whose work was considered revolutionary by behaviorists at the time. While the field of psychology was focused on the stimulus–response association, Vygotsky’s work emphasized interactions between individuals and their social environment as a single unit of analysis that can be mediated by actions. The concept of mediation introduced by Vygotsky was one of the psychologist’s main contributions to CHAT. In activity theory, actions mediate human activity, which is defined as a process involving artefacts and signs available in the social environment, where artefacts refer to technical tools and signs refer to psychological tools (Wertsch, Tulviste, & Hagstrom, 1993). Vygotsky’s basic components of mediated action are *subject*, *object* and *mediating artefact* (Engeström, 2001, p. 134; Vygotsky, 1978), and are presented in a triangular model. The *subject* in any mediated action refers to an individual or group of individuals involved in an activity, while the *object* refers to the goal or motive of the activity. While, the *mediating artefact* refers to the tools, social others, and prior knowledge that an individual can use as resources to mediate the subject in the activity (Yamagata-Lynch, 2010, p. 2).

The subject, object, and mediating artefact exist in a dialectical relationship. This means that each component has a mutually affective relationship with the other components and with the activity as a whole. The primary idea in Vygotsky’s mediation model of human activity is that humans develop consciousness through interactions, which are less dualistic (i.e., stimulus–response) than originally perceived (Engeström, 2001). Mediating tools are thus more culturally constructed. Vygotsky (1978) argued that the role of the sign and tool in the mediated action is to facilitate the object of the activity. Furthermore, mediation specifically focuses on social factors and interactions between people and their environments. Kaptelinin, Nardi, and Macaulay (1999) explained why the principle of “tool mediation” plays a central role in human activity (p. 31). First, tools shape the way human beings interact with reality:

when an external activity is shaped, internal activity is shaped accordingly. Second, tools are perceived to be the result of experiences of other people who previously attempted to solve the same or a similar problem. Thus, tools are invented, modified, and improved based on the sociocultural perspectives of those who collaborate in an activity.

To analyze and comprehend an activity, the social and cultural aspects of the process should be considered. In addition to the triangular model of mediation, another contribution made by Vygotsky is the zone of proximal development (ZPD) in mediated action. The ZPD refers to the distance between the actual development level as determined by independent problem solving and the level of potential development as determined through problem solving under adult guidance or in collaboration with more capable peers (Vygotsky, 1978, p. 86). Within CHAT, the ZPD can be used as a conceptual tool to guide the analytical framework of a human activity. In the study of the inclusion of students in higher education, the ZPD is likely to be used in relation to the selection and justification of pedagogical tools for teaching.

With respect to learning activities, the ZPD refers to knowledge about which activities can be performed by learners independently and which require assistance from a more knowledgeable other (MKO). In learning contexts, MKOs can be teachers, researchers, peers, or paraprofessionals, the last of which refers to a person who is delegated an aspect of a professional task but is not licensed to work as a fully trained and qualified professional. In this study, student teachers who worked for students with visual impairment as readers or notetakers were considered paraprofessionals. The existence of different MKOs in the learning context and process presupposes their interactions with students (i.e., the subject). ZPD can help outline and describe interactions among MKOs and subjects in the learning process. It has been argued that in the ZPD, students are provided with supportive techniques, collectively known as *scaffolding* (Ormrod, 2014, p. 333), to accomplish challenging tasks. Once students have mastered a task the scaffolding can be removed, and the students should be able to complete subsequent tasks individually and independently (Vygotsky, 1987). In CHAT, both ZPD and scaffolding are important concepts in mediated activity and can both be used to assist students with special educational needs in mastering an assistive technology.

It has been acknowledged that Vygotsky's work was the foundation for activity theory (AT). Since his time, post-Vygotsky theorists have extended his concepts to encompass a more collective view as a unit of analysis (Engeström, 2001; Yamagata-Lynch, 2010). This means that both the environment and the subject, using mediating tools, affect the achievement of the

goals or motives of the activity. That said, the concept of mediation remains important in the interactions between subjects and objects, i.e., the collective unit of analysis. For the post-Vygotsky theorists, the main contribution of the collective unit of analysis is that it highlights the contributions of both the subject and the environment via the use of mediating tools to achieve the intended goals of an activity.

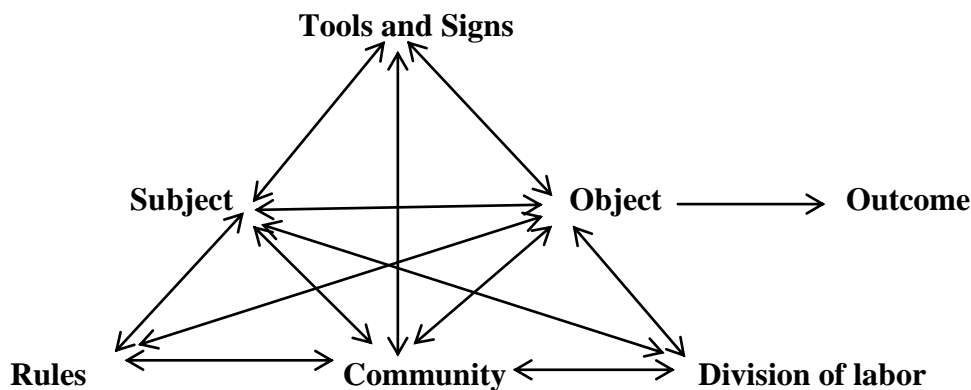
Another limitation inherent to Vygotsky's mediated triangular model is that it gives less consideration to sociohistorical perspectives (Yamagata-Lynch, 2010, p. 22). The ways in which the triangular model inadequately reflects social and historical aspects have been demonstrated. For example, mediating tools are not developed in a vacuum, but rather within various sociocultural contexts with their own particular norms and values. Mediating tools can also change over time. It is not always the case that mediating tools are ready-made to accommodate all subjects; that is, they are not always convenient and appropriate for every individual (subject) in an activity. In contrast, the idea that tools must suit the needs of each subject in an activity is inherent to UD principles. After all, the purpose of UD is to proactively facilitate the participation of the subject in an activity. Some of the resulting tools can be purchased, created, or adjusted to fit each subject's needs. In other situations, some tools can be discarded when no longer useful or outdated, while other tools can be maintained. The same phenomenon applies to the inclusion of students in higher education, where some tools may be useful for students without visual impairment, but not useful for those with the disability and vice versa. It is absolutely important for tools to be universally designed so as to enhance opportunities for all users equally, especially students with disabilities or diverse backgrounds.

In the effort to incorporate sociohistorical considerations into the activity model, some components had to be added, such as rules, community, and the division of labor (Engeström, 1999). As a result, the simple model of mediation became more complex, with interactive, mutually influential components in the activity system, which I discuss in the next section.

### **3.3 The components and structure of activity systems**

The components of human activity can be viewed as a systemic unit of analysis. The components of CHAT are traced back from Vygotsky's basic triangular model which asked: Who is doing what? Why is she/he doing it? By what means is she/he doing it? Later on, post-Vygotsky theorists expanded the model by asking: In what environment is the subject

performing the activity? Who else shares the responsibilities? What are the rules, regulations, or cultural norms in place which regulate the activity? What is the desired outcome? These theoretical questions can serve as important tools for guiding and shaping the analytical language used to examine and discuss an activity. Importantly, the theoretical questions posed here reflect the components of activity theory. In human activity the components are subject, object, tools and signs, rules, community, division of labor, and outcome (Engeström, 2001). Figure 2 illustrates the structure of human activity, indicating not only the components in the activity system but also the potential relations and interactions within the activity system (the arrows in the figure), which are not always smooth, producing in some situations systemic contradictions or tensions (Engeström, 2001, p. 135).



**Figure 2.** The structure and components of human activity (Engeström, 2001).

The structure of CHAT reveals that the components have passed through different evolutionary stages. Activity theory evolved through three generations of research (Engeström, 2001). The first generation was based on the work of Vygotsky, whose main contribution was mediated action. The next significant contribution was from Aleksii Leontiev, whose emphasis was on the collective nature of human activity, and it is this contribution which signifies the importance of the division of labor in human activity (Engeström, 1999). The third generation of CHAT was shaped by contributions made by Engeström (Engeström, 2001), who presented the idea of expansive learning, in which at least two activity systems interact, and meaningful objects are collectively constructed.

### 3.4 Characteristics of CHAT

The three generations of CHAT described above entail three important phases based on the works of Vygotsky, Leontiev, Engeström, and others. The human activity system is now

known to have interactive components, and the effects of these components are now known to be mutually influential. Moreover, in the process of interaction, the components in the activity system can be used to detect and evaluate tensions or structural contradictions.

As I pointed out earlier, a more specific aim of this study of the inclusion of students in higher education was to investigate whether students with visual impairment have equal opportunities to engage, access knowledge, and develop skills of equal quality compared to their non-visually impaired peers. The idea is that the inclusion of students as the activity can be analyzed via an activity system. Activity systems have characteristics and principles which I found useful to describe and which contributed to the choice of CHAT as the analytical framework for the present study.

I conducted my study in a learning context, asking myself the question, “What can be useful characteristics of activity theory in a learning context?” DeVane and Squire (2012) claimed that there are five characteristics of activity theory in learning contexts: first, activity theory is an analytical tool that can be used by researchers to analyze their empirical data; second, cultural and historical methods are more situated simply means in activity theory studies are situated in particular sociocultural contexts in which activity is performed and examined; third, activity theory is described as a theoretical assumption that can assist researchers in understanding human activity; fourth, learning and knowledge are shaped by context; fifth, contradictions encountered in an activity are essential for changes and improvements to occur.

Although all CHAT characteristics seemed significant, in the present study some were deemed more significant than others. First, one important characteristic is that the theory can be used as a data analysis tool. Second, the theory provides the grounds to internalize the activity under investigation. Third, the importance and contributions of the learning context are emphasized, with the result that learning contexts were examined in the present study to see how they create opportunities for engagement and access to knowledge and skills of equal quality to visually impaired students in the learning process. The last important characteristic refers more to the cultural and historical methods involved in a human activity; thus, in this study, the institution of higher education, as well as relevant cultural, historical, and pedagogical practices, contributed to the understanding of the inclusion of students in higher education, particularly for visually impaired students.



### **3.5 Principles of activity theory**

Despite the complexity of activity theory, the theory can be summarized in the form of core principles, of which any researcher who applies activity theory as an analytical tool should be aware. Engeström (2001) identified five principles of activity theory, and this section describes the significance of these in the context of the present study. The first principle states that the main units of analysis include collective activity systems, tool-mediated activity systems, and object-oriented activity systems (Engeström, 2001, p. 136). To analyze these activity systems, researchers must observe the ways in which the units in the system interrelate and network. The context and background of the activity system facilitates the conceptualization of the goal-directed actions of individuals or groups in the system in relation to the whole system. Activity systems are self-reproduced and realized based on actions and operations. This principle reveals that an activity system, such as a tool-mediated system and an object-mediated system, is a unit of analysis. In this study, both tools and objects were viewed as significant in the analytical framework and data analysis.

The second principle focuses on the diversity of the community engaged in an activity. In an activity system, the community consists of multiple traditions, interests, and perspectives. Community members (subjects) are positioned differently in the system based on tasks assigned to individuals as part of the division of labor. The main argument made in regard to this principle is that activity systems resonate with multiple voices (Engeström, 2001, p. 136). Individual differences in an activity system can culminate in and are the culmination of multiple different perspectives based on individuals' unique histories, which can be a source of discussion, conflict, innovation, or re-adjustment. The activity system exists in several strata and constituencies simultaneously, a reality which can be reflected in the tools, rules, and conventions used in the activity in question. This means that some voices and perspectives in the activity system can be examined via the tools used and the rules and norms imposed to regulate the system. In the present study, multiple voices were heard from students, teachers, and SEU staff about the technology used to support students' learning, instructions, policies, and assessments.

The third principle insists that dynamism is likely to bring change to an activity system. Engeström (2001) argued that the length of time elapsed can help transform the activities in the system. Therefore, if researchers want to understand an activity system, they should examine its history as well as its motives or objects; they must evaluate the theoretical ideas

and trace tools used over time. This principle presupposes that it is possible to understand existing barriers or facilitating factors in an activity system based on their history. Since the present study was informed by the quick advancement of science and technology, it is assumed that students with visual impairment should have equal opportunities for learning due to the technology available to support them in the learning process.

The fourth principle is that activity systems are open systems. Activities are neither static nor rigid entities (Kurtts, 2006), but are instead open to changes emanating from the environment. As such, due to advancements in science and technology, activity systems can adopt new technologies to improve or change their constituent activities. Importantly, (technological) changes can create contradictions within or between activity systems. These changes can involve the rules, tools, shared responsibilities, and specializations of activity systems. The inclusion of students in higher education can also be considered an open system insofar as it allows changes and improvements to tools, pedagogies, policies, and practitioners' attitudes and skills. It is not always easy to embrace such changes, while sometimes contradictions and tensions must emerge to ultimately improve the state of the activity in question. In this sense, contradictions are not bad; rather, they evoke tensions in a system over time, which can in turn lead to improvements. Engeström (2001) argued that contradictions are not the same as problems or conflicts, which represent historically accumulating structural tensions within and between activity systems (p. 137). Likewise, he claimed that in activity theory, contradictions have a central role in transformations and improvements. In the present study, contradictions and tensions which were identified in the context of the inclusion of students in higher education were viewed as central to the improvement of higher education practices.

The fifth principle is the existence of perceived long cycles of qualitative transformations. Engeström (2001) argued that participants begin to question and deviate from an activity system's established norms when the contradictions become severe (p. 137). In some instances, contradictions can lead to a re-understanding and re-structuring of the goals of the object and the establishment of new activity systems. The main contribution of this principle is the idea that quality transformations happen when participants in an activity start to question and/or avoid conservative practices that do not embrace quality transformations.

These five principles of activity theory serve as significant tools for analyzing human activity. In analysis, therefore, an activity system is treated as a unit of analysis in which different perspectives from diverse actors become critical. Also, although the historical and cultural

attributes of the participants (subjects) and the tools used in the activity system can develop systemic contradictions and tensions, these should not be viewed as problematic but rather as resources for improvements or changes in the system.

Improvements and change can sometimes go beyond tools such that new activity systems are developed. The situation in which participants deliberately work together to change an existing activity system is called expansive transformation. Engeström (2001) argued that expansive transformation occurs through the ZPD of an activity, which means that the everyday practices of individuals and the history of new forms of activity systems work together as a solution. A complete full cycle of expansive transformation is thus claimed to occur through ZPD, whereby there is a collective reconceptualization of the present activity of an individual and the historical new form of the activity.

### **3.6 Positioning of the study in activity theory**

The present case study investigated the inclusion of students in higher education. The purpose was to examine whether students with visual impairment in teacher preparation programs are equally engaged and have equal opportunities to access knowledge and develop skills. In the teaching profession, the development of computer skills as well as how to prepare teaching media (aids) and technology are among the most important skills teachers can have. However, both computer skills and the preparation and use of media and technology in education demand visual ability. It was thus important to investigate whether students with visual impairment had equal access to such opportunities.

It is assumed that if students with visual impairment obtain access to important professional skills and knowledge, then there is a good chance they can be employed and maintain their positions. This is in turn based on the presumption that student teachers who graduate with professional competency have an increased likelihood of obtaining and maintaining employment. In the present study, the Computer Literacy for Teachers (CLT) and Educational Media and Technology (EMT) courses were used as a benchmark to evaluate the requisite engagement, skills, and knowledge. Since *activity* can be defined as “a form of doing directed to an object” (Issroff & Scanlon, 2002, p. 78), the inclusion of students in higher education can be considered an activity. Likewise, both activities and higher education are performed in complex environments. In this respect, it was crucial to find a theory that could serve as an

analytical tool to address the question of how individuals and complex environments impact the inclusion of students with visual impairment in higher education via various tools.

The inclusion of students in higher education requires different interventions from different actors. The concept and process of mediated action, associated with the work of Vygotsky, can explain human activity (Yamagata-Lynch, 2010) via the investigation of relationships between different individuals in an activity. Towards this end, CHAT was used in the present study to analyze the state of inclusive higher education by highlighting its components as an activity system. These components, as structured in activity theory, provide guidelines by which their interactions can be described. In addition to the components of activity theory, the principles of the theory served as a useful analytical guide.

In the process of promoting the inclusion of students in higher education, different, interacting components can be observed, as articulated in activity theory. The interactions between and among these components outline their existing relationships and serve as convenient concepts by which to explain their mutual influence as an outcome in the activity. Meanwhile, mediations can be explained on the basis of relationships in the activity system, of which there are three: first, the relationship between *the subject* and *the object* as mediated by *tools*; second, the relationship between *the subject* and *the community*, which share *the object*, as mediated by *rules, norms, and regulations*; third, the interaction between *the community* and *the object* as mediated by *the division of labor* (and possibly by *policy*), which involves the distribution of roles, specializations, tasks, and responsibilities (Kuutti, 1996, p. 14).

In the present study, the *subject* is students with visual impairment, while *tools* refer to assistive technology, teaching pedagogies, and supportive learning materials. *Object* is the process of inclusion of students in higher education including the opportunity to engage, access knowledge, and develop skills. *Community*, which is more contextual, supports the subject and consists of teachers, readers, notetakers, university management, transcribers in the Special Education Unit (SEU), and educational development partners. *Rules* can include examination rules and regulations, university admission rules, and quality assurance rules. *Division of labor* can consist of the expertise, specialization, or knowledge of each member included in the community. The components of activity system models will be used to present the relationships found in the present study with regard to the inclusion of students in higher education.

As has been observed, mediating tools are central to any human activity, empowering the subject in the transformation process while paradoxically also having the capacity to disempower (Kuutti, 1996). Accordingly, an important aim of this study was to determine whether the mediating tools used in higher education facilitate or further complicate the inclusion of students with visual impairment. Although activity theory can describe activities and the relationships among the components, it is insufficient when examining the accessibility of tools used in the activity. This is the reason why I selected UDL to supplement CHAT in this regard. UDL improved the analysis of the mediating tools used in the classrooms and the determination of whether they were promoting or hindering opportunities for engagement, access to knowledge, and development of skills of equal quality for visually impaired students. The principles and guidelines were used to examine whether the mediating tools used promoted inclusion of students with visual impairment in the higher learning institution. UDL addresses two important aspects: learning differences and the design of supportive learning environments that provide students with a wider array of learning options, such as affective learning, recognition learning, and strategic learning (Rose & Meyer, 2002). In Figure 3, the three principles of UDL, their foci, and potential examples are provided (Centre for Applied Special Technology, 2011; Rose & Meyer, 2002).

<b>Principles of UDL</b>	<b>How to support</b>	<b>Examples</b>
<b>Principle 1:</b> Support affective learning: engagement	Provide multiple means of engagement, i.e., flexible options for generating and sustaining motivation, the <i>why</i> of learning. The main focus is to stimulate interest and motivation for learning.	Provide options for recruiting interests, self-regulation, sustained effort, and persistence.
<b>Principle 2:</b> Support recognition learning: representation	By providing multiple, flexible methods to present <i>what</i> is taught and learned. The emphasis is on different ways of presenting the information and content.	Provide options for perceptions, comprehension, language, mathematical expressions, and symbols.
<b>Principle 3:</b> Support strategic learning: action and expression	Provide multiple means of action and expression, i.e., flexible options for <i>how</i> to learn and express what is known. The main emphasis is on differentiating the ways students can express what they know.	Provide options for physical actions, expressions, and communications.

**Figure 3.** Three principles of the UDL framework.

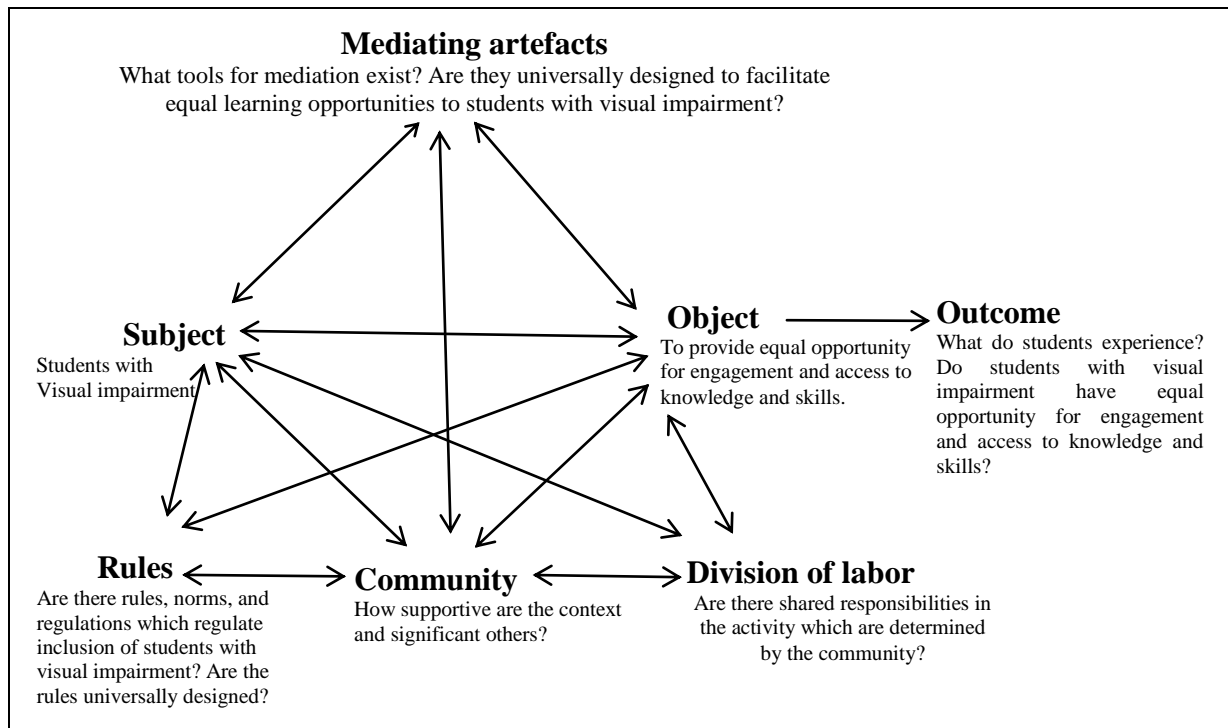
In this study, the principles of UDL were used to examine whether higher education practices promoted equal opportunities for students with visual impairment to engage, access knowledge, and develop skills of equal quality comparable to their non-visually impaired peers. More specifically, UDL provided the framework to examine whether these practices

valued learning differences and whether the learning environment was supportive of the inclusion of students with visual impairment in the learning process. CHAT, on the other hand, provided the language by which such practices and the potential tensions they created were analyzed.

The present study also made use of activity theory principles to guide the analytical framework. First, the process of the *inclusion of students in higher education* was considered as a unit of analysis in accordance with activity theory principles. Second, multiple voices regarding the activity in question were recognized, namely, the voices of teachers, students, and SEU staff are presented in this study according to the principle of multiple voices in activity theory. Third, the study made use of the principle of contradictions as central to changes, improvements, and outcomes in the activity system. Fourth, the principle of the importance of the history of subjects and tools in the activity system was used to shed light on issues concerning differences among individuals as well as the historical precedent and potential of tools to improve learning conditions. Overall, these principles also highlight issues of expansive transformation in activity systems resulting from tensions between or within them. Tensions, which can be generated via systemic contradictions within rules, objects, division of labor, subject knowledge, awareness, or attitudes, can obstruct subjects from obtaining objects or at least make it more difficult for them to do so (Yamagata-Lynch, 2010), thus influencing individual activities in complex learning situations such as inclusive (higher) education.

The activity system model was used as a framework to guide the analysis of the inclusion of students in higher education. The analysis was based on the basic structure of an activity as developed by Engeström (Uden, 2006, p. 86). Figure 4 shows how the inclusion of students in higher education was investigated based on CHAT as the main framework and UDL as a complementary framework. Based on the components of CHAT, the following questions were framed with respect to each component and to each aspect of UDL: Who is involved in the activity? What materials, resources or tools are used to carry out the activity? Why are they engaging in the activity? Are there rules or norms which regulate the activity? Who else shares the responsibilities? In what context is the activity carried out? What is the desired outcome? What are the systemic contradictions and tensions in the activity? Do the tools and rules or norms observed in higher education embrace provision of multiple means for

engagement, representation, and expressing what students know? Does the learning environment (community) support the inclusion of students in higher education?



**Figure 4.** Analytical framework applied to guide the investigation.

Since the main goal of students in higher education is to develop their careers, the primary question addressed here is whether students with visual impairment have equal opportunity for engagement and access to knowledge and skills of equal quality. If so, they will develop the skills needed to succeed in their chosen profession; if not, they will develop inadequate skills and competency in their profession.

### 3.7 Justification for the theoretical framework

Although CHAT and UDL were chosen for the theoretical framework of this study, other studies applying the two theoretical frameworks were hard to found. However, through review of the literature, I realized the importance of the two theories. First, the inclusion of students in this study (as actual research subjects) is an activity requiring theories that can enable study design, data analysis, and interpretation. Second, CHAT has several features relevant to the analysis, such as mediation, ZPD and scaffolding. In addition, post-Vygotsky theorists like Engeström expanded the analytical constituents of an activity to include rules,

community, and division of labor. CHAT and UDL have a complementary relationship whereby CHAT provides the main analytical framework and UDL provides supplementary information on the components of CHAT. This means that for the goal of any activity to be achieved, principles of UDL should be implemented. Likewise, the inclusion of students in higher education, as an activity, requires different aspects of the activity to be universally designed to support student learning. CHAT was used to explain how inclusion was practiced in higher education, the most important mechanisms by which it occurred, and the tensions that emerged between or within the activity system itself. But the question of whether there were equal opportunities for engagement and access to knowledge and skills was addressed based on the principles of UDL, which explains how learners are engaged, collect facts, and organize and express their ideas (Meyer et al., 2014, p. 90). For this reason, I applied both CHAT and UDL in the theoretical framework of the present study.

### **3.8 Chapter summary**

This chapter has explained the analytical framework selected for the present case study. The study topic – inclusion of students in higher education in Tanzania – was framed within CHAT. Inclusion of students, in this study, is defined as an activity by which different material objects and pedagogies contribute to the achievement of an intended goal (or goals), which is (are) to ensure access and participation for all students. The chapter described the development of CHAT, as framed within Vygotsky’s idea of mediated action, in addition to the contributions of post-Vygotsky theorists who emphasized the issue of collectiveness and contexts. Vygotsky’s triangular model of mediated action and its expansion by Engeström were also presented. In its expansive form, the components of activity theory were presented and discussed in relation to the present study, as was the usefulness of the principles and characteristics of activity theory.

Moreover, I introduced the concept of universal design for learning (UDL) as a part of the theoretical framework. The principles of UDL were used to describe whether the mediating artefacts – specifically, tools and rules – were universally designed in the sense of whether the instructions motivate and engage students in the activity, whether the materials used offer different ways for students to comprehend, and whether the students were provided with different ways to demonstrate what they know and are capable of doing. In CHAT, the contexts and tools in which the activity is performed matters a lot. The context and used



mediating tools can promote engagement and active participation among students in the learning process only if both the context and the tools are universally designed for learning to occur.

The UDL framework can thus be used to analyze whether the components of CHAT as observed in this study enhanced equal learning opportunities to visually impaired students. In some cases, some components were observed to be limited, resulting in the development of systemic contradictions or tensions. Hence, the institution may explore ways to improve the learning contexts so as to promote learning for all, including students with disabilities. Lastly, I presented the central role of systemic contradictions, which can be expected to create tensions particularly in the study of inclusion of students in higher education in Tanzania. Consequently, the effects of tensions were also discussed in this chapter.

The next chapter describes the methodology used in the present study. Both CHAT and UDL influenced the type of methodology to be used. CHAT emphasized the importance of contextual factors that facilitate interactions between the individuals and their environments. The contextual factors must be inclusive in order for everyone to engage in the activity, that is, the contextual factors must be universally designed. Within CHAT, inclusion of students is defined as activity within specific institution where mediating material, objects, tools, or pedagogics must be universally designed for equal learning opportunity to be warranted. The theoretical framework suggested the appropriateness of a case-study design that collected qualitative data primarily through interviews and observations of the real activity (i.e. teaching practices) in the classrooms. When using CHAT in a study, Engeström (2007) stated that you can interview the person, observe them, and invite them for further discussion in a laboratory session.



## 4 Research Methodology

### 4.1 Introduction

This chapter explains the methods with which I conducted this study. The chapter presents the philosophical position of the study, the approaches used and their justification, and the situations in which the study was conducted. The chapter then also describes the population, sampling techniques, sample size, and participant selection criteria. Thereafter, I present the techniques used to gather the data and the procedures used in the data analysis. Finally, I discuss issues of validity, reliability, and research ethics as pertinent to this study.

### 4.2 Philosophical assumptions and positions of the study

Qualitative research is formulated within a framework characterized by abstract ideas and beliefs. Creswell (2012) defined these abstract ideas and beliefs as constituting the *philosophy* of the research, with this philosophy containing four assumptions: ontology, epistemology, axiology, and methodology (p. 19). In this study, ontology and epistemology are regarded as the anchoring philosophical assumptions. Ontology informs researchers about the “nature of reality,” while epistemology concerns “how knowledge is known” (p. 20). Research has shown that researchers tend to use their study participants’ own words to develop themes and provide evidence of the reality in question. It is also common practice to use different perspectives or voices to investigate a single phenomenon and thus present multiple views of its underlying nature. On the other hand, when qualitative researchers conduct research, their ultimate intention is to understand the knowledge of the research participants about the topic under investigation, that is, the epistemology of the research participants. Likewise, for researchers, the epistemological positions they take in their study can be influenced by the theoretical frameworks guiding them, by the related literature reviewed, and by their personal experiences. In this study, my epistemological position has been influenced mostly by universal design for learning as a new scientific approach to address diversities in learning contexts. In the learning process, contexts matter. This is the reason why cultural-historical activity theory (CHAT) was used in this study. In addition, global policies on inclusive education and sustainable development goals strengthened my epistemological position. Further, being in the teaching profession myself while having a limited knowledge of how to work with students with disabilities in regular classrooms motivated me to investigate in-

depth the phenomenon of inclusion of students in higher education in Tanzania. The study presupposes that the institutional contexts contributed to the process of inclusion of students in higher education. The context is framed within a particular culture and history, which are important factors for an activity to understand and sustain development and learning (Postholm, 2015). Thus, the mediating artefacts used in the process of inclusion of students in higher education can be investigated within CHAT and UDL frameworks in order to see how the mediating tools used embrace UDL principles and guidelines to enhance engagement, understanding, and development of skills. Thus, these two ideas – multiple views or perspectives of reality and how knowledge is known – have informed the present study.

Philosophical assumptions are used to determine philosophical frameworks, of which there are many. In this study, an interpretive framework was employed. Interpretive frameworks include different categories; in the present study, however, social constructivism was the most relevant and appropriate. This is because social constructivism argues that knowledge is socially constructed by research participants in the research process and that researchers should understand their research participants constructed knowledge (Creswell, 2012; Robson, 2002). In the interpretive paradigm, ontological social constructivism evokes the discussion of multiple realities as constructed through interactions in living contexts. In addition, researchers tend to use verbatim quotations to present the different perspectives and thus indicate the nature of reality (ontological aspects). On the other hand, epistemologically, social constructivism places emphasis on the importance of the relationship between the researcher(s), the participants, and what is being researched. Hence, knowledge is co-constructed by both the researcher and the research participants, and is later shaped by individual experiences (Creswell & Clark, 2011; Robson, 2002).

It has been argued that constructivist researchers believe that the task of a researcher is to understand the multiple social constructions of meaning (ontology) and knowledge (epistemology) through the use of different methods that enable them to acquire multiple perspectives (Robson, 2002). For this reason, research participants are viewed as helping to construct reality with the researchers. Research findings entail the meanings and purposes of the research participants who worked as informants (Cohen, Manion, & Morrison, 2013). Briefly, ontology addresses the question “What is the nature of reality?” while epistemology asks, “What is the relationship between the researcher and that being researched?” Consequently, the relationship that emerged between the researcher, informants, and data

collected contributed to the understanding of multiple perspectives on reality of the present study. Creswell and Clark (2011) think that multiple perspectives on reality is a result of data collected and the relationship between the researcher and the research participants (p. 42).

In this study, both philosophical assumptions and interpretive frameworks of social constructivism shed light on the investigated phenomenon. Notably, it became evident that different perspectives – and therefore, multiple realities – existed about the phenomenon being investigated. That said, the present study also developed realities based on the researcher's interactions with informants.

### **4.3 Research design approach**

In the process of conducting research, a researcher can choose to conduct either qualitative, quantitative, or mixed methods research (Creswell, 2012, p. 12). Quantitative research approaches collect and analyze numerical data, qualitative approaches collect and analyze testimonies of informants, while mixed methods approaches integrate both qualitative and quantitative data (Creswell, 2013, p. 14). Since the philosophical position taken in this study was interpretive/constructivist, the research was primarily qualitative. The choice of the research approach depends on the purpose and research questions, which in this case were to explore the typical lives of students, particularly of visually impaired students, in inclusive higher education through their own voices. These voices, in turn, could be used to construct knowledge about the existing reality. Qualitative approaches aim to collect data in depth. However, in this study, to complement the qualitatively collected information, a questionnaire was added to capture interesting quantitative information from non-visually impaired students in the inclusive classrooms (see subsection 4.9.1). There are many types of qualitative research, but the eight most widely used approaches are those of ethnography, grounded theory, historical studies, narrative inquiry, content-document analysis, basic interpretative studies, case studies, and phenomenology (Ary, Jacobs, & Sorensen, 2010, p. 29). In this study, due to the fact that CHAT and UDL regard contexts tools as important in engagement, a case-study approach was chosen as being appropriate.

Case studies are often defined as a type of ethnographic research that focuses on a single unit of analysis, such as an individual, a group, an organization, or a program (Ary et al., 2010). The goal of this approach is to collect in-depth information about the entity or phenomenon in its real-world context (Yin, 2014, p. 237). It is argued that researchers who use a case-study

approach have no ability to control or manipulate existing situations or events (Yin, 2014). It is important to note that case studies can be of different designs. The present study can be regarded as an embedded single-case design insofar as it incorporated more than one unit of analysis into the design (Cohen et al., 2013, p. 291), that is, it included both a higher learning institution and teacher preparation programs. It is an embedded single-case study since the units of analysis (the institutional perspectives, classroom pedagogical practices, and the learning experiences of students with visual impairments) were intertwined within the processes of one higher learning institution. The present study concentrated on one unit in the institution of higher education (teacher preparation programs). The aim here was to collect in-depth information about the phenomenon (inclusion of students) in a specific teaching and learning environment. In the teacher preparation programs, two important courses were purposively selected as a single entity to discuss the phenomenon under investigation: Computer Literacy for Teachers (CLT) and Educational Media and Technology (EMT). This type of case study approach allowed me to use different tools for data collection in actual teaching and learning contexts, which in turn helped me to understand the topic under investigation from different perspectives.

#### **4.4 Research setting and justification**

This study was conducted at the University of Dar es Salaam School of Education. The University of Dar es Salaam (UDSM) was the first public university in Tanzania, established in 1961 as a college of the University of London (Kimambo, 2008, p. 153). UDSM claims to be an “equal-opportunities” institution of higher learning that is committed to a policy of student admission and staff recruitment regardless of race, ethnicity, religion, gender, or physical disability (<http://chet.org.za>). Komba, Anangisyee, and Katabaro (2013, p. 67) named UDSM the premier higher learning institution in Tanzania. Furthermore, UDSM has a long history of admitting students with disabilities; students with visual impairment were first admitted in the 1978–1979 academic year (UDSM School of Education, n.d; see appendix 14). Since then, the number of students with special needs admitted to the university has been increasing, including students with physical impairments, deafness, and albinism. UDSM is thus inclusive in terms of enrolment. However, the concepts of “inclusion” and “accessibility” are occasionally confused. In this study, the two concepts are considered distinct: inclusion refers to (equal) opportunities for admission to higher education, whereas accessibility (to learning) includes practices that enable or engage students with special needs in achieving

their intended goals. The purpose of analyzing the two selected courses was to determine whether they were universally designed to facilitate equal opportunities for engagement and access to the skills and knowledge intended, particularly concerning visually impaired students. For the purpose of this study, UDSM was considered to be an information-rich case. Flyvbjerg (2006) argues that cases selected on the basis of expectations about their informational content can be referred to as information-oriented cases (p. 230). Based on the fact that UDSM has a history of more than 35 years of admitting students with disabilities in higher education, the supposition was that the university would have accrued ample pedagogical knowledge and skills for inclusive education in higher education. For this reason I purposively selected it as a case to be studied.

#### **4.5 Study population, sampling technique, and sample size**

This section describes the population from which a sample was selected, and the techniques used to select the research participants. Based on the components of CHAT, the study's population and sample can be a subject or community in the activity system.

##### **4.5.1 Study population**

Population refers to the universe of elements from which the sample elements were drawn, literal population of people included (Robson, 2002, p. 550). In this study, the general population comprised of university teachers, students, and staff in the Special Education Unit (SEU). The targeted population was the University of Dar es Salaam School of Education's academic staff, students and SEU staff. The sampling technique used to gather study participants is explained below, as are sampling techniques in general.

##### **4.5.2 Sampling technique**

Sampling techniques are employed to draw a sample from a study population. Sampling techniques can either be probabilistic or non-probabilistic. In the probabilistic sampling method, the probability of members of the wider population being selected for the sample is known, while in non-probabilistic sampling this probability is unknown. In other words, not all members of a wider population have an equal chance of being included in the sample. For this study I used non-probabilistic sampling, meaning that not all teachers and students in the institution under investigation had an equal chance of being selected and that the sample was

selected purposefully. The reason for this decision was that I wanted to obtain knowledge from potential informants who were perceived as having adequate experience to contribute to the topic. One important criteria for purposive sampling is that the case being studied should be an information-rich case (Flyvbjerg, 2006; Patton, 1990, 2002), meaning that purposefully selected cases are those that merit in-depth study (Patton, 1990, p. 181). Therefore, the criteria I used involved experiences, disabilities, and positions of informants in the institution. Describing the importance of purposive sampling in terms of specific objectives, (Cohen et al., 2013, p. 157), stated that, “There is little benefit in seeking a random sample when most of the random sample may be largely ignorant of particular issues and unable to comment on matters of interest to the researcher.”

It was important in this study to select the participants purposefully in order to gather in-depth knowledge, expertise, and experiences about the topic being explored. The sampling technique I used consisted of typical case sampling, which means it comprised typical cases of the population (Cohen et al., 2013). In typical case sampling, the researcher can randomly sample cases from already purposefully-identified cases in an approach known as “combination or mixed purposeful sampling” (Patton, 1990, pp. 174, 183). Thus, in this study, it is more realistic to describe the criteria used for selection of information-rich cases as a combination or mixed purposeful sampling. The reason for applying a combination or mixed purposeful sampling is due to the fact that, after identification of typical samples then process of random purposeful sampling and snowball or chain purposeful sampling emerged within the typical cases identified as information-rich cases. This means that some research participants particularly teachers were mentioned by either students with visual impairment or SNE experts as potential individuals with experience and practical information about inclusion of students in higher education, particularly at their institution UDSM (see subsection 4.5.4 for more details).

#### 4.5.3 **Sample size**

Sample sizes are more flexible in qualitative research than in quantitative research (Mertens, 1998). In a qualitative study, sample size depends on the purpose of the study and what the researcher intends to achieve (Patton, 1990). It is argued that in case studies, sample size can include one case or multiple cases (Mertens, 1998, p. 271). In this study, what was important was information about the topic of inclusion of students in higher education in Tanzania,



regardless of the ultimate size of the sample. Samples are defined as the units chosen for study from the wider population (Robson, 2002, p. 551). In this study, the sample size comprised 11 university teachers, 4 university-employed SNEU staff, six visually impaired (practically blind) students registered as such with the SEU, and 568 students in teacher training programs who were not students with disabilities but were studying together with students with disabilities in their regular classrooms. Of the 568 students who completed the questionnaires, 24 volunteered to participate in the focus-group discussions.

#### 4.5.4 Selection of research participants

This subsection presents how the participants (teachers, students with visual impairment, and SEU staff) were selected and the specific criteria used for their selection. The sample was purposive based on specific criteria (see sampling technique 4.5.2), but the most important criterion was that the selected participants should yield rich data regarding the inclusion of students in higher education.

##### *University teachers*

Teacher is a generic title. In higher education, particularly in universities, academic staff members have different academic titles. These titles distinguish them hierarchically, with the highest being “professor” and the lowest “tutorial assistant.” Academic staff who participated in this study included professors, senior lecturers, regular lecturers, and assistant lecturers. I intentionally opted to use the generic title “teachers” for all participants in order to contribute to their anonymity. Notably, in this study, the term “teachers” refers to all participating university academic staff. More specifically in terms of the case study, most of the teachers who participated in this study belonged to the department administratively responsible for the SEU.

The criteria for the purposive sampling of teachers were as follows: First, teachers with leadership experience in the Department of Educational Psychology and Curriculum Studies in which the SEU is hosted. Second, teachers with large classes that included students with disabilities, particularly visually impaired students. Based on this criterion, the Counselling and Special Needs Education (CSNE) and Introduction to Educational Measurement and Evaluation (EMT) course teachers were purposively selected. Third, teachers of courses that were perceived to developed practical professional skills in the teacher preparation programs.

Based on this criterion, the Computer Literacy for Teachers (CLT) and Education Media and Technology (EMT) course teachers were selected. Fourth, teachers identified by other participants as potentially valuable for the study (here is where the snowball or chain purposeful sampling technique applied), particularly teachers who had ever worked as examination officers. I consulted potential teachers based on these four criteria and solicited their participation. Ultimately, 11 university teachers agreed to participate in the study.

#### *Special needs education experts*

Another category of participants who were purposively selected in this study were the SEU employees. The unit consisted of two cadres of employees: trained staff (transcribers and sign language interpreters) and non-trained assistants (readers and notetakers, the majority of whom were either selected peers or part-time recruited individuals to assist students with special needs). The data collected for the present study came from the category of trained SEU staff. I opted to address these participants as special needs education experts (SNE experts). No such employees with that professional title exist in UDSM, but I have decided to invent the title to represent the participants who were providing services to students with special needs at UDSM. SNE experts were selected by first visiting the SEU and meeting with them. I informed them of my interest in the topic of inclusive education in higher learning institutions in Tanzania and UDL. Then, I solicited their voluntary participation and four SNE experts agreed to participate in the study. I selected participants from this unit as it was providing services to students with disabilities. The SEU staff worked as assistants between teachers and the students with disabilities in the teaching and learning process. Thus, it was important to document their voices, experiences, and expertise regarding the inclusion of students in higher education in Tanzania.

#### *Students*

Another category of participants in the present study were students in teacher preparation programs, namely students with visual impairment (braille users or tactile readers) in inclusive higher education. Having a blind student in class would necessitate teachers to design the teaching and learning materials to be accessible to all students, including visually impaired learners. First, preliminary information about students with visual impairment in the SEU was examined to identify students in the teacher education programs. Next, students who had studied or were studying the two professional-skills and competency-building courses (CLT and EMT) were identified. Thereafter, I consulted with the potential students, informed

them about the research topic, and solicited their participation. Ultimately, six students agreed to participate in the study. Noteworthy here is the manner in which students with visual impairment responded when consulted and informed about the study: I felt that they saw it as an opportunity to share their experiences in education and that, to some extent, they wanted to let the researcher know the degree to which learning problems emanated not from their impairment but from man-made institutions and structures. In addition, I could also sense the students' desire for change in the institution. Participation in the study was one way they perceived that they could contribute to improvements.

It was important to administer a questionnaire to students whose classes had visually impaired students. The aim was to explore experiences and perceptions regarding inclusion of students in a higher learning institution. Other students who were not visually impaired could shed light on how learning contexts contribute to learning difficulties if not universally designed regardless of other students' disabilities. Consequently, students in inclusive classrooms were informed of the present study and asked to participate. In this group, participating students completed and returned questionnaires, while a few volunteered to share their experiences of inclusion in higher education in focus-group discussions. Although the classes were purposively selected, the questionnaires were only distributed to the students who volunteered to participate. Ultimately, out of 1000 printed and supplied questionnaires, 568 students completed and returned the questionnaires on time. Of these students, three groups, with six to eight students in each, participated in the focus-group discussions. Both the questionnaires and group discussions were regarded as complementary data used to provide additional experiential insights about teachers, students, and experts in the Special Education Unit regarding inclusive education in a higher learning institution.

## **4.6 Data sources and data collection methods**

### **4.6.1 Data sources**

In research, data sources simply refer to what is used to obtain information to address the research questions. In practice, there are two categories of data sources: primary sources and secondary sources. The difference between the two is that primary sources refer to unpublished data that the researcher has collected directly from people or organizations, while secondary sources refer to any materials previously collected and published (Ary et al., 2010;

Myers, 1997). Primary data can be obtained through face-to-face interviews, discussions, experiments, and observations in a research environment.

In the present study, data were collected from both primary and secondary sources. The primary data were collected via face-to-face interviews, focus-group discussions, observations, and questionnaires (i.e., unpublished data from teachers, students, and SNE experts). In addition to primary data, I also collected secondary data from public documents such as training syllabi for the two training courses (CLT and EMT), policy documents, and institutional reports.

The aim of using multiple data sources was to improve the quality of information, as the process of inclusion of students in higher education is perceived to be a collaborative activity according to the principles of CHAT, which emphasizes the importance of multiple-voices. Hence, it was important to collect data from different primary sources in addition to secondary sources, which I postulated to be the foundation on which practices of inclusion of students in higher education are based.

#### 4.6.2 **Data collection methods**

In the process of collecting data, the researcher can ask a series of questions (using interviews and/or focus-group discussions), watch participants performing a particular task (observations), and/or search for other evidence (archival documents). In the present study, I used all of these methods. The core data, however, were collected mainly through interviews and observations. Specific details for each of the data collection methods used are described below.

##### *Face-to-face interviews*

The purpose of this study was to investigate the inclusion of students in higher education in Tanzania. As described earlier, the study purposively focused on inclusion of blind students in regular education settings. Hence, in order to gain in-depth understanding about the topic, talking to students themselves, their teachers, and SEU staff was inevitable. As Kvale (2007) proposed, “If you want to know how people understand their world and their lives, why not talk with them?” (p. 1). This question emphasizes the need to engage in human interaction with the purpose of understanding how others feel and their experiences with the world in which they live. In this study, I intended to understand how students, teachers, and SNE

experts perceive and what they experience about the inclusion of students in higher education. In interviews, knowledge is socially constructed between interviewees and interviewers via one of three types of interview: structured, semi-structured, or unstructured (Robson, 2002, p. 270). Semi-structured and unstructured interviews allow more flexibility in qualitative research, with the difference between the two types corresponding to their characterizations and attributes. Semi-structured interviews are characterized by limited use of predetermined questions that allow flexibility in the order of the questions during the session. Also, they permit wording changes and the provision of explanations. Furthermore, semi-structured interviews allow the omission or addition of questions. In contrast, unstructured interviews are completely informal in the sense that the interviewer has a broad area of interest that allows the discussion to proceed in whatever direction it will so long as it contributes in some respect to the stated topic (Robson, 2002).

In the present study, I initially prepared a set of questions but soon realized that it was not possible to follow the list faithfully. I initiated interview sessions based on the interests of the participants. We discussed the potential ethical issues of the study as well as obtaining the approval of each participant to audio-record the interviews. As we continued the discussion, some participants began to speak about the topic freely. I did not stop them from doing so, nor did I inform them that this was not my first question; rather, I was trying as much as possible to remember the questions I believed had been answered to avoid repetition. Another semi-structured aspect of these interviews was that some of the predetermined questions were ultimately irrelevant to some interviewees and were omitted. Conversely, some questions were added as the interview phase progressed.

In the face-to-face interviews, contextual factors contributed to the quality of the data collection process. For instance, based on the setting in which the interviews were conducted, it was possible to infer meanings that otherwise would have been difficult to grasp. This was especially the case in the SEU, where some participants could reference objects in the immediate environment to better explain their experiences. Similarly, some participants shared documents that illustrated the points they were trying to make.

Initially, before leaving for field work, I planned to interview one category of participants after another. This proved unrealistic. As I visited each group prior to data collection, some informants wanted to set up appointments for interviews in advance. Based on this, I realized that it would be impossible to interview one category of informants before another.

Consequently, I chose to follow the appointment schedule as it emerged. It was my obligation to sort the collected information and make follow-up appointments depending on different contingencies as they arose.

### *Limitations of interviews*

Although interviews provide opportunities to generate a rich co-construction of meaning, they have limitations. For example, interviews are time consuming (Robson, 2002). In my field work, although appointments were set, they often had to be rescheduled due to various contingencies. Interview sessions by themselves ranged from 30 to 90 minutes. However, the most time-consuming aspect of interviews is their transcription. Robson (2002) noted that a one-hour tape takes 10 hours to transcribe (p. 273). Fortunately, I rather enjoyed this task, as transcription can yield a better understanding of and hidden meanings within both speech and text.

Another limitation of interviews is that participants often ask for the opinion of the researcher. For example, in an interview one day, an SNE expert asked me whether I had ever seen an inclusive class with both visually- and hearing-impaired students, and inquired what inclusive education was like in developed countries, such as in the country where I was pursuing my PhD. From this context, it was confirmed that meanings are socially constructed, and that informants in some contexts during interviews call for win-win situations, meaning that they wanted also to learn from the researcher's experience and theoretical knowledge about the topic.

### *Observations*

Observation in research is a means of data collection that offers researchers the opportunity to gather so-called "live" data from the actual social situations in which they occur (Cohen, Manion, Morrison, & Bell, 2011, p. 456). In addition, observational researchers monitor people's behaviors, objects, and/or events. Observations can be highly structured, semi-structured, or unstructured, and the role of the observer can vary from complete observer to participant observer (p. 457). Observations also provide the opportunity to collect data with a certain degree of flexibility.

In this study, observations were conducted in different contexts but in the same real-world setting. Observations were made in the SEU, in classrooms, and in computer laboratories

when students were learning. They were semi-structured guided observations insofar as their purpose was to systematically collect data that would allow the examination of whether the learning activities, facilities used, and instructional pedagogies were universally designed to embrace inclusion of students with visual impairment in the regular learning environments. In the semi-structured observation, a researcher has an agenda of issues (Cohen et al., 2013), and consequently the observations were semi-structured guided observations also due to the fact that the researcher's agenda required data through classroom observations to examine whether classroom pedagogies used by teachers were universally designed to promote engagement and equal access to learning opportunity. In observation, researchers can be of different types of identities or roles of the participants. Denzin (1989) indicated four types of identities or roles of participant-observers: complete participant, the participant as observer, the observer as participant, and the complete observer (p. 162). In the observation sessions, I had no control of the participants' activities. I only observed what and how things were conducted in SEU, classrooms and computer laboratory.

In the observation settings in the SEU, classrooms, and computer laboratory, I acted more as an observer as participant. Robson (2002) describes the observer as participant as someone who takes no part in the activity, but whose status as researcher is known to participants (p. 319). However, having no part in the activity does not mean non-participation. It rather represents the extent of the researcher's participation in the activity in a continuum. This participation continuum varies from complete immersion in the setting as full participant to complete separation from the setting as spectator (Patton, 2002, p. 265). In the classrooms, the focus was to observe two purposively selected courses aimed at developing competences in the teaching profession, as stated earlier. Furthermore, the selected courses had two components: theoretical and practical. They were also mandatory courses, meaning that all students in the education program had to complete them. Being mandatory, the courses were positioned as a baseline to reflect practices regarding the inclusion of students in higher education. Moreover, the courses shared the same goal of orienting student teachers towards emerging issues that they are required to become familiar with, such as the advancement of science and technology.

In the Computer Literacy for Teachers (CLT) course, which had about 200 students, observations were based on theoretical teaching and laboratory practices, with particular emphasis on the teaching of pedagogical practices. I went into each classroom to observe the

teaching methods, the general learning environment, and facilities available to support students with visual impairment. In the Educational Media and Technology (EMT) course, which had more than one thousand students (see excerpt 6-12), the emphasis was placed on students' self-designed projects and subsequent presentations. However, students with visual impairment who study education degree programs also studied together with their peers who are not visually impaired. The purpose here was to explore the ways in which students develop instructional media as part of their course projects and how the course develops the idea of inclusion of students in the context of their future teaching careers.

Observations were also conducted in the SEU. These were less formal compared to the classroom and laboratory observations. I visited the unit at different times to gain insights into the nature of available activities, services, and facilities.

#### *Focus-group discussions*

Focus groups are a form of group interview (Cohen et al., 2011, p. 436). In focus-group interviews, a researcher introduces a topic for discussion and facilitates interactions among participants. In research, the terms “group interview” and “focus group” tend to be used interchangeably (Robson, 2002, p. 283). Focus groups require researchers to decide on some issues in advance, such as group size, sampling techniques, and whether the participants possess knowledge about the topic to be discussed (Cohen et al., 2011). Furthermore, focus groups have the following advantages: they are efficient in the sense that they enable researchers to gather substantial data, they are easy to organize, and they can empower participants, allowing them to check and balance the contributions of other group members (Robson, 2002). On the other hand, focus groups have some limitations, including the risk of violating confidentiality, dominance by some participants, and restrictions on the number of questions that can be covered (typically fewer than 10); in addition, knowledge about how to conduct a focus-group interview is required.

In the present study, the focus groups consisted of six to eight participants. All participants were selected randomly from inclusive classrooms observed. The participants were aware of the inclusion of students with disabilities in their classrooms. Three groups were formed based on their year of study (first year, second year, and third year students), with those who voluntarily accepted to participate in the discussion after completing the questionnaires being involved in the discussion. The criterion used was students were asked to express their



interest to participate in the study of which then among them were included in the focus group discussions. I conducted interviews with each group separately. The participants were provided with some questions to guide the discussions. The purpose of the focus groups was to gain insights on issues concerning the inclusion of students in higher education. The collected information was compared with the information obtained through the face-to-face interviews for quality and complementary purposes.

### *Questionnaires*

A questionnaire is an instrument widely used for collecting information. Questionnaires are often structured and typically provide numerical data; additionally, they can be administered in the absence of the researcher and are relatively straightforward (Cohen et al., 2011). In addition, items included in the questionnaire can be closed or open questions. In this study, I developed a questionnaire to collect the experiences of other students who studied together with students with disabilities in regular large classrooms in the higher learning institution selected. The questionnaire was the last instrument administered during data collection. It was not one of the main sources of information and was instead considered a tool to complement the information obtained from face-to-face interviews and observations. However, data obtained from the questionnaires were significant for interpretation and discussion of the findings derived from interviews and observations.

## **4.7 Data analysis procedures**

Data analysis is the stage at which sense is made of the gathered information, which, in a qualitative study, constitutes a very large amount of raw data (Robson, 2002). As the present case study made use of multiple methods of data collection, a large amount of raw data was obtained from personal field notes, interviews, observations, and discussions. Needless to say, data collection was not as challenging as the analytical process. I began by descriptively transcribing all the audio-recorded interviews, group discussions, and observations. I found myself with more than 100 pages of transcripts. Not everything was relevant to the present study.

With such large amounts of data, computer-assisted tools can be useful for coding and organizing the data (Yin, 2014). I finally decided to use computer-assisted qualitative analysis software (CAQDAS) to import the transcribed data and assist in coding, organizing, and

managing the findings. Out of the various types of CAQDAS software available, I used HyperRESEARCH version 3.7.1. HyperRESEARCH is described as a qualitative data analysis software package that enables researchers to code and retrieve data, build theories, and conduct analyses (Myers, 1997). The transcribed interviews, observations, and discussions were imported and coded into the HyperRESEARCH program, making my data visible in portions of codes and categories. The codes focused on issues of interest in the study, including the institutionally framed meaning of inclusive education, the practices perceived to enhance the inclusion of students, classroom practices in relation to the inclusion of students, and the experiences of students with visual impairment in the context of inclusion in higher education. The software helped to organize and manage the data while providing systematic ways to navigate the large data set in its entirety. It was also possible to command a summary report of all the codes and their sources in the text. This was useful in the process of obtaining direct quotes from the transcriptions across categories and data set sources. The questionnaire data, on the other hand, were entered into the SPSS software package, version 22 (IBM, SPSS v.22), with the resulting analysis being predominantly descriptive, focusing on the frequencies in the students' responses to support the qualitative data. No deeper quantitatively analysis was performed.

#### **4.8 Validity of the study**

Validity refers to whether the research instruments measure what they are intended to measure. In qualitative research, validity refers to honesty, depth, richness in the scope of data obtained, and participants approached (Cohen et al., 2011, p. 179). The validity of a study is not automatic, and thus researchers should deploy some validity-enhancing strategies throughout the whole study process, as qualitative research encounters threats to its validity at different stages. These threats may emanate during the design stage, during data collection and data analysis, or when reporting the findings. Lincoln and Guba (1985) suggested various strategies that can be used to improve the validity in qualitative research. In this study, triangulation, peer briefing, and respondent validation strategies were applied, and I will discuss how and why I applied these strategies in the following subsections.

#### 4.8.1 **Triangulation**

Robson (2002) claimed that threats to validity in qualitative research can be countered by the use of triangulation. Cohen et al. (2011) defined triangulation as the use of two or more methods of data collection in the study of some human behavior (p. 195). The importance of triangulation was highlighted by (Patton, 2002) who claimed that triangulation improves credibility and confidence in the conclusions drawn based on the study data. Furthermore, he claimed that triangulation can be on multiple sources of data, multiple observers, and multiple uses of theories or perspectives (p. 556).

In this study, different sources of data and methods were used. Data were collected from the natural setting in which human activities were conducted. It is claimed that in the collection of data, the natural setting is a key principle to the sources of data (Cohen et al., 2011) (Cohen et al., 2011, p. 180). The study viewed the learning context as a potential source of information as well. The interactions and relationship between the CHAT theoretical components contributed to the understanding of inclusion of students in higher education as a human activity. Furthermore, the observations shed light on whether mediating tools used in higher education supported students with visual impairment. Thus, triangulation of methods and data sources contributed to understanding of the field data obtained particularly based on the interactions and relationships of the components engaged in the activity. The components included subjects such as students with visual impairment, community as supportive learning environment in which the presence of SEU and employed staff contributed to understanding of the topic under investigation. Teachers could be within the community to support inclusion of students. Additionally, the presence of rules and regulations regulating the university activities could fall under rules and norms within CHAT. Most importantly, the presence of different actors in the activity could cause systemic conditions and tensions that trigger changes or improvements. In the triangulation process, it was possible to understand how and what mediating tools used in classrooms either support or create learning barriers to visually impaired students. It was possible to examine whether the mediating tools were universally designed by collecting information from different sources and using different methods.

#### 4.8.2 **Peer debriefing**

Another technique used in this study was peer debriefing, which is a method of data collection used in qualitative research in which the researcher finds a colleague who was not involved in

the study and asks him or her to examine the preliminary analysis of the research findings (Yamagata-Lynch, 2010). First, I alone conducted the interviews and observations, which I then transcribed myself. Later, I asked a peer who was unaware of the objectives of the study to examine some issues that emerged in the transcribed data. The main purpose to apply the debriefing sessions is to contribute to the minimization of researchers' biases while improving credibility of the study (Lincoln & Guba, 1985). The peer noted some issues that I had documented myself in my field notes as they emerged. However, the challenge my peer reviewer faced was insufficient information about the contexts of the study, which are needed for the interpretation of the data and the related sense-making. This process thus demonstrated how important natural settings are for comprehensive interpretation of the data.

#### 4.8.3 **Respondent validation**

Respondent validation was also performed. During data collection, teacher and SNE expert participants (but not student participants) were asked whether they would like to read the transcriptions of their interview contributions. In their readings, the interviewees provided more emphasis on some points and less on others, while some points were deleted due to ethical issues; lastly, some interviewees added examples due to the importance or significance they perceived in their transcripts.

#### 4.8.4 **Ecological validity**

Despite the fact that, triangulations, peer debriefing, and respondent validation were applied in this study so as to improve its validity, additional challenges arise in case studies with respect to ecological aspects of validity. It is especially important to discuss ecological validity, as it raises different issues in terms of research ethics. In qualitative research, specific research sites, such as schools, universities, and regions, are significant and must be taken into account (Cohen et al., 2011, p. 195). In case-study research, a description of the setting helps illuminate the research findings. However, the more details are provided, the more ethical issues arise.

Cohen et al. (2011) argued that many features and factors of a given situation should be indicated in qualitative research to demonstrate ecological validity. The effect of describing the characteristics and factors of a research site and participants, however, is problematic due to ethical concerns over non-traceability, anonymity, and non-identifiability (p. 195). This

assumption predicts more risk in case studies due to the necessity of adequate description. Although I ensured my research participants that their names would not appear anywhere in this study, the omission of names alone does not guarantee anonymity, non-traceability, and non-identifiability, particularly where the case under investigation is known.

To improve validity, individual, group and organization levels of analysis are determined, and these form the principal levels of analysis (Denzin, 1989). In the present study, the individual level included teachers, students, and SNE experts; the group level involved classroom interactions for the two courses selected (CLT and EMT); and the organization level pertained to the policies and perspectives of the institution used as a research site. However, both the individual and group levels were perceived to be dependent to some extent on the institutional (i.e., organization) level. Hence, validity of the study can be influenced by different factors, which are presented in the next subsection.

#### 4.8.5 **Factors influencing validity in this study**

In the development of this study, two factors might have influenced its validity. First, the influence of the Higher Education and Multimedia in Special Needs Education and Rehabilitation project, which funded this study, might have contributed to its framing and design. Second, the design of the study overall might have affected its validity. For example, the study was developed based on interest in students with visual impairment and thus pays little attention to other students with disabilities. This is despite the fact that the inclusion of students and their access to learning is not just an issue for visually impaired students, but for all students. Therefore, the focus on visually impaired students can also be viewed as a bias. However, this degree of specificity provided significant and valuable data concerning the chosen group of students identified in the inclusive learning setting.

Another perceived threat to validity emerged from the interview data. As explained earlier, I approached potential participants to solicit their participation in the study. Most responded positively, primarily due to interest after seeing the approval letter for research within the institution that described, among other things, the research topic. Appointments were then set. However, it is not possible to know what occurred among and between the participants from the time I introduced myself to the day I visited them for interview sessions. Could this waiting time have influenced the validity of the collected data? This question was critically observed so as to determine factors that could influence the validity of data collected. In

addition, I read in advance studies that indicated the importance of respondent validation and possible traps to be aware of as a researcher (Carlson, 2010; Creswell & Miller, 2000). One of the most useful strategies I applied was to discuss with informants the reasons for respondent validation and what the expected outcome was. The aim was to maintain a relationship with my informants by hearing their impression of what was said during the interview session. Further, I realized that the longer time a researcher spends with respondents, the more the validity of the study is improved.

There is also the question of whether interview settings can influence the validity of a study, as situational factors can consist of noise and distractions (Cohen et al., 2011). The effect of these factors was evident during interviews with teachers, students, and SNE experts. For example, interruptions, including incoming calls or visits by students, sometimes occurred in teacher interviews due to the fact that their offices were used for the interviews. One scenario that could have affected the validity of the findings is an unexpected break in the progress of a single interview. For example, one interview was conducted in which the discussion began around 4:00 pm. However, about 20 minutes into the interview, the interviewee received a call and had to adjourn the interview until the following day. The next day, we met as agreed, and I requested that the interviewee listen to what we had discussed the day before. I then asked whether anything should be added before we proceeded with other questions. I realized that my interviewee was still having the same ideas, but this time presented more examples to accompany the arguments being made. We then continued with the interview. Both positive and negative contributions to the validity of the study result in such scenarios. For a researcher with a tight schedule, this scenario might present a challenge that could impact the results. However, this was not the case for me as I was flexible enough to accommodate my interviewee's schedule. Besides, I was aware of the context in which I conducted my study: university teachers are both elites and researchers. To obtain sufficient data from them, it was wise for me to accommodate their schedules.

Another example arose in the context of an interview with an employee in the SEU. During the introduction stage, which constituted rapport building, I observed that the interviewee was unsettled. I asked about this, to which the interviewee replied that a personal problem had occurred just 30 minutes prior to the interview. We discussed the matter and agreed to postpone the interview to another day. Once again, it was only possible to obtain complete data from this interviewee later on, and thus flexibility on my part was necessary.

In summary, validity in this study was threatened by a variety of different factors. In response, I triangulated the methods and data sources to ensure the quality of information and improve the quality of this study regardless of intervening variables.

## **4.9 Ethical considerations addressed in this study**

As discussed earlier, most qualitative research involves key informants, and as such there are ethical concerns that must be addressed. Here, I will discuss aspects related to site access, the data collection process, informants in general, informal events, privacy, confidentiality and anonymity.

### **4.9.1 Access and acceptability**

Ethical concerns in this study can be grouped according to three time frames: before data collection, during data collection, and after data collection. Before data collection, I had to ensure that all necessary permits were solicited from the right authorities. This study considered ethical issues in both the country of study (Norway) and the country where the data were collected (Tanzania). In Norway, I informed the *Norsk Senter for Forskningsdata* (NSD), which is a Norwegian center for research data protection for the assessment of the present project, as well as the Department of Education at the University of Oslo (see appendix 10). I received feedback from the NSD in terms of project evaluation (see appendix 9). I also received an approval letter from the Department of Education at the University of Oslo (see appendix 10). Thereafter, I applied for a research permit from the University of Dar es Salaam (UDSM) (see appendix 11). I indicated that my study would be based at the university's School of Education. The reason I selected the School of Education was that it was responsible for the SEU and hence oversaw all matters regarding students with disabilities. The research permit was granted by the relevant university authority. Afterwards, I reported to the administration of University of Dar es Salaam School of Education, where I was also provided with an introductory letter identifying me as a researcher (see appendix 12). Both approval letters, from the university and from the School of Education, granted me access to potential research participants. The research permit letter stated the name of the researcher, the topic of study, and the place and period of the study.

Thereafter, I visited potential informants. Together with the research approval letters, I introduced myself as a researcher, since being open in this way is considered a strategy for

establishing a research relationship. Thus, I introduced myself as a PhD candidate conducting a study on inclusive education in a higher learning institution. I then asked them to share their experiences concerning this topic. Most of those whom I approached agreed to participate. However, they did not all agree on the same day, and thus an appointment for each interview was made. As already mentioned, not all appointments worked out as planned for various reasons, including busy schedules. This occurred more for senior academic staff, whose schedules were understandably tight. Since the topic was both relevant and contextualized within the day-to-day practices of the institution, the research participants were interested in the study and able to contribute or share their knowledge and experiences about the inclusion of students in higher education.

Prior to the interviews, several discussions with participants took place in which I explained my purposive selection process and emphasized that participation was voluntary. I added that they could withdraw from the study at any point without any cost to them. Also, the settings for interviews were discussed. Although the School of Education had allowed me to use one of their rooms (a boardroom) for interviews, some participants suggested better places to be interviewed. Furthermore, we discussed the use of audio-recorded devices and respondent validation. In the respondent validation, I asked the participants whether they would like to read the transcriptions resulting from the audio-recorded interviews. As described earlier, both teachers and SNE experts agreed to read the transcriptions. I observed that providing participating teachers and SNE experts with transcripts of their interviews allowed them to confirm the information they had provided during the interview sessions. Some participants added more information to the transcriptions, while others asked for some information to be omitted due to ethical issues. The participants also assisted in removing or anonymizing any content perceived to be sensitive. Respondent validation improved the ethical status of the present study. Other ethical issues addressed in this study included informed consent, the right to privacy, and the protection from risks and vulnerability.

#### 4.9.2 **Informed consent**

Entry information involved explaining myself to informants as a way to build rapport during the data collection process and evoked some concerns about informed consent regarding participation in the study. Informed consent is defined simply as gaining participants' consent (Cohen et al., 2013, p. 78). It is important for participants in the research to freely decide to



become involved in the study without coercion, be it direct or indirect. In this study, the informants voluntarily participated in the study. In fact, some were eager to share their experiences regarding the inclusion of students in higher education. Teachers, students, and SNE experts collaborated well in the study. Everyone felt they had something to contribute to the topic under investigation. For informed consent to be fully attained, the researcher must truthfully and completely inform the participants of the facts, which can in turn affect their decision to participate or not. The facts about this study were provided, but more were generated from the informants' knowledge. However, as Cohen et al. (2013) argued, it is rarely possible for a researcher to know everything about the study; therefore, researchers should aim for "reasonable informed consent" (p. 78). As I stated earlier, the participants in this study participated voluntarily based on their understanding of the topic. All informants were adults and mentally capable of making their own decisions. Hence, it was on this basis that reasonable informed consent was solicited and accepted.

#### 4.9.3 **Protection of privacy, confidentiality, and anonymity**

Another issue I addressed was privacy, confidentiality, and anonymity. All three concepts are related to each other in the context of participants' rights in the study. Participants must be guaranteed confidentiality and anonymity. The study participants were informed about their rights to confidentiality and that the information obtained would only be used for the study, not otherwise, and would be stored and analyzed anonymously. Confidentiality means that participants' real names and other identifying characteristics must be withheld (Cohen et al., 2013, p. 228).

I and my research participants discussed this aspect of confidentiality and we agreed that their names will not appear in the final report. Further, we discussed the fact that the absence of names in the final report does not guarantee total confidentiality, privacy, and anonymity of research participants, particularly when it is a case study. Consequently, several additional efforts were planned and applied to safeguard the rights of the research participants. First, I used Bitlocker software to encrypt the audio-recorded interviews. Second, after transcribing the interviews, the transcriptions (texts) were coded, categorized, and anonymized. The anonymity and generality of the selected quotations was also ensured. I have avoided presenting specific personal information of any participants in this thesis that could facilitate the re-identification of the exact informant. In this thesis, I have deliberately not used

participants' personal information like names, ages, genders, specific degree programs, dates, and interview schedules in this thesis. The ultimate purpose of these measures was to ensure the participants' rights to privacy.

Despite all the efforts and discussions with the research participants on how to improve their anonymity, there remains a question as to whether all research participants want to remain anonymous or not. Shulman (1990) argued that in collaborative studies, there comes a time when informants desire visibility and recognition of the contributions they have made to the study, and consequently several ethical dilemmas emerge regarding their anonymity and their aspiration for recognition and visibility when their personal information is revealed. This implies that ethical issues in research are not easily handled and that probably no "one size fits all," and thus there are several ways researchers can address ethical issues. However, there remains a responsibility to address issues of privacy, confidentiality, and anonymity of research participants. In some cases, it appears to be reasonable to discuss what participants need to be protected from (Cohen et al., 2011). In this study, for example, we are addressing the provision of equal opportunity for all students in higher education and some participants would need to be recognized for their efforts regarding provision of support to students with disabilities. Regardless of any ethical dilemmas, some efforts have been made in this study to improve the privacy, confidentiality, and anonymity of individual informants. For example, quotes from the participants appear without names or other specific details that could identify actual individuals.

Research ethics appear to primarily be the responsibility of researchers. However, there may be a point at which this responsibility shifts from the researcher to the informants. For instance, in this study, I transcribed the audio-recorded interviews into texts and sent them to teachers and SNE experts to verify the information they provided. Kvale (2007) defined a "transcript" as a translation from one narrative mode, oral discourse, to another, written discourse (p. 93). However, differences can occur in the process of translation. For this reason, it was important for me to share the transcripts with teachers and SNE experts to ensure consistency between what was said and what appeared in written form. After I had transcribed the interviews, I printed them out, sealed them in envelopes, and personally gave them to the respective informants. A time was then agreed upon to collect the transcripts. At this point I observed that the role of research ethics is shared by both researcher and research participant. Since the transcripts given to the informants had yet to be fully processed, they

contained everything said by the informants during the interviews. Under such circumstances, at that moment, the interviewees became responsible for protecting their own privacy and confidentiality. A “mutual trust” between the researcher and the informants operates under such circumstances. In the process, what I considered sensitive information from interviewees included names of other practitioners, especially when mentioned in a negative light, or negative practices regarding inclusion of students in higher education. Therefore, we discussed how important it was for them to protect themselves by ensuring confidentiality and privacy of their own information before being processed further by the researcher.

Lastly, privacy includes the places where the interviews were conducted. As stated earlier, the UDSM School of Education provided me with a room that I could use for discussions and interviews. However, I agreed to conduct the interviews wherever the respondents wished. Teachers and SNE experts were comfortable being interviewed in their offices. However, this was not the case for students. Some students opted for open spaces with fresh air, either outside or inside classrooms that were not in use; others were comfortable being interviewed in the room (Boardroom) that I had been permitted to use for interviews by the institution.

#### **4.10 Chapter summary**

Philosophically, the study was guided by an interpretive social constructivism framework. This framework values the importance of multiple realities and the relationship between the researcher and the study participants. The idea is that knowledge or reality is socially constructed (Robson, 2002, p. 27) through interactions between the researcher and study participants in their particular environment (context). A case study approach was used, and UDSM was purposively selected for the study. The study participants involved university teachers, students, and experts in the Special Education Unit. In addition, the study was primarily qualitatively designed, with interviews and observations being the main tools for data collection in addition to focus-group discussions and questionnaires. In the analysis stage, I used HyperRESEARCH, a computer assisted tool for qualitative data analysis. Thereafter, I discussed the various ways by which I addressed validity and ethical issues in the study. How the CHAT and UDL frameworks influenced some methodology decisions was also described.



# **5 Institutional Perspectives Towards Achieving Inclusive Education**

## **5.1 Introduction**

The study's results are presented here in Chapter 5 and in the following two chapters. The current chapter concentrates on the meaning of the term "inclusive education" to university teachers, students, and staff in the Special Education Unit (SEU), in addition to the institutional practices they perceived as promoting inclusive higher education in Tanzania and whether these practices were universally designed (see section 1.7). Subsequently, chapter 6 reports on classroom instructional practices for the two selected courses, while Chapter 7 reports the voices of visually impaired students on inclusive education.

The way teachers, students, and SEU staff conceptualize inclusive education was of great importance due to the fact that there is a close relationship between the understanding of the concept and the practices reflecting the concept. In other words, the way people understand the concept can influence their practices. Theoretically, CHAT shed light on the importance of interactions between and among the components in the inclusion of students in higher education. For the effective inclusion of students to occur there should be interaction and collaborations between and/or among the components in the activity. As described earlier, inclusion of students in higher education is an activity characterized by mediated actions.

Based on CHAT, in this study, inclusion of students in higher education is an activity and for the purpose of this study, students with visual impairment who have a right to an engaging, accessible, and inclusive learning environment referred as subject. Next is community, which refers to teachers and SEU staff, whose role, with institutional support, is to develop and deliver inclusive learning materials to support visually impaired students. Another component is rules and regulations, which in this study refers to the various institutional policies that serve as important documents to regulate inclusive education in higher learning institutions. There is also the division of labor component. In this study, division of labor refers to how different specialized human resources work together to embrace learning opportunity for all students. In any activity, there should be a mediating tool as another component. In this study, mediating tools refers to any tool used in the institution to maximize engagement of students in the learning process and to maximize the accessibility of curricula. Mediating tools must be

universally designed to achieve effective inclusive education. Hehir and Katzman (2012) stated that UDL has the power to transform not only the instructional practices but the perceptions of what and how students can learn (p. 193). Through effective inclusive education, the students become prepared for full adult lives with their own careers and stay fully connected in their own communities.

## **5.2 Conceptualization of inclusive education in higher education**

This section describes how teachers, students, and SEU staff conceptualize inclusive education. In the CHAT framework, people can perceive the object differently for various reasons, one being subjectivity, of which can affect engagements (Postholm, 2015). The present study found that inclusive education in higher education was conceptualized in various ways. That is, there were multiple conceptualized meanings based on multiple interpretations. However, one common interpretation could be found regarding the aspect of “non-discrimination” practices in education, that is, the provision of equal learning opportunities. The common interpretation was that all students regardless of their socioeconomic background and disability status should be equally treated. However, the study also showed that interpretations were more in favor of students with disabilities, which means that the presence of students with disabilities in the institution investigated inferred the evidence of inclusive education in higher education. The following excerpt represents a teacher’s view that inclusive education should be aimed at supporting students with special needs in the same setting as other students without disabilities.

Inclusive education was established with emphasis on students with special needs to be included in normal schools. The general aim is to reduce discrimination, segregation, and make sure that these students learn harmoniously with other students in order to achieve in their learning process.

**Excerpt 5-1**, from an interview with a university teacher

Inclusive education in all levels of education was also noted as being important. The idea behind this was that it would be impossible to enroll students with disabilities in higher education if strategic measures had not already been implemented at lower levels of education. The following excerpt from a teacher demonstrates the importance of access and equity in the education system.

I came to understand inclusive education after discussing various international agendas on education which emphasizes education for all in terms of including females and males, in terms of equity, and access to schools, which has been a big challenge. So, there was a need for an international strategy to ensure that all children get into schools. And, it should start from lower levels of education. Therefore, the emphasis has been on access and equity.

**Excerpt 5-2**, from an interview with a university teacher

In a different and traditional view, inclusive education was associated more with visual impairment, as the effect of this impairment was believed to be more pronounced since much of the learning materials demand visual ability. For that reason, students with visual impairment are believed to experience more difficulties in accessing learning materials. This generalization was made by several participants, who explained that, comparatively speaking, visually impaired students receive more attention from education practitioners than students with other kinds of disabilities. The following excerpt involves a teacher explaining the inclusion process in higher education.

I think in my own view we are all more conscious of students with visual impairment than any other disability. And I personally do take those with visual impairment as to generalize. So personally, when I hear someone talk of students with disabilities, what rings in my mind are students with visual impairment. The reason is, I think, personally I feel like those with visual impairment are the most disadvantaged ones. Sight to me is something I consider from a cultural perspective. I consider them more disadvantaged and in need of more attention.

**Excerpt 5-3**, from an interview with a university teacher

In this study, the greater attention paid to students with visual impairment by teachers is perceived as a narrow idea of what constitutes inclusive education. Alternatively, some teachers viewed inclusive education as being more than the inclusion of students with disabilities. For them, inclusive education involved promoting access to education for minority social groups such as the disabled, the especially talented, and students from rural, pastoralist communities. One teacher contended that all of these minority groups have the same right to be included in education:

There is a narrow focus where people are focusing on including people with disabilities and those without disabilities or impairment. But of course, inclusive education is a little bit wide if not wider. With us for example, when you tell me to talk about inclusive education, the gifted and talented, people with disabilities, people who are poor, minority groups like ... the pastoralists, you know..., is like everybody,

every child, is educable and should be taken on board. And when you are talking of education, but of course with other things, everybody is included and that is the focus.

**Excerpt 5-4**, from an interview with a university teacher

Another conceptualization of inclusive education was the diversification of courses and degree programs. The understanding here was that for an institution to be inclusive, it should be able to include all categories of interest to students professionally, that is, a diversity of career programs. UDSM was perceived to be inclusive in this regard. The following excerpt is from an interview with a teacher who defined inclusive education based on the availability of different degree programs in the institution of higher education.

Inclusive education for me refers to diversities of degree programs, and therefore many institutions of higher education are inclusive because they have faculties, colleges, and different departments for different subjects.

**Excerpt 5-5**, from an interview with a university teacher

This excerpt reflects how inclusive education was conceptualized by other practitioners in higher education. As observed, inclusive education was defined as a process of accommodating students' interest in different learning programs. In summary, teachers conceptualized inclusive education based on the presence of students with disabilities, particularly the blind and deaf; marginalized social groups; gender; and exceptional students, that is, especially gifted and talented students. On the other hand, some teachers conceptualized inclusive education based on the presence of different degree programs, where students can choose to study degree programs of their interest.

In addition to the conceptualization of inclusive education offered by teachers, SNE experts defined inclusive education as a philosophy which embraces "togetherness" in the learning environment. To them, the term "togetherness" meant the inclusion of students both with and without special needs in education. Furthermore, it was explained that in some situations, "exclusion" becomes important in the inclusive learning environment; however, they did not mean exclusion in a negative sense. The term "exclusion" was used to emphasize situations in the inclusive learning environment where students with disabilities are provided with individually adapted materials. In inclusive learning, individualized services may be needed to facilitate accessibility to facilities, materials, or services. So, it was argued that inclusion is not blindly applicable across all situations in the learning environment. In some situations, more individualized resources are required for students with special needs to be engaged and



access skills and knowledge. Ultimately, this means that individualized education programs are often necessary. The following excerpt is of an SNE expert describing what inclusive education is and how it should be practiced in higher education.

This [inclusive education] is a philosophy which promotes learning in the togetherness setting. Students with disabilities learn together with others without disability. However, the most important thing is that, to make inclusive education, we need to have barrier-free materials. In the context of inclusion, there are significant benefits in terms of socialization, though there will be some materials which are in a special way. Individualized education program (IEP) is highly encouraged in inclusive settings.

**Excerpt 5-6**, from an interview with an SNE expert

This excerpt reveals the importance of inclusive education as an important environment for socialization. However, learning materials need to be barrier-free, which calls for universally designed learning materials; and thus, in some situations, individualized programs worked better. With respect to students with special needs, they viewed inclusive education in higher education positively based on good, prior preparation from lower educational levels, where necessary assistive technology skills and usage were developed. The supposition was, if assistive technology and other necessary universally designed tools – which are mediating tools – are provided to students early on, there will be fewer problems in inclusive education. The following excerpt depicts views about inclusive education in higher learning institutions from the perspective of one student with visual impairment.

In higher levels (of education), no problem, inclusive education is of great help if well prepared in lower levels. It is possible to do very well, and you can study anywhere only if you are provided with basic services/equipment like Perkins Braille (type for us), notetaker, typewriter, manila papers, full scape. If we have all this, we can do anything. And now we have computers which can even read for us. In higher education, inclusive education is very okay.

**Excerpt 5-7**, from an interview with a student with special educational needs

Although visually impaired students perceived the importance of computer programs to support their reading, the observations showed that speech reader services were rarely available.

In focus-group discussions with students, it was found that they also conceptualized inclusive education as the admission of students with visual and/or physical impairment in institutions of higher education. This means that inclusive education was more associated with provision

of opportunities to visually or physically impaired students, while there was less consciousness of other possible disabilities such as learning disabilities.

The conceptualization of inclusive education was mainly based on a medical model of disability, whereby the medical condition(s) defining an individual became an indicator of inclusion. In the questionnaire designed to explore their perceptions of inclusion, students with no disability were asked whether their institution was practicing inclusive education. A total of 531 students responded to this question. The responses showed that 427 (80.4%) perceived the institution to be inclusive, while 104 (19.6%) perceived the opposite. Likewise, visually impaired students also perceived the institution to be inclusive. However, several challenges to the effective and successful implementation of inclusive higher education were identified. The following excerpt is from interviews with one student with visual impairment who conceptualized inclusive education in higher education as a shared learning environment in which all students could participate and about which the institution should be flexible.

I agree that higher education is inclusive. However, there are a few challenges to be addressed regarding the use of assistive technology devices. Let the institution be flexible on what devices a student with visual impairment can use.

**Excerpt 5-8**, from an interview with a student with special educational needs

Here, a visually impaired student argued about the institutional rules which were not flexible for them to be able to deliver or express what they know or have learned. Thus, there was a call for more universally designed devices that do not create learning barriers to visually impaired students.

Another student with visual impairment regarded higher education as inclusive. Just due to the fact that was given an opportunity to learn with other students with no disabilities.

I see higher education as inclusive, I stay (study) with my fellow[s] with sight, and we share the learning environment and cooperate.

**Excerpt 5-9**, from an interview with a student with special educational needs

Both excerpts demonstrate the way in which visually impaired students conceptualized the inclusiveness of higher education. In a different way, these students conceptualized inclusive education along two lines: first, their presence in higher education, and second, the institutional practices developed to enhance their learning process in higher education.

In summary, there was wide consensus that the institution was inclusive and hence enhanced inclusive education. This does not mean that the small percentage of students who viewed the institution as not inclusive was insignificant. Instead, it reflects the continued existence of barriers that are perceived to challenge inclusive practices in higher education in Tanzania. The conceptualized meaning of inclusive education was likely influenced by the existence of institutional practices towards inclusion of students.

### **5.3 Institutional efforts to enhance inclusive education**

In this section, I present the various practices at the University of Dar es Salaam perceived by teachers, students, and SEU staff as representing institutional efforts intended to promote inclusive education in the university, together with the challenges reported to impede these efforts, particularly those concerning the inclusion of blind students. Based on CHAT principles, there must be a supportive environment to enhance equal engagement and access to learning opportunities in the process of inclusion of students. The institutional culture and history can influence the process of inclusion of students, particularly students with disabilities.

#### **5.3.1 Financial support to students with visual impairment in higher education**

Higher education was perceived to be expensive. Most students with disabilities could not afford the costs of higher education. Without government financial support many students with visual impairment would not be able to higher education. Fortunately, this financial support is within the national circulars which are within lawful premises, in that a bylaw exists that identifies students with disabilities or students whose parents are disabled as “needy applicants” and thus prioritizes them for higher education financial support. Since there are many applicants competing for the available resources, the government has stated clearly that students with disabilities should be given priority for the loans. The Higher Education Students’ Loan Board states that, “The needy applicant as stated by law is ‘a poor applicant with a disability or whose parents have disabilities’” (HESLB, 2015/16, p. 2).

This bylaw provision mandates the inclusion of students with disabilities in higher education. Financial difficulties have traditionally been one barrier to students’ access to higher education, especially those from poor families or those with disabilities. For this reason, the

government and its higher education institutions have prioritized needy applicants for financial support. The availability of financial support was thus perceived to be a practice aimed at improving inclusion in higher education. Furthermore, the provision of student loans (Act No. 17 of 2007) has put in place obligations, eligibility criteria, and liabilities to guide boards whose job is to provide financial, loan-based support to meet students' higher education costs. The loans provided can cover tuition fees, meals, accommodations, stationery, practical work expenses, and, importantly, the special needs of students with disabilities (URT, 2007, p. 13). Theoretically, the presence of a law to support inclusion of students with disabilities in higher education reflects the CHAT component concerning the presence of rules, regulations, and norms regulating or facilitating the activity in question, which is inclusion of students in higher education. In conclusion, the presence of this law articulating the prioritization of financial support to students with disabilities is interpreted as an effort to promote inclusive education.

### **5.3.2 Provision of housing within the institution to students with disabilities**

The institution was reported to have limited rooms to accommodate its students. To ensure that the needier groups, including students with disabilities, did not suffer due to lack of housing, such students were given priority. The housing policy of the institution studied describes the prioritization of housing provision to students with disabilities as follows:

Students may be offered accommodation in the University Halls of Residence or any hostel or residence rented to the University. Where campus or hostel accommodation is not available to all for residence in the campus halls or in University rented hostels, priority shall be given to students with disabilities and such other categories as Council shall determine from time to time (UDSM, 2011, p. 16).

The issue of housing was investigated further, and it was found that many other students were facing challenges regarding housing. Data from the questionnaire administered to students with no disabilities revealed that out of 568 students who completed and returned the questionnaires, only 172 (32.0%) were provided with housing in the institution while 362 (68.0%) lived elsewhere, outside the university premises and facilities. In other words, a significant number of students lived outside institutional housing, whereas students with disabilities were provided with housing within the institution. Thus, students with disabilities were prioritized. In this study, the institutional decision to prioritize housing for students with disabilities was perceived to promote inclusion in higher education due to the fact that it

reduces the challenges disabled students had been facing when living outside the institutional housing.

### **5.3.3 Recruitment of personnel to support students with visual impairment**

The institution supported students with disabilities in a variety of ways. For example, it employed transcribers to support students with visual difficulties and sign language interpreters for students with hearing impairments. Both transcribers and sign language interpreters worked in the SEU. The role of transcribers in the institution was mostly to support students with visual impairment, but also included supporting teachers in the teaching and learning process. The transcribers processed the learning materials by embossing the text into a more tactile, accessible format. In interviews with SNE experts, it was reported that their role was to bridge the gap between teachers and students with visual difficulties in the teaching and learning process. The following is an excerpt describing the main role of transcribers employed by UDSM to support inclusive education.

We [experts in the SEU] narrow the gap between teachers and visually impaired [students]. We help teachers to convert their materials into a recommendable medium for students with visual impairment.

**Excerpt 5-10**, from an interview with an SNE expert

This observation shows that some of the learning materials prepared by the teachers demanded visual ability. Mostly, such materials were inaccessible for students with visual impairment and thus were not universally designed. As a result, the SEU had the task of processing the materials so that they could be engaging for and accessible to students with visual impairment. Two main techniques were observed: first, using an embosser to convert the materials provided by teachers into braille so that students with visual impairment could access them in tactile form; second, enlarging the font size of the materials for students with limited vision. The latter task could also be completed by the teachers themselves, but it was not always done. Furthermore, it was explained that another important contribution of the Special Education Unit was to create awareness among the institutional community, mainly teachers, students, and institutional management, about issues concerning the learning experiences of students with disabilities. In other words, special arrangements were made between the SEU and the department to prepare teachers ahead of time for students with disabilities.

The professional role of the SEU was to ensure that students with disabilities obtain appropriate services in the institution. The following is an excerpt from an interview with an SNE expert who gave an example of a situation where the SEU bridges the gap between students with special needs and teachers or university management.

One of my professional roles is to create awareness. For example, this year, we got a student from college X [the name provided is withheld] with low vision, which was severe. It was difficult, but we tried to inform the head of the college. So, it took time to make him understand what we meant, though he was asking for a letter from university management ... later on he understood our concerns.

**Excerpt 5-11**, from an interview with an SNE expert

This excerpt indicates tension between and within the institutions regarding first encounters with students with special educational needs. It was through the advocacy of the SEU, which put forward suggestions on how to promote the inclusion of such students in regular institutional programs, that the needs of students with disabilities became known to the respective departments and teachers. In turn, this brought attention to ensuring the provision of quality education. As reported, some department heads were unaware of what services should be provided specifically to students with special educational needs, which highlights the significant role played by SNE experts in the SEU in enhancing quality learning by providing adequate services for students with special needs.

In addition to transcribers and sign language interpreters, the institution employed readers and notetakers as well. The role of readers was to assist students with visual impairment in reading books due to the lack of books in braille or audio format, while the role of notetakers was to take notes in lectures on behalf of students with hearing impairment. The readers and notetakers were either university students (i.e., peers of students with disabilities) or non-students. In the context of this study, “readers” and “notetakers” both refer to paraprofessionals or personal assistants to visually impaired students. Students with special needs had the freedom to choose their peers as their readers or notetakers. The following excerpt, from an interview with an SNE expert, demonstrates the freedom students were given in choosing their peers as readers.

The unit [SEU] allows the students in the unit to choose a fellow student who will be a personal assistant. The personal assistant helps students with visual impairment to read.

**Excerpt 5-12**, from an interview with an SNE expert

In the interviews with teachers, it was found that students with visual impairment preferred fellow university students to be their readers or notetakers. The reasons for this preference were revealed by one teacher in the interview as illustrated in the following excerpt.

Readers are employed to work with students with special needs. They are paid by the institution. Earlier, the reader was external, form-six students, but now a reader is selected by a student with special needs her/himself. So, the reader is sharing a course or a program with students with special needs. The assumption is they will be helping each other and sharing knowledge as opposed to the earlier readers who were just form-six leavers who sometimes had challenges on issues related to knowledge required.

**Excerpt 5-13**, from an interview with a university teacher

The students who were chosen as readers or notetakers also benefitted from the working relationship – it was a win-win situation. In the focus-group discussions, students who had worked as readers or notetakers expressed satisfaction with their work. They used their time to discuss what was taught in class with students with special needs and received social and spiritual benefits in exchange. Both students with disabilities and students who were chosen to work as readers or notetakers had mutual benefits. In the focus-group discussion with students with no disabilities, the students reported benefitting from their colleagues with disabilities. The most significant benefit was the ability to learn from the challenges faced by students with visual impairment as well as the strategies used to overcome them. The following excerpt is a contribution of a student in a focus-group discussion.

Their presence [students with visual impairment] makes us learn from their challenges, and learn how to overcome such challenges in case one has to overcome them.

**Excerpt 5-14**, from a student participating in a focus-group discussion

The idea presented here is that some challenges faced by students with special needs in higher education, as well as the approaches used to handle these challenges, offered important lessons to all students in the teaching profession programs. In summary, the recruitment of support personnel and their collaboration with students with special needs was perceived as a source of systemic tension that ended up by solving the challenges in the learning processes of visually impaired students.

#### 5.3.4 **Provision of assistive technologies and learning materials**

Another practice reported to be an indicator of an inclusive education environment was the provision of facilities, technologies, and other materials necessary for all students' learning

regardless of ability or disability. Equipment found in the SEU included Perkins braille (electronic and manual), embossers (braille printer), scanners, PAC mates, talking dictionaries, laptops, magnifiers, white canes (both folded and unfolded), printers, computers, wheelchairs (both manual and motorized), desktop video magnifiers (closed-circuit television: CCTV), typewriters, digital voice recorders, and stationery. The SEU reported that the equipment available for students with disabilities was expensive. However, the institution as well as both governmental and non-governmental organizations contributed financially to the availability of learning facilities and materials for students with special needs. The conditions in the SEU facilities were perceived to be improving, yet it was noted that some items of equipment were lacking, while others were poorly maintained.

Students were observed using digital voice recorders in classrooms and the SEU. The SEU discouraged the use of cassette recorders since they were too demanding in terms of cost. It was claimed that if allowed, every student attending class would have to carry multiple tapes depending on the length of the sessions. At the same time, dry cells (batteries) would have to be purchased frequently. Thus, cassette recorders were considered non-user-friendly and outdated technology. Accordingly, the SEU supported the use of digital voice (audio) recorders by students with visual impairment, as these recorders produced no extra cost and, in some situations, were more effective and efficient. The following excerpt was taken from an interview with an SNE expert who was discussing efforts made towards the promotion and use of updated technology to support students with visual impairment.

We discourage the use of tape recorders because they have many challenges, including cost for dry cells, tapes, and easy breakdown. We prefer digital voice recording devices because they are flexible in terms of storage of the materials recorded.

**Excerpt 5-15**, from an interview with an SNE expert

The idea that technology has been steadily improving was understood by the SNE experts. They explained how difficult it had been to process examinations of students with special needs before the introduction of braille printers (embossers). In the absence of braille printers, SNE experts were supposed to type the examinations into a braille form one by one depending on the number of students. Thereafter, “thermoform” technology was used, but this had several limitations when preparing examinations, as it was found to be time consuming and of limited capacity. The situation gradually started to improve when the SEU began using braille printers (embossers), which quickened the process of preparing learning materials for



students with visual impairment. Documents are now processed on computers and printed with embossers, making the process faster, more efficient, and more effective. The following excerpt is from an interview with an SNE expert who was explaining the improvements observed thus far in the SEU with regard to supporting visually impaired students.

There is improvement resulting from advancements of technology. Initially, the work of preparation of materials was too tedious: we used Perkins machines to type students' examinations, so if there are five students then we were supposed to type five papers; later on we got the thermoform, which still was limited to a small number of copies, but as we speak, the use of computers and embossers has really improved the process.

**Excerpt 5-16**, from an interview with an SNE expert

The availability of computers and printers capable of processing documents into braille form was viewed as an improvement to services for both students and employees in the SEU. The provision of such equipment was among the institutional practices perceived to enhance inclusive education in the higher learning institution. In CHAT, the provision of assistive technology and learning materials has improved the process of ensuring that students with visual impairment have equal opportunities to engagement and access to skills and knowledge of equal quality.

### **5.3.5 Training programs on issues of special needs education**

As part of the process of practicing inclusive education, training is an important institutional strategy and was reported to occur at two levels: training of student teachers and training of teachers. Regarding student teacher training, it was explained that the institution had a course on special needs education that was taught to student teachers. The course topics, as described in the course outline, included "Foundation of special education, development of the special education unit, categories of exceptional learners and current issues of exceptional learners" (Counselling and Special Needs Education course outline-UDSM).

There was a feeling among students that knowledge and skills regarding how to promote inclusion were less covered in the courses taught. Instead, more information was provided about "special needs education." Indeed, the course syllabus indicated a wider coverage of concepts in special needs education. This was also evidenced in the stated course objectives:

By the end of the course, students should be able to: Define concepts of exceptionality, gain an insight into the field and scope of special education delivery, identify persons with special education needs,

develop an understanding of basic concepts in special education delivery, apply both cognitive and behavioural theories of learning in teaching students with special needs in integrated settings, develop awareness of various techniques of handling persons with special education needs and finally applying theories of counselling in helping students with special needs. (Counselling and Special Needs Education course outline-UDSM).

Based on the objectives as stated above, there appears to be little training in inclusive education offered to student teachers in the teacher education programs.

On the side of university teachers, it was reported that the institution had been offering in-service training to teachers. The aim was to orient university teachers towards different issues related to teaching, including special needs education. This was observed to be a useful training technique for teachers in higher education because a significant number of such teachers did not have a background in the teaching profession. Although the training was not specifically about special needs education, important and relevant issues were discussed. Thus, for newly recruited teachers, viewed the importance that course and find it useful. Among other challenges, newly recruited teachers reported facing difficulties with teaching methods. Consequently, in the training, effective teaching, assessment, and special needs education issues were significant for teachers in higher education. The following excerpt, regarding in-service workshops and seminars provided by the university to its teachers, is from an interview conducted with a teacher who perceived such in-service training as an approach to facilitate inclusive education.

There have been several trainings of us as academic staff; several issues are put forward like recording gadgets in class, examination processing and different modes of teaching in the class where there are students with special needs. It is very important training to university academic staff, especially those without backgrounds in the teaching [profession]. Currently, I am not sure whether newly employed academic staff gets any training on such issues.

**Excerpt 5-17**, from an interview with a university teacher

This was among the institutional efforts to orient teachers towards basic issues concerning teaching an inclusive classroom. Among other topics, teachers were informed about the different learning strategies used by students with special needs, including the use of digital recording devices, which some teachers were not in favor of as they did not wish to be audio recorded. So far, the training sought to inform teachers about the importance of audio recording of lectures for students with visual impairment. The excerpt below is from an interview with a teacher who described the challenge of audio recordings in classrooms in terms of teacher concerns over victimization.

Students with disabilities have voice recorders. Sometimes they get problems due to some lecturers who do not like to be recorded. The reason why some teachers do not like to be recorded is due to uncertainty on how the records are going to be used thereafter by the students. Furthermore, some records can be used to threaten the lecturers in case something wrong or irrelevant (legal issues) had been discussed in the class. So, the sounds recorded can be used to victimize the teachers.

**Excerpt 5-18**, from an interview with a university teacher

The intention of providing the visually impaired students with voice recorders was to facilitate their collection of lecture notes in class sessions, which they could later transcribe into braille or just store them on another device (e.g., a computer) for future review. This raised a question concerning the ethical guidelines considered by visually impaired students regarding the recorded materials.

Finally, it was not clear how the teachers' voice-recorded lectures were to be treated. The in-service training was viewed as an institutional effort to support students with disabilities and subsequently create awareness among teachers at university. On the other hand, it was reported that training students in higher education about inclusive education had two advantages. First, it informed students about issues regarding special needs, ignorance of which was viewed as a foundation for negative attitudes. Hence, training helped develop a more positive attitude towards their fellow colleagues with disabilities. Second, student teachers trained in inclusive education could apply the knowledge and skills they received in their work places in the future, including in schools.

#### **5.4 Challenges in enhancing quality inclusive education**

The investigated institution was viewed as inclusive by some teachers, students, and SEU employees. This view was based mostly on the integration of students with disabilities, regardless of their special educational needs, with their non-disabled colleagues into the same classrooms. As reported earlier, institutional practices were in place to enhance inclusive education. However, there were some sociocultural and socioeconomic factors that were perceived to challenge such institutional efforts. These factors, and their effects on the achievement of inclusive education, are presented in the following subsections.

#### 5.4.1 Identification of students with disabilities

Institutional practitioners had positive perceptions about the academic ability of students with special needs. However, not all students with special needs were properly identified. The effect of unidentified learners with special needs affected not just these students but teachers and the institution as well. The institution cannot render appropriate services to these students so long as they remain unknown, nor can teachers accommodate their needs. As a result, unidentified individuals with disabilities continue to experience challenges regarding their opportunity for engagement and access to skills and knowledge. Hence, teachers stressed the importance of becoming fully aware of all students with special needs. Such knowledge could, accordingly, allow teachers to determine appropriate and effective teaching approaches for all students. However, as has been reported, not all students with special needs were interested in having their disabilities known publicly. This is attributable to various factors, including underestimation of their abilities and overestimation of the effect of their perceived disability. Consequently, it was noted that some students with disabilities were identified by teachers in the teaching and learning process. However, these teachers were only able to identify students with special needs in situations where the number of students was manageable, that is, in smaller classes. Clearly, it was more difficult to identify students with special needs in classes of more than 700 students. In such large classes, knowledge about special needs among students was observed to be useful but also challenging by both teachers and students.

The following excerpt from an interview with a teacher presents the idea that students in the institution with severe visual impairment (i.e., blindness) were more likely to report themselves to the SEU than students with hearing impairment or poor vision.

It is hard to identify students with hearing impairment and poor vision among students. For students who are blind (in the classroom) are likely to be identified or they present themselves to the office of special education.

**Excerpt 5-19**, from an interview with a university teacher

Furthermore, although the presence of audio-recording devices and white canes in the classrooms informally alerts teachers to the presence of students with visual impairment, it is not always easy for teachers to be aware of students with poor vision or hearing impairment in large classes. In situations where students with poor vision or hearing impairment did not self-report, it was difficult for teachers to design their lessons to suit the needs of these learners. Mostly, teachers identified such students when they were asked to work on class activities, as illustrated in the following excerpt.

One day, I projected data of rainfall for almost 10 years, and asked all students to draw a graph by using that data. I realized that one student was not doing anything. I asked him why he was not working. He told me that he was having a problem seeing the data on the board. I asked him when that condition started, and he said since he was in secondary school. So, I asked him why he didn't tell us [teachers]. He replied, "I did not want people to know." Then I asked him, "How do you benefit from not informing us? Don't you see that if it would have been a test, how would it be? Do you know that we have a special needs education unit that helps students with special needs? He said if he would join the Special Education Unit, he would also have to do his examinations in the unit. And he did not like that: that is labelling. So, from that time as a teacher, I decided to tailor-make my teaching materials.

**Excerpt 5-20**, from an interview with a university teacher

It was possible for this teacher to recognize the student because the student's visual challenges became evident through the classroom activities. Furthermore, it was also possible to identify the student due to the small class size. Generally, therefore, it is likely that unidentified students with special needs remain in large classes throughout the institution. In such classes, teachers usually become aware of students with special needs when examination time approaches, as these students must complete their examinations in the SEU. The following excerpt is from an interview with a teacher who expressed the institutional concern over identifying students with special needs:

It is not clear how students with special needs are identified. It is possible if students with special needs report it to their teachers. Due to class size (big class size), frequently I get a report about students with special needs when it comes to tests or examinations. At that moment, you will hear students with special need say, "Please teacher, do not forget us in the test by sending our exams to the special unit." Then, I find that I have been teaching a class without knowing the presence of students with special needs. So, the influence of class size is that it becomes difficult to identify and find a proper way of teaching that will benefit all, including students with special needs.

**Excerpt 5-21**, from an interview with a university teacher

The issue of unidentified students with special needs was a concern in this study and a challenge to the institution, which was tasked with facilitating access to skills and knowledge for all students equally. In inclusive classrooms, where students with visual impairment were included, students with no disability were requested to complete and return the questionnaire developed for this study. One of the questions on the questionnaire asked students whether they frequently experienced challenges hearing the teacher or seeing the materials written or displayed in the classroom. Although this is not a very reliable way of testing visual or hearing problems in students, it can provide a picture of the quality of audio and visual perceptions in the classrooms. Thus, based on self-reported responses, it was possible to establish comprehensive procedures to identify and address challenges on the part of teacher and learning materials or in terms of students' sensory capabilities. Such findings could stimulate further investigation to identify core problems. A total of 568 students from the first through third years of the education degree programs volunteered to fill out the questionnaires, and it was found that 94 students (17.6%) frequently experienced challenges seeing the materials displayed or written by the teacher in the classrooms, while 39 students (7.4%) reported experiencing challenges hearing what was being presented by teachers. Difficulties with other senses were also reported to at least have some effect on students' capacity to encode information in teaching and learning situations. I should clarify here that the students who filled out the questionnaires were not registered as students with special needs; rather, they were students who shared classes with students with disabilities officially registered as such in the SEU. Table 3 below summarizes the questionnaire responses.

**Table 3.** Students' responses regarding difficulties experienced in relation to senses.

<b>In the learning process, do you frequently experience any problem with ...</b>			
	<b>Yes (n, %)</b>	<b>No (n, %)</b>	<b>Number of students who responded</b>
Seeing?	94 (17.6%)	440 (82.4%)	534
Hearing?	39 (7.4%)	486 (92.6%)	525
Touching?	16 (3.0%)	512 (97.1%)	528
Smelling?	22 (4.2%)	504 (95.8%)	526
Tasting?	15 (2.8%)	512 (97.2%)	529

*Source: Field data, 2016*

The auditory and visual senses play a crucial role in students' learning processes. In this context, the study established that in teaching and learning, students with special needs were present though not always identified (i.e., unknown officially). In the analysis, vision problems were attributed to three factors: student-oriented factors, teacher-oriented factors,

and learning-environment-oriented factors. In terms of student-oriented factors, seating positions or visual acuity problems were to blame. Regarding seating position, 276 students (48.9%) preferred front seats, 224 (39.4%) preferred middle seats, and 64 (11.3%) preferred sitting in the back of the classroom. Thus, a higher number of students preferred to sit in the front of the classroom, which may be associated with both hearing and vision problems. Some students reported sitting where they did not prefer to because of the large class size. Regarding visual acuity, it was found that 81 students (15.1%) used corrective glasses in their reading.

For teachers, the issue of students' needs is a complex phenomenon that requires identification and mitigation. Effective teaching depends to a great degree on observations of students' needs. Otherwise, the quality of and access to teaching and learning can be compromised. In terms of teacher- and learning-environment-oriented factors, the voices of teachers, the size and resolution of media, and the font size of written materials can affect teaching and learning. The institution was perceived to rely on the self-identification of students with disabilities. The institution asked students to indicate their disability status in the application form, but some students did not do so for two reasons: the fear of being underestimated due to their condition and the fear of not being admitted to higher education. In some cases there was the concern that certain conditions were too minor to be indicated as a disability, but the fear of not being admitted was not necessarily justified, as there was no evidence of any student being denied admission due to their disability. Admissions were based instead on academic merit.

In conclusion to this subsection, the study established that, institutionally, there was no specific approach to identify students with disabilities. Consequently, teachers found it difficult to include all students with special needs in their instructional practices. This practice reveals the importance including UDL issues in teacher training, so as to encourage teachers to consider learners' variabilities in the design of curricular materials and practices.

#### 5.4.2 **Shortage of experts in the Special Education Unit**

Another challenge reported was the inadequate number of employees in the SEU. During data collection, the unit had 54 students with disabilities registered for 2015–2016, but only had 4 employees (SNEU, 2015). Thus, the ratio between SEU employees and students with disabilities registered in the unit was about 1:14. With each SNE expert in the unit serving 14

students, there was relatively little time for individual assistance. For example, at the time of data collection, there was only one sign-language interpreter in the unit, and it was impossible for this interpreter to serve two students studying two different courses at the same time.

#### 5.4.3 **Lack of facilities and up-to-date technology**

In the institution, significant efforts were made regarding the provision of facilities to students with special needs as well as to employees in the SEU. However, several challenges were reported, including a lack of computers with software that could support students with visual impairment. There was a clear idea a perception among the SNE experts about what could work better for students, but challenges existed in terms of finance. It was reported that facilities for students with visual impairment were expensive. To overcome this, the SEU used free online software to support students with visual impairment, which proved helpful but had limitations in terms of access. Downloading the software also required strong antivirus programs. There was also the perception that the free downloaded software was of inferior quality. The following excerpt from an interview with an SEU employee sheds light on the use of free downloaded software and the challenges experienced as a result.

Commercial software is quality-oriented; the free ones are not of that quality. Sometimes the free software distorts even the hardware; you may even need to format the whole computer. Computers we have are old and software is downloaded which is not of the required quality.

**Excerpt 5-22**, from an interview with an SNE expert

The idea that free software was of inferior quality needs to be changed, since both commercial and free downloaded programs can be of great use. However, the necessary skills are required to make them work effectively. Thus, I observed that the SEU was equipped with various facilities of low or outdated quality to support students with visual impairment. The challenge involved in using cheap or free software may have more to do with knowing how to use and maintain them and less to do with inherent quality. Without this knowledge, outdated technology and facilities could hinder engagement and access to skills and knowledge of equal quality.



## 5.5 Chapter summary

This chapter focused on how inclusive education was conceptualized by university teachers, students, and SEU staff, and also on the institutional practices perceived to contribute to inclusive education in higher education. Understandings of inclusive education were found to vary, but more emphasis was placed on students with disabilities and, more specifically, on students with visual and/or physical impairment. In the classroom context, practitioners claimed that the presence of students with visual impairment demanded the use of appropriate pedagogies that provide multiple ways for engagement and alternatives to visual learning materials. The presence of students with visual impairment was perceived to indicate an inclusive institution. Unexpectedly, it was discovered that even students with visual impairment conceptualized inclusive education based on their presence and the services provided to them by the institution. The presence of visually impaired students in a classroom where facilities and materials were inaccessible hence affected the teaching pedagogies. In the CHAT framework, the equipment and materials used are mediating tools, which must be universally designed for them to be accessible and engaging. The institutional practices perceived to enhance inclusive education consisted of prioritization of students with disabilities in terms of financial support, the provision of housing on the institution's premises, and the provision of assistive technology devices to students with special needs to support their access to skills and knowledge. These devices included Perkins braille, typewriters, white canes, and voice recorders (mediating tools). Another institutional practice perceived to enhance inclusive education was the recruitment of SNE experts and other paraprofessionals to support learners with special educational needs, such as transcribers, sign language interpreters, readers, and notetakers. SNE experts and other paraprofessionals are classified as a community component in the CHAT perspective. Their role is to support visually impaired students in their learning process. I also reported on challenges likely to create obstacles to enhancing access to learning for students with visual impairment in inclusive settings. At this juncture, I presented an overview of institutional perspectives and practices that act as an umbrella for inclusive higher education in Tanzania. In this chapter, I have reported how inclusive education was conceptualized in a higher learning institution in Tanzania by teachers, students and SNE experts and their perceptions on practices within their institution which reflected inclusive higher education.



## **6 Pedagogical Practices in the Inclusive Classrooms**

### **6.1 Introduction**

This chapter reports on the pedagogies used in the classroom instructions with the aim of examining whether they were universally designed. As stated earlier, this study used CHAT and UDL frameworks. The pedagogies observed to be used classrooms were classified as mediating tools within CHAT. CHAT emphasizes the use of mediating tools to achieve an intended goal, and these mediations should be universally designed so as to accommodate learners' different needs. UDL sheds light on whether mediating tools such as teaching methods, technology used during the instruction, instructional materials, and learning activities provided to students simply engaged students in the learning activities; whether the mediating tools used provide students with alternative ways to express or present what they know; and finally, whether the tools provided supported students in accessing the instructional materials.

As described earlier, the classroom practices presented in this chapter concern two observed courses: Computer Literacy for Teachers (CLT) and Educational Media and Technology (EMT). First, I will report on how CLT was taught in the classroom and in the computer laboratory. Second, I will present how EMT engaged students in hands-on experience through the course project. Regarding the EMT course, I will not present how it was taught in class, as the course used lecture methods. Instead, I decided to examine and report on the practical aspects of the course, in which students were tasked with developing instructional media. Students were asked to develop teaching aids, and this work would ultimately be graded as part of the coursework counting towards their examination results. Third, I will report on the issues that emerged in relation to whether visually impaired students had equal engagement and access to skills and knowledge of equal quality when compared with their peers.

### **6.2 Pedagogical practices in the Computer Literacy for Teachers (CLT) course**

Computer literacy in education is of great importance. This was very clear at UDSM, where various strategies were employed to equip students with computer skills. For the purpose of this study, I focused on teacher preparation programs following visually impaired students in

the inclusive setting. The CLT course intended to equip students with basic skills concerning computer applications in education. The following excerpt from the course guidelines provides a description of the course and its objectives.

This is an introductory course on basic computer skills aimed at equipping prospective teachers with basic knowledge and skills on computer applications in education. The prospective teachers will learn how these applications are used within the classroom and classroom management techniques, as well as the social implications of the use of computers in education and other related areas.

The objectives: to prepare learners to have theoretical and practical skills in such areas as:

- Structure and principles of computer operation, including understanding software classifications and applications in word processing, databases, spreadsheets, graphics, presentations, internet and e-mail
- Raising student attainment and broadening the range of teaching methods used
- Obtaining a higher level of ability to access and evaluate discipline-linked technological tools and resources
- Creating competent and self-confident users of technology for education

(CLT course guidelines)

From this excerpt, the importance of computer skills in education is demonstrated. Although the course is designed for prospective teachers, some prospective teachers are students with visual impairment. Accordingly, it was meaningful to observe how the course was taught to determine how pedagogical practices engage students and promote access to knowledge and development of skills for prospective teachers with visual impairment in such inclusive classroom settings. In the following subsections, I will describe the observations made in classrooms and in the computer laboratory.

### 6.2.1 **Classroom observation**

On the day scheduled for classroom observation, I arrived 10 minutes before the lesson began. I found that the course teacher had already arrived and was waiting to gain access to the lecture room. At that time, another course was still being taught in the room. That lesson concluded at approximately 6:00 pm, after which the students and teacher entered the room. The lesson was scheduled to be from 6:00 pm to 7:00 pm.

*Getting started: Use of technology to support representation of subject matter*

The teacher carried a laptop as we all entered the lecture room. A public address (PA) system was installed in the room, which consisted of a microphone, amplifier, and loudspeakers to amplify the teacher's voice. PA systems are typically used to amplify speech or music in a large building or outdoor venue. In addition, a digital video projector and projection screen was installed in the room. The video projector, intended to provide access to visual learning materials to students, was primarily used for PowerPoint presentations. Furthermore, a blackboard and table used by the teacher were positioned at the front of the class. Students' seats were in fixed rows and hence inflexible. There was no way to rearrange seats. Importantly, there were students with visual impairment in the class whose voice recording devices were placed on the teacher's table to record the lesson. The students with visual impairment were seated in the first row, on the left side, closer to the teacher.

The teacher attempted to connect the laptop to the projector but was not successful, and subsequently called the person who took care of the room to come by and resolve the problem. After the projector was connected properly to the teacher's laptop, the students clapped their hands. The impression was that the students were happy and eager to hear the lecture (oral presentation) and accompanying PowerPoint presentation (visual presentation). Thereafter, the teacher turned to the microphone, which was on the table; at first, the microphone produced an unpleasant sound. The following excerpt is from the classroom observation record and reflects what happened in the first few minutes prior to the start of the lesson.

*Teacher:* Hello! Hello! Hello!! Do you hear me?

*Students:* Yes! ... No! [I.e., some students could hear well, while others could not]

*Teacher:* I think something is not properly working here. [The teacher tries to examine the gadget]

*Student:* It may be the power of the dry cells is weak. [one student quickly comments; the idea was that the microphone had been in use since the morning, and thus the battery might be low and in need of replacement; thereafter, the teacher decided not to use the microphone]

*Teacher:* Therefore, I will try to raise my voice! But some of you, like those sitting at the back, if you can't hear me from the back, make some efforts to hear me.

**Excerpt 6-1**, from the classroom observation record

An important observation from this class was the need for working technology to support both the teacher and students in the teaching and learning process. The use of a digital video projector connected to the teacher's laptop and a working microphone was necessary to

facilitate the teaching. This explains why the teacher appeared to be disappointed with the status and condition of the PA system, which was not working properly, and decided to speak with a raised voice. Voice recorders were another important device in the classroom, specifically for visually impaired students. The use of technology in this context was aimed at providing different perceptual options. Both auditory and visual supportive devices provided flexibility depending on the needs of individuals. However, the visual supportive technology (PowerPoint presentations) was not applicable for students with visual impairment and was thus considered inaccessible to them. One potential solution in this respect would be to provide details of the contents of the presentation to visually impaired students so that they too could access the materials. This means that different tools used for mediation need to be universally designed to accommodate students with different needs. Despite the challenges faced in using the technology available to support the provision of different ways of representing the subject matter, the teacher applied techniques to promote inclusion of students.

#### *Use of scaffolding to support comprehension*

In the classroom observation, the teacher made use of a scaffolding approach in introducing the lesson so as to facilitate comprehension of the instructional materials. The teacher attempted to connect the new lesson and the previous lesson. The lesson introduction emphasized the significance of flexibility in the teaching and learning milieu. The following is an excerpt from the classroom observation record which shows the importance of connecting new learning materials to familiar materials already learned, as practiced by the teacher in this case.

*[Teacher introduces the lesson]* Last period we were in module five, but today we are starting module four – it is sometimes important to re-order the topics in the syllabus. So, the module we are starting today is “database”, which is similar to “Excel”, which some of you are familiar with. This “Excel” is what we have been discussing in previous sessions. So, database is very similar to Excel. We discussed about Excel already and today we are going to start discussing database. Because you already know about Excel, then it will be easy to follow the database...

**Excerpt 6-2**, from the classroom observation record

This excerpt tells us something positive about the ability to reframe topics to facilitate better understanding on the part of learners. In this case, the students studied module five (Microsoft Excel) before studying module four (databases). The teacher claimed that it would be possible

for students to comprehend “databases” if they had already understood “Excel.” The teacher promoted access to knowledge with contextual information that was known and familiar by that time in order to approach unknown and unfamiliar subject matter. Furthermore, the teacher stated the specific objectives of that particular lesson, which included “the meaning of database, the database management approach, important characteristics of databases and database management.” The provision of lesson objectives acted as a tool to guide the lesson for both the teacher and the students. The students with visual impairment perceived provision of lesson objectives as a guiding tool and it was a useful tool for them to follow the subject matter.

### *The use of visual materials in the classroom*

In the classroom, I observed that different options were used to facilitate students’ engagement and access to knowledge and skills. Nonetheless, the visual materials used compromised accessibility to students with visual impairment. The teachers made use of PowerPoint presentations that presented descriptions of databases. It was too abstract to conceptualize, not only for visually impaired students but also for other non-visually impaired students. This was evidently noticed, as one student (non-visually impaired) asked a couple of questions. The questions and the teacher’s responses are described in the following excerpt.

*Student:* What does a database look like?

*Teacher:* So, the aim of a database is to solve the problem of multiple records. We may have data in one file which may be not connected to another file. You may have a file of a student with names, another with addresses; another may have parents’ information. If you have one file already, then you may need some information from it when creating another file ... The new file depends on the previous file, look here: *[the teacher draws a simple table with columns and rows on the chalkboard]*

Student’s name	Sex	Registration number	Degree program	Address
Juma				
Joe				
Anne				
Sostenes				

*Teacher:* We can use this file when we want to create a new file for students’ university examinations scores, but we cannot just create marks without previous information, like student names, registration numbers, and degree programs. In creating a new file, some information may be deleted because it is not needed: for example, addresses are not necessarily needed for creating students’ academic records.

*Student:* So which problem does the database try to solve?

*Teacher:* We are saying that databases compile multiple files of information. I may have the file about my admission, but I may also have a file about my employment issues, and another for academic issues. All these files are there and can be put together in a database. Previously, these files had no relation, and so the database can treat them in such a way that all the information can be accessed. So, a database is a collection of entered data of different files in the system. As you can see here, you may have “name” and then the “address” of this student, and the names of the parents; then here may be “age” and so on ...

**Excerpt 6-3**, from the classroom observation record

In this context, the teacher provided an alternative for students to conceptualize the concept of databases. The concept was better understood when a simple table was drawn on the chalkboard. At this time, students were also drawing the table into their notebooks. However, the situation was different for students with visual impairment, because the table used to illuminate the concept was not accessible to them as they could not see it; instead, they listened to and audio-recorded the lecture. Thus, the voice recording was not helpful in this regard, due to the fact that vision was also required to conceptualize the table drawn on the chalkboard. Furthermore, I heard the visually impaired students ask fellow classmates near to them about the table, but they did not reply since they were busy drawing the table into their notebooks. Ultimately, this was not a big challenge for students with visual impairment, as group discussions were mentioned in the interview sessions as an alternative approach for clarifying learning materials. In one interview, a visually impaired student shared the view that teaching pedagogies were satisfactory and that their complexities were discussed adequately in their groups to reach consensus about the materials. The following excerpt demonstrates the perspective of a visually impaired student about the teaching pedagogies used in the CLT course.

Methods are good, though there are challenges. For me, I like group discussions, learning from colleagues.

**Excerpt 6-4**, from an interview with a student with special educational needs

This situation shows that the classroom is a place for collecting learning materials, which thereafter can be used to facilitate group discussions among students. In the representation of the visual materials, less information corresponded to less engagement and access to skills and knowledge for students with visual impairment.

Another aspect for promoting representations of learning is the provision of options for language. The medium of instruction in higher education in this study was English. Thus, the



class session observed was also conducted in English. However, there were some instances in which Kiswahili was used. Thus, in the classroom observations, two languages were used. Although the Kiswahili language enabled the students to understand the concepts in a familiar language, students with visual impairment reported to experience challenges when transcribing the recorded lectures. The reason for this was that the process of transcription was time consuming and it was also sometimes difficult to obtain equivalent English words. In addition, the students believed some teachers to be less aware of the presence of visually impaired students in their classes with respect to the language used during teaching. This was clearly observed in the class, where the students were shown a table on the chalkboard with information in columns and rows. It was possible for most students to follow both the diagrammatical presentation and the descriptions, except for the visually impaired students. The use of the phrases “look here” and “if you look at this column here” (when directing students to specific information in the table) was noted as exclusive and inhibiting with regard to accessing the intended skills and knowledge, as both of these phrases emphasize the use of vision as a way to obtain the information and understand the concepts.

Time management was observed to influence the teaching and learning process. This was observed when the lesson was approaching its end, with 10 minutes remaining. The teacher remarked about the time:

How many slides remain for today? I will try to cover them by speed. *[The teacher tries to scroll and count the remaining slides, loudly at first and then silently: there were still many slides to be covered in the short time remaining for that period.]* When do we have a period again? Okay, let us end here and we shall meet then!

**Excerpt 6-5**, from the classroom observation record

A relationship between available time and the number of slides left to be presented was observed. When the end of the lesson was near, there were still many slides left; hence, the teacher promised to send the students a copy of the slides later for further reading.

The CLT course seemed more like a process with a definite goal. Tools such as computers, video projectors, and voice recorders were observed to be significant tools towards achieving this goal. The process included different actors, such as teachers and students, and each actor had a particular role in the process of teaching and learning. The roles assigned were guided by different institutional rules as well as professional codes of conduct. The learning environment was also reported to have some effects on the process of engaging students and

promoting access to skills and knowledge. That said, in any process, there are enabling and disabling factors. The same can be said for the CLT course. Visually impaired students faced socially constructed barriers in the course that emerged from the nature of the content (databases) and the medium of presentation (drawing a table on the blackboard).

### 6.2.2 **Practical session observation (computer laboratory)**

It was interesting to observe how the same CLT course was practiced differently in the computer laboratory, which took place in a different room from the lessons described above. The conditions present in the learning environment (the computer lab) were less conducive to developing effective practical skills, as there were not sufficient technological devices available to facilitate access to practical skills for all students. The devices available included computers connected to the video projector for PowerPoint presentations and desktop computers for students to work on. The following excerpts represent the views of the teacher about the condition of enablers in facilitating practical sessions.

This computer laboratory has no installed projector, so the teacher has to hire a projector from the department where there is only one projector. It is therefore possible sometimes to miss it (taken by another teacher). And also, no laptop for projection: I must carry mine [my own laptop].

**Excerpt 6-6**, from an interview with a university teacher

Another teacher simply commented that the learning environment, including the laboratories for practical training, did not favor students with special needs:

Classrooms, libraries, laboratories are not friendly to students with disabilities, so the learning environment is challenging.

**Excerpt 6-7**, from an interview with a university teacher

As reported, no video projector was installed in the computer laboratory to facilitate visual learning. While a video projector could have been borrowed from the department, but it was not always available. As a result, the process of displaying visual materials for practical learning was not always implemented. Similarly, it was important for the teacher to have a laptop to facilitate the visualization of the materials in the practical session. On the other hand, for the practical session to be effective, the students needed to have access to properly functioning computers. Yet, this was not the case. The computer laboratory had a significant

shortage of equipment. The following is an excerpt from a teacher about the state of the computer laboratory for the practical session.

To be good, the computer laboratory has to install about 40 PCs [computers], but this one I have, it has only 6 computers, while there are 250 students in each group seminar; groups are about 30–40 [students], hence the ratio is one PC for seven students. It is hard to teach this course practically. The situation is worse for students with visual impairment. I heard there is a “concept keyboard.” I don’t have any of these concept keyboards. Our computer lab is not friendly to students with special needs, especially to visually impaired students.

**Excerpt 6-8**, from an interview with a university teacher

As has been reported, it was hard to teach the course practically due to a lack of devices (i.e., an insufficient number of computers). Consequently, students had to share the available desktop computers. As the teacher explained, there were about 250 students in the course, with 30 to 40 students per group for practical lessons, meaning a ratio of students to computers of about 1:6 or 1:7 (one computer shared by six or seven students). Computer sharing was also considered problematic due to the laboratory’s structure, in which computers were installed with only a single student at a time in mind. As an alternative, the teacher used PowerPoint presentations to demonstrate procedures for how to complete some important operations in the course. As strongly voiced by the teacher in the excerpt, the situation was unfavorable for students with visual impairment as the computer laboratory had no supportive technology for such students. Thus, it was almost impossible for the teacher to facilitate practical sessions for students with special needs, especially for students with visual impairment.

The observations conducted during the practical lessons revealed that much of the content appealed to visual ability. Otherwise, the presence of a particular technology could have facilitated access to visual material to visually impaired students. In the classroom, I observed that in the CLT practical sessions, students were taught how to work with Microsoft Excel to process student examination results (see next excerpt), the nature of which demanded visual acuity or supportive technology.

*Teacher:* This is a sample of students’ scores [*the teacher displays some scores in a slide*]. Last time, we discussed how to find the total score by just clicking on the auto sum icon and clicking sum after selecting all the scores of students, you want to find the sum. Another thing we looked at was average; you must go there in auto sum and select average. We saw that if you click, it provides averages for the selected scores. These are built-in programs. Alternatively, you can use formulae as well. In case you find

a problem, click F1 and you will get help for your problem. So many things can be solved online; everything is there [*meaning the help provided via the F1 button*]. But because you are lazy you don't want to read, so I will explain some to you. Our discussion today is about how to assign a grade to a student's scores. You can run logic test. I used it, but it disturbed me, and I stopped using it. So, what we are going to discuss is a manual entering of the formula for a grading system like A = 75 and above; B+ = 60 and above; B = 50 and above; C = 40 and above; and D = less than 40, etc. You can grade students based on one subject or even all subjects based on average or total scores. The problem that I have been experiencing is that some of the keyboards have problems with signs being used: for example, there is no sign of greater than or equal to; instead, you will see me using a sign greater than then equal to.

**Excerpt 6-9**, from the computer laboratory observation record

In this introductory remark, the students were reminded about what was discussed in the previous practical session, which concerned how to compute the sum and average of the students' examination results. The students were also told how to find help online. The new lesson was introduced as being about how to compute grade examination scores. Two approaches were proposed: computing average scores by using a logistic test, or manually entering formulae. Important signs when entering the scores were identified. The signs considered important enough for students to remember and make use of were the greater than or equal to sign [ $\geq$ ], the less than or equal to sign [ $\leq$ ], and opening and closing brackets [()]. One challenge observed in the class was the teacher's laptop, which was in use but could not properly insert the signs just listed; consequently, the teacher had to enter each sign separately. The first sign the teacher entered was < then = to represent  $\leq$ . Understanding all of this information was easy for students who could see the signs, but the inclusion of students with visual impairment was compromised in that context and situation. The following excerpt demonstrates the process of grading students by using the formula discussed in the practical session.

*[The teacher displays some data on the PowerPoint slides and shows how to command Excel to insert a grade for a student's score. This was activity based lesson, the teacher showed students how to enter the formula and students could see the process on the slides projected]*

*Teacher:* We must enter formula here [*the teacher clicks the cell to insert formula*]. If [column] J is greater or equal to 70 (if  $J2 \geq 70$ , "A", that means *anayepata sabini*) [*the teacher speaks Kiswahili, which means who scored 70*] then that score is an A grade. So, if you get 69.6, it takes you to 70, which is an A. The system, like ARIS [*Academic Registration Information System*], will always round/estimate to boundary numbers in decimals. Then you go to the next formula just after the comma; you write again if ( $J2 \geq 60$ , "B+") that plus sign is in the keyboard. Then open another bracket if ( $J2 \geq 50$ , "B", then we say again if ( $J2 \geq 40$ , "C", what else? [*The teacher looks at the*

*data on the slide*] I don't see "D" in these scores, but maybe you will see later, so we say (the teacher is inserting the formula on the slide), if the same cell,  $J2 \geq 30$ , let us call it "D" inverted commas. And if one scored less than 30, let the system assign "F" for the student's score. So, we say, if J2 is greater or equal to 20, we are going to assign this person a score of D, if J2 is above 10 then E, then assign F if J2 is above 0. Remember, I did not close any of the brackets. You need to close all the brackets you opened. If you opened five times, close all five brackets. From mine, you can see the formula has colors from there which distinguish the brackets; I can see colors there, red, green, pink, etc. ... Sometimes you can make mistakes, if brackets are with errors. But the program will tell you. So, I am going to close this one here, first [*the teacher indicates the bracket to be closed*].

*Student:* Where do we get brackets? [*Some students who were following the teacher did not see the bracket signs in their keyboards.*]

*Teacher:* See it is in your keyboard, for opening bracket, see it on number nine, and closing bracket is on zero [*according to the teacher's laptop keyboard*].

*Student:* It is different to us: on number nine, it is a closing bracket, not opening, but 8 is opening! [*Some students who had access to desktops discovered that the opening bracket was on number 8 on their keyboard and the closing bracket was on number 9*]

*Teacher:* .... So, all the brackets are already closed. If you are done with that formula, then just press enter. After pressing enter, the student who has been graded as B and we graded this one in reference to the column J2. The grading based on cell two which appears as column J. After that, you can copy the formula to the rest of the students. I say, you can copy the formula to the rest of the students or you can hold your pointer and drag to all students [*the teacher shows how to drag and all grades for all students appear in the selected cell*]. That means if you copy the formula or drag the first cell then you will get the grades for all students.

**Excerpt 6-10**, from the computer laboratory observation record

In this excerpt, students were supposed to conceptualize the process of inserting formulae into the Microsoft Excel program to compute averages of students' grade scores. Students were shown how to read the number in the cell that is supposed to be computed for average score, and were told of the importance of brackets and their colors. The teacher demonstrated the importance of being careful when inserting a formula for assigning students' grades in the Microsoft Excel program. In the context of students with visual impairment, it was not possible to see and follow the process of inserting grades for students' scores. It was impossible for them to see the colors used to distinguish the closing brackets in the inserted formula.

*[The teacher is demonstrating that when one places a pointer in an active cell in the Excel sheet, it shows the formula that has been inserted]*

*Teacher:* Let us read this grade here: it reads, *ukisoma fomula yake pale* [Kiswahili, meaning, “if you read the formula there”], if J2 is greater or equal to. If I remove my pointer from this active cell, I click on the same formula that appears, but J2 has changed into J19. The same formula applies but the difference is in the row number; this grade here falls in row number 19. The number after J will change depending on the position that the grade falls in or the row that the grade is in.

*Student:* What if I reverse the formula? Instead of starting from higher scores, I start with low grades to high grades? *[Here the student wanted to know whether it is possible to assign grades to examination scores starting from low to high scores.]*

*Teacher:* Have you heard the question? One student is asking, what if we decide to reverse the formula instead of starting from the highest score to the lowest score as we have done? A student starts from the lowest score to the highest, that is, instead of starting on top, I start from the bottom. Instead of using, if J2 is greater than or equal to, we ask what if J2 is less than the scores given, then, if it accepts, that means the formula is correct but if it disagrees then something is wrong *[the teacher tries to apply the ideas by starting with the lowest score]*. If we put less or equal to 30 and it accepts, there must be a problem *[the teacher tries to enter the formula and it does not work]*. I don’t know what happens here, anyway that is the way we are looking for grades and you can start from top to lower or lower to top *[the students are advised to work on that task later to find out what will happen]*. Otherwise, this is the formula from top to bottom scores = If (J2>=70, “A”, if (J2>=60, “B+”, if (J2>=50, “B”, if (J2>=40, “C”, if (J2>=30, “D”, if (J2<=29, “F”) (The teacher displayed this formula on the slide).

**Excerpt 6-11**, from the computer laboratory observation record

The lesson was result-oriented, which means that some of the activities were performed by the teacher and the results were seen by the students. These visually collaborative activities were useful for most students. However, for visually challenged students, they were a barrier. It was possible for students to observe the “active cell” in the Microsoft Excel with its score, and the cell showed the formula used to calculate the specific number result, but this process was thus non-inclusive for students with visual impairment. In a context where text-to-speech technology is not used, such as in the CLT course, engagement and access to learning for students with visual impairment is inhibited.

In the practical session, I observed that the course contents were visually oriented but could be accessed by anyone using technology. Lack of appropriate assistive technology to enable the practical lessons for students with visual impairment was therefore observed to be one of

the main obstacles to equal learning opportunities, meaning that there was no evidence demonstrating that students with visual impairment had equal learning opportunities.

### **6.3 Pedagogical practices in the Educational Media and Technology (EMT) course**

Educational Media and Technology (EMT) was a very important course for teacher preparation. The course, taught to second-year student teachers, served to orient student teachers concerning media and technology issues in education. Two teaching methods were indicated in the syllabus: lectures and projects. Lectures were conducted to orient students towards the theoretical aspects of the course, while projects were intended to examine students' ability to apply theoretical skills in practice. The theoretical teaching was a more teacher-centered approach in which lectures were used to familiarize students with concepts and theoretical aspects of media and technology in education. On the other hand, students were also given the opportunity to apply theoretical knowledge to the design and development of instructional media and to present it in seminars for evaluation. This means that artefacts developed by students as parts of their project work were graded as part of their continuous assessment, which contributed to their final score for the course. Project work was done by students in groups. Due to the size of the class, the groups were large. The course supposedly had 1700 students, and therefore it was not possible to accommodate all the students in one room. Instead, the class was divided into two groups with about 800 students in each. In these circumstances, the teacher argued that it was more convenient to use media and technology to support teaching yet difficult to ensure that every student became active participants in the classroom.

The following excerpt indicates that the use of media and technology in teaching large classes does not guarantee the possibility to ensure students' engagement and active participation in the learning. Theoretically, the suggestion is that in the human activity, several components contribute to achievement of the intended goals.

My course has about 1700 students who are taught in two groups. This class size does not allow me to countercheck everyone's (each student's) participation in the process of learning.

**Excerpt 6-12**, from an interview with a university teacher

### 6.3.1 The importance of using instructional media in the classroom

An instructional medium, which includes visual or audio media, or a combination of both, are important in the process of teaching and learning. In the preparation of teachers, knowledge about how to instruct students in media and technology was emphasized. Teaching aids or educational media and technology can be viewed as mediating tools in the teaching and learning context and contribute to inclusion of students in the classrooms. In large classes, the teachers emphasized the use of accessible tools or media to facilitate the process of teaching and learning. However, the tools were discussed more in the context of facilitating teachers not student engagement. The following excerpt is from an interview with a teacher who describes the importance of using media for teaching large classes in higher education institutions.

Media and technology are important for teacher's preparation program. Let me say, for example, that using a projector (for PowerPoint presentations) is kind of motivating for students, but if not careful you can find yourself using a projector as a blackboard ... there is no way that will enable teachers to teach big classes without using media and technology.

**Excerpt 6-13**, from an interview with a university teacher

In this excerpt, I realized that most media and technology referred to in the EMT course aimed to motivate and engage learners in the learning process. Despite the fact that the use of media and technology was emphasized, it was not clear how such media and technology enhanced engagement and equal learning opportunities for visually impaired students. It was reported in the interviews that several tools were available, the purposes of which were to display information to students and inform them about how far media and technology have come in education. The following excerpt from an interview with a teacher indicates various media and technology used in the EMT course.

There are several types of projectors. The ones which are working now are LCD [*Liquid Crystal Display*] projectors and overhead projectors. Other types which we use to display to students, but we do not use in presentations, are sound film projectors, slide projectors and Epi projectors, which are useful for projecting book photos. Others are recording gadgets, such as tape recorders and audio digital recorders. Television receivers should be differentiated from monitors and flash disks.

**Excerpt 6-14**, from an interview with a university teacher

The media and technology tools described in the excerpt were displayed for students to see and gain a sense of old technology in education. The excerpt shows that there were tools used



as objects to facilitate learning instead of objects for learning. Tools like sound film projectors, slide projectors, tape recorders and floppy disks were presented as outdated technology but still important for students to know in terms of the history of such tools in education practices.

The EMT course was using both teacher-centered methods and learner-centered methods. However, the teacher-centered methods were mostly in the form of lectures, while the learner-centered methods involved dividing students into groups to develop teaching aids or media as a course project.

### **6.3.2 Engagement of students in developing instructional media projects**

It was important to observe students' presentations to evaluate their skills and knowledge regarding the inclusion of students with disabilities, particularly students with visual impairment. Here, I will describe how the students organized themselves and developed artefacts for presentation in the EMT course seminars. As reported earlier, the EMT course consisted of a very large number of students. Students were instructed to form groups of 10 students each (the groups were not assigned by the teacher), in which they should brainstorm and then decide on what artefact to create for their seminar presentations. All the presented instructional media projects were graded as part of the students' continuous assessment, meaning that the points scored in the presentation of their projects were included in the final university examination grade. In the interviews with teachers, it was reported that a significant number of students were focusing on scores, not the skills and knowledge required. One teacher stated that,

Our students are not serious, they just want scores.

**Excerpt 6-15**, from an interview with a university teacher

This indicates that some teachers were dissatisfied with the motivations of students regarding competence and skills development during the course. This perception was derived from the nature of the media developed and the complexity of measuring individuals' engagement and participation in such group assignments.

It was important to determine the process in which the students engaged to achieve the objectives of the course. Through interviews with students, a number of steps were identified.

Two focus groups were used to shed light on the process and steps students followed when collaborating on the instructional media project for the course. The first group explained their procedures for arriving at a type of instructional media to design and develop for their course project:

We first faced a challenge: we were less than 10, and hence we were supposed to find other colleagues from another group which was also less than 10. So, we sent texts (messages) to our friends so that we could meet, and they agreed to join us; hence, we got a group of 10 people. We brainstormed ... how to get the topic ... so each of us brought up ideas and thereafter we discussed the ideas and how the media will be presented. The topics discussed included: (1) *alama za uandishi [punctuation in Kiswahili subject]*, (2) soil color (black and white...), (3) *matawi ya fasihi [branches of literature in Kiswahili]*. The majority supported punctuation marks.... Then we discussed how to prepare it ... For this we listed all the materials which needed to be bought, like plywood, razors, scissors, pens, rubber, boxes, marker pens, glue, plain white paper, and pencils. We divided ourselves to make a follow-up of the materials. Thereafter, we came together again and started developing the media... After finishing, three of us took it somewhere for safekeeping to wait for the day of the presentation.

**Excerpt 6-16**, from a student participating in a focus group discussion

This process shows that the students were challenged to find 10 group members for the EMT course. In response, they sent text messages to each other and then merged groups. Thereafter, as a group, they brainstormed to find a topic on which their instructional media would be based. Each group member contributed, and finally, three topics were identified: punctuation in Kiswahili, soil color, and branches of literature. The next step was to choose only one topic out of the three. A significant number of members in the group were convinced that “punctuation marks” would be a good topic on which to base their instructional media. This process shows that discussions occurred over the materials to be used and the ways in which to develop the media itself. This group was collaborative in the sense that every student had a chance to contribute to the development of the instructional media. The last stage of the project was the presentation of the media in a seminar, which would then be assessed and contribute to the students’ continuous assessment. The media developed by this group was intended to demonstrate how to teach punctuation marks in the Kiswahili language as a subject in secondary schools in Tanzania. Generally, the teaching aid developed demanded visual ability, and was thus not supportive of students with visual impairment.

Another group presented a map of Tanzania showing historical sites. The following excerpt describes the process the group went through to develop their instructional media.

In our group, we all came from different disciplines. We brainstormed to find a topic .... We got three topics like digestion system, slave trade, historical sites ... Finally, we agreed that historical sites were to be our topic ... It was also agreed that since we were having seminars and tests, it was not possible to meet for such work. Then we decided to pay someone to make it for us. So, we found a picture in a book and asked that person to draw it for us. Thereafter, we were ready for presentation.

**Excerpt 6-17**, from a student participating in a focus group discussion

In this group, the students belonged to different specializations. Some were prospective science teachers, while others were prospective social science teachers. This disciplinary diversity was evident in the variety of suggested topics (“digestive system, slave trade, historical sites”). For each topic, the group brainstormed to find an example of instructional media that could be used to represent it. The observations also show that not all members always agreed. However, a majority rule was applied. This means that the selected topic was not necessarily agreed on by all members; instead, if the majority agreed, then the topic of the group was selected. After deciding on the topic, the next decision was about how to develop it. First, the group determined a specific instructional media, and then they found pictures of historical site in textbooks. They agreed that this would be their instructional media for the presentation. The next question that emerged was how to work on it. Group members thought it would be a good idea to find someone who knew how to draw and let him or her draw the map for them. The reason behind such a decision was that, due to their tight schedules, they would not be able to draw it themselves. It is important to highlight here that this project was completed towards the end of the semester. In this period, students had to prepare for many examinations and work on seminar presentations for other courses; in their group, they discussed and agreed to hire a person to draw the map for them. The chosen person was to draw a map based on historical sites presented in a textbook. Each group member contributed money to pay for the drawing, which raises two concerns: first, ethical issues; second, paying someone else to draw the map deprived the group members from gaining the skills required in the course. Nonetheless, the plan proceeded as agreed and the drawing was prepared. Next, the group decided on who would present the map. Only one student was supposed to present the work on behalf of the entire group. Other group members were open to questions or elaborations if needed.

In both groups, students’ engagement was reported in different stages during the development of the instructional media for the presentation. There was much negotiating done to arrive at a decision. This process was both inclusive and flexible, leaving room to accommodate

diversity in the learning process. For some, group work was a good practice, while for others, this was not the case. In the focus-group discussions with students, it was reported that group work was sometimes a very complicated activity in the learning process. It was also reported that regardless of the large number of students in the courses, some students were not selected for groups due to their reluctance to participate fully in the group's activities. The following excerpt illustrates this problem:

Some students are dodging their group work ...some students get challenged to find a group to work with ... this is due to their habit of dodging.

**Excerpt 6-18**, from a student participating in a focus group discussion

The process of working in groups requires contributions from all group members to achieve the group's goal(s). This activity can be examined as a unit of analysis, and the participants' objective use of tools, the enabling environments, the governing rules, and the individual group members' assignments can be analyzed through the lens of UDL principles (i.e., provision of options for engagement, representation, action, and expression).

### 6.3.3 **Students' project presentations**

In the EMT course, students were provided the opportunity to develop and then present their instructional media. In the seminar sessions, groups of students were provided time slots for presentations. This subsection outlines how the presentations were delivered, in terms of how they promoted inclusion, particularly of students with visual impairment. I will use a sample of two presentations to provide an overview of pedagogical practices in relation to inclusion of visually impaired students.

The students were required to present their instructional media projects based on the guidance and specific questions provided by the teacher. In their presentations, the students were asked to provide a name for the designed artefact and to name the subject the media would be used to teach, the topic intended to be taught, the students' class level, and alternative materials for the media. Furthermore, the students were required to explain how they developed their media for the course project. In addition, they were also required to explain how the media would be used in teaching and at which stage of the lesson. Lastly, they were asked to explain the learner activities incorporated into the developed media.

Due to the size of the class, the presentation time for each group was not to exceed five minutes. Below are two examples of the developed media and how they were presented in the seminar. The first group, which presented soil as a real object, is labelled “Group X.”

*[Group X presents soil in a glass container.]*

*Teacher:* What is the name of the media?

*Student:* Soil profile.

*Teacher:* Which class will you teach?

*Student:* Form five.

*Teacher:* Which subject will you teach?

*Student:* Geography.

*Teacher:* Which topic are you going to teach?

*Student:* Soil profile.

*Teacher:* What alternative materials can be used?

*Student:* Iron materials.

*Teacher:* How was the media made?

*Student:* We collected types of soil, and we bought the vessel and fixed the vessel

*Teacher:* What are the students’ activities?

*Student:* While teaching, students can be attentive, listening to instructions and taking some notes. They can also ask questions when they do not understand and respond to the questions they have been given in the class ... *[another student from the same group interrupts]*

*Student 2:* In addition, sir, you can call some students to come and investigate the soil

*Teacher:* Did you think about whether students can touch and tell you about the texture?

*Student:* Yes sir, but it will depend on the nature of the class; if they are many, it may be difficult, but for a small number it can be suitable.

*Teacher:* Small number? Like how many?

*Student:* Forty, fifty or sixty! *[The whole class burst into laughter and starts murmuring. The teacher asks whether that is small. Students went on laughing.]*

**Excerpt 6-19**, from EMT project presentations observation record

In Group X, the media aimed to facilitate students’ understanding about soil profiles, which in turn demands visual perception. Although there was a tactile component, implementing it was considered unwieldy due to the large number of students in the class. In this presentation, it was difficult for the student teachers to show how the materials presented would be engaging and accessible to students with visual impairment. Another group, Group Y, presented the soil as a real object in small containers, and their objective was to enable students to distinguish clay from other types of soil. The following is an excerpt from the classroom observation record.

*[Group Y present soil classification in small vessels. Ten group members stood in front of the class; one started by addressing the issues of concern.]*

*Teacher:* What is the name of your media?

*Student:* Soil Structure.

*Teacher:* Which subject will you teach?

*Student:* Geography.

*Teacher:* Which class will the media be intended to teach?

*Student:* Form three, secondary school.

*Teacher:* What is the main topic?

*Student:* Soil.

*Teacher:* What is the specific sub-topic?

*Student:* Soil classification.

*Teacher:* At what stage or time will you use your media in the classroom?

*Student:* I will use it during application stage. I will start by explaining the concepts, then students will be asked to touch and see the soil for differentiating them.

*Teacher:* How and where did you obtain the materials?

*Student:* We bought some glasses and glue, then we attached the glasses together to get this structure.

*Teacher:* What can be alternative materials?

*Student:* Use of different shapes to differentiate this kind of clay according to texture.

*Teacher:* How will you use the media?

*Student:* I will display it to the students, and based on class size, students in groups will go in front of the class and observe the differences. The soil sample will be provided to students in order for them to touch and see the difference. In case I have 40 students in class, I will divide them into four groups: 40 divided by 10 equals 4.

*Teacher:* When others are observing, what will the remaining students be doing?

*Student:* I will give each group work with soil samples.

*Teacher:* Did you think of asking the students to bring soil of their own, and therefore you could ask them to differentiate the four kinds of soil?

*Student:* No sir, but if they will ask me more questions, I will ask them to take it *[the question]* as homework *[the whole class bursts into laughter]*.

**Excerpt 6-20**, from EMT project presentations observation record

In this group, the materials were presented more for sighted students. The presenters wanted students to “observe” the materials displayed in front of the class. It was difficult to determine how an alternative could have been provided for students with visual impairment. In general, the media presented by both groups were real objects or drawings. A tactile component, however, was mentioned as an alternative to observation. Furthermore, provision of more descriptions about the object (tool) was observed to be useful for students with visual impairment.

#### 6.3.4 Pedagogical aspects of the students' project presentations

Both group presentations put greater emphasis on visual materials, albeit with a tactile component. This was a context in which the need for flexibility in the presentation and use of the materials should have been emphasized. The attempt to provide accessibility options was perceived to be challenged by a variety of factors, including class size. The presenters were worried that class size could hinder their demonstration and use of the designed artefacts. The artefacts were presented in such a way as to provide an alternative for perception in which the visual information was explained by the teacher. Otherwise, there was no auditory alternative. The presented media were observed to facilitate the teaching process, but not the learning process. As previously mentioned, class size affects learning. In the EMT class, group sizes were large, and since the presentations were assigned scores per group, it was hard to definitively assess the understanding and participation of each individual student in the groups. Thus, group size affects assessment procedures. It was difficult to determine the contribution of each student in the group. Also, it was difficult to state whether student teachers in the course achieved their intended objectives. The following is an excerpt from an interview with a teacher who reported the effect of class size in relation to the achievement of the EMT course goals.

The class size is too big, about 1700 students, the sub-group consists of 10 people [*students*], and it is not easy to know how everybody participated in the assignment.

**Excerpt 6-21**, from an interview with a university teacher

The effect of class size was associated with challenges regarding the accurate assessment of learners' understanding of the subject matter. Confidence about whether students' performance reflected their proper acquisition of skills and knowledge (in both the CLT and EMT courses) was not evidenced. This limitation was due to the difficulties teachers experienced in ensuring that students' performance reflected the skills and knowledge attained in the course. In the group projects, students with visual impairment participated in different stages of the development of their media for the course. In addition, if the artefacts were described to them, visually impaired students could explain and respond to questions about how their instructional media could be used in the process of teaching and learning. The following excerpt from an interview with a teacher shows how some teachers viewed the engagement of students with visual impairment in the development and presentation of the instructional media for the course.

The students with visual impairment who participated in groups were also active especially in responding to questions. Though only one student presents on behalf of the group, the remaining [students in the group] can cooperatively respond to questions.

**Excerpt 6-22**, from an interview with a university teacher

The positive view illuminated by the teacher was supported by the students themselves. The challenge reported to be faced by students with visual impairment was the actual development of the media, but using the media for teaching was not considered a challenge. Every student teacher was attached to an educational institution (a school or college) to practice teaching. Thus, in this context, the excerpt below captures the voice of a student with visual impairment explaining the complexity of applying the skills and knowledge obtained in the EMT course.

I used a drawing to teach my students in History. It was a picture of a processing industry. I paid for someone to draw it for me. Then, I asked one student to explain the media and I taught what I wanted. It is still challenging, though, for visually impaired students.

**Excerpt 6-23**, from an interview with a student with special educational needs

In this course, it was discovered that some of the group projects presented by students were not prepared by the student teachers themselves, being either bought outright or, in some cases, completed by someone outside the group on its behalf. Furthermore, some of the teaching media presented were taken from textbooks. Many of these instructional media were visually demanding artefacts, which for the most part did not provide equal opportunities for visually impaired students for engagement and access to the constituent skills and knowledge. Hence, university teachers considered the practice of extracting course artefacts from textbooks and/or purchasing media for the course presentation as an indication of a lack of “seriousness” on the part of such students. The teachers were less concerned about whether the students were achieving the intended course objectives. The objectives, skills, and knowledge were about developing and using instructional media in the teaching and learning process. The media presented were awarded scores, but the skills achieved were less prominent. The group projects were viewed as learner-centered pedagogical practices. However, their effectiveness in promoting access to skills and knowledge specific to their level of education was not significant.



## **6.4 Pedagogical practices relating to the inclusion of students with visual impairment**

Both courses (CLT and EMT) were observed to be process-oriented, which means they both emphasized student engagement. The students' engagement in different learning activities was pedagogically constructed. The process of teaching and learning in this course was directed to achieve a particular goal and engaged several practitioners. The most important condition was within the institution itself, which tried to provide an enabling learning environment to support students' learning. The importance of different mediating tools to support the teaching and learning process, such as those used by students in their projects and those used by teachers in the classroom, was noted. In the classrooms, students with visual impairment were more reliant on hearing and the use of voice-recording equipment. It was observed by teachers, students and SNE experts that, pedagogically, both teacher-centered methods and learner-centered methods of teaching were applied. However, teachers viewed learner-centered pedagogies as less effective for various reasons, including the large class sizes, lack of commitment to learning among students, inadequate time in relation to the subject matter being taught, and a shortage of tools to facilitate teaching and learning. Given such challenges, teacher-centered pedagogies were more favored and viewed as more effective than learner-centered pedagogies. In the next part of this chapter, I will specifically present the pedagogical practices in higher education in relation to the inclusion of students with visual impairment.

### **6.4.1 Teacher-centered pedagogical practices**

In the observations made in this study, teachers are positioned as the main source of knowledge: teachers talk while students listen. The students were viewed more as recipients of information provided by teachers and less as contributors. As was observed and reported in the two investigated courses, significant learning activities were determined by the teachers, which in turn influenced the students' learning process. The main effect of this arrangement was reported to be the students' dependence on the teachers' lessons and materials. The idea of providing teaching notes and other materials to students was viewed differently by teachers and students. Students viewed this provision as helpful, as it made revision easier and aided in a fuller understanding of the subject matter, and because many students struggled to keep up with the pace of the lecture when taking notes. The practice of notetaking originates in lower levels of education in which teachers write notes on the blackboard and students copy them

into their notebooks, but this is not the practice in higher education, where teachers expect students to be able to take their own notes during lectures. The following excerpt shows how students perceived notetaking in higher education to be a challenging task compared to notetaking in lower levels of education.

[In] our education systems in lower levels, students are given notes, but here at university you need to take notes yourself during the lectures. We really suffer taking notes. Even in advanced secondary education, teachers give notes to copy, but at university, no. Some teachers may give notes if using PowerPoint presentations, some do not provide notes.

**Excerpt 6-24**, from a student participating in a focus group discussion

Some teachers openly opposed the habit of preparing and providing students with notes, as illustrated in the following excerpt from an interview with a teacher.

There is a note that says every professor should provide notes to students ... people do not know how bad this thing is, because students do not concentrate in the lecture room. They just stay there (in the class) waiting for the notes.

**Excerpt 6-25**, from an interview with a university teacher

In the interviews with teachers, several reasons were provided to justify why some teachers were not in favor of providing notes, foremost among them was the idea that the provision of notes disabled learning among students and instead promoted passive learning, truancy, and decreased motivation to read textbooks. Another reason provided was that some students used their teachers' notes to teach in other newly established institutions of higher education.

Some teachers do not wish to provide slides because the students, after getting the slides, keep reading the slides and not books, journals, etc. ... And some do not attend lectures once they get the slides presented in the class. [*From interview with teacher A.*]

Some students are asking for notes; they do not visit the library for more reading. It may have the effect of spoon feeding from lower classes to undergraduate students. [*From interview with teacher B.*]

My students ask for my teaching notes either printed or in softcopy. I do not provide them because they prepare books (pamphlets/handouts) and sell them, while I do not benefit from my own notes I prepare for teaching. [*From interview with teacher C.*]

**Excerpt 6-26**, from various interviews with university teachers

In the focus-group discussions with students, it was reported that students often read over previous notes provided by teachers, discussed past examination questions, and made use of the internet to search for materials online. The claim that students rarely attended the library

to read books was also supported by the students themselves, who stated that they only went to the library when provided an assignment requiring specific books from the library. In the following excerpt from a focus-group discussion, two students explain that the last time they had been to the library was because of assignments provided by the teacher in the EMT course. The first student uses the term *madesa*, a term used to refer both to the use of previous notes, provided either by teachers or former students, and to the use of past examination papers, which students often used to lead their discussions when preparing for examinations. The second student supported the claim that students read more notes and internet-based materials than books in the library.

*Student A:* Our studies depend much on *madesa*, [which means] previous notes provided by teachers, past papers, or internet-based materials. And some materials are in the library. We were given assignments and the teacher postponed the seminars so that we could go to the library to find answers for the questions the teacher provided. For example: good characteristics of media, differences between learning with media and learning from media. That was the last time I went to the library.

*Student B:* Also, we go to the library as a comfortable place to read our notes or papers, not necessarily the books which are in the library.

**Excerpt 6-27**, from a student participating in a focus group discussion

The issue of the provision of notes is an institutional concern of the Quality Assurance Bureau (QAB). Teachers are supposed to provide notes to their students; and to demonstrate the emphasis on the provision of notes to students, at the end of the semester, students are supposed to use “provision of notes” as one of the categories by which to evaluate the teaching and learning process of the courses offered. Students were also supposed to evaluate their teachers. As observed, some teachers were less satisfied with the requirement to provide notes to students. From the students’ perspective, notes can consist of either copies of PowerPoint presentations used in class or teachers’ written notes. There was less of a consensus on whether book chapters or articles qualified as teaching notes.

While some teachers did not favor providing lecture notes to students, others were more open to it and thus did provide notes to their students. In this group, the question was not whether to provide notes, but rather when the notes should be provided. Should the materials be provided before or after the lecture session? The provision of notes after lecture sessions was viewed as useful to students with visual impairment, as they could then take them to the SEU

to convert them into an accessible format. In the following interview excerpt, a student with visual impairment discusses the provision of learning materials.

Provision of teaching and learning materials ... I think no problem, because when we ask for notes, teachers give them to us, and then we ask our unit of special education to emboss and print them for us (in a braille format). The problem comes when the teaching and learning materials have photos or diagrams, which are challenging to be embossed.

**Excerpt 6-28**, from an interview with a student with special educational needs

To students, the provision of lecture notes was viewed as important for several reasons. Notetaking necessitates skills that many students viewed as a challenge. So far, the teacher's notes were used to find and re-read parts of lectures that were not understood and then discuss them with other students. Therefore, having a teacher's notes helped students in their group discussions. SEU staff and students with visual impairment favored the provision of notes after teaching, while others preferred receiving them before teaching. Some student teachers reported using the same teaching notes provided by their teachers to teach in teacher-training colleges during their field work. This practice was discouraged because such materials need to be modified for use in lower levels of education, and also due to teachers' concerns over the reuse of their notes without their permission. It was claimed that using similar materials without updating and adapting them to the new contexts was unacceptable.

As reported earlier, most of the teaching methods in higher education constituted teacher-centered approaches, in which the teacher is considered the primary source of knowledge. In the case of students with visual impairment, teacher-centered methods were preferred over learner-centered approaches. This is because in teacher-centered approaches, the teacher lectures on everything, and consequently visually impaired students can hear and record the entire lesson. Audio-recorded lectures could then be listened to repeatedly by these students depending on their needs.

#### **6.4.2 Factors contributing to the use of teacher-centered approaches**

Several factors were reported to contribute to the selection of teacher-centered approaches among student teachers. These factors included teaching load, class size, availability of facilities, limited knowledge of various teaching methods, and students' background, expectations and needs.

### *Teaching load, class size and other responsibilities among teachers*

Teachers reported that the main teaching approach at university was the teacher-centered lecture format. For teachers with a heavy teaching load, as well as teachers with other administrative responsibilities, the lecture method was preferred. Teaching load includes the number of hours spent preparing lectures, the actual number of teaching hours in class, the supervision of students' projects or assignments, and the grading of students' work.

In the case of EMT course, the teachers named it among the courses with large class sizes of which it was about 1700. At the institution studied there was no a class for 1700 students hence the teacher had to spilt the class into two groups of which each group consisted of not less than 800 students. The course teacher also had to teach and supervise postgraduate students, as well as having many administrative responsibilities. The teacher therefore preferred the teacher-centered approach over the learner-centered approach.

### *Students' background and expectations*

In the interviews, teachers argued that the background and expectations of students influence the teaching approaches. The focus of many students was more on grades (scores) and less on skills and competency in the subject matter. Teachers argued that students expected them to lecture (i.e., use a teacher-centered approach), yet teachers with manageable class sizes were reported to use learner-centered approaches. It was argued that students viewed teachers who used learner-centered approaches as avoiding or delegating responsibilities. The lower levels of education were argued to be "spoon-fed," with the meaning that learners expected the teacher to provide them with everything they needed, while their main role was to simply memorize and recall information for examinations. Some students complained about teachers who attempted to change the "spoon feeding" mentality by promoting students' independent thinking. In other words, rather than promoting the notion that "teachers know everything," some teachers instead viewed students as resources possessing knowledge that should be shared in class. In the following excerpt, a teacher mentions a situation in which the students were encouraged to think independently and not merely reproduce information memorized from lectures.

I tried to ask students to work on concepts and what is happening in this country, and I faced a commotion. I gave students assignments which demanded them to consult different data sources ... the assignment wanted them to reflect on what happens on the ground or in real life. They found it too complex and the teacher too demanding.

**Excerpt 6-29**, from various interviews with university teachers

In addition, teacher-centered approaches were also encouraged due to the students' expectations and backgrounds. Such approaches were viewed as a "banking education system," in which students are required to simply store and retrieve information as needed. In the following excerpt, a university teacher discusses how the "banking system" concept was embodied in the context of the teaching methods observed in the present study.

In banking systems, you are giving everything to a student who puts it somewhere ready for reproducing in the examinations. This happens mostly for large classes.

**Excerpt 6-30**, from an interview with a university teacher

The effect of this teaching approach is that students rely only on teachers' notes to pass examinations. There was no motivation to read books in the library, for example. As a result, the reading culture is not developed among higher education students, the consequences of which are evident in the responses students provided in their assignments, especially those involving writing skills. The terms "spoon feeding" and "banking system" as used by the interviewees refers to a teaching practice that assumes students to be "empty containers" and teachers to be those who fill them with what is traditionally called "content." The purpose is not to foster long-term learning outcomes; instead, it is simply to memorize content to be reproduced in examinations. In one interview, a teacher reported how "spoon feeding" and the "banking system" affected students' learning:

But more generally on the side of students, the reading culture is dying very fast. So, if you can provide them with books, the chance that they will read is very limited. Most of them are used to chat through WhatsApp and other social media; they are using shorthand and this is coming up when responding to examinations [questions]; you can see this clearly when responding to essay questions.

**Excerpt 6-31**, from an interview with a university teacher

#### *Availability of resources for practical computer training*

The study noted that the availability of teaching materials and resources had an impact on the selection of instructional methods. This was observed when students had practical sessions in the computer laboratory. There was a great shortage of computers for students to practice on

and use to follow teachers' instructions. In the first course, the teacher used PowerPoint presentations to lead the practical session, which concerned how to use the Excel program to process examination results for students. Students took notes instead of practicing due to the inadequate number of computers in the computer laboratory. In the case of students with visual impairment, no computer was installed with text-to-speech software, such as Job Access with Speech (JAWS) or Nonvisual Desktop Access (NVDA), to support their access to the skills and knowledge needed for the CLT course. In this study, it is argued that students with visual impairment had no opportunity to access the necessary practical skills and knowledge due to a lack of supportive facilities. In the following excerpt, a teacher explains how difficult the situation was due to a shortage of supportive facilities when teaching.

The computer lab seems to have hardly six working computers, and in each practical session, there are 30 to 40 students, hence the ratio is one PC to almost seven students. So many students were still listening and taking notes from me. Not all students have laptops, just a few of them. So, this is a challenge for practical session to be effective. The situation is worse for students with visual impairment.

**Excerpt 6-32**, from an interview with a university teacher

## **6.5 Communication and the use of media and technology in the classroom**

In higher learning institutions in Tanzania, the medium of instruction is English, except in Swahili courses. The use of English in classrooms was reported to create some challenges, not just for teachers but also for students. The issue of using two languages in teaching was observed to facilitate a dual representation of the subject matter. In the case of this study, English and Kiswahili were used. In the inclusive classrooms, the issue of code-mixing was observed to be a challenge for inclusive practices. The following excerpt from an interview with a teacher shows that code-mixing, when used in classes, affects not only students with special needs but also foreign students (“non-nationals”).

In higher education, we mostly use lecture methods; it does not give them [students] time. Minorities and non-nationals suffer much, especially when Kiswahili is used in lectures (bilingualism). Therefore, some languages used in classrooms exclude students regardless of disability. This is a big challenge!

**Excerpt 6-33**, from an interview with a university teacher

In fact, higher learning institutions are by nature international, so it is always possible that there may be students who do not speak Swahili (Swahili and Kiswahili are interchangeable, i.e., the same language). Kiswahili is the national language and the medium of instruction in

primary schools in Tanzania, while English is a foreign language, albeit one used in secondary school instruction. There was a perception that using Kiswahili words or phrases in combination with English instruction would help students better understand the subject matter, yet the study shows this was not always the case. Instead, it developed barriers to both non-Swahili speakers and visually impaired students, particularly when transcribing their audio-recorded lectures into braille format. It was thus a more complicated tactic, and students with visual impairment had to take additional time to determine which English words or concepts the teachers intended to present. So, in general, whenever mixed languages are used, difficulties result. Students with visual impairment had to listen, find appropriate words in English, and then type their notes in Perkins braille for future reference. As a result, their translations were likely to be irrelevant for discussions with other students. The following excerpt from an interview with a visually impaired student explains how the situation of transcribing the audio-recorded lessons into braille format was tedious.

I record the lectures; it is very nice because I can have all the things presented (discussed) in class. The challenge is during transcription: it takes so long to transcribe, it requires listening and stopping the audio recording gadget frequently to understand the meaning of what was said, and then type it in Perkins Braille, a too tedious task.

**Excerpt 6-34**, from an interview with a student with special educational needs

Another issue in communication was the use of pointing words or phrases. These are vague words or phrases in the sense that they do not state meanings by themselves, but instead refer to what they indicate or represent in context. For example, the meaning of “look at this number here” will be understood only if one can see the number being designated. This kind of phrase in the teaching context was reported to create barriers. The students with visual impairment reported experiencing such challenges from the use of perceptually demanding phrases. For instance, students with visual impairment provided an example of less communicative approaches applied in classrooms. In their example, a student argued that the teacher was presenting numbers in columns in a chart that, at the end, had to be compared regarding differences in two given sets of data on temperature [here the student with visual impairment provided this example from another subject, not the subject that I observed]. This was typically a visual task, but the teacher was not aware of the barriers being erected for visually impaired students. In the following excerpt, a visually impaired student provides an example of a teacher who was fond of using phrases requiring visual capability.



If you look at this value here and compare with these values here, then which day do you think was hotter?

**Excerpt 6-35**, from an interview with a student with special educational needs

For a student to respond to this question, he or she would first need to see the set of temperature degrees being displayed. Unfortunately, the data were displayed as a PowerPoint presentation. While other students could see the data and state which day was hotter, this was not possible for students with visual impairment. Thus, this pedagogical practice did not enhance the inclusion of students with visual impairment.

Another example of perceptually demanding tasks and the ways in which they create barriers to engagement and access to skills and knowledge is expressed in the following excerpt from an interview with a visually impaired student.

It reaches a time when our teacher was saying, “This and this equals to how much?” So, we hear other students say five. Then we assume that maybe it is three plus two or maybe four plus 1, or ... While we are still contemplating about the example given, you find the teacher has already left and started another example. It is hard to know what was “this plus this” which brought five.

**Excerpt 6-36**, from an interview with a student with special educational needs

In this context, the student needed sight to respond or engage in the discussion. Alternatively, the teacher could have mentioned the number(s) instead of using demonstrative words/phrases. The use of demonstratives created barriers to visually impaired students and, as a result, it became difficult for them to be engaged and access the skills and knowledge needed.

The pronunciation of English words also caused communication barriers for visually impaired students. The students argued that some teachers used American slang and accents, while others’ pronunciations were influenced by their first language, making it difficult for the students to hear and understand. This was not only a challenge to visually impaired students but to students in general, especially in terms of notetaking and comprehending subject matter. Furthermore, in the case of students with visual impairment who were recording the lectures, the transcription process was very difficult. The following is an excerpt from a student whose focus-group discussed such difficulties.

[Regarding the] accents and the pronunciations used, sometimes I do not understand what they [teachers] say. I can't understand what the lecturer is teaching. For example, some lecturers have American accents; we do not really understand, it is slang, and we are left empty handed and headed. This is a barrier really.

**Excerpt 6-37**, from a student participating in a focus group discussion

Thus, how language is used can present challenges to the promotion of access to skills. Furthermore, it was reported that not all teachers were using PowerPoint presentations. Some were not using them due to inadequate skills or lack of equipment, such as laptops and projectors. With some exceptions, teachers with less teaching experience were reported to favor the use of technology more than the experienced teachers. Although teachers were reported to value the contribution of technology, it was not widely used due to various challenges.

When we project on slides students get correct information by seeing the spellings, as some may have problems with pronunciation. Though projection is good, in developing countries there are so many challenges: low level of technology and lack of facilities, for example laptops; some teachers read their notes from the laptop but do not project them, just carry your own laptop, no projector. Other challenges include the presence of unreliable power [electricity] and low knowledge on how to use technology among lecturers.

**Excerpt 6-38**, from an interview with a university teacher

Students with visual impairment reported that when PowerPoint presentations were used in class, some content was skipped by teachers. There were two reasons for this, according to these students. First, the teachers assumed that all students could see what was projected. Second, the teachers believed that the students would read and discuss the content with each other. The students reported that teachers occasionally provided a copy of the slides presented. However, visually impaired students had a problem converting them into braille format. This was supported by one SEU employee who reported having trouble converting some slides provided by teachers into braille print.

Though many teachers prefer to use PowerPoint presentations, some are in pdf or in programs which are incompatible with our software; therefore, it is important to have a hardcopy so that I can compare. But mostly, we prefer teachers to use word format in their slides.

**Excerpt 6-39**, from an interview with an SNE expert

Another relevant category of media and technology are public address (PA) systems. In all large lecture rooms, tools such as wireless microphones and speakers were available to

amplify the voices of teachers during lectures. These PA systems were intended to ensure that the teacher is clearly heard by the students and were especially useful to students with visual impairment as their main avenue for encoding information is through hearing. However, some challenges were encountered interfering with the recording process, such as teachers' inability to use the microphones while teaching, teachers moving away from the microphones as well as ambient noise.

As was observed in the CLT course, media and technology can break down. In this case, the teacher was unable to use the microphone due to ambient noise in the surrounding environment. This in turn affected the pedagogy to a certain extent. As noted, the presence of technological devices in classrooms does not necessarily assure equal opportunity for students' engagement, access to knowledge, and development of skills of equal quality.

Teachers' use of blackboards and whiteboards to clarify concepts was observed to be a useful tactic in the study, as described by one of the teachers:

When speaking, students do not understand immediately, but as soon as I use a blackboard or whiteboard to explain the concept, it becomes easier.

**Excerpt 6-40**, from an interview with a university teacher

In the case of students with visual impairment, it was reported that some teachers made good use of the boards. Whenever they wrote something important on the whiteboard, they also spelled it out and explained it in such a way that students with visual impairment could understand. But some teachers were seen as less supportive of visually impaired students. These teachers wrote but did not spell out or explain the concepts sufficiently. One visually impaired student provided an example from class sessions where a student with visual impairment asked the teacher to spell one of the words being repeatedly used and written on the whiteboard, but the teacher refused, asking the student how many words should be spelled out in the class while teaching:

Pronunciation of English words is confusing when teachers pronounce them with the effects of other languages. Teachers write the words on the board but do not spell them for us to note. For example, my fellow asked the teacher to spell the word, "Bourgeois," which we heard the teacher pronounce and then write on the whiteboard. The teacher refused by saying "How many words shall I spell?"

**Excerpt 6-41**, from an interview with a student with special educational needs

This example appears to indicate unfavorable attitudes among teachers towards students with disabilities, although it may also simply suggest a lack of experience in assisting students with special needs. From an interview with a visually impaired student, the following is an excerpt which reflects the use of boards by less supportive teachers. In a learning situation, visually impaired students need to hear the correct spellings of new words and concepts introduced in class. If the spellings of new concepts are not given, then barriers are created to adequate learning.

## **6.6 Challenges teachers face in teaching inclusive classes**

In the interviews with teachers, several challenges regarding teaching inclusive classes were reported. An inclusive class simply refers to a class in which students registered with the SEU are included with colleagues without identified disabilities. Teachers were reported to experience different challenges in promoting engagement and access to skills and knowledge for students with visual impairment. Inclusion demands an appropriate design to ensure access to learning. Teaching approaches were observed to be among the barriers to accessing learning by students with visual impairment. The following subsections describe the challenges that teachers reported in teaching inclusive classes.

Teaching is a process that requires knowledge about how to teach, and in the teaching process, students' conditions do matter. The teachers in the studied institution reported that every teacher was viewed as being capable of teaching an inclusive class, yet it was added that not all teachers in higher education were trained to teach. It was also argued that some teachers experienced difficulties supporting visually impaired students and that teachers could not read the materials produced by students with visual impairment, which were in a braille format. In the following excerpt, a teacher explains the challenges faced when trying to support students with visual impairment in their university studies.

It is a very low percentage of teachers who have been prepared to support students with special needs. It is like the government overlooked this part with an assumption that every teacher might have an ability to teach classrooms with students with special needs. It is important to remember that students with special needs have more needs that teachers would be in a good position to help if they could know other necessary skills like the use of braille; then they could teach, read, and mark students' work as well as interacting with them because they have the skills. But this is not the case in higher education. I know I have students with visual impairment in my class, but I do not know how to use braille; in another way, I will not be able to help my students with visual impairment.

The challenges teachers faced were reported more during university examinations, in which teachers had to construct questions accessible to all students in the course, including visually impaired students.

### **6.7 Assessment of students' academic progress**

Achieving inclusive education in higher learning institutions is more challenging when it comes to evaluating students' academic progress than it is in the teaching and learning process, where visually impaired students have opportunities to discuss the learning materials with their colleagues. There are two kinds of assessments: group assessments and individual assessments. As was observed and reported in the EMT course, students were satisfied with their group assignments (projects) but had difficulties with individual assessment activities, such as class quizzes, essays, tests, and examinations, which were mostly completed using paper and pencil. The assessments ranged in function from formative to summative. The former type was for monitoring the progress of students in their learning, while the latter was for decision making. Decisions based on students' performance included promotion to another level of study or expulsion due to failure to perform. Assessment activities in which decisions would be based on the assessment's results were perceived to be among the more sensitive activities in higher education institutions. Assessment tools, measures, and processes in general need to be valid for decisions to be fair and valid as well. Assessments, therefore, are aimed at evaluating what is supposed to be assessed. Teachers and the SEU collaborated to facilitate the quality and accessibility of the assessment tools used. Students with visual impairment, however, faced the most challenges. There were two categories of such students: those with poor vision whose assessment tools required enlarged fonts, and blind students whose assessment tools had to be in a braille format. In this study, students with visual impairment refer to blind students who read braille print. In the case of enlarged font size for assessment tools, teachers could do this by themselves. However, teachers could not process braille materials, so this work was completed by the SEU. In practice, teachers prepared the questions and asked the transcribers to emboss the materials so that students with visual impairment could access the questions. Teachers and SEU staff faced challenges in improving the accessibility of examination questions.

In the interviews and document reviews, it was reported that teachers prepared examinations for “average users.” Consequently, some of the items used for assessment presented barriers to the SEU, which had to convert the questions into an accessible format. Challenges were present in the examination instructions, the presentation of the questions, and the content of the questions. In the following subsections, I will present these challenges and how the approaches used to overcome them affect inclusion of students with visual impairment.

#### 6.7.1 **Challenges with instructions provided in the examinations**

In the interviews with SNE experts, it was reported that one of the challenges observed in the process of improving accessibility to questions constructed by teachers concerned that fact that some of the assistive devices used by students with visual impairment were not able to understand certain instructions. For example, in multiple choice examination questions, where students were sometimes instructed to circle the correct answer or insert a tick, two problems arose: first, embossing such circle or tick signs was difficult for braille readers, and second, the assistive devices would not allow the signs to be typed in the typewriter:

Teachers ask students to circle or tick the most correct answer; in general this cannot work on typewriter machines.

**Excerpt 6-43**, from an interview with an SNE expert

Thus, the challenge with instructions provided by examiners (teachers) is associated with how students are instructed to respond to the questions. In response, adjustments have been made for such instructions in the examinations to accommodate the needs of students with visual impairment. The SNE experts reported that instead of asking students to circle or tick, teachers should instruct them “to write the letter corresponding to the correct answer” (Special Education Unit, 2014). This suggestion provided by the SEU indicates that flexibility in terms of instruction is an important aspect for students with special needs and particularly for visually impaired students.

#### 6.7.2 **Challenges with presentation of questions in the examinations**

Another challenge reported in the process of student evaluation was related to the presentation of the examination items, that is, the format applied to construct the questions. Such challenges included “matching items” presented in a chart or table with columns and rows,

and items presented in sketches, photos, diagrams, or drawings, which were not easily converted into braille format. In the following excerpt, an SNE expert describes the difficulties faced.

Some assessment formats are not friendly to braille format. For example, matching items are not supposed to be in tables as many teachers practice here (in this institution); embosser does not support complicated tables, particularly those with numerous columns containing too many words.

**Excerpt 6-44**, from an interview with an SNE expert

In addition to challenges posed by the design of questions, the questions themselves were challenging for students with visual impairment. Technological devices used by these students were not able to produce tables, sketches, and diagrams. Thus, questions requiring visually impaired students to see the question and write labels were reported to create barriers, as stated in an interview with an SEU transcriber:

Another example is you find a teacher who asks [the students] to study a diagram and label the diagram provided to indicate the parts of the grasshopper. This cannot work for students with visual impairments.

**Excerpt 6-45**, from an interview with an SNE expert

In summary, SNE experts argued that the SEU was challenged to convert such items into a format accessible to visually impaired students. Likewise, it was challenging for these students to answer such visually demanding questions. However, most of the challenges faced by students with visual impairment and SNE experts could be solved by the use of appropriate equipment and software, or with some creativity on the part of the SEU.

### 6.7.3 **Challenges with the content of questions in the examinations**

In terms of the content of the questions developed by teachers, SNE experts reported that the content required from students was impossible for visually impaired students to provide. The SNE experts provided examples of questions requiring students to draw diagrams, which is too difficult for students with visual impairment. This means that students with visual impairment could not rely on either assistive technology or exposure to skills and knowledge about drawing. Such questions demanded content that was inaccessible to these students.

Teachers ask students to draw a diagram of a grasshopper or to study a diagram and respond to the questions that follow, or to label the diagram provided to indicate the parts of the grasshopper. This cannot work for students with visual impairments.

The questions that demanded visual acuity were reported to create inequalities, as they were impossible to complete by students with visual impairment. In the process of improving accessibility, the questions requiring students to draw or sketch were modified, as were the objectives of the questions. In such a transformation process, collaboration between the SEU and teachers was critical to ensuring that the questions were converted into an accessible format.

Several efforts were reported to have been made, especially in relation to examinations. Both teachers and SNE experts observed that examinations were considered highly sensitive matters to be handled carefully, and that students with visual impairment should not be deprived access to the skills and knowledge needed to perform well on the examinations. The SEU was reported to share knowledge with teachers on different strategies to improve the accessibility of the examination questions. In a document entitled “Guidelines for lecturers/examiners on how to handle students with disabilities in different settings” (2014), the SEU indicated that some questions constructed by teachers were visually demanding and as such not recommended; instead, the unit proposed substituting the questions with others that appealed to tactile and auditory senses. In reflecting on examples of questions viewed as inaccessible, as well as the way in which they were converted by the unit, this study argues that the converted items changed the objective (level) of the questions. This means that the skills and knowledge tested seemed different from the original questions.

The above-mentioned SEU document includes guidelines for the design of examination questions in higher education and provides examples of questions deemed to be inaccessible, together with examples of similar but more accessible alternative questions that were suggested to be capable of measuring different levels of the cognitive domain (see Figure 5 below). The document emphasizes the application of universal design principles and guidelines to avoid unnecessary modifications. Observations referred to in the SEU document indicate that any modification is likely to compromise the quality of the skills or competencies being measured. For example, the question “Draw a well-labelled diagram of a housefly, indicating its three main parts” was deemed to be inaccessible to students with visual impairment, as responding to this question would require vision. A more accessible version of the question is suggested: “Mention the three main structural parts of a housefly, citing the corresponding position of each part.” This alternative is not the same, however, in



terms of the skills and competencies required. The original question asks for *drawing* and *labelling*, while the alternative asks for recall of the three parts of a housefly. In this alternative question, the core skills purported to be measured are different from the original question. The alternative could not measure what the original question intended to measure. Hence, the quality of the evaluation was compromised in this respect.

**Example 1:**

- a. Draw a well-labelled diagram of a housefly indicating its three main parts. (*Not accessible*)
- b. Mention the three main structural parts of a housefly, citing the corresponding position of each part. (*Accessible*)

**Example 2:**

- a. In the box below, draw what you consider to be the communication cycle and on the three dotted lines that follow the box explain the usefulness of the feedback. (*Not accessible*)

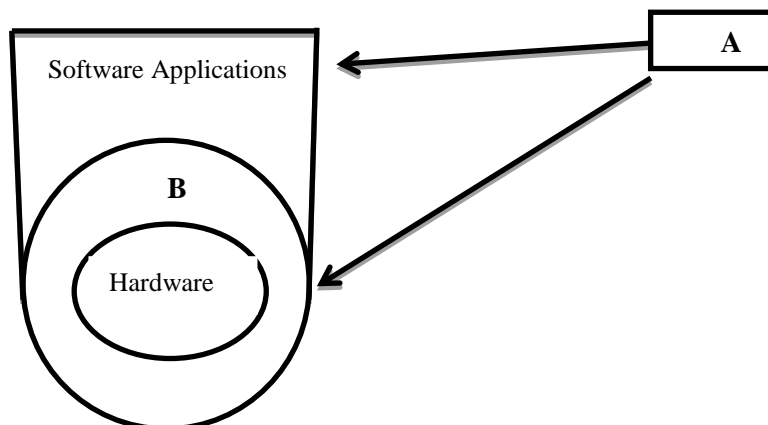
.....  
.....  
.....

- b. Identify all basic components of what you consider to be ‘the communication cycle’ and on the three dotted lines below, explain the usefulness of the feedback. (*Accessible*)

.....  
.....  
.....

**Example 3:**

- c. Figure 2 below represents the relationship between hardware and software. Name the items labelled A and B. (*Not accessible*)



- 1. Name two components which represent the relationship between hardware and software. (*Accessible*)

**Figure 5.** Excerpt from SEU manual showing how to construct accessible questions for visually impaired students. Source: SNEU (2014)

## **6.8 Approaches used to address inaccessibility of assessment tools**

In addition to the approaches recommended by the SNE experts, teachers reported various other ways of handling accessibility issues relating to examination questions. Four approaches to improving accessibility for students with visual impairment were identified.

### **6.8.1 Construction of equivalent questions**

The first group of teachers constructed two versions of the examination with equivalent questions. Interviews with teachers revealed how difficult it was to develop alternative questions with similar or equivalent weights and objectives. Furthermore, this method was reported to create problems among students, as some assumed one version might have been easier than the other.

### **6.8.2 Delegating all responsibilities to the Special Education Unit**

In the interviews with teachers, it was noted that some teachers left all responsibilities to the SEU. The teachers reported that the normal procedure was to construct one version of the examination and then take the softcopy to the unit. Thereafter, the unit was responsible for processing the examination into an accessible medium for students with visual impairment. Unit staff members embossed the examination items in order to enhance accessibility. The following is an excerpt from an interview with a teacher who viewed the issue of improving accessibility to examination questions as the role of the SEU.

In terms of assessment, we take tests to the special education unit and an invigilator (teacher) is sent to invigilate (supervise) the exam. So, I normally send the softcopy of my exams to the special education unit and they reproduce according to the needs of the students with special needs.

**Excerpt 6-47**, from an interview with a university teacher

For SNE experts, processing examinations without complex instructions or formats was relatively manageable. However, complications often arose in situations where the content of questions cannot be processed and embossed for students with visual impairment. Accordingly, the teachers were asked to restructure the question(s), which was also perceived as difficult insofar as maintaining equal attributes.

### 6.8.3 Deleting the question

In handling problems related to the inaccessibility of examination questions, some teachers reported simply deleting inaccessible questions. This occurred mainly when teachers submitted their examinations late to the SEU, meaning that there was no time for revising and improving questions for the sake of accessibility (it was not possible for the SEU to process and modify inaccessible questions in exam papers brought to the unit 30 minutes prior to exam time). In such cases, the course teachers simply asked the unit to delete inaccessible questions. The following is an excerpt from an interview with a teacher who reported challenges with constructing accessible examination items for students with visual impairment.

Setting examinations is an issue. I put a table there in the exam and send it to the [SNE] unit; during the exam I receive a call: the student cannot read a question, what to do is to remove/delete the question. Hence the marks will not be the same as those of others.

**Excerpt 6-48**, from an interview with a university teacher

### 6.8.4 Changing the question

In the interviews with teachers, it was found that when certain questions could not be embossed, the best solution was to change the questions. Teachers in this category argued that although the curriculum should stay the same, the evaluation process could be adjusted to accommodate students with visual impairment. The following excerpt is from a teacher who emphasized adjustments in the evaluation process but not in the curriculum.

*[There is]* no difference in [the] curriculum. Of course, there are situations, especially in examinations, where adaptations and changes are needed to accommodate the students with disability. For example, there are people who change questions for the examinations so that students can cope with [them].

**Excerpt 6-49**, from an interview with a university teacher

It was added that some content and questions required assistive technologies, which would be feasible for those accustomed to using them. However, some questions should simply be changed to meet the needs of the students. One teacher indicated the need for teachers and transcribers in the SEU to orient students towards the various assistive technologies that could be used in the evaluation process.

Actually, some of the things students with visual impairment should be able to do. But they need gadgets [assistive technology] to facilitate their process of learning. If you tell them to work with numbers yet they do not have gadgets to work with [these] on their own, then there is a problem. And it is difficult for them.

**Excerpt 6-50**, from an interview with a university teacher

In the interviews with SNE experts, it was reported that accessibility problems were decreased when teachers collaborated with the SEU. Furthermore, transcribers were less favorable towards teachers who simply deleted or removed questions identified as too difficult for students with visual impairment. Also, the alternative questions were observed to be different in terms of the skills measured and level of complexity. It was also reported that students with visual impairment were less satisfied when informed that their questions were modified due to inaccessibility issues. These students called for equality and equity: it was the assessment tools which needed modification, instead of students. This simply means the designing of assessment tools needs to accommodate different needs of students.

#### **6.8.5 Issues relating to examination marking and releasing examination results**

It was reported that teachers with large classes graded the examinations of students with visual impairment last. The reason provided for this during the interviews with teachers was that more attention was required when grading students with visual impairment due to the organization of their work. The teachers argued that questions and question numbers were sometimes misplaced. Thus, some teachers thought that grading their examinations last would benefit the students, yet not all of the teachers or SNE experts agreed with this view.

As a teacher, I mark the scripts of students with disability at the end, after [I] finish marking all other scripts of other students. The reason [for this] is [that] when I mark their papers I require more attention: they sometimes misplace the questions [or] misplace their responses against the respective number of the questions. So, I need more time and more concentration to mark students with disability's papers. And sometimes, I release the course work [results] because of pressure of other students; I may release the big load. It brings another perception [negative perception by working on papers of students with visual impairment last, after marking all papers of other students] of why marking their paper last and releasing their course work after releasing those of their fellow students without disabilities. What I can say is [that] there is an issue of marking and releasing of course work.

**Excerpt 6-51**, from an interview with a university teacher

## **6.9 Chapter summary**

This chapter focused on teaching pedagogies and the way they influence inclusion of students with visual impairment in a higher learning institution, through examining the case of two courses (CLT and EMT). The experiences of teachers, visually impaired students, and SNE experts were brought to light through interviews. Generally, the institution investigated emphasized learner-centered approaches, and for this reason the two courses provided practical skills and knowledge to students. However, due to the diversity of students and their varied educational needs, in addition to a lack of technology and facilities that can enable the inclusion of students with visual impairment, teacher-centered approaches was favored by teachers and students with visual impairment. Visually impaired students relied mainly on oral presentations and recordings of lectures that they later transcribed as lecture notes.

In the cases where teachers attempted to apply learner-centered approaches with the aim of providing equal access to learning opportunities, these approaches were observed to be problematic due to the shortage of teaching and learning facilities to support learning activities. This situation was unfavorable to students with visual impairment, and for this reason, such students favored teacher-centered approaches, characterized by “teacher talk.” The importance of learner-centered approaches was not ignored, but the implementation of such approaches in a learning environment that lacks adequate teaching and learning materials is counter-productive. In the two courses observed, it was found that students with visual impairment did not have equal opportunity to engage and acquire knowledge and skills of equal quality.

Another observation was the importance of cooperation and collaboration among different actors, which was reported to be significant. According to the CHAT methodology, there should be an interrelationship among CHAT components such as community and subject, which calls for the division of labor, rules, and appropriate tools to achieve the intended goals. As reported, several challenges arose in relation to the mediating tools such as computers, voice recorders, PA systems, and assistive technologies, some of which were in a poor condition. If the mediating tools were universally designed, engagement and accessibility of learning materials for visually impaired students could be increased.

Although the institutional culture and historical attributes of the institution supported inclusion, there was no specific approach in place to promote inclusion of students with

special needs. Therefore, there is a need to promote UDL as a pedagogical approach to engage and enhance equal access to learning opportunities for all students.

# **7 Learning Experiences of Students with Visual Impairment**

## **7.1 Introduction**

In this chapter, the learning experiences of students with visual impairment are addressed by listening to their own “voices” regarding engagement and access to skills and knowledge in higher education. As stated earlier, the core principles of UDL concern the provision of multiple ways for engagement, representations, actions, and expressions. Effective inclusion of students is supported by appropriate use of mediating tools in the learning process. CHAT emphasizes the interactions of tools, subject, community, the guidance of rules, and specialization that contributes to goal achievement in the activity.

I will examine and report the experiences of students with visual impairment in different aspects such as teachers teaching practices or pedagogies, learning approaches, evaluation activities, challenges when using assistive technology (devises), challenges working with paraprofessionals like notetakers and readers. It is important to note that the learning experiences discussed in this study are not limited to the two courses investigated in Chapter 6. Accordingly, this chapter focuses not only on these two courses but also on experiences from other courses concerning the inclusion of students and opportunities for engagement and access to skills and knowledge in their profession, as reported by students with visual impairment.

## **7.2 Students’ experiences based on teaching practices**

Students’ engagement in the learning process contributes to the development of competence in the profession. As reported in Chapter 6, two pedagogical approaches were used; teacher-centered approaches (lecture methods) and student-centered approaches (seminar, practicum, and projects). In teacher-centered approaches, teachers are the sources and “senders” of knowledge, while students are the “recipients.” Learner-centered approaches, on the other hand, are primarily activity-based approaches in which student engagement is core to the learning process. The two approaches were exemplified in the two courses reviewed in this study: Computer Literacy for Teachers (CLT) and Educational Media and Technology (EMT). However, the studied institution encouraged learner-centered approaches based on the

hypothesis that students learn better through hands-on experiences. However, such approaches are less inclusive of students with visual impairment since hands-on learning experiences require facilities that were reported to be unavailable or in short supply. In such contexts, therefore, students with visual impairment lack engagement opportunities.

In the following excerpt, one such student explained how difficult practical sessions were in the absence of interactive facilities. The student had attempted to use a PAC device in the class but it produced too much noise, which the student claimed was unfavorable to other students in the class. In this situation, the approach was practical (learner-centered) but not inclusive, and it created hindrances to the learning process itself.

I remember a computer course, which was practical, where the facilitator asked students to click xyz and find out what happens; unfortunately, I could not catch anything in that course, I had a PAC Mate but it had no screen, so the teacher could not see the results of my work. The PAC Mate I sometimes tried to use in class, but it is too noisy: it disturbs my fellow counterparts [students].

**Excerpt 7-1**, from an interview with a student with special educational needs.

It was argued by students that the use of teaching aids facilitates the process of teaching and learning. However, this is not always the case, especially concerning students with visual impairment, as some teaching aids exclude such students. Some students argued in the interviews that other students had an opportunity to obtain information through different senses, but students with visual impairment basically depended on auditory and tactile senses alone. The following excerpt is drawn from an interview with a student with visual impairment who raised a concern to a teacher when a particular teaching aid or method (as mediating tool) was being used.

The use of teaching media should be designed to be inclusive. Does your teaching aid enable every learner to understand your concepts? Most of us, we cannot see, we can touch and hear it.

**Excerpt 7-2**, from an interview with a student with special educational needs.

The main concern of this student was whether the teaching aid used by the teacher was useful in supporting inclusion of students with visual impairment (i.e., whether the tool was universally designed).

Another learning experience reported concerned the availability of learning materials (mediating tools) such as textbooks. The experiences of students with visual impairment who were interviewed showed that they had never encountered a braille book being used in higher



education. As a result, it was not possible for them to interact with the textbooks independently as they depended on readers to read the books to them. In other words, the books were inaccessible to visually impaired students. Furthermore, the students observed that since the library was a place where people read silently, it was not convenient for students with visual impairment and their readers. Clearly, readers must read aloud for visually impaired students to hear. Hence, some students with visual impairment made use of rooms in the SEU for reading. The following excerpt describes a student's experience regarding inaccessible learning materials.

I had never found a book in braille here [in the institution], and I had never gone to the library. I hear that people have to read silently in the library, while for us, we need readers.

**Excerpt 7-3**, from an interview with a student with special educational needs.

It is important to note the different impressions students with visual impairment had about teacher-centered and learner-centered approaches: students with visual impairment were more in favor of teacher-centered approaches in which teachers talk more and thus visually impaired students can use voice-recording devices to retain more information about the subject matter. This contrasts with learner-centered approaches, where teachers facilitate the lesson, but students are more responsible for a variety of practical activities and experiences. Most challenges faced by students with visual impairment were related to inaccessible mediating tools (i.e., tools that were not universally designed).

### **7.3 Students' experiences based on learning approaches**

In the context of students' learning approaches, two main approaches were highlighted: individual learning approaches and collaborative learning approaches. These approaches depended on contextual factors, yet collaborative learning approaches, which involve discussions between colleagues, were more often used to facilitate access to skills and knowledge, especially by students with visual impairment. The following is an excerpt from an interview with a student who explained how discussions were important and beneficial.

I use different learning strategies, such as studying hard, writing notes, and reading them frequently, but we benefit much from our colleagues in the group discussion.

**Excerpt 7-4**, from an interview with a student with special educational needs.

Although the perception of students with visual impairment about group discussions was positive, some difficulties were also mentioned. The most complicated aspect concerned how to form a group in which everyone enjoys working collaboratively. The experiences of the students with visual impairment demonstrated that groups developed by the students themselves were more productive than those created by teachers. Apparently, the students needed the freedom to choose and create their own groups.

Despite the claim that students with disabilities faced difficulties in being chosen for a group, this was not apparent across all learning contexts. In some classes, students with visual impairment had friends or peers who wished to work collaboratively with them. The following excerpt conveys the experience of a student with visual impairment in learning in an inclusive setting.

Students with disabilities are good to associate with others, though sometimes students without disabilities avoid us with a fear of getting low scores in the assessment [assignment]. A good group practice is that we are allowed to select our groups ourselves, but those set by teachers are bad: we are avoided. One time, I was left alone in the group formed by our teacher.

**Excerpt 7-5**, from an interview with a student with special educational needs.

It was thus argued that letting students form their own groups for group work was highly advantageous, particularly to visually impaired students. During group discussions with students without visual impairment, it was noted that students with visual impairment suffer in groups that are not formed by the students themselves. Sometimes, students were grouped by their teachers to perform a particular learning task. In such groups, students with visual impairment reported experiencing negative attitudes from some group members. But when students were given the opportunity to form their own groups, students with visual impairment reported a more positive collaborative experience. The following excerpt is taken from a group discussion with students:

Learning through imitations [just imitate what the teacher say or do in class], thus group discussion is good but very challenging. The challenges include lack of cooperation. This is worse to students with visual impairment: they are sometimes not engaged in groups.

**Excerpt 7-6**, from a student participating in a focus group discussion

In addition, both students with and without visual impairment reported occasionally experiencing difficulty in conceptualizing the learning materials. However, several approaches were applied to resolve this issue, including “cramming,” which students defined

as reading by heart, whereby memorization was viewed as a strategy. The aim of cramming was to pass the examinations, as questions asked by teachers resembled what was taught in class:

Imitation of teacher's definitions: if provided learning materials [*madesa*], then we imitate what has been provided by teachers so we cram the materials provided by teachers so that we can pass examinations.

**Excerpt 7-7**, from a student participating in a focus group discussion

As has been noted, the students' main concern was to pass the examinations. Two practical examples included memorization or making use of mnemonic patterns to aid in recall and retrieval, which implied active remembering of more complicated material. One student created a mnemonic to remember the six levels of the cognitive taxonomy of educational objectives, which were hierarchically arranged according to their complexity (see excerpt below). The mnemonic sounded like the name of a person, and each letter in the name corresponded to the initial letter of each level of the cognitive domain. Thus, it was possible for the student to remember the six levels in their order of complexity.

In learning the levels of the cognitive domain according to Bloom, I created my own name, which represented all levels in a right order by taking initial letters of each level. This was the word "kcaase" or "esaack." It was simple for me to remember knowledge, comprehension, application, analysis, synthesis, and finally evaluation.

**Excerpt 7-8**, from a student participating in a focus group discussion

The use of mnemonic patterns by visually impaired students worked principally as scaffolding, promoting the expression of what the student has learned or knows.

## **7.4 Experiences of students in the evaluation activities and processes**

In the teaching and learning process, evaluation is important for determining progress. Evaluation results affect both students and teachers. For students, failure is likely to lead to expulsion, while success will lead to promotion to a higher category of education. After graduation, employers look at the grades listed in students' academic records. Thus, evaluation needs to be valid and reliable as important decisions are made based on their results. Teachers are also evaluated by their students at the end of each semester based on the courses they taught. In this section, I discuss the experiences of students with visual

impairment both in evaluating their courses and in the evaluation of their academic progress at the classroom level.

#### **7.4.1 Experiences of students in evaluating their courses**

UDSM conducts various evaluations to guarantee the quality of teaching and learning on its premises. The monitoring and evaluation of teaching and learning processes are conducted by the Quality Assurance Bureau (QAB), which conducts evaluations in two ways: first, it observes teachers while teaching in classrooms, and second, it administers questionnaires to students, which are completed by students at the end of the semester. Given these circumstances, students with visual impairment are provided with fewer opportunities to evaluate their courses and their teachers, as the questionnaires have never been prepared in an accessible format for visually impaired students. Clearly, this practice is not inclusive. In the following excerpt, an SEU employee explains the lack of opportunity for students with visual impairment to evaluate their courses and teachers.

Course evaluation forms are never in braille format, [so] students with visual impairments do not have the opportunity to assess or evaluate their courses and their teachers at the end of the semester as is done by other students.

**Excerpt 7-9**, from an interview with an SNE expert.

This is unfortunate, as feedback from students with special needs is important for improving the process of teaching and learning.

#### **7.4.2 Evaluation of students' academic progress at the classroom level**

At the classroom level, a teacher is responsible for evaluating the whole process of teaching and learning. The strategies used to conduct evaluations are likely to vary from anecdotal observations to the provision of particular tasks in the classroom. The most relevant strategy in this study was evaluation based on learning tasks. In the case of students with visual impairment, some of these tasks needed to be modified. For example, so-called “ambush quizzes” were problematic insofar as students with visual impairment require specific assistive technologies to complete them. This kind of practice was thus viewed as non-inclusive. The following excerpt conveys the feeling of a student with visual impairment regarding ambush quizzes and other unexpected class assignments.

Sometimes, you find a teacher comes and asks students to answer the following questions on a piece of paper, [but] our assignments need to be prepared in the unit of special needs education.

**Excerpt 7-10**, from an interview with a student with special educational needs.

Another student added that such assignments indicate ignorance of the presence of students with visual impairment in classes, as otherwise, alternative assignments would have been prepared for them:

When it happens that we are given a classroom quiz. What sometimes happens we are advised to share with colleagues? Other students have paper and pencil while for us we need a machine (Perkins braille or typewriter) to work. It is a challenge.

**Excerpt 7-11**, from an interview with a student with special educational needs.

Besides quizzes, which were viewed as disablers, teachers used other tools like projects, seminar presentations, tests, and examinations to evaluate students' academic progress. Challenges were reported more often for tests and examinations, and these challenges were related to a number of different factors that affected the performance of students with visual impairment. Such factors included inadequate given time, challenges in punctuation due to limitations in the devices used by students, organization of work, examination length, inexperience using assistive technologies, and outdated rules and regulations that were perceived to be inflexible in accommodating the needs of visually impaired students.

The most important assistive technology used by students in examinations was the typewriter. Teachers compose examinations in Microsoft Word and then the transcribers in the SEU convert the word document into braille format using an embosser. The document is then printed into a tactile format for students with visual impairment to read. Reading was not a problem, but the means to respond to the examination questions was. Inexperience using typewriters on the part of students with visual impairment was reported. Instead of using Perkins braille, which is used in lower levels of education, students with visual impairment were supposed to use typewriters. The use of typewriters is helpful to teachers but not for students lacking the skills required to use them. Some students could only use Perkins braille, and it was feared that these students could not read what was typed. Conversely, teachers could read the text, so long as it was not in braille. Consequently, students who could only use Perkins braille had to have someone else translate their work. This kind of service was not available in the institution investigated. The inclusion of visually impaired students was

therefore compromised. In the following excerpt, a student with visual impairment explains one challenge regarding the use of assistive technology devices during examinations or tests.

I started reading braille writing from class one. Unfortunately, I do not know how to use a typewriter. To be honest, the use of a typewriter is a big challenge. Imagine from class one to form six, I have been using Perkins braille to write my notes as well as doing examinations. But here at university I am told that I have to use a typewriter during examinations. I find this to be very challenging.

**Excerpt 7-12**, from an interview with a student with special educational needs.

When asked whether it was possible for them to learn how to use a typewriter, students replied that it led to disablers in learning practices. They also mentioned their tight schedules as an obstacle:

Here time is inadequate. I am supposed to attend classes, at the same time to find a person to read notes for me after periods: then how will I get time to study how to use the typewriter?

**Excerpt 7-13**, from an interview with a student with special educational needs.

Students with visual impairment who knew how to use typewriters were satisfied with the practice. For such students, hiring someone to process their materials was unnecessary. The following excerpt from an interview with a student describes the diversity among students regarding the use of gadgets in examinations.

Every [visually impaired] student is supposed to use a typewriter. I do not feel good to write by using Perkins braille, which will need my materials to be interpreted. I wish to use a typewriter because my examination will go direct to the teacher for marking instead of having someone else to interpret my work into writing for teachers to be able to read.

**Excerpt 7-14**, from an interview with a student with special educational needs.

The main concern was the inflexibility of the perceived practice. As observed, some students wished to use Perkins Braille, while others preferred the use of a typewriter. The students with little experience using typewriters perceived the inflexibility of the device to be a barrier to learning that compromised equal access to learning opportunities. Further, they felt that the institution should provide flexible approaches to accommodate students' learning needs, in which students could use either typewriters, Perkins braille, or computers for their work. This flexibility was missing, and thus there is a need to advocate for UDL as a way to promote inclusion of students with various educational needs.

## 7.5 Challenges experienced by students when using assistive technologies

Assistive technology is imperative for enhancing access to skills and knowledge. Students were provided with supportive devices for learning, the most important of which were audio recording and writing devices. However, some of these tools, such as cassette tape recorders, were perceived to be outdated. Tape recorders were reported to be inefficient as well as ineffective. Students were well aware of current technology. One of the students interviewed had decided to purchase a different, up-to-date device instead of using the one provided by the institution:

I bought my own gadget. The one I was given was old: it was a radio cassette. This is an old technology. Mine is a recent technology. I bought it when I was in the second year. The radio does not capture waves [voices] well. Sometimes I miss dry cells, and also it was too easy to mix the recorded lectures, hence miss coherence. I was not happy with it. For example, for a two-hour lecture, I was to have four cassettes for recording.

**Excerpt 7-15**, from an interview with a student with special educational needs.

This does not mean the institution was unaware of current technologies, but some students with visual impairment reported that the institution sometimes delayed purchasing the new gadgets. This was evidenced during data collection, where students were provided digital voice-recording devices. The challenge observed here was in the operation of such devices, which often left little room for trial and error. The following is an excerpt from an interview with a teacher who realized that a student was not recording the teacher's lectures due to difficulty operating the digital voice recorder.

What I got from my student [one teacher explaining not only how tools were delayed to students with visual impairment but also difficult to use the devices] who was just given an audio recorder, though it was provided late, the student was also not well taught how to operate it. One visually impaired student told me that when given the audio recorder, instruction provided was how to switch on/off only. I tried to teach that student, but I found myself facing some challenges on how I could teach that student other operations. So, the instruction provided was insufficient.

**Excerpt 7-16**, from an interview with a university teacher.

This challenge was reported by both teachers and SNE experts. In an observation made in the SEU, a student was given an up-to-date digital voice recorder but had difficulty operating it as some buttons had multiple functions and there was no option for speech among the buttons' functions. In an interview with one visually impaired student, advanced assistive technology

devices were perceived as valuable but also as creating additional challenges for students with visual impairment.

Some technologies have passed in time, for example radio cassette. We used them previously. This technology was not cost effective: you were to buy dry cell, tape cassettes. But now we have recent technology like digital voice recorders. It is nice and effective but it requires time to master the equipment.

**Excerpt 7-17**, from an interview with a student with special educational needs.

Technical challenges were also an issue. The following excerpt is from an observation conducted in the SEU.

*[A student was doing a test in the SEU. It was a one-hour test. The student was using a typewriter. The transcriber provided the student with white paper and carbon paper. The papers were inserted in the typewriter. The questions were typed in braille format. The student was supposed to read a particular government document. Unfortunately, there was no copy of the document in braille format. The teacher who was supervising the student decided to read the document to the student. Then the student started responding to the questions by typing the answers. The student was observed typing the work for almost 40 minutes, then asked for help from the teacher.]*

*Student:* Excuse me teacher, can you add me a paper please!

*Teacher:* Okay, wait.

*[The teacher went to call a transcriber to come and add more papers to the student's typewriter. The transcriber looked at the student's work and realized that something was not working properly. The typed letters were faint, probably due to reused carbon paper].*

*Transcriber:* It seems the typed work is faint; would you be able to read? *[The transcriber asked the teacher]*

*Teacher:* Hmm, I will try to read though it is too difficult to see what was typed.

*[The transcriber then fixed papers to the typewriter and the student went on working. After about 10 minutes, the student completed the work. The student called the teacher's attention once more].*

*Student:* Teacher, I have finished. Would you kindly look at my registration number, whether [it is] properly written?

*Teacher:* Yes, I can see it, but can you say it loudly so that I can prove whether it is correct?

*Student:* Yes, it is ... *[Number removed for anonymity]*

*Teacher:* It is correct.

*Student:* Thank you, teacher!



**Excerpt 7-18**, from the Special Education Unit observation record.

This situation demonstrates the challenges students with visual impairment experience when working with assignments in the SEU. Any technological breakdown created barriers to students with visual impairment. It was impossible for students to proofread their own work because what was produced was inaccessible to them, but it was accessible to the sighted teacher. A similar experience was reported by a student who was told that nothing had been typed on the exam paper, which would not have happened if the student had been able to see what was being typed:

Imagine, I used a typewriter, I thought it was writing, unfortunately I was told that it did not write anything. Imagine that! It affects us psychologically in the exams.

**Excerpt 7-19**, from an interview with a student with special educational needs.

Other examples of challenges faced by students pertained to teachers' demands or instructions. The students claimed that some teachers demanded good arrangement and formatting of their work, and if not properly arranged, the work was penalized. For students with visual impairment, formatting was a challenge. The following is an excerpt from a student with visual impairment whose work had points deducted due to the poor arrangement of the bibliography.

One of the challenges we face is arrangement of work. This is among the mistakes which we [students with visual impairment] make due to our disabilities. I remember one day I worked on an essay, and it was 10 pages. I asked my reader to read, so we arranged the work. I told the reader to put the bibliography at the end [but] it happens then it was on top [page]. I submitted [it] to the lecturer. The lecturer commented that my bibliography was not at the end of the work, but I actually knew it was at the end as required [the claim here is when printing document the assistant placed the bibliography page in the beginning instead of at the end of the document].

**Excerpt 7-20**, from an interview with a student with special educational needs.

In this situation, when the student's work was typed on the computer with the assistance of a reader, it was not possible for the visually impaired student to verify whether the work appeared as intended. This was a challenge, not due to the student's knowledge but rather due to the tool having no verification options. For example, if the work had been read by a text-to-speech program, it would have been possible to notice the problem.

Another scenario experienced by students with visual impairment concerns punctuation. Students who use Perkins braille have short-cuts (contractions) in their writing, which is different from the style used in typewriters; accordingly, students often made errors related to spelling and punctuation:

Normally we use short-cuts and in the case of British Braille no capital letters. We use specific short-cuts, therefore when using a typewriter, it confuses us.

**Excerpt 7-21**, from an interview with a student with special educational needs.

Another student experienced difficulties with spelling when using a typewriter as compared to when using Perkins braille. The lack of one-to-one correspondence between characters in these two tools (i.e., the differences in the spellings and short-cuts used in each), was highlighted as the main issue:

Spelling is a problem. In braille we use short-cuts, while in [the] sighted typewriter [there are] no uses of short-cuts. Short-cuts in braille, for example, the word “known,” in the braille you just press a certain dot and k. So, when you come to a typewriter, it is hard to specify one letter for each.

**Excerpt 7-22**, from an interview with a student with special educational needs.

In general, computers are often mentioned when speaking of technology, yet it is notable that the observations show very little actual use of computers in the SEU by students with visual impairment. It was a fact that the unit of special education had a shortage of computers. As a result, it was only the SNE experts who used a few available computers to process examinations and perform other administrative functions. It was also observed that a student with visual impairment used a computer to look online in the SEU for some materials related to seminar questions. The student’s reader could not use Google’s text-to-speech facility to read the materials aloud. This means, text-to-speech programs could be installed to promote enabling learning environments for students with visual impairment.

## **7.6 Experiences of students working with paraprofessionals**

Students with visual impairment also worked with paraprofessional readers, whose presence was reported to be very positive overall. However, not all students were fully satisfied with the services they received from readers. There were two kinds of readers: fellow students in the same degree program (peer readers) and non-student readers. Visually impaired students were more satisfied with their fellow students as readers and less so with non-students, which can

be attributed to the perceived ability of non-student readers. In cases where teachers more often wrote on whiteboards than lectured, visually impaired students reported using their readers and notetakers more; thus, it was considered better to have a fellow student as a reader or notetaker. It was considered easier for undergraduates to obtain a peer reader from the same class than it was for postgraduate students. It was also believed that peer readers could be trusted more than non-student readers. The following problems were also reported for non-student readers: inability to deliver, less motivation to work, and relationship problems. In the following excerpt, a student with visual impairment describes the challenges faced when working with non-student readers.

Some readers face a problem with language, pronunciation, time management, etc. Also, some have a lot of excuses which minimizes efficiency. Another problem is relationships [misunderstandings], and some become less motivated to work effectively due to delay of payment.

**Excerpt 7-23**, from an interview with a student with special educational needs.

In this excerpt, it was clear that non-student readers worked as employees; understandably, then, visually impaired students preferred to appoint readers who were motivated by the desire to be helpful and the enjoyment of assisting a colleague. Hence, students with visual impairment were more in favor of their fellow students being their readers and notetakers.

## **7.7 Chapter summary**

In this chapter, I described the experiences of students with visual impairment in a higher education institution. These students were given lecture notes and different efforts were made institutionally. However, several challenges observed were more influenced by social, cultural, and historical perspectives within the institution. Students' disability conditions as reported by the students themselves were not a problem to them. Instead, the institutional contexts, pedagogical practices (both methods and contents), limited and inaccessible tools, lack of teachers' competence in teaching inclusive classrooms, and limited collaborations among the practitioners in the institution were perceived to be problematic areas regarding the effective inclusion of students, particularly of blind students. Also, some teachers' practices were perceived to reflect undesirable attitudes to blind students, for instance, the refusal to spell out words written on the chalkboard.

The study reported that visually impaired students were in favor of teacher-centered approaches due to a lack of learning materials and equipment to support engagement in their learning process. Students reported two approaches to support their learning in this context: group discussions and the use of audio recording devices given to students with visual impairment by SEU to audio record and follow the lectures. However, several barriers remained when listening to audio-recorded lectures, including the use in class of image-linked language. The importance of collaborative learning was thus presented as a positive practice in higher education for visually impaired students.

Further, systemic tensions were observed when assessing students' academic progress. The students reported challenges in academic assessment tools and procedures. Hence, teachers, SEU staff, paraprofessionals, and other education practitioners need to be familiar with the principles of UDL in their practices. Finally, tools used by students were observed to be inflexible regarding their ability to accommodate the differing needs of students. A good example was the use of typewriters for visually impaired students, which was perceived to be incompatible with the needs of visually impaired students. The UDL framework promotes flexibility to accommodate variability in students' needs. Therefore, to promote engagement and accessibility for all students in the learning process, there is a great need for UDL training and advocacy for educational practitioners in higher learning institutions in Tanzania.

# **8 Interpretation and Discussion of the Study's Results**

## **8.1 Introduction**

This chapter begins by introducing the study, its research questions, and the theoretical framework applied, in addition to providing an interpretation of the theoretical concepts used in the study. Thereafter, I interpret and discuss the empirical findings as presented in chapters 5 to 7 (excerpts from interviews and observation records will be referred to by means of the excerpt number, where, for example, excerpt 5-1 refers to the first excerpt quoted in Chapter 5). I will start with the institutional perspective, which consists of the conceptualization of inclusive education and the perceived institutional efforts and challenges concerning the promotion of inclusive higher education. I will then interpret and discuss pedagogical practices and the challenges observed or reported regarding classroom pedagogies. Thereafter, I will interpret and discuss the voices of students with visual impairment concerning their learning process at UDSM. Finally, I will group the various empirical findings according to the theoretical tensions and systemic contradictions that can be stated through the CHAT perspective.

This study investigated the inclusion of students with visual impairment at the University of Dar es Salaam (UDSM), a higher learning institution in Tanzania. The Salamanca statement and other statements on human rights in relation to inclusion and social justice contributed to the formulation of the present study's research questions. It has long been claimed that blind students experience exclusion and discrimination in relation to various social justice themes, including in the context of education (UNESCO, 1961, 1994, 2001). The right to quality education has been among the rights denied to people with disabilities. The institution selected for this study (UDSM) was the first higher education institution in Tanzania (Kimambo, 2008), and the overriding aspect that led me as a researcher to select this institution as a study case was its effort to embrace inclusion. It is not rare to find materials that state UDSM to be an "equal opportunity" higher learning institution committed to an inclusive student admission policy, that is, one that treats all students equally regardless of their race, ethnicity, gender, or disability. UDSM records show that the institution started to admit the first students with disabilities, including those with visual impairment, in 1978 (see appendix 14).

In this study, the process of inclusion of students is described as an activity by which different cultural and historical tools contribute to the fulfillment of process's goals. Effective learning is likely to occur if the learning environment supports interactions between students and their environment. Collaborations and mediations of different practitioners in the learning contexts can contribute to the development of enthusiasm among students, thus helping them to stay motivated and engaged in the learning process. As described in chapter three, Vygotsky's basic model of cultural mediation, initially comprised of subject, mediating artefacts (signs and tools), and object, was revised, and rules, community, and division of labor were added to the model (Engeström, 2001). Among the human-activity components suggested, the emphasis is on the mediating tools (Kaptelinin et al., 1999). In addition to the necessary interaction between and among the components in the activity system being not always smooth, some systemic contradictions and tensions occurred. This is one of the study finding's more important aspects in terms of cultural-historical activity theory (CHAT). In this transitional era, educators need to view whatever goes wrong primarily based on the mediating tools, not on the students. In other words, when perceiving a problem, educators should not think of students' deficiencies, such as lack of intelligence, attention, motivation, or effort (Meyer et al., 2014). Through this change in mindset, we intend to view tools as a source of the problems and hence necessitating proper design and execution. Universal design for learning (UDL) promotes such a shift in mindset, thus promoting equal opportunity for engagement, access to knowledge, and development of skills. UDL embraces a dynamic model of education, which celebrates human diversity and variability (Meyer et al., 2014, p. 107). Education practitioners need to minimize unnecessary barriers in their design and during instructions. From this perspective I was motivated to investigate the inclusion of students in higher education based on CHAT and UDL. The CHAT framework highlighted the importance of the mediating tools and the learning environment being engaging and favorable, collaborative, and accommodative, while UDL brought to the discussion aspects of learners' variability and the need for careful design that ensures optimum opportunity for learning regardless of the learners variability (Meyer et al., 2014, p. 89).

As described earlier, UDSM was the first public university in Tanzania and has been registering students with disabilities for more than three decades. Implicitly, this represents the physical inclusion of students in the higher learning institution. It was worth investigating the understanding of inclusive education and its aim to address discriminatory and exclusionary practices as articulated in United Nations human rights conventions, the

Salamanca statement, and the constitution and national policies in Tanzania. Among the CHAT components, *subject* and *community* were interpreted in this study as comprising students, teachers, and SNE experts. The study's research questions were as follows: First, how do the subject (students) and community (teachers and SNE experts) conceptualize inclusive education in higher education in Tanzania? Second, what are the perceptions of both the subject and community concerning institutional practices that promote inclusive education in higher education in Tanzania, and what are the challenges that hinder the inclusion of students in their institution? This first part of the study mostly reflected the institutional contexts and perspectives in which institutional activities and practices are framed and influenced by the institutional culture and history.

The second part of this study was more concerned with instructional pedagogies, and here observations were made of the classrooms, computer laboratory, and Special Education Unit (SEU). The objective was still to understand whether the mediating tools and learning environment in these contexts were promoting the inclusion of blind students. In the classrooms and computer laboratory, teaching and learning were observed as activities, and a carefully examination was made of how the mediating tools and classroom environments accommodated blind students. The question was whether the instructional pedagogies, tools, and learning environments were universally designed to promote engagement, support different ways to get instructional information and finally ways students can use to demonstrate their master of subject content. Likewise, in the SEU, the observed activities included students working on their assignments. In the classrooms, I observed how the instructional methods, contents, tools, or materials used by teachers reflected the principles of UDL. The interpretation and discussion of the findings is essentially based on the three core principles of UDL, which intend to elucidate whether visually impaired students got alternative means to stay motivated and engaged in the lessons observed, whether they were provided with a variety of ways by which information or content was presented, and whether they were given options of how they could demonstrate their knowledge and skills. It is emphasized that UDL views effective teaching methods as those methods that support and allow continual adjustment to meet the students' learning needs and promote collaborative environments in which all students are included (Meyer et al., 2014, p. 148).

The final part of the study focused on the experiences of visually impaired students in UDSM, as it was important to conclude the study with an examination of the learning experiences of

such students in a higher learning institution that claims to be inclusive. The students' own voices were able to shed light on whether the learning environment and pedagogical practices were universally designed to accommodate learners' variability (a central supposition in UDL). In any activity, the interactions between and among the CHAT components are likely to give rise to tensions and systemic contradictions. In this study, some empirical findings indicate the presence of systemic contradictions emanating from tensions experienced by different participants in the activity. In the last section of this chapter, I will interpret and discuss such findings in the context of the inclusion of students in higher learning institutions in Tanzania.

### 8.1.1 Interpretation of the theoretical concepts used

Concepts used in the theoretical framework are delineated here. The components of the CHAT framework are central to the study's analysis and interpretation of the "inclusion of students in higher education in Tanzania" as an activity. The CHAT components provide a language to describe, analyze, interpret, and discuss the activity. The components, as presented in Chapter 3 (and illustrated in Figure 2) comprise subject, object, mediating tools, rules, community, and division of labor and the ultimate end is the outcome of the activity itself (Engeström, 2001). In the context of the present study, these components were defined and interpreted for analysis, interpretation, and discussion reasons as follows. *Subject* refers to students, particularly visually impaired students. *Mediating tools* include the use of computers, assistive technologies, and teaching and learning materials used in the classrooms. *Object* is the main goal of UDL, which is to reach and engage all students so as to develop expertise and competence in their profession (i.e., teaching). *Rules and regulations* observed in the activity mostly concerned examination rules and affirmative actions regarding the inclusion of students with disabilities, mostly focusing on blindness. *Division of labor* refers in this study to different individuals and/or units responsible for teaching, transcribing materials for visually impaired students, purchasing assistive technologies (embossers, braille paper, Perkins braille, typewriters, lens magnifiers, white canes, audio recorders, etc.), and reading or taking notes for visually or hearing impaired students. *Community* refers to the learning environment surrounding the higher education institution, and in this study it simply refers to university teachers and SEU employees. Importantly, UDL was used to interpret the pedagogical practices as well as the teaching and learning materials used in the selected inclusive classrooms, meaning that teaching pedagogies and learning materials are construed



as mediating tools that should be barrier-free. The interpretation will be based on how well the teaching pedagogies reflected the principles of UDL, which are the provision of multiple means of engagement, the provision of multiple means of representation, and the provision of multiple means of action and expression (Meyer et al., 2014, p. 110).

## **8.2 Institutional perspectives towards inclusive higher education in Tanzania**

The meanings we attach to concepts impact our practices. In this study, as explained earlier, inclusive education is regarded as a normative supposition. For this reason, it was important to explore how inclusive education was conceptualized by teachers, SEU employees, and students in higher education. Different emphases were found in the conceptualization of inclusive education in the higher learning institution. Inclusive education was regarded in terms of gender (see excerpt 5-2), areas of specialization (see excerpt 5-5), and individual differences based on disabilities (see excerpts 5-1, 5-3, and 5-6), socioeconomic status, and special abilities (i.e., “gifted” or especially talented individuals; see excerpt 5-4). The institution was perceived to have strengthened various programs to enhance gender equity. In this regard, the focus was to promote the inclusion of female students, as it was claimed that females faced challenges in terms of equal opportunity to access higher education. The second conceptualization was that, in any specialization, ranging from social sciences to natural sciences, or from the humanities to engineering, the higher learning institution would be expected to accommodate inclusive education. In this conception, inclusion refers more to the availability of academic programs to suit the needs and interests of applicants as well as society. In higher education in Tanzania, inclusive education is perceived to be a broad and differentially defined concept. Nevertheless, more emphasis was placed on the inclusion of students with disabilities, and admission of students with disabilities was perceived to signify how inclusive the institution was. In this sense, inclusive education was understood simply in terms of student admission. Studies on inclusion have indicated that the concept of inclusive education is often misunderstood. For example, one study conducted in the English education system reported political pressure on institutions to provide education to all; however, there was the concern that, for many teachers, inclusion remained poorly specified and conceptualized (Hodkinson, 2005). In this section, I will bring into the discussion the perspective that inclusive education is mainly about students with disabilities in the regular education system, in addition to a view extracted from an interview with one SEU employee

that “not all disabilities can be included in the mainstream (regular) education”. Partly, this statement reflected the idea that severity of a disability can bar a student from attending regular schools. As a way to support, such students with severe disability conditions then individualized services are important.

In Tanzania, no specific higher education institution exists exclusively for people with disabilities. All students (those with and without disability) study together in the same classrooms regardless of their disability status. All students in higher education in Tanzania are taught in the same classrooms. The inclusive learning environment appeals for teachers practices to support inclusion of students in their teaching. In one study, it was reported that the way in which inclusive education is implemented depends, among other factors, on how individual teachers define it (Hodkinson, 2006, p. 45). What I observed in the conceptualization of inclusive education was constructed from a cultural and historical context in which people with disabilities are excluded from the social world. So, in terms of CHAT perspectives, people with disabilities had limited access to tools that could enable them to engage in the social world. This is a context in which inclusive education can be viewed as a way to address the social exclusion experienced by people with disabilities in education settings. In fact, the probability of students with disabilities obtaining higher education is affected by numerous sociocultural barriers.

As reported earlier in Chapter 5 (see excerpts 5-1 and 5-3), more emphasis was placed on the inclusion of people with disabilities who have traditionally been excluded than on other groups of marginalized students, as if these other marginalized groups were not experiencing as much difficulty compared to students with disabilities, particularly those who were blind. Similarly, this conception was also held by one student with visual impairment, who commented that the institution was inclusive due to the presence of blind students in a higher learning institution studied. This means that even students with visual impairment perceived that UDSM was inclusive because of the opportunity provided to them. Thus, the presence of students with visual impairment was perceived to be an indication of both inclusive education and an institution being inclusive. The conception of inclusive education in the case of UDSM was therefore mostly framed in relation to the presence of students with disabilities, while other dimensions of inclusiveness had a lower profile. As described earlier, I wanted to understand other institutional practices that indicate the inclusiveness of the institution and

support the claim that inclusive education is about providing opportunities for students with disabilities.

As discussed in Chapter 2, section 2.3, the emphasis on including students with disabilities in the regular education system can be explained as emanating from a medical-model view of disability. In this view, disability is considered a personal “problem” that must be overcome. As observed in this study, there was also an impression in the studied institution that providing services to students with disabilities was challenging (see excerpts 5-19 and 5-20). This is an impression that emanates from a medical view of disability. Consequently, the medical view of disability contributes to socially constructed barriers. Some conditions were perceived as more demanding than others (see excerpts 5-3 and 5-18), and visual impairment and physical impairment were prioritized over other categories of impairment (see Appendix 14). In particular, a greater level of institutional support was offered for visual impairment.

Due to the “noticeability” of visually impaired students, whenever teachers heard of students with special needs, students with visual impairment came into their mind (see excerpt 5-3). This prevailing notion was confirmed in the way the SEU was organized. The facilities and resources in the unit were devoted primarily to visually impaired students, and the unit’s staff had more expertise in visual impairment. At the time of data collection, there were four SEU employees, three of whom were specialized in visual impairment, while only one was a sign-language interpreter. However, many students had special needs beyond visual impairment.

### **8.3 Institutional efforts towards enhancing inclusive education**

Several approaches to promoting inclusion in higher education in Tanzania were presented. The observations showed that the studied institution attempted to establish some affirmative actions concerning particular aspects where students with disabilities were likely to experience more discrimination or exclusion. These aspects were associated with socioeconomic factors, working tools, supportive and knowledgeable staff, and training on issues relating to special needs education. All these aspects were regarded as institutional efforts to enhance the inclusion of students with disabilities. In this section, I will explain and discuss each of these aspects based on the findings presented in this study and with regard to the relevant reviewed literatures and theoretical assumptions.

### 8.3.1 Financial support to students with disabilities

The findings revealed various practices that were regarded as ways to promote inclusive education for students with special needs. These practices constituted collective effort on the part of different practitioners in the institution (i.e., the *community*). The institution also received governmental support, most prominently through the Higher Education Students' Loan Board (HESLB), which offers financial support to students in higher education (see subsection 5.1.3). Not all students admitted for higher education are provided with loans. For example, in the questionnaire administered to students in the teacher preparation program, it was found that out of the 542 students who answered the relevant question, 480 (88.6%) received loans, while 62 (11.4%) did not. Most of the students therefore received financial support from the government. However, this result can be misleading, as the government of Tanzania prioritizes certain programs over others, and teacher preparation is one of the prioritized programs. Nevertheless, 11.4% of those who tried to secure a loan could not, even though they were in a prioritized degree program.

Students with disabilities were given priority in terms of financial support. The provision of loans intervenes in the “vicious cycle of poverty,” which would otherwise not allow students with disabilities to obtain higher education. One of the great barriers to higher education for students from poorer communities is the financial resources needed to support them. Thus, financially supporting students with visual impairment was one of the ways used to promote inclusion in higher education in Tanzania. Such financial support covered tuition fees, stationery, and living expenses. Students with visual impairment regularly reported insufficient financial support; thus, being financially supported by the government of Tanzania through their institution of higher education was appreciated regardless of how effectively it covered higher education expenses. This is similar to the finding of a study conducted in Spain, which reported that free tuition was one way universities support disabled students (López Gavira & Moriña, 2015). The difference between the Spanish study and the present study is that the students in the present study received financial support in the form of loans, which they will have to pay back, while in Spain the tuition was free in the absolute sense of the word. In Tanzania, students with visual impairment may experience challenges making their loan repayments for various reasons such as unemployment.

### **8.3.2 Prioritized provision of accommodation to students with disabilities**

Another important issue observed in this study was the lack of student accommodation. Only a small number of students received accommodation within the institution's premises: out of the 568 students who completed the questionnaires, only 170 (32%) were living in the student residence halls, while 362 (68%) lived in off-campus rental accommodation. This was a challenge for these students, as in addition to university-related expenses, they also had to pay rent, utility bills such as water and electricity, and transportation costs. The amount students paid for the institutional accommodation, on the other hand, was reasonable and included all necessary facilities. For that reason, living outside of the university facilities was a struggle for students, and even more so for students with disabilities. In addition, private accommodations were not suitable for individual evening study or for working on group assignments. In the investigated institution, it was reported that students with disabilities were among those prioritized for residence within the institution because of affirmative action (see subsection 5.3.2). The provision of accommodations to students with disabilities, including visually impaired students, was regarded as a means to overcome challenges associated with living outside the university campus while studying. The advantages of staying within institutional facilities included the availability of necessary support, safety, and security.

### **8.3.3 Establishment of an institutional center to support students with disabilities**

In addition to the abovementioned institutional efforts, the SEU was established and paraprofessionals were recruited by the unit to support teachers and students with disabilities. The establishment of a unit intended to support students and teachers with disabilities was also reported in other studies elsewhere, indicating that students with disabilities obtain support from student aides. For instance, one study conducted in Spain described the student aides as volunteers whose function was assist students with disabilities by taking notes, accessing information, and escorting the students to and/or from the university (López Gavira & Moríña, 2015), and the unit established for this purpose was called the Service to Students with Disabilities (*Servicio para el Alumnado con Discapacidad*).

In CHAT, the phenomenon of institutional efforts towards achieving inclusive education can be viewed as a *community* of multiple disciplines that assist students with disabilities by

establishing units such as the SEU (*mediating tool*) that aim to work with both teachers and students with special needs (*subject*). The institutional context of this study is considered an instance of a higher learning institution which promotes inclusive education. Teachers and students were regarded as key actors engaged in the process of inclusive education. In the theoretical perspective, teachers and students can be considered subjects who collaboratively engage in ensuring equal opportunity for students' engagement, comprehension, and skills development. Both teachers and students perform different tasks with the assistance of experts employed in the SEU (*division of labor*) but with the same educational goal (*object*) of enhanced engagement, knowledge, and skills (*outcome*). Furthermore, the institution provides equipment (*tools*) to mediate teaching and learning activities. The institution is also governed by different policies (*rules, principles, regulations*), including an education policy that advocates for equal access to education to all students regardless of disability status (*object*).

## **8.4 Challenges in promoting inclusive education at UDSM**

There were several challenges faced in the process of promoting inclusive education in the context of this study. These challenges ranged from those associated with identification of students with disabilities, inadequate number of employees in the SEU, insufficient resources and facilities to support the SEU, and perceived attitudes among some teachers.

### **8.4.1 Complexity of identifying students with special needs**

In some contexts, there are laws highlighting entitlements to equal access to post-secondary education. It is stated that to ensure accommodations for students with disabilities, such students must identify themselves to teachers before courses begin. They must also provide documentation as proof of their disability and then request specific support services, such as the provision of notetakers or readers (Scott et al., 2003, p. 370). Likewise, in Tanzania, higher education institutions depend on students' self-reporting their disability conditions. The results of this study have revealed difficulties in the institution regarding the identification of students with special needs, as there was no other mechanism to identify students with disabilities other than students' self-reporting (see except 5-19). Therefore, if a student with a disability does not identify her/himself, then the appropriate services will likely not be provided.

The institution depended on students' self-reporting, preferably at the time students applied for admission into higher education. When they apply for higher education, students are asked to indicate whether they have any disabilities. However, the findings reported that some students avoided identifying themselves as having a disability over the fear of being denied admission. Students who had negative experiences, such as exclusion at different stages of their lives were, more prone to avoid revealing their disability status. The present study associated the students' fear of self-reporting not only with their disability, but also with a limited awareness of the importance of such disclosure. It was argued that students with visual impairment (braille and/or typewriter users) and physical impairment (wheelchair users) were more likely to disclose their disability status (see excerpt 5-18). As indicated in Chapter 5, the fear of indicating one's disability was associated with previous negative experiences (Kochung, 2011, p. 146; UNESCO, 2009). In addition, other students did not reveal their disabilities to the institution because they underestimated their condition. Hence, some students did not see a need to identify themselves as disabled. For instance, those with "poor vision" or who were "hard of hearing" often underestimated their condition. As reported in this study, some of these students were identified by teachers during classroom teaching (see excerpts 5-19, 5-20, and 5-21). In such cases, however, not all students identified were interested in registering themselves in the SEU for various reasons, such as the fear of being "labelled" as a student with special needs.

As reported by teachers, students with more subtle disabilities could not find a reason to register themselves in the SEU. However, teachers handled such students' needs by preparing learning materials accordingly, for example by using enlarged text and other learning materials prepared for poor vision and using microphones to help the students with special needs. Fewer challenges were identified during the teaching process, as challenges occurred more often when the students were instructed to work on a particular task in the classroom. It was in this context that some teachers became aware of students with poor vision or hearing problems. Thus, teachers had an obligation to ensure that their teaching pedagogies and materials benefitted these students as well. That is, their mediating tools were required to be universally designed so as to enhance engagement and access to knowledge and skills.

Teachers were perceived to be able to identify different needs of students and to select suitable approaches to integrate them accordingly. This implies that UDSM was bound to the social-model view of disability, in which support and barriers are perceived to be socially

constructed within the curriculum and within the curriculum goals, assessments, methods, and materials (see excerpts 6-24, 6-25, 6-28, 6-29, 6-30, 6-32, and 6-33). These excerpts reflect more students' disabilities, which simply means the socially developed challenges experienced by students in the learning contexts. It is important for teachers and other educators to consider what materials, teaching methods, and assessments create unnecessary barriers to students and find ways to improve these. In the medical-model view of disability, disability is perceived as an individualized problem (López Gavira & Moraña, 2015) while the social-model view embraces the dynamic view that supports learners' variability concerning the ways in which they become engaged, stay motivated, comprehend information, and strategically approach tasks (Meyer et al., 2014, p. 147). As was found in this study, many learning needs among students remain unknown, yet teachers are in a position to identify some of these in the teaching process. However, other studies have reported that teachers lack disabilities training (López Gavira & Moraña, 2015). This was also found to be true in the present study, where teachers themselves reported challenges in identifying and accommodating the needs of students with disabilities. In some cases, it was difficult to determine whether a student had special needs or was simply being inattentive or disinterested. The importance of the UDL framework arises within this context, indicating the importance of promoting learning expertise to students.

The consensus about the reality of students with unidentified special needs calls for higher learning institutions in Tanzania to be aware of such diversities among students. In this respect, a concept observed to disturb some teachers was "equality and equity." In the process of treating individual students based on their needs, will equality and equity be compromised? In interviews with teachers, the prospect of treating students differently was considered problematic in institutions in which programs tend to be highly structured and inflexible, and one teacher was concerned that attempts to become flexible could result in admonishment (see excerpt 6-29). Hence, teachers in general strive to conform to institutional rules and regulations. The idea that there is no "one size fits all" was not clearly expressed, although some teachers attempted to apply this idea in collaboration with the SNE experts, particularly during examinations.

The complications involved in identifying students with special needs were perceived to have historical and cultural justifications. Both, in the present study and other two reviewed mentioned attitudes as a barrier (Kochung, 2011; UNESCO, 2009), as was the concept of



labelling. The present study highlights the need for institutions of higher education to look for better ways of accommodating students' needs without registering or labelling individuals. However, achieving this for blind students who require specialized equipment would be complicated. The institution should therefore plan for diversities in their designs. As discussed in section 2.3, disability can be explained through either the medical model or the social model (Oliver & Barnes, 2010). In some contexts, this dichotomized approach is criticized, and a combinatory model is suggested where both medical and social models are defined as important aspects when discussing disability. The biopsychosocial model is such a synthesis of medical and social models (Üstün et al., 2003). According to this model, educational institutions should focus more on the disabling factors created by the institutions regardless of the students' conditions (Üstün et al., 2003). This requires learning about the challenges students with disabilities face due to structural, physical, attitudinal, and pedagogical barriers (see excerpts 5-21, 6-7, 7-2, 7-3, 7-9, 7-13, and 7-16). The supposition is that the identification and modification of barriers to learning emerge from the institutional environment and that learning design can improve engagement and motivation of students in their learning processes. Institutional environment and learning designs are among the contextual factors that have a negative impact on students with visual impairment. Environmental factors also have an impact on all components of functioning and disability (WHO, 2001, p. 8), and it is therefore important to remove such environmentally established hindrances so as to develop a barrier-free learning environment that embraces learners' diversities.

#### **8.4.2 Inadequate number of support staff in the Special Education Unit**

The presence of trained experts in the SEU was reported as an important step towards achieving inclusive education. The investigated institution employed professionals in special needs education, particularly in relation to vision and hearing special needs. However, the growing number of registered special needs students overwhelmed the few staff who worked in the unit. Making matters worse, the students belonged to diverse degree programs, while the staff faced challenges using the advanced technology available. As observed during data collection, one student with visual impairment was provided with a voice-recording device, which proved difficult to use. In this sense, the real problem was not the teachers, paraprofessionals, or students, but the device itself. The device had no speech or tactile

options that could assist students with visual impairment in following instructions. It is therefore important to evaluate the equipment and materials before buying or providing them to students with special needs. Meyer et al. (2014) made clear that the selection of instructional materials is not about picking the right ones but it is about picking the ones that meet the needs of learners (p. 151). As I have reported in this study, the use of typewrite was viewed as a right tool to be used by students with visual impairment when doing their examinations but typewriter did not meet the needs of all students with visual impairment. Thus, it is valuable to examine how universally the materials have been designed to support different learners' needs, as non-universally-designed materials can become barriers instead of enablers. This kind of a barrier was also found in another study which stated that the selection of materials for facilitating learning among students with disabilities can itself create challenges in learning (Scott et al., 2003). At UDSM, the number of employees in the SEU (see subsection 5.3.8) and the selection of equipment challenged the process of inclusion of visually impaired students in the learning process.

#### **8.4.3 Inadequacy of resources to support students with special needs**

This study reported on institutional efforts to provide supportive equipment and resources to students with special needs. However, the observations in the SEU indicated that the SEU needed more tools to adequately support such students. Notably, many of the available tools were outdated and as a result, were largely ineffective and inefficient (see excerpt 7-15). In the SEU, facilities like Perkins braille, typewriters, braille printers (embossers), and computers are among the most important tools for facilitating the learning process of students with visual impairment (see excerpts 5-15, 5-16 and 5-18). These tools should be culturally relevant, appropriate, and universally designed to include the diversities among individuals. The primary challenge associated with such equipment and resources was financial in nature. It was perceived that the tools were expensive and that it was difficult to obtain tools of sufficient quality and in sufficient quantities (see excerpt 5-22). In addition, tool breakage and lack of maintenance was another cause of the lack of equipment in the SEU. In the case of visually impaired students, multiple tools, such as Perkins braille for note writing, typewriters for examinations and tests, audio recorders for recording lectures, and white canes, were needed for different activities. However, regardless of the provision of equipment to support visually impaired students in higher education, the learning environment must be universally

designed to accommodate the various needs of students. As Meyer et al. (2014) commented, the abilities of learners to perceive, interpret, and understand information is dependent upon the media and methods to be used (p. 99). Consequently, teachers should consider the methods or media they use in classrooms to be sure they facilitate students' learning.

### **8.5 Teaching pedagogies in light of universal design for learning (UDL)**

Institutional perspectives as observed embraced an inclusive education “ideology” and were reflected in the teaching pedagogies used in classrooms. In essence, these institutional perspectives support the notion of “equal-opportunity higher education institutions.” This study examined whether the teaching pedagogies applied at UDSM provided opportunities for students with visual impairment to be motivated and engaged, to grasp information, and to approach the given tasks strategically. Two courses taught to student teachers were observed for the purpose of this study due to the fact that they were activity-oriented courses. Computer Literacy for Teachers (CLT) had theoretical and practical sessions, and similarly, Educational Media and Technology (EMT) had a theoretical component and practical student projects. It was important to find out how such theoretical sessions and hands-on activities in such inclusive classes promote engagement and access to knowledge and skills of equal quality for students with special needs in comparison to their peers.

As reported, both teacher-centered methods (lectures) and learner-centered methods were used in these courses, but teacher-centered methods were more often practiced (see excerpt 6-30). Some researchers, however, have suggested that learner-centered approaches maximize opportunities for student learning (Kafanabo, 2011; Kitta & Tilya, 2010; Mino, 2004). In the teacher-centered methods, information was provided mainly by teachers for various reasons, including shortage of equipment to support students' hands-on teaching methods (see excerpts 6-1, 6-6 and 6-8). Another reason for the more frequent use of lecture methods was the large class sizes, in which it appears unrealistic to use learner-centered approaches. In contrast, the practical components of the EMT and CLT courses were more learner-centered and aimed to promote engagement as learners develop interest and skills in the practical aspects of the subject matter.

This study found that students with visual impairment were more comfortable with teacher-centered approaches, as they argued that teacher-centered approaches provided more information about the subject matter. This claim rests on the view that in the teacher-centered

approaches, teachers use lectures more often, which is an advantage for students with visual impairment who can use voice recorders to audio-record the lectures (see excerpt 6-34). As Mino (2004) argued, higher education classes are more content-driven and teaching follows the sequence talk–text–test (p. 159). Learner-centered approaches were less favored by students with visual impairment, primarily due to the lack of enabling equipment. For example, the observations in the computer laboratory revealed that in the computer laboratory there was no equipment or facilities available to support students with visual impairment during the practical sessions. Additionally, when the necessary technology and equipment become outdated or are in a state of disrepair, learner-centered approaches can become a disabler. Consequently, active participation by students in learner-centered approaches depends on the situations and availability of appropriate mediating tools to facilitate interactions and engagement among the CHAT components such as subject, community, and mediating tools. UDL emphasizes the importance of fostering community collaboration in the classroom (Meyer et al., 2014, p. 149) regarding students engagement and access to the learning of skills. This study found that the absence of enabling tools and technology compromised engagement of students with visual impairment and access to skills and knowledge in the learning process.

The discussion about whether teaching pedagogies promoted students' engagement and access to skills and knowledge among students with visual impairment is based on UDL guidelines. In inclusive education studies, it has been confirmed that incorporating UDL into lesson plans creates multiple opportunities for students to explain the knowledge they learn (Kurtts, 2006). I will discuss pedagogical practices in the context of the present study based on the three UDL principles of provision of multiple means of engagement, representation, and expression (Hehir & Katzman, 2012; Meyer et al., 2014). Rose et al. (2008) argued that although providing access to information and materials is often essential to learning, it is insufficient on its own; accordingly, they suggested UDL not only for facilitating access to information but also for making pedagogies accessible (p. 46). The idea is based on the guidelines given within the UDL principles, which state that it is possible to design teaching methods that value students' variability based on brain networks. Teaching methods should support diverse affective, recognition, and strategic networks. Thus, in my discussion I will attempt to use the UDL principles supported by relevant guidelines to evaluate whether students with visual impairment were pedagogically engaged, whether information was varied

enough for them to grasp the content, and whether options were provided for them to approach tasks in class differently.

#### 8.5.1 **Student engagement in the learning process**

When designing for learning, the first concern should not simply be how the information will be presented or expressed but rather how learners will be engaged or motivated. The realization of effective learning is possible if the learning design promotes engagement and motivation of students in the process of learning. In the three networks of learning which are affection (why of learning), recognition (what of learning) and strategic (how of learning), it is the “why” of learning that motivates students’ learning. Meyer et al. (2014) argue that the aim of UDL is to make learners experts, in the sense that students are enabled in developing interest, purpose, motivation, and self-regulation (p. 90). I will interpret and discuss some of the present study’s empirical findings based on the first principle of UDL, which in this context is the principle of providing multiple means of engagement. This principle has guidelines that if applied appropriately in the design of learning environments and materials will enable students to become engaged, to stay motivated, and to develop a sense of self-regulation. The guidelines provide options for self-regulation, options for sustaining effort and persistence, and for recruiting interest (Meyer et al., 2014, p. 91). Engagement of students in the learning process depends on various factors including teaching pedagogies and the media and materials used to facilitate interaction between the student and the learning activities.

According to UDL guidelines, there are various ways teachers can engage learners in lessons, such as making knowledge more relevant, rendering necessary materials and lesson notes, and group work (CAST, 2011). In addition, teachers can foster collaboration and a sense of community to enhance students’ engagement. The provision of practical skills and freedom to choose what to work on in learning activities promotes students’ engagement, interest, and motivation in the learning process, while nurturing a spirit of collaboration among learners and minimizing threats and distractions can also be motivating for students. The end result of providing multiple means of engagement is to make students purposeful and motivated to the extent that they self-regulate their learning (Meyer et al., 2014).

In this study, I reported the efforts of teachers applying different methods to motivate the engagement of students in the learning process. In the CLT course, for example, students

were provided with supportive materials, such as PowerPoint presentations. In addition, students were also directed to online accessible resources for self-help (see excerpt 6-9). Students were also inspired by the appropriateness of the course itself in that it addressed the importance of computer skills in the teaching profession. For instance, students were taught about the theoretical aspects of databases, how to work with Excel to process students' examinations results in schools, and how to rank students' examination scores (see excerpts 6-2 and 6-3). These skills were relevant and appropriate for student teachers and, consequently, inspired them. However, the situation was different for students with visual impairment. It was almost impossible for visually impaired students to access the instructional content and participate. The interpretation is that visually impaired students had no opportunity to be engaged in the activity (based on CHAT perspectives) because the learning environment had no alternatives to visual materials and as such was not universally designed (based on UDL perspectives). As noted in excerpts 6-7 and 6-8, there were no supportive tools for students with visual impairment in relation to CLT course practices.

Flexibility in students' activities is recommended as a way to accommodate students' diverse needs in the learning process. This was observed in the EMT course, in which students were given opportunities to decide their own topics of interest for their course projects. The provision of such opportunities for students contributed to development of interest and students became engaged and motivated in the project while learning. Students were also encouraged to collaborate, which contributed to the sharing of experiences, skills, and knowledge and to the development of a sense of community, and the appreciation of contributions from different individuals in the groups was contributed to sustaining efforts and persistence when working as a group or community for a determined educational goal.

This study revealed that students with visual impairment favored group assignments. Such group work contributes to motivation and a spirit of collaboration and engagement among students regardless of their disability status. However, the students with visual impairment favored group work on the condition that they were given the opportunity to form their own groups, while they were less in favor of groups formed by teachers. Wade and Zone (2000) argued that student groups formed by teachers tend to be more heterogeneous as opposed to groups formed by students themselves, which tend to be more homogeneous. In this study, students with visual impairment were more satisfied when teachers provided them with the opportunity to select members of their own group based on matching interests (see excerpt 7-

5). A study by López Gavira and Moriña (2015) reported that group work can be very challenging and consequently individual differences need to be accommodated for the group to work effectively as a team.

In this study, it was clear that student groups created by teachers disregarded students' interests. Such groups were viewed as dysfunctional, particularly for students with visual impairment. As a result, tensions within the groups arose, introducing disablers and unneeded complexity into collaborative group work. The visually impaired students' desire to be provided an opportunity to create their own groups did not mean that they wanted groups of visually impaired students only, but that they desired to be in a group of students with positive attitudes towards working with students with disabilities (see excerpt 7-5). One visually impaired student provided an example of a group created by the teacher in which most of the group's members felt uncomfortable working with the visually impaired student, who was ultimately ignored and left alone. It would thus be wise for teachers to allow students to select peers for their own groups. As described earlier in this thesis, it is the way we feel that affects our learning. The feelings or emotions influence our learning process. For-instance, Immordino-Yang (2016) argued that classroom climate and social relationships among students and teachers contribute to effective engagement and learning (p. 103).

In addition to collaborative team working, another issue reported was the provision of resources and equipment necessary to contribute to engagement of students in the lesson. However, most of the tools used in the classroom were appropriate for "average users." In other words, most of the working tools were not appropriate for students with visual impairment, both in the classroom and in the computer laboratory. As a result, students with visual impairment felt disengaged from on-going learning activities. The tools, equipment, or technology available and used in the classroom were generally not universally designed for visually impaired students to be engaged and become active participants in the learning process (see excerpts 6-28, 6-32, 7-3, 7-12 and 7-13).

In the selection of tools, educators must consider whether the tools will be able to engage and keep students motivated in the learning process. If teachers select tools that are less engaging and motivating for learners, the tools can become disablers. Some facilities and other equipment were useful to students with visual impairment but were not necessary for students with other disabilities or with no disabilities. This is the reason why one study suggested that although "instruction can be universal, [such instruction] is not realistic" (Scott et al., 2003, p.

372). This means that teachers need to understand students' variability and design their instructions and learning environment to address students' variability. One way to achieve this is for teachers to apply the UDL framework, which can guide teachers towards designing for all. Teachers can thus design their instruction in a way that enables all students to reach curriculum goals regardless of their diverse ways of learning (Hehir & Katzman, 2012). It is also important to highlight that UDL gives two insights from the learning sciences regarding students' variability, which is described as predictable and systematic and as context-dependent (Meyer et al., 2014, p. 87). A contextual design and availability of tools to be used can reinforce students' self-regulation, enabling them to sustain effort and develop interest in a particular learning task. In the present study, the contextual design and shortage of equipment negatively affected visually impaired students' self-regulation, sustained effort, and development of interest.

#### 8.5.2 Provision of multiple means of representation

In the UDL framework, flexibility and the presence of alternatives offered to students can change students from being passive participants to active participants who can encode instructional information in different ways. One role of teachers is to ensure that students are provided with alternative ways to get instructional information of equal quality. This is related to the UDL principle that emphasizes the provision of multiple means of representation (Hehir & Katzman, 2012; Meyer et al., 2014). UDL recommends teachers to be flexible, so as to include all students in the learning process while ensuring they have the relevant and appropriate means to learn. During the study's class observations, I noted that students encode and process information in multiple ways as well. For example, in the CLT course, students with visual impairment were observed to be recording lectures using audio recorders at the same time as they were listening to the teacher, while their sighted peers were listening, seeing, and writing what the teacher was displaying and writing on the whiteboard (see excerpts 6-3, 6-9, 6-10, and 6-11). Furthermore, there were two main options available for representation of the information: auditory and visual. In the observed classes, mainly auditory means of information representation were emphasized and practiced by the teachers. In both the EMT and CLT courses, teachers used microphones and loudspeakers installed in the classrooms so as to amplify their voices and enhance their audibility, particularly in larger classes (i.e., classes of more than 200 students). Nonetheless, sometimes the tools may malfunction (see excerpt 6-1). This is in line with the results of previous research by Kochung



(2011), whose study indicated that acoustic learning environments could be challenging for students who depend on hearing in their learning. Visually impaired students observed in the CLT course were largely dependent on the teachers' audibility. In such situations, students dependent on hearing are deprived from attaining quality instructional information when the tools to support audibility malfunction.

On the other hand, teachers used visual materials such as PowerPoint presentations, real objects, and whiteboard- or blackboard-drawn tables and diagrams to support their teaching (see excerpts 6-1, 6-2, 6-3, 6-5, 6-9, 6-10, and 6-11). Teachers applied the principle of provision of multiple means of representation to promote the accessibility of instructional information. However, the present study argues that the visual materials represented were not an alternative to the given auditory information but were rather complementary to it. In a study by Rapp (Rapp, 2014), it was reported that students appear to benefit from the use of both audio and visual materials (i.e., multiple input for every learner). Therefore, it is very important for teachers in the inclusive classes to know that the presence of visual materials should not deprive visually impaired students from obtaining the information, meaning that visual learning materials should be described alternatively so as to benefit students who depended more on hearing (auditory). For instance, in the absence of visual materials (slides), teachers in the CLT course tended to talk more and in more detail, whereas in the presence of visual materials, teachers seemed to overlook providing complete auditory information (see excerpts 6-34, 6-35, 6-39 and 7-2). As a result, the use of visual representations was perceived as a challenge for students with visual impairment, particularly those who were blind. This study identified that in the cases where teachers used both visual materials and provided adequate verbal descriptions, the visually impaired students interviewed reported fewer challenges in relation to accessing instructional information. This suggests that employing UDL to guide teachers' use of alternative ways for perception could result in fewer perception barriers for students.

A practical interpretation of the study's findings in this respect is that when teachers use more visual materials they tend to provide limited descriptions of these materials and consequently provide less auditory information. Students with visual impairment were thus deprived of their right to access and comprehend information of equal quality when compared to their classmates. Accordingly, this study demonstrated the need for UDL guidelines that advise teachers to offer alternative options for perception and comprehension.

In the CLT course, various approaches were used to enhance perception of the information presented in the classroom. Examples include the use of various media and tools such as PowerPoint presentations, drawings to illustrating concepts, and concept maps. The use of these tools and media played a significant scaffolding role within the zone of proximal development (ZPD) context (see excerpts 6-2 and 6-3). In addition, it was also found that the teaching included various approaches to maximizing recognition of information in the subject matter, including the various ways of presenting materials to support perception and comprehension. In the case of comprehension, methods include the construction of knowledge from what is already known by students to what is unknown to them, likewise, from what is familiar to students to what is unfamiliar to them. This technique is used by teachers to activate background knowledge from previous lessons before teaching new lessons. For example, the CLT teacher linked a previous topic, to the current topic (see excerpt 6-2). Strategically, this was intended to promote associations and related competences between the two topics, while it also worked as scaffolding for students in their learning context. As a result, the relationships between concepts contribute to the ability to comprehend a variety of materials. It was also observed that mathematical expressions and symbols were used in the CLT computer practical sessions when the string of information was too long to be internalized through an auditory path only (see excerpt 6-10). Here, I refer to the formulas presented to perform various tasks in the Excel computer program. Difficulties were experienced by many students in the classroom, and hence comprehension of the information and the grasping of the intended knowledge and skills was compromised. It is difficult to envision how challenging this was to students with visual impairment. First, there were no alternative options of the subject content presented , and it was therefore impossible to visualize and comprehend the very long mathematical expression presented in the class (see excerpt 6-11). Second, no alternative tools or models of presentation were available to support recognition of such core information during that lesson (see excerpt 6-10). If used by teachers, UDL can improve student's learning when supported by the necessary variety of tools and scaffolds for specific tasks. It is in such contexts where UDL could guide the practice to support recognition of the information presented. Thus, the availability of various accessible mediation tools and knowledge of UDL among teachers could be of great value in inclusive classes.

### 8.5.3 Provision of multiple means of action and expression

Another UDL principle urges teachers to support students' strategic learning. One way is by providing flexible methods of expression and apprenticeship to support strategic learning (Hehir & Katzman, 2012). This principle asks teachers to provide multiple means of action and expression to demonstrate what they know or have learnt, and suggests that activities provide options that help all students act strategically, express themselves fluently, or physically respond (Meyer et al., 2014, p. 113). The core goal of the principle is to differentiate the ways that students can express what they know (p.90). It is practical to support students with assistive technologies and offer relevant tools as a means to enable students to become strategic and self-directed (CAST, 2011; Meyer et al., 2014). Further, the principle suggests that teachers provide options or executive functions, provide options for expression and communication, and provide options for physical actions (Meyer 2014 p.111).

It was reported in this study that students were given different options to express and communicate what they know or learned. Students were mainly given tests, assignments, and examinations, most of which were in written form. In addition, we have seen that EMT students were given the opportunity to develop teaching materials and present them as part of the course project (see excerpts 6-19 and 6-20). In this project, students developed different artefacts and presented them in the classroom, yet it was difficult to examine the contribution of each student in the group due to the large number of students (10) in each group (see excerpt 6-19). In the practical component of the CLT course, there were few computers available in the computer laboratory and the majority of students were left with no tools to practice on. Students were then provided with assignments, tests, and a final examination, meaning that some efforts were made to provide alternative ways for students to express what they know, despite the fact that the interviewed teachers did not have an idea what UDL was. However, the traditional view of how students should be assessed influenced the practices, particularly concerning visually impaired students working on their assignments, tests, and examinations in the SEU (see excerpt 6-50). Here, it was noted that some blind students who were more competent in using Perkins Braille were required to use typewriters during examinations, which were inaccessible and unfriendly to their needs as they could not see what they were typing (see excerpt 7-12 and 7-13). The reason given for this was that teachers could not read braille materials, and the institution had no option to convert the braille materials to "normal" prints. Here, the alternatives given created unnecessary barriers to visually impaired students (see excerpts 7-17, 7-19, 7-18, 7-20, and 7-21). Students with

visual impairment could be given other options to maximize their opportunity to demonstrate their mastery of the subject matter. Also concerning the CLT course, alternative assistive technology and programs must be available for students with visual impairment so as to engage them into action during the practical sessions.

Despite the various ways in which students with visual impairment were supported, several challenges were reported to hinder their opportunity to become strategic and goal-directed in their learning due to the lack of a universally-designed environment. It is argued that in UDL assessment, flexibility regarding how students interact with materials is key to reducing barriers and maintaining the relevancy of the concepts which means maintain “construct relevancy” (Meyer et al., 2014, p. 142). If teachers were to apply the principles of UDL, particularly the principle of providing multiple means for students to demonstrate their mastery of knowledge and skills in the subject matter, then different options were to be provided to students including the ways of demonstrate their mastery of knowledge and skills as well as the user friendly tools or equipment. The SEU was assigned the role of improving the assessment materials/tools for visually impaired students (see excerpts 6-43, 6-44, 6-45, 6-46, 6-47 and 6-48) and supporting students’ interaction with these materials, including embossing the materials and providing the students with visual impairment support materials . However, despite all the efforts to improve the accessibility of test/examination items to visually impaired students, there were no alternative options concerning the equipment to be used by blind students, who were required to use typewriters regardless of their limited ability to do so.

## **8.6 Challenges observed by teachers in inclusive classrooms**

In this case study, inclusive education practices were positively viewed by the majority of higher learning institution practitioners. Efforts were made by the institution to enhance opportunities for students with diverse needs, including students with disabilities. The structure of this study was influenced by how practitioners in the institution described the phenomenon under investigation. Three levels of analysis consequently emerged. First, practices at the institutional level, mainly relating to contextual and pedagogical aspects for which CHAT can be used as an analytical framework to discuss the inclusiveness of the investigated institution; second, observed practices at the classroom level, and whether they were universally designed to create learning contexts that aim to optimize the opportunity of

all students and particularly, for the purposes of this study, blind students. Third, the individual-student level, with the student as an end-user outcome or a beneficiary of the institutional designed learning environment and classroom practices at the selected institution. There is a proverb which says, “only the wearer knows where the shoe pinches.” In the context of this study, students with visual impairment, as proverbial shoe wearers, can best explain the usefulness of teaching pedagogies, tools, and the learning environment in relation to the provision of multiple means of engagement, representation of instructional information, and demonstration of mastery of knowledge and skills. The three levels mentioned above are mutually influential, but it is important to discuss them separately for the sake of presentation and comprehensiveness. The study found that more challenges existed in the pedagogical practices used in inclusive classrooms. These challenges included a need for teacher training to equip teachers regarding the different issues faced when teaching inclusive classrooms (see excerpt 5-17). The studied institution emphasized learner-centered approaches, yet it was difficult for teachers to apply such approaches due to the large number of students in their classes, and despite students with visual impairment being provided with some assistive equipment, some of these students claimed that the assistive technologies and other individualized equipment or materials were outdated (see excerpts 5-7 and 7-18). CHAT emphasizes the case of appropriate tools to facilitate interactions. In addition, the UDL provides a framework to examine how such tools, technologies, or methods are universally designed to optimize learning opportunities for all students. The investigated institution may have been unaware that, in some courses, learner-centered approaches were impractical and were perceived to constitute learning barriers for students. In the following subsections, I will discuss the challenges experienced by teachers in teaching inclusive classrooms at UDSM.

#### **8.6.1 Pedagogic competency among teachers**

Teachers’ competency in teaching inclusive classrooms affects how and whether students with visual impairment become engaged and have access to knowledge and skills. A study conducted in Kenya, for instance, reported that teachers had no experience handling students with disabilities in classes due to large class sizes, lack of supporting staff, large workload among teachers, and motivation problems (Kochung, 2011). Another study reported that while trained teachers and paraprofessionals in special needs education are available in some places, higher education teachers generally do not have such expertise (Scott et al., 2003, p. 373). Both studies indicated challenges related to inclusive teaching pedagogies among

teachers. Similarly, in this study teachers reported significant challenges in teaching inclusive classes, such as how to help students with visual impairment to conceptualize perceptual skills or knowledge, as observed in the CLT and EMT courses (see excerpts 6-3, 6-14, 6-35, and 6-36). Teaching computer skills, in which visual ability is often crucial to information processing, was another challenge regarding students with visual impairment. The context is similar to the one in which a blind person was asked to solve a traditional Rubik's cube, which would be impossible due to the fact that vision is essential for such a task (Meyer et al., 2014). The learning barriers in this context are present within the design and not in the disability itself (see excerpt 5-8). Hence, there is the need for redesign based on UDL principles.

Teachers experienced difficulties teaching inclusive classes effectively, the reason for which was a lack of training in issues concerning special needs and inclusion. University teachers reported the need for training to be able to enhance opportunities for students' engagement and access to skills and knowledge of equal quality. Effective teacher training programs would give teachers access to an extensive range of pedagogies, materials, and activities that can assist students with special needs, particularly those with visual impairment, in becoming engaged and motivated and in acquiring the necessary skills and knowledge. The challenges faced by teachers in adapting to inclusive classrooms was perceived by teachers to be their own fault (López Gavira & Moriña, 2015). However, in my view, it is not the teachers' fault because, as discussed earlier in this thesis, teachers in higher education are more competent in content than pedagogies (Scott et al., 2003). Hence, UDL training of may improve the pedagogical skills and competencies of university teachers with regard to promoting inclusion of students with different needs, including blind students, in their teaching (see excerpts 5-10, 5-11, and 5-12).

### **8.6.2 Availability and status of teaching and learning materials and technology**

Despite the institutional efforts observed in this study to provide equipment and support inclusion of students with visual impairment in higher education, visually impaired students faced challenges in comprehending visually presented materials. For example, in the CLT course, visually impaired students struggled to conceptualize databases, a concept that non-visually-impaired students could understand by asking "What does a database looked like?"

This suggests the significance of visual presentations of abstract concepts (see excerpt 6-3). In this case, the teacher responded by drawing some rows and columns in an attempt to explain what a database looks like, a response that adopted a scaffolding approach to help students build a mental picture of a concept that appears to be abstract. While some non-visually-impaired students found it challenging to grasp this seemingly abstract concept, the situation was even worse for students with visual impairment. Few options were offered to enable students grasp the intended meaning of the concept. Knowledge of UDL guidelines and principles could be of great use in such learning contexts. Students with visual impairment had two options for encoding the instructional information and materials presented in the classroom: listening attentively and recording the lectures using their voice recorders. These approaches depended on the teaching methods used. When teachers use visual materials in the classroom, then such materials must be adequately described, and important features must be highlighted for the benefit of visually impaired students to construct knowledge. Otherwise, the listening and audio-recording options become insufficient.

Another practice observed was the use of PowerPoint presentations (slides). These were widely used and were considered to be a good way to improve higher education teaching practices. One study argued that the aim of using technology to enhance teaching was to improve students' learning and satisfaction, as well as to mediate changes in learning behavior (Jump, 2011, p. 62). In the present study, the use of PowerPoint presentations was reported to be less inclusive for students with visual impairment. It should also be noted that the addition of technology to traditional teaching does not always improve students' learning, as suggested by Jump (2011). On the other hand, López Gavira and Moriña (2015) reported that some teachers tend to simply read out their PowerPoint presentations to students, which was a poor or even negligent practice from the standpoint of those with visual and hearing difficulties. Similarly, in the present study, I reported how students with visual impairment complained when teachers used PowerPoint presentations, as the teachers spoke less, assuming that students could see important points displayed on the slides and sometimes even skipping them believing that students could read them in their own time (see excerpts 6-2 and 6-11). In such a learning situation, the use of PowerPoint presentations compromised the rights of students with visual impairment to be engaged and access knowledge and skills equally, thus becoming a barrier rather than an enabler. Teachers and SNE experts can emboss learning materials for visually impaired students to engage and access (see excerpts 5-10, 6-28, and 6-29). Furthermore, committed teachers could describe their texts and drawings

in detail for visually impaired students to comprehend, and, in the case of PowerPoint, can print the slides in an embossed format and verbally discuss their contents in class or even make use of text to speech programs where possible. Hence, such classroom practices do not have to be as challenging as was sometimes reported by teachers and SEU employees.

### **8.6.3 The impact of increasing student numbers on teaching and learning**

This study also reported on the effect of class size in the teaching and learning process (see excerpts 5-21, 6-12, and 6-22). Teachers reported experiencing hardships when teaching classes with large numbers of students. However, what constitutes a large class is differently perceived. Some research defines large classes simply based on the number of students. For example, Foley and Masingila (2014) defined large classes to be those with between 300 and 1000 students. On the other hand, Mulryan-Kyne (2010, p. 176), asserted that it is difficult to determine exactly what constitutes a large class in higher education or at what point a class becomes too large for effective learning to occur. For instance, in a science laboratory designed for 30 students, 50 students would be excessive; in the case of a history lecture in a lecture room designed for 200, however, 220 students would not likely be excessive. In this context, how a class is defined as “large” seems to be based on the nature of the course and the availability of supportive materials and other resources and equipment required. In the sciences and in other practical subjects, enabling equipment matters even if only a few students lack them, while other subjects, in which students depend on listening (lectures), can be taught narratively.

As observed in the present study, although teachers provided students with opportunities to practice computer skills in the CLT laboratory, the lack of computers to support students with visual impairment was an issue (see excerpt 6-8). The same situation applied in the EMT course, in which students developed an instructional model in groups consisting of 10 students. Several challenges were reported based on the nature of the tasks, which demanded visual perception. Overall, group discussions were viewed as helpful. However, a group of 10 students was considered too large for every member to participate equally and effectively. As some teachers argued, it was hard to evaluate contributions by everyone in such large groups (see excerpt 6-21). In one study conducted in a Spanish higher education institution, the usefulness of peers in inclusive education was emphasized. However, students with



disabilities still faced challenges when working in groups of five or six students. Such challenges included a lack of cooperation among peers and difficulty reaching consensus (López Gavira & Moríña, 2015). Likewise, in the present study, the effect of class size was a challenge for blind students, because not much attention was paid to them. For these students, the provision of learning materials after class sessions through copies of the PowerPoint presentations or lesson notes was valuable (see excerpt 6-24) as opposed to some teachers who thought giving students lecture notes was to encourage spoon-feed kind of teaching (see excerpt 6-26). Furthermore, a few teachers invited students with special needs to discuss the challenges they faced and ways to overcome them. Studies have argued for the value of learner-centered approaches for students regardless of the challenges (Kafanabo, 2011; Kitta & Tilya, 2010; Mino, 2004), as learner-centered approaches value the abilities and specific needs of students, so as to facilitate students' learning. However, in the present study, I reported that learner-centered approaches work in the contexts where teaching and learning materials, tools, and technologies are adequately available and used. Furthermore, I reported earlier that class size, shortage of resources, and inadequacy of teaching approaches, particularly regarding the extent to which they embrace UDL, were among the contextual factors that motivated teachers to use teacher-centered approaches.

The increase in class sizes in higher education is the result of a recent phenomenon in higher education termed "massification." This concept denotes the rapid growth in higher education enrolment (Alexander, 2000, p. 415). The effects of class size as reported in this study affected both teachers and students. Thus, teachers mostly use lecture (teacher-centered) methods. Foley and Masingila (2014) reported that large classes frequently utilize didactic lecture formats only. Students with disabilities viewed traditional lectures as outdated and geared towards enabling teachers to finish syllabi and prepare students for examination (López Gavira & Moríña, 2015, p. 373). In the present study, with reference to the two observed courses (CLT and EMT; see sections 6.2 and 6.3), efforts were made to alleviate this problem through adopting several different approaches, such as seminar presentations, course projects, group discussions, and laboratory practices. However, these approaches were not free from socially created barriers. As a result, visually impaired students reported experiencing various challenges in their learning in higher education. UDL emphasizes engagement of students in their learning process. In the UDL principle of engagement, the aspects of motivation, self-regulation, and interests are critical to learning. The principle of engagement is from the affective networks of models of learning, which intends to address the

“why” of learning. As, I will present in chapter 7, many students’ learning experiences were primarily based on how they were feeling (emotion), which simply reflects the affective aspects in the learning context.

### **8.7 Learning experiences of students with visual impairment in inclusive learning at UDSM**

In this section, I will interpret and discuss the experiences of students with visual impairment in inclusive higher in the studied learning institution. The collected data illuminated issues related to the learning experiences of students with visual impairment in higher education. The students’ learning experiences as reported in the findings pertained to the use of assistive technologies and other equipment in both learning and assessment processes (see excerpts 7-12, 7-13, 7-17, 7-18, 7-19, and 7-21 for examples). In addition, learning experiences were associated with teaching approaches, learning strategies, and assessment approaches (see excerpts 6-40, 6-41, 6-42, and 6-43). The results showed that inadequate teaching methods and a shortage of facilities in higher education adversely affected students with visual impairment. For example, in the CLT course, visually impaired students had no opportunity to follow the course due to a lack of supportive text-to-speech software. Similarly, in the SEU, one visually impaired student had to use a reader (see excerpts 5-12 and 5-13) to read out the materials from the internet because the computer had no software to allow the student to work independently. In a similar circumstance where peer assistance was unavailable, computers lacking appropriate up-to-date software would be inaccessible and useless to visually impaired students. Thus, computers used as mediating tools to achieve the educational goals were inaccessible and failed to engage students in the learning process. Theoretically, mediating tools are among the CHAT components that subject (students) and community (teachers and SNE experts) have to use for engagement and active participation so as to attain the intended object, which is the desired goal of the activity, in this case equal opportunity for engagement and access to knowledge and skills of equal quality regardless of students’ disabilities.

In the EMT course, students with visual impairment were challenged in the development of instructional media for presentations. This effect extended beyond the classroom to actual teaching practice (i.e., fieldwork). Student teachers had to practice teaching in their first and second year for a three-year education degree program, and the application of skills and

knowledge obtained in the EMT course was intended to acquaint students with skills for creating teaching aids (tools) to support their teaching practices in schools. One visually impaired student reported having to pay a sighted person to construct such instruction media (see excerpt 6-23). The same student added that during teaching practice, he asked a student in the class to describe the media to other students in the classroom. Then, the student teacher continued to teach based on what had been described. For the visually impaired student teacher, using a sighted person to develop a teaching tool incurred extra costs for the student.

The use of assistive technology was also reported to be a challenge for students with visual impairment, some of whom were not competent using typewriters (see excerpt 7-12), while others were both competent and comfortable with them (see excerpt 7-14). The challenge reported was that during examinations all students with visual impairment (blind students) were supposed to use typewriters, and those who were not proficient in their use had no other options. Such inflexibility concerning equipment, technology, and tools adversely impacted those students. It is also important to highlight that there was a very minimal use of computers for supporting visually impaired students. Thus, the technology that was required to be used was inappropriate and inaccessible to some visually impaired students. I argue that it may be useful for students to become capable of using typewriters, as this skill is an added advantage in terms of employment. However, it is important for the institution to establish alternatives for visually impaired students that allow them to use the devices they are more comfortable using when writing their examinations. The absence of multiple means of action and expression in terms of available technology is attributed to a lack of understanding of the usefulness of UDL. If multiple options were provided, then students with visual impairment would be able to choose from a pool of tools available those that worked better for each of them. While learning to use a typewriter may be desirable for employability, it should not be considered the only technology to be used by students when doing their university examinations. The present study reports differences based on study contexts, in developed countries, it was possible for students with visual impairment to have online access to information and course materials as well as access to e-mails regarding university information (López Gavira & Moriña, 2015). As opposed to in global south countries, including Tanzania, broad challenges are still faced in this respect. But, as the future is largely with digital technology, research knowledge and UDL practices will be more widely discussed and situated in educational practices both in Africa in general, and in Tanzania in particular.

The present study also reported the experiences of students with visual impairment in working with paraprofessionals (see excerpts 5-12, 5-13, and 7-23). In the SEU, I observed that notetakers, readers, transcribers, and sign language interpreters all collaboratively worked for students in the SEU. Differences among paraprofessionals and students with special needs were also reported to contribute to difficult experiences of students with visual impairment in higher education. The CHAT framework used in this study places emphasis on the importance of interactions, engagement, and collaborations between and among the components of CHAT as situated in the activity system, which is the inclusion of students in higher learning institutions in Tanzania. Immordino-Yang (2016) argues that social engagement has effects on academic engagement as well. This is one reason why some students with visual impairment perceived that having socially related challenges with their paraprofessionals had an effect on their studies. Immordino-Yang (2016) has stated how emotions in the learning environment can affect cognition. Drawing from this work, the results of the present study describe situations in which visually impaired students' emotions affect them not only psychologically but also cognitively. An example is found in the comment of one visually impaired student (see excerpt 7-23) whose learning was affected due to an unfavorable relationship with the student's personal assistant (reader/notetaker). The students with visual impairment perceived that in a learning context in which some visually impaired students feel unhappy working with certain paraprofessionals, the learning processes and outcomes of these students are likely to be affected as well.

### **8.8 Systemic contradictions and tensions perceived in the process of inclusion of students**

The emergence of tension and systemic contradiction in human activity systems is one of the principles of CHAT. Both tension and systemic contradiction act as a source of change or improvement in the activity system. For that reason, systemic contradictions and tensions are not "bad" things, as they can help bring about improvement or change. In this study, the presence of students with visual impairment was perceived to create tensions not only among teachers but also in the institution. This is because teachers are only prepared to accommodate "average learners," without much preparation and design for learning variability. As a result, any deviation in this regard creates tensions both in the institution and among teachers. The tension of having a blind student contributes to the teachers becoming more critical in assessing how to improve the existing situation. The following are the contexts in which

systemic contradictions and tensions were perceived to have emerged due to inclusion of students with visual impairment at UDSM.

First, there was a perception that identifying students with special needs would be useful for teachers in the provision of services. However, it was reported that not all students with special needs wanted to identify themselves as such for various reasons, including negative attitudes (see excerpts 5-18, 5-19, and 5-20). Systemic contradictions were evident in the SEU, among institutional management, and among students and teachers. It is a fact that more relevant services were provided to those students identified as having special needs. It was argued that the institution should purchase the materials and facilities required to accommodate the special needs of identified students. The same notion applied to teachers, who were also expected to accommodate the needs of students, when known. A major lesson from the perceived tension in this study is that the institution was not universally designed. The presence of systemic contradictions and tensions calls for improvements and changes from preparing only for average students to accommodating multiple types of students with a diverse array of needs. The UDL framework can be of great importance here. The evidence from the present study shows that even in situations where students with special needs were identified, challenges still arose in terms of the tools being used (see excerpt 5-13), which were outdated and of poor quality. Some tensions arose due to the teaching pedagogies used. In summary, tensions arose due to a lack of pedagogical competency, inadequate facilities, and an increase in the number of students in classrooms, where it becomes challenging for teachers to manage their students' needs.

Second, institutional demands also created tensions. The institution was reported to emphasize the use of learner-centered approaches; however, such approaches created tensions among teachers and students. The observations in the present study demonstrated that the use of learner-centered approaches in a class of more than one thousand students without fully enabling contexts and tools was ineffective and even counter-productive (see excerpts 5-21, 6-13, and 6-33). The situation was even worse for visually impaired students (see excerpt 6-33). For this reason, visually impaired students prefer teacher-centered approaches, which allowed them to simply record the lectures (see excerpt 6-34). This context developed a systemic contradiction and tension. Learner-centered approaches created more problems, but these problems can be used as a catalyst towards change and improvements in the teaching

pedagogies and provision of equipment to support the engagement of visually impaired students in the learning process.

Third, in the practical session, some tensions arose from the contents themselves insofar as they required visual ability. Tensions were observed in the CLT course when the Excel topic turned into a discussion of how to assign grades to students' scores using the program. Students were supposed to enter a chain of formulae into the computer (see excerpt 6-11), but the formula used to compute the grades was impossible for students with visual impairment to conceptualize, as it was not possible to see or touch it, and the available computers had no features to support them, nor could Perkins braille facilitate students' learning in that context. This situation was observed by teachers, visually impaired students and SNE experts to create tensions and there was a source to seek solutions, which can in turn trigger changes that will improve the learning situation for students with visual impairment.

Fourth, the evaluation of students' progress was also a source of tension. The present study demonstrated the hardships experienced by teachers, SNE experts, and visually impaired students in the evaluation process. The institution demanded quality examinations, yet in some situations, the structure and content of the questions were inaccessible and thus non-inclusive, resulting in tension (see excerpt 6-44, 6-45, 6-46, 7-10, and 7-11). When improvements to accessibility were suggested, they were perceived as possibly compromising the quality of the attributes being measured in the evaluations, which calls for improving the relevancy of the constructs which are measured.

Fifth, decisions about what technological devices to use and how to use them created tension among teachers, SNE experts, and visually impaired students. The varying ability of students to use typewriters and other tools was a source of tension, as were the limited abilities of teachers to comprehend the output of such devices. Since many teachers could not read braille prints, students were supposed to use typewriters, which not all blind students could do (see excerpt 7-12) as opposed to other students with visual impairment who preferred typewriters as a tool to use when writing her examinations (see excerpt 7-14 ). So, tensions were created by the decision over which tools should be used. This situation calls for changes or improvements, such as flexibility in the use of tools among visually impaired students.

Sixth, financial support presented another systemic contradiction and tension. The group of students with disabilities or students whose parents were disabled were prioritized in financial

loan to support them in their higher education (see subsection 5.3.1). A challenge will arise however when they will have to pay back the loans to the government after graduation. In the community of where negative attitude to persons with disability exists then employment to persons with disabilities bring tensions and systemic contradictions. The financial loan provided will have to be paid back immediately after being employed, despite the fact that employment is not guaranteed to any graduates, even those with no disability. For blind persons the situation becomes even more difficult. The systemic contradiction emerges regarding whether the financed student will be able to repay the loans, and if not, then whether the government can waive the loan repayments for disabled students so as to encourage more persons with disability to enter higher education. One role of tension and systemic contradiction is to stimulate the rethinking of certain existing practices in the institution with the aim of discovering how to improve the existing conditions and practices.

## **8.9 Chapter summary**

In this chapter I interpreted and discussed the empirical findings as presented in Chapters 5, 6, and 7 in relation to the four research questions introduced in Chapter 1. These research questions were as follows: (1) How is inclusive education conceptualized by students and by teachers and SNE experts in higher education (the CHAT components of subject and community, respectively)? (2) Which institutional practices were perceived (by subject and community) as enhancing inclusive education in higher education in Tanzania? (3) What were the instructional pedagogies and were these universally designed for learning to promote equal opportunity for engagement and access to knowledge and skills for students with visual impairment? (4) What were the learning experiences of students with visual impairment in the inclusive higher education setting? The chapter also reviewed the relevant theoretical interpretations of concepts and core suppositions.

Subsequently, the results for research question three were interpreted and discussed primarily based on classroom observations and interviews with subject and community. As discussed earlier in this chapter, teachers and SNE experts were aware of learners' variability and a need for strategies for effective inclusion. However, various challenges were reported, for example, due to class size, teaching pedagogies, and availability and use of technology. Further, despite the fact that some teachers had no idea what UDL meant, they were observed applying some UDL ideas in their teaching practices. This is closely related to the findings of a study of

effective inclusive schools which also found that teaching practices reflected the use of UDL principles despite the fact that not all teachers explicitly recognized these principles (Hehir & Katzman, 2012). Students with visual impairment encountered different experiences in learning practices in the learning process. Thus, to improve engagement and access to learning for students with special needs, particularly those with visual impairment, the institution must invest in teachers as well as enabling a more inclusive teaching and learning environment in general. It is important to orient teachers towards UDL's theoretical perspectives and to ensure that the learning environment is universally designed to embrace diverse learners.



## **9 Summary, Conclusions, and Recommendations**

### **9.1 Introduction**

In this chapter, I will present an overall summary of the study and its findings. This will be followed by a discussion of its empirical, theoretical, methodological, and practical contributions, as well as of its limitations. Lastly, I will present the study's conclusions and their implications for practice and future research.

### **9.2 Summary of the study**

Every person has a right to quality education. Widely, education systems have been denying people with disabilities their rights to quality education. The United Nations Declaration of Human Rights and the Salamanca Statement were among the international tools devised to secure the rights of people with disabilities to receive education. No-one should see disability as a problem, rather they should see education systems as the problem that needs to be addressed in order to accommodate students with disabilities. We are advised to shift our mindset from viewing disability as a problem to recognition of context and self-awareness as disabling conditions (Meyer et al., 2014). It is within this global effort that inclusive education became an issue internationally. In Tanzania, students with disability are admitted to higher education based on their academic merits in the same way as their peers. However, institutions are obliged to ensure the learning contexts and tools used embrace students' variability, particularly concerning blind students. Learning contexts and mediating tools can influence inclusion of students in higher education. This study sought to examine the inclusion of students in higher education in Tanzania through the perspective of universal design for learning (UDL). I purposively selected the University of Dar es Salaam (UDSM) as a study case due to its long history and culture of admitting students based on their academic merits regardless of their disability status. I collected research data from teachers, students, and staff in the Special Education Unit (SEU) through interviews, observations, discussions, and a questionnaire. The final goal was to address the following four research questions:

1. In what ways is inclusive education conceptualized by teachers, students, and SEU staff in higher education in Tanzania?

2. Which institutional practices are perceived by teachers, visually impaired students, and SEU staff to enhance inclusive education and are they universally designed?
3. Which instructional pedagogies are practiced in the classrooms and how do they facilitate or inhibit equal opportunity for engagement and access to knowledge and skills in the learning process for visually impaired students?
4. What are the learning experiences of students with visual impairment in the selected higher learning institution?

I used two theoretical frameworks to approach these four research questions. First, cultural-historical activity theory (CHAT) was applied to emphasize the role of mediating tools when interacting with the contexts. Tools are culturally and historically embedded, and hence mediating tools used can either facilitate or, if not contextually relevant, hinder interaction. Second, universal design for learning (UDL) was applied to question whether contexts and mediating tools were universally designed to optimize opportunity for all. The results presented in Chapter 5 related mainly to institutional contexts and practices that are largely influenced by institutional cultural and historical perspectives. The results presented in Chapters 6 and 7 were framed through the perspective of UDL. Classroom pedagogical practices were observed to examine whether they were universally designed to the extent of promoting equal opportunity for engagement, acquisition of knowledge, and development of skills for students with visual impairment. Chapter 7, also presented the learning experiences of visually impaired students in terms of institutional and pedagogical practices. Mediating tools are socioculturally constructed and thus cultural aspects can affect the ways in which people use tools and conduct activities. The institutional learning context embraced cultural and other forms of diversity. It was meaningful to apply the UDL framework to examine the institutional pedagogical practices to discover whether there was provision of multiple means of engagement, multiple means of representation, and multiple means of action and expression to ensure inclusion of students (Hehir & Katzman, 2012; Meyer et al., 2014).

The first research question concerned the conceptualization of inclusive education, with the idea being that inclusive education is a normative concept and the way in which practitioners understand it may influence their practices. Teachers, students, and SEU staff conceptualized inclusive education differently, yet the core understanding related to embracing diversity. Interpretations of diversity ranged from aspects concerning gender, diversified curricula,

students from marginalized communities (in terms of socioeconomic status), and people with disabilities. Regardless of these various groups, inclusive education was implicitly defined based on disability. Even students with visual impairment defined the term inclusive education based on their presence in higher education. The enrolment of visually impaired students was thus perceived to be an indication that UDSM was an inclusive higher learning institution. Likewise, most of the students without disability questioned by the study agreed that their institution was inclusive, based on the provision of opportunities for students with disabilities.

The second research question concerned the institutional efforts or practices that were perceived to be promoting inclusive education at UDSM. The provision of loans to disabled students, prioritized campus housing allocation, employment of special needs education (SNE) experts, provision of equipment to support students with disabilities, and advocacy related to special needs issues were among the efforts and practices identified by students, staff and SNE experts. Nevertheless, there were some challenges mentioned that hindered these efforts, including the lack of support staff in the Special Education Unit (SEU), difficulties faced by some teachers in identifying students' needs, and a great lack in equipment (tools) to support students with special needs, including visually impaired students.

The third research question examined classroom pedagogies and the extent to which they promoted inclusion of students with visual impairment, in the cases of two courses: Computer Literacy for Teachers (CLT) and Educational Media and Technology (EMT). Teachers were found to be aware of the diversity of students' needs. To accommodate such variability, I observed teachers using technology to support their presentations, mostly visual and auditory. In addition, teachers used various tools as scaffolding to support students' learning. Drawings, tables, real objects, and familiar examples were given to promote engagement of students in the subject matter. However, this was problematic for students with visual impairment due to the great lack of technology to support their engagement in the subject matter.

The fourth research question aimed at investigating the experiences of students with visual impairment in the learning process. The experiences of visually impaired students were anchored in the teaching methods used, the assessment activities and approaches, the availability and usefulness of assistive tools, their own approaches to learning, and the working relationships between the students and paraprofessionals (their readers and

notetakers). Poor relationships between some students and paraprofessionals influenced the opportunity for visually impaired students to engage and access knowledge and skills.

### **9.3 Contributions and limitations of the study**

#### **9.3.1 Empirical contributions**

The present study contributed to the empirical literature on inclusion of students in higher education in Tanzania, with reference to institutional practices, classroom pedagogies, and individual students' experiences. The findings demonstrated the complexity experienced by higher education practitioners when attempting to define inclusive education. The aspects used to define inclusive education as described earlier involved gender, socioeconomic status, disabilities, and diverse educational programs. However, strong emphasis was on disability. Inclusive education in this sense refers to any education system that enrolls students with disabilities in regular programs. The findings also demonstrated how emphasis was placed more on "physical accessibility" and less on engagement of students in the pedagogical practices, with the implication that the studied institution made efforts to address physical accessibility but less effort was made on the side of teaching pedagogies. Visually impaired students missed opportunities to engage and actively participate in the lessons due to non-universally-designed tools, materials, and pedagogies. The institution also offered priority to students with special needs for loans to support higher education, priority in the provision of housing, employment of SNE experts, and the provision of assistive devices. However, Institutional efforts faced some challenges. For example, students with visual impairment experienced that assistive devices were of inadequate quality and were outdated, and as a result, such students depended on their peers or on paraprofessionals (readers and notetakers) to support them in the zone of proximal development (ZPD). It is important to create a learning environment that will promote less human dependency and the use of user-friendly technology to support independence among individuals with disabilities.

In addition, good intentions were identified among teachers concerning the use of various teaching pedagogies. However, there were potential barriers in relation to teaching methods for students with visual impairment, including the use of visual materials that were inadequately explained, the use of language which demanded vision (constructed communication barriers), and overcrowded classrooms that influenced the teaching

pedagogies. Learner-centered approaches were favored for the benefit of students, yet it was found that students with visual impairment experienced more impediments in learner-centered approaches due to a lack of universally designed tools. The study therefore identified the usefulness of teacher-centered approaches, where a teacher talks about the subject matter and the students with visual impairment record the teacher's lectures through audio recorders, making sense of them after class. To improve learner-centered approaches, it is important to consider UDL principles in all the mediating tools to facilitate engagement and a sense of learning expertise in addition to providing teacher training on UDL practices.

In contrast to some previous studies, which indicated the presence of negative attitudes as being among the challenges students with disabilities faced in higher education (Kochung, 2011; Tungaraza, 2010), the present study demonstrated that teachers and SEU staff at UDSM were positive towards the academic abilities of students with disabilities and were eager to assist such students. However, their ability to provide such assistance was limited by their lack of necessary knowledge and skills. Some teachers lacked skills regarding how to teach inclusive classes. Students interpreted the refusal of a teacher to verbally spell out specific terms to visually impaired students as a negative attitude, implying that some teachers were not aware of the impact of their practices in the classrooms on students with disabilities. This implies a need for training teachers about UDL and about students' variability in the learning process.

Finally, the findings demonstrated the perception that examination scores are more often emphasized than required skills and competency in general. The findings also indicated barriers to the development of more adequate assessment tools. Thus, disabilities emanated from the content and format of the examination questions. It is important that teachers and institutional management determine how to make teaching and student examinations accessible to braille users. The understanding of the subject and the community regarding how UDL could be a useful framework to promote inclusion of students in higher education in Tanzania was limited. It is important that the institution implements UDL guidelines for the inclusion of students with diverse learning needs.

### 9.3.2 **Theoretical contributions**

The combination of CHAT and UDL is a promising theoretical framework. This study applied such a framework to examine not only inclusion of students as an activity shaped within

particular cultural and historical perspectives, but also to what extent the mediating cultural tools and/or signs used were universally designed to optimize opportunity for all to become engaged and to develop interest, motivations, and self-regulation in the learning process (activity). The study focused on the case of visually impaired students in a higher learning institution in Tanzania (UDSM).

I framed the research problem from a perspective that that inclusion of students in higher education is an activity in which a variety of cultural and historical contexts are likely to shape the practices within the activity itself. For a human activity to be effective, the tools used for mediation must be pertinent and assured to be available. Tools are culturally entrenched, and therefore all tools must be universally designed to ensure effective inclusion of students, where the learning context is created to optimize opportunity for all (Meyer et al., 2014). Applying CHAT in Tanzania can also be viewed as a validation of a theory that was developed in Eurasia and improved in Europe and North America. These geographic contexts are all very different. Thus, the use of CHAT in the present case study contributes to the idea that the theory can be used to understand the phenomenon under investigation regardless of sociocultural or geographic contexts. In this study, CHAT facilitated the understanding of the inclusion of students in higher education as an activity that calls for collaborative efforts from various components, such as subject, community, appropriate mediating tools, value for expertise and their specialties, and rules and norms that regulate the activity so as to achieve the goal, which is the provision of equal opportunity for engagement and access to knowledge and skills for all.

Another theoretical contribution of this study concerns the importance of triangulation. I placed CHAT as a useful framework for the analysis of inclusion of students in higher education in Tanzania, a human activity that is influenced by the culture and history of the individuals or institutions involved in the activity itself. In the activity, a significant aspect is the nature of the tools used to mediate the actions or activity goals. These mediating tools ought to be barrier-free, and UDL theory describes how tools or practices can be designed as such. It was for this reason that I established a theoretical framework combining both CHAT and UDL. CHAT can provide useful insights regarding the components and principles that may be significant in the analysis of an activity. CHAT also provided strategies to scrutinize systemic contradictions and tensions as the foundation on which to promote change. However, some components of human activity need a separate lens to evaluate the processes

in the activity. It was difficult to analyze whether mediated actions were enablers or disablers in relation to provision of equal opportunity for engagement and access to knowledge and skills, particularly regarding blind students. To overcome this challenge, CHAT was triangulated with UDL to frame the study's theoretical perspective.

In the process of inclusion of students in higher education, tools and the learning environment created must be universally designed (i.e., barrier-free). Practitioners, in this context, teachers and SEU staff, should also be aware of UDL principles and guidelines at the start of the preparations for their lessons. Rules and norms established to regulate practices in the institution should also provide alternatives means for people with special needs as should the general learning environment, which should also be barrier-free. In view of that, in the inclusion of students in higher education in Tanzania, significant components for design and analysis are stipulated by CHAT, but the evaluation of such components was facilitated by the UDL framework. To conclude, I argue that this study contributes to the theoretical perspective that CHAT and UDL can complement each other in any human activity under investigation. Moreover, it offers a promising approach for research that aims to address the creation of space for all.

### 9.3.3 **Methodological contributions**

The study's findings were based on data collected through interviews, observations, discussions, questionnaires, and document analysis, thus demonstrating how case studies can obtain information from varied sources. The methodological approach used in this study indicated the significance of methodological triangulation, and the nature of the study called for varied methods and sources of information. Because the main methods were face-to-face interviews with university teachers, SNE experts, and visually impaired students registered in the SEU, three levels of informants were considered with the same research objectives. The approach provided a way to verify information collected within or between levels of informants. Observations were conducted in the SEU, classrooms, and the computer laboratory. Computer-assisted qualitative data analysis was used to support the data analysis. The study contributed to the practical understanding of how embedded units of analysis can be analyzed in case studies.

The concepts of inclusive education and UDL have been treated as two different related disciplines. In the present study, the two concepts were conceptualized as philosophies of

“what” and “how,” respectively. The consensus achieved in the 1990 declaration on education for all (EFA) instigated universalized access to education for all children, youths, and adults. Furthermore, the plea to promote equity that can pinpoint barriers and find resources to overcome disablers was identified by the member states (UNESCO, 2009, p. 8). UDL is among the pedagogical theories intending to create classrooms that belong to everyone equally (Rapp, 2014, p. 2). This study contributes methodologically to approaches in which the foci of concepts are intertwined to examine the whole process of creation of learning contexts that aim to maximize students’ engagement and access to knowledge and skills in the inclusive learning settings. The study bridged philosophical concepts (inclusive education) and practical concepts (design for all based on the principles and guidelines of UDL), with particular reference to African contexts and a focus on Tanzania. The study also contributes to the existing literature by confirming that the inclusion of students in higher education and the improvement of learning opportunities for all, not only in Tanzania or in Africa in general, but worldwide, calls for a design that embraces diversity and the needs of students.

#### 9.3.4 **Practical contributions**

The findings of the present case study act as an eye-opener for higher education practitioners, particularly in Tanzania and Africa, calling for them to become aware of learning barriers emanating from the design of learning contexts created for students, particularly students with disabilities. Likewise, tools, technology, and materials need to feature the principles and guidelines of UDL, to improve the learning environment and pedagogies and to embrace inclusion. The areas noted to have created injustice were mainly the mediating tools and the rules regulating practices in the institution. Another learning barrier was asserted to be within the division of labor. Higher learning institutions in Tanzania are thus urged to apply universal design principles and guidelines to examine how their learning contexts, mediating tools, technology, and rules address students’ learning variabilities as a strategy to advocate for inclusive education.

Another practical implication is that although learner-centered approaches were emphasized, an unsupportive technological environment and the shortage of equipment and materials to facilitate learner-centered pedagogies hindered the development of learners’ expertise in three important areas: affective, recognition and strategic networks for learning. As one teacher expressed, some students had little interest in some courses, thinking more about the



examinations rather than being concerned with their engagement in the learning process. It is an obligation of teachers to develop and design their courses so as to contribute to students becoming motivated, knowledgeable, and self-directed. Teachers can apply the following three questions that can contribute to the development and design of universally designed lessons (Meyer et al., 2014): How will learners become engaged in the lesson? How will the information be presented to the learner? How are learners expected to act and express themselves strategically? If teachers can obtain answers to these three questions, then many unnecessary barriers to learning will be minimized or eliminated.

### 9.3.5 **Limitations of the study**

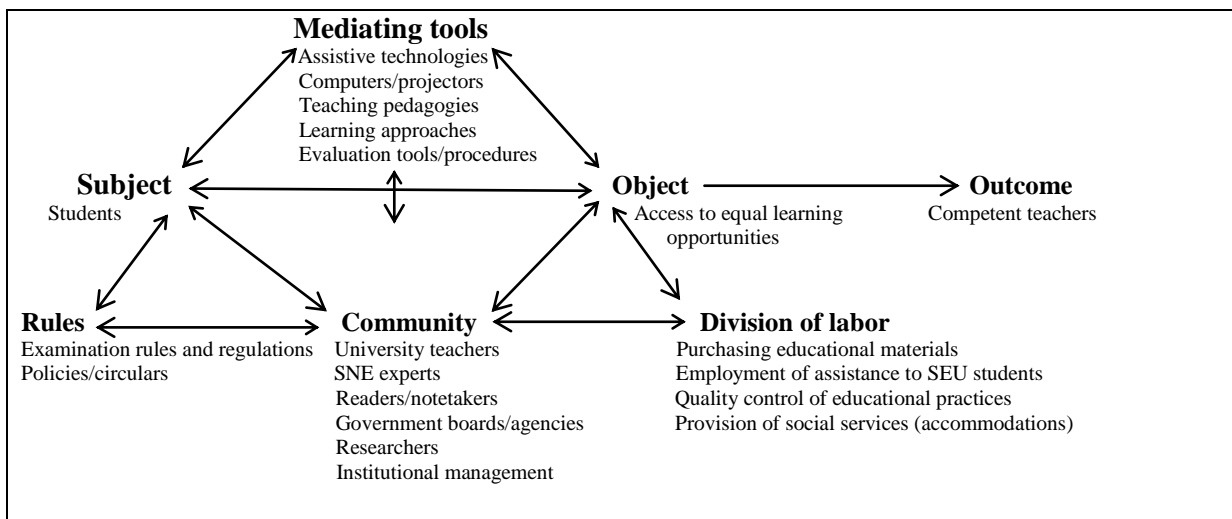
All studies have limitations. This study is no exception. The first limitation is in the sample and sampling technique. In this case study, the sample was purposively selected based on its potential to yield information about the topic. I present it as a limitation because there might be a bias on the side of the informants, either positive or negative, towards the topic. It is important to discuss sampling techniques in order to develop transparency, reveal possible biases, and present ways in which to tackle them. Informants were selected based on the following criteria: first, teachers who had leadership experience in the department that hosts the SEU; second, teachers whose classes included students with special needs, particularly visually impaired (practically blind) students; third, employees in the SEU; and fourth, students registered as visually impaired in the SEU. Each group had a specific role regarding the inclusion of students in higher education in Tanzania and enhancement of equal learning opportunity for all. In the process of data collection, some limitations emerged due to attributions, meaning that the situation was explained based on positive outcomes for oneself but unfavorable outcomes of external factors. A good example of this was the poor condition of tools, lack of training, large classes, and lack of resources. Cause attributions in this study were observed as a limiting factor. Observations intended to minimize biases were based on attributions. Triangulation and the verification of data collected were important. The question here concerned whether the results would have been different if the informants had been randomly selected. However, this was not the focus of the present study, which was a case study with an explorative perspective regarding the phenomenon of the inclusion of students in higher education in Tanzania.

Another limitation in this study concerned the methods used to collect data. Although observations were situated in such a way as to verify information, informants' awareness of the observations could have affected the results. However, since the observations were conducted within established institutional practices, there would be less change in such practices due to the awareness of being observed. Additionally, a survey of and discussions with students with no disabilities were conducted to include their perspectives regarding the topic of inclusion of students in higher education. Data collected through the questionnaires and group discussions were used to address the issue of limitations based on observations and the self-reporting of visually impaired students. In addition, the research design and scope of this study was a limitation. Since it was a case study limited to a single higher education institution in Tanzania, the results likely cannot be generalized. This argument, however, has been disputed (Yin, 2014), and the distinction between the two claims is based on how generalizations are made. Concerning the view that case studies cannot be generalized, generalization is from the sample to the population, whereas in the other view, case studies can be generalized to existing theories. Subsequently, case studies aim for analytical generalization rather than statistical generalization (Robson, 2002, p. 183). Yin (2014) thus argued that case studies are generalizable to theoretical propositions but not to populations or universes (Yin, 2014, p. 21).

In the present study, generalization from sample to population was limited due to variations between the educational conditions and contexts of teachers and students with visual impairment. This limitation applies across the population, meaning that the findings cannot be generalized to different populations in primary and secondary levels of education in Tanzania. Instead, the findings in the present study can be used to expand and generalize to the existing body of literature or to theoretical propositions. It is the purpose of the present study to contribute to analytical generalization, where evidence from the study is used to understand phenomena occurring in higher education in Tanzania regarding inclusive education. Analytical generalization also provided evidence of the applicability of CHAT and UDL in a different context as well as of their mechanisms. Therefore, generalization in this study is limited in terms of samples and populations but not as limited for analytical perspectives. Analytical generalization targets the contribution of the study findings to assist researchers and practitioners in understanding other, related phenomena or cases.

## 9.4 Conclusions of the study

The general purpose of the present study was to investigate the inclusion of students in higher education in Tanzania through the perspective of UDL. At the time of data collection, informants were asked about the meaning and their experiences with inclusive education in higher education. The results showed that the necessary understandings of inclusive education in higher education and associated practices were in place to improve inclusion of students, but the challenges were more on pedagogical practices in classrooms in relation to provision of equal opportunity for engagement, knowledge, and skills. The results also brought to light the experiences of students with visual impairment in the inclusive learning setting. Figure 6 illustrates the analytical components used in this study, as well as the key issues that emerged.



**Figure 6.** Interrelated components in the inclusion of students in higher education.

The present study indicated that the inclusion of students in higher education in Tanzania was a complex human activity. The end result of such human activity is an outcome. In this study, the focus was on students in education programs aimed at preparing teachers. Particular emphasis was placed on students with visual impairment (the subject) and whether they were provided equal opportunity for engagement, comprehension, and development of skills (the object), which would in turn make them more competent in their teaching profession (the outcome). Based on its findings, the present study draws the following conclusions:

First, the inclusion of students with visual impairment in regular education systems can be successful if appropriate and accessible tools are available and properly used. The findings have indicated the ways in which mediating tools work as enablers or disablers in the learning

process. Students with visual impairment want flexibility in the decision over what tools to use. This means that some assistive technologies (mediating tools) are more user-friendly than others. The study concludes that some tools used in higher education in Tanzania create barriers to students with visual impairment. As indicated in Figure 6, these tools include assistive devices (Perkins braille, typewriters, PAC mates, and digital audio recorders), evaluation tools (tests and examinations with inaccessible formats or contents) and teaching pedagogies, such as learner-centered pedagogies. Teacher-centered pedagogies (more emphasis on oral lectures) were preferred in contexts where tools were inadequate in promoting interactions between the students and materials presented. Consequently, the study concludes that a significant amount of materials used in higher education in Tanzania are not universally designed for learning to occur for students with visual impairment.

Second, the study concludes that the experiences of students with visual impairment indicate that many challenges are socially created, including the principles established to regulate the activity (rules), the environment in which the activity takes place (community), and the skills and knowledge of the individuals responsible for administering the activity (division of labor).

Third, the study concludes that inclusive education is perceived to be successful for addressing physical impediments. However, critical aspects that hinder inclusion include provision of multiple means for engagement, the way information is presented, and the way students are supposed to act and express what they know regardless of their disability status. This situation occurs due to various factors, including lack of training on issues related to special needs, universal design for learning, and user-friendly technologies.

Fourth, the study concludes that there were systemic contradictions and tensions in the institution, primarily between teachers and students. The presence of a blind student in class created tension with teachers. This, in fact, made teachers think more critically about how to improve their teaching methods or how to search for assistance from the SEU. Likewise, for the institution's management, the presence of students with special needs created tensions, which were reflected in the way informants discussed practices perceived to promote inclusive education in higher education in Tanzania. Tension also occurred between the mediating tools and informants (subjects), rules (norms and principles that govern the practices in the activity), object (objective of the activity), division of labor (shared responsibilities), and community (learning environment and surroundings). The requirement

for some blind students to use typewriters in their examinations for the benefit of teachers who could not read braille prints, even though the student could not then see what she/he was typing, is framed as a tension among blind students and as a result gives rise to systemic contradictions. Consequently, these systemic tensions and contradictions should help to drive change or improvement.

Fifth, the study concludes that in the case of the two investigated courses (CLT and EMT), engagement, skills, and knowledge were attained less by students with visual impairment due to a shortage of the tools and expertise needed to attain the intended objectives (object). As a result, students did not obtain adequate skills and knowledge in the use of computers in education or in instructional media and technology in education practices. Lack of competency in this respect places a person at risk of unemployment and perpetuates the vicious cycle of poverty.

Regarding the extent to which the four research questions (as outlined in section 1.7) were answered, the answers to the first and second research questions were presented in Chapter 5, which addressed the conceptualization of inclusive education by the subject and community in higher education as well as the institutional efforts perceived to play a role in promoting inclusive education in higher education. The third research question was answered in Chapter 6, which focused on whether instructional pedagogies used in a higher learning institution studied were universally designed while the fourth research question is answered in Chapter 7, which addressed the experiences of students with visual impairment. However, further studies are needed on pedagogical practices in classrooms, particularly those using an intervention-based research design, where teachers are oriented on UDL principles and thereafter the results in terms of teaching practices and students' engagement in the learning process are investigated.

## **9.5 Implications of the study findings and recommendations**

The findings obtained in this study can be useful in debates concerning the inclusion of students in higher education and provision of equal learning opportunity for all, in particular with regard to existing knowledge about UDL (i.e., design for all) and inclusive education (as normative knowledge about inclusion), especially in the context of higher education where students are preparing themselves to become skilled and competent professionals. In the

following subsections, I will present the implications of the study's findings and the resulting recommendations.

#### **9.5.1 Implications for institutions practicing inclusive higher education**

The institution of higher education investigated in this study confirmed its positive intention to provide quality education to all students, including students with disabilities. The institution offered students with disabilities individualized equipment to improve their learning conditions and circumstances. The institution depended on information from the students about their disability conditions, but it was not obligatory for students to indicate the status of their disabilities. As a result, it was difficult for the institution to offer individualized services to students whose needs were not identified. It is argued by teachers that opportunity for engagement and access to knowledge and skills was compromised for students unwilling to disclose their disability. An important question that emerged in this study concerned whether it is necessary or not to identify students' disabilities so as to improve teaching practices. In situations where people hold undesirable attitudes towards disabilities, individuals with disabilities will be unlikely to reveal their disability status, due to fear of rejection, discrimination, or exclusion. Instead, a change in attitude and the willingness to include everyone in the learning process is needed. In this study, self-identification was observed to be important for students who require special tools or equipment to support them in the learning process. However, other students may have unrecognized special needs, which necessitate the attention of practitioners (i.e., teachers and SEU staff) when designing and delivering instructional materials. Institutions must design for all regardless of whether students identify themselves as disabled or not. This calls for proactive inclusive designing. Through universal design, proactive design emphasizes thinking about multiple users in the design and delivery of services that provide multiple options for accessing them (David Rose & Meyer, 2002). UDL, on the other hand, emphasizes the provision of multiple means of engagement, representation, action, and expression (Meyer et al., 2014). This means that practitioners need to be proactive and think in different ways to support students' learning. Teachers need to be proactive in their preparation of the teaching materials and methods, considering all possible differences in classes and design for all. Encouragingly, the nature of learning has been revealed in the learning and education sciences. This has elucidated issues relating to the proactive design of education systems in which there is an understanding that

learner variability is systematic and mostly predictable and that learner capacity is context-dependent (Meyer et al., 2014, p. 85).

Another implication for higher education in Tanzania is based on the lack of resources required to support all students. For instance, I observed that housing, finances, and the scarcity of up-to-date technological devices were among the great challenges for students with visual impairment at UDSM. When resources and facilities are in short supply, the institutions set affirmative actions to support students with identified special needs. These actions imply including some students by excluding others according to the available resources. The present study recommends institutions of higher education in Tanzania to secure resources for all students enrolled in higher learning institutions regardless of disability status. Every student enrolled in higher education in Tanzania and elsewhere in this world has the same right to enabling facilities, technology, resources, and quality education. However, learning needs and the availability of various resources, technology, and other supportive tools are more contextually situated.

A lack of SNE experts to support students with special needs was also reported. In such situations, it is important for institutions to strengthen the unit dealing with special educational needs. The institution should secure potential assistive devices and ensure that staff in the special needs unit acquire competence in their use. Higher education institutions should also provide in-service training to teachers. The findings reported challenges faced by teachers when teaching inclusive classes. Some teachers reported a need for training in teaching inclusive classes. As discussed earlier, teachers faced more challenges when teaching an inclusive class with blind students, as the contents of some subjects demanded vision. Teachers need to learn how to teach visual concepts to students with visual impairment. Therefore, sharing of experiences among participants (community collaboration) within the institution, including teachers, transcribers, sign language interpreters and students with disabilities, can be of great importance in promoting inclusion of students with visual impairment in higher education.

The present study demonstrated a low level of flexibility regarding the kind of assistive technology used during university examinations. Typewriters were supposed to be used, yet students without typewriting skills were not comfortable using them. The study recommends the provision of options to students with visual impairment in responding to examination questions. For example, if the examination does not assess handwriting, the student could

perhaps be provided with an oral examination. Consequently, institutions are recommended to think about the provision of multiple options on how students can act and express what they know, one of the UDL principles. It is also important to have options for multimedia. Teachers used both audio as well as visual materials and media to support students' learning. Students require media options to express what they know about the subject matter. This means that the way students are asked to act or express what they know should not disable them, but rather serve as a medium or channel by which to enable them.

### 9.5.2 **Implications for further research**

The present case study explored the use of UDL towards achieving inclusive higher education. It was a case study guided by an eclectic theoretical approach and was basically qualitatively designed. Data collected for this study was provided by teachers, students, and SEU staff, and through observations. The following areas are recommended as warranting further research:

1. Tensions among components that compromise the inclusion of students should be examined. It is important to develop another study with the purpose of exploring strategies that can be used to address quality learning in institutions that experience a shortage of resources and facilities.
2. It is worth conducting a study on how UDL can serve as a key parameter in designed environments and materials for the purpose of making them more engaging and accessible to the varied needs of students in the context of Tanzania.
3. Further research should emphasize the development of materials and their testing in the inclusive higher education institution in Tanzania. In the present study, there was no development and testing of learning materials based on CHAT and UDL theoretical frameworks.
4. It is important to think about different technologies whose purpose is to enhance the inclusion of students, particularly in developing countries, including Tanzania. For example, it might be possible to conduct a study whose purpose is to explore how the internet, among other current technological phenomena, can promote engagement of students with visual impairment in large classes in higher education in Tanzania.



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# Appendices

## Data collection instruments

### Appendix 1: Interview guide for interviewing university teachers

1. Inclusive education is globally promoted. What do you think inclusive education is and what practices do you think reflect inclusive education policy in this institution?
2. Think about when and how you design course materials and describe the process for me. Who says what to whom in what channel with what intended effect?
3. What are the most important limitations when it comes to designing course materials to be inclusive?
4. Would you describe how you practice inclusion in your course? And what are the achievements and challenges?
5. Would you describe the learning strategies preferred by your students? And in general, what kinds of learning strategies does the institution aim for its students?
6. Do all students, including those with sensory loss, have access to your course materials? If “Yes,” how? If “No,” why?
7. What do you think affects the implementation of designed course materials in classrooms?
8. Think of your course materials, either visual or audio. Can you describe how your students interact with them? Any comments about special needs students?
9. How do you describe the relationship between course material design and students’ learning opportunities?
10. Is there anything you would like to comment on in relation to our discussion?





## **Appendix 2: Interview guide for interviewing students with visual impairment**

1. Can you describe your historical school learning experiences? What educational and social factors contributed to your success from lower levels to university education? What factors contributed to the selection of the profession you are pursuing at this institution?
2. Can you share with me what preparations you make before lectures and what you do after lectures? What happens in the lectures? And what do you think about the lecture that you have just attended?
3. How far do you think course materials designed or used in class include individual students' learning differences? How inclusive are the course materials (think of content, instructional methods, media used for instruction, and learning activities)? In what ways do students differ in learning? How do you think the materials should be designed to be more effective for students' learning?
4. What issues of interest have you learnt from the course selected? What helps you to identify and understand information, ideas, and concepts in the course materials? How do you identify and understand information, ideas, and concepts in the course materials?
5. Students have different approaches to learning. Can you describe approaches you are using for effective learning? How successful or challenging are your approaches? How do your teaching approaches and your learning approaches relate or differ? Can you describe the course materials and the way you interact with them? Finally, how does course material design facilitate your learning outcome?
6. What comment do you have about the course material and its presentations? What course activities are you participating in? What do you think about the activities? If you could have a choice, would you choose the same course materials, modes of presentation, or activities? Do course materials and activities make you active in the learning process? If "Yes," how. If "No," why?
7. Is there anything you would like to comment on in relation to our discussion?



### **Appendix 3: Interview guide for interviewing SNE experts**

1. Can you tell me the history of the SNEU in this institution (establishment, aims, activities, etc.)?
2. When you think about the history of the SEU, has the unit gone through any important changes? What are the changes and why did they occur? How does the unit improve? What does it aim to achieve in the future?
3. What is your professional relationship with students and lecturers?
4. Can you describe your experience(s) with the course materials (content, reading materials, and learning activities) prepared for students' learning and students with special needs in this unit?
5. Can you describe strategies you are using to accommodate students with visual impairment to access effective learning?
6. What are strategies students with visual impairment use to interact with visual/audio materials?
7. What assistive technologies do you have and how useful and challenging are they?
8. In your experience, how does course material design affect students' learning?
9. What are critical crisis situations students with sensory loss experience and how do they overcome these situations?
10. Is there anything you would like to comment on in relation to our discussion?



## **Appendix 4: Classroom observation guide**

### *Preliminary information:*

Date

Course

What topic was taught?

Location

Estimated observed class size

### *Important issues to be noted:*

1. Are there students with special needs with preferred seating positions?
2. What kind of teaching materials are used to facilitate the learning process?
3. What teaching method is used?
4. What teachers and student activities are observed?
5. Are there any paraprofessionals in the class? If so, what are their activities?
6. What tools are used by students with special needs?
7. How do teachers and students interact?



## **Appendix 5: Special Education Unit (SEU) observation guide**

1. What activities are performed by the student in the unit?
2. What learning supporting materials are available in the unit?
3. How are the learning materials used by special needs students in the unit?
4. What are difficulties students with special needs face in using the available learning materials?
5. What activities are performed by paraprofessionals (if available)?





## **Appendix 6: Student focus-group discussion guide**

Students who participated in focus-group discussions were invited to discuss inclusive education in higher learning institutions. They were asked to focus on subject matter, pedagogies, learning activities, facilities, learning materials, and any other issues they thought were important in relation to the topic.

*[Note: It was hard to follow the guide prepared prior to field work as shown below. The reason was that the focus group was for the validation process of what was obtained in the interviews with key informants; therefore, many of the findings regarding the project were directed to the teaching methods, technology, facilities, assessment of students' progress, and learning approaches used by students.]*

1. Students in higher education are diverse, they differ in various ways. How far do you think course materials designed include individual students' learning differences? How inclusive are the course materials (think of content, instructional methods, media used for instruction, and learning activities)? In what ways do students differ in learning strategies? How do you think the materials should be designed to be more effective for students' learning outcomes?
2. What did you learn from the course selected? What helped you to identify and understand information, ideas, and concepts in the course materials? How did you identify and understand information, ideas, and concepts in the course materials?
3. Students have different approaches to learning. Can you describe approaches you are using for effective learning? How successful or challenging are your approaches? How do your teaching approaches and learning approaches relate or differ? Can you describe the course materials and the way you interact with them? How does course material design facilitate your learning outcome?
4. What are the promoting aspects or problematic aspects of the course material and its presentation? What course activities are you participating in? What do you think about the activities? How do they make you active in the learning process?
5. Is there anything you would like to comment on in relation to our discussion?



## Appendix 7: Student questionnaire

Dear student,

*Inclusive education is a global phenomenon which emphasises the non-discriminatory provision of education services. For learning to be inclusive, it requires a design which aims to include every student in the learning process. Universal design for learning (UDL) is a philosophy which celebrates diversities in the designing of educational materials. Therefore, this questionnaire intends to examine how UDL promotes inclusive education in higher learning institutions.*

*I request you to participate voluntarily by answering the following questions. Data to be collected will be anonymised and used for research purposes only. Thus, you do not need to write your name anywhere in this questionnaire.*

1. Degree programme: \_\_\_\_\_
2. Gender: F (\_\_\_), M (\_\_\_)
3. Year of study: First\_\_\_\_; Second \_\_\_\_; Third \_\_\_\_
4. Employment status: Pre-service\_\_\_\_; In-service \_\_\_\_
5. When in class, which position of seats do you prefer? Front seats\_\_\_\_; Middle seats\_\_\_\_; Back seats\_\_\_\_\_

### **PART ONE: Read the following statements and tick one box provided from Strongly Agree to Strongly Disagree**

No.	Read the following statements then respond by assigning a tick (✓) in one of the boxes showing the extent you agree or disagree with the statement about learning experiences in higher education.	Strongly Agree	Agree	Disagree	Strongly Disagree
1	The use of video is useful to all students in the classroom				
2	It is easy for me to understand and follow up on lectures prepared and presented in PowerPoint presentations				
3	I frequently experience difficulty understanding the language used in lectures				
4	I frequently experience difficulty hearing what is presented in lectures				
5	I learn best by practically exploring physical worlds around me				
6	I frequently experience difficulty seeing what is written on the blackboard/whiteboard				
7	In this institution, the use of teaching media in lectures includes all students				
8	Classrooms are designed in a way that every student including those with visual or hearing impairment can access				
9	Library services are designed in a way that every student can access the learning materials, including braille books				
10	Computer laboratories are designed in a way that every student including those with disabilities can access the computers				
11	Technology used to register students is accessible to every student regardless of disability				
12	I benefit much from the use of ICT facilities in the classroom				

13	Course materials are actively engaging for students in learning				
14	Available teaching and learning materials are accessible and easy to use				
15	Instructional technologies are used to enhance students' learning process				
16	I learn best by interpreting the underlying meanings of speech by listening to tone of voice and pitch				
17	The assignments in this institution are challenging and meaningful				
18	I learn best from visual displays like diagrams, illustrated textbooks, overhead transparency, videos, flipcharts, and handouts				
19	Course materials design engages and motivates student learning				
20	In this institution, students have opportunities to express their understanding of materials in different ways than tests/exams				
21	I understand what is taught when key points are summarised during or at the end of the lectures				
22	In this institution, students are given options for course activities or assignments				
23	In this institution, the interest and motivations of students are considered in the process of learning				
24	All students in this institution have access to equal learning opportunities				
25	I learn best by seeing the teacher's body language and facial expression				
26	Teaching and learning materials design have effects on students' learning				
27	I prefer taking detailed notes during lectures				
28	I learn best through verbal lectures, discussions and listening to what others are saying				
29	I learn best through hands-on approaches like touching or doing				
30	In this inclusive setting, there are teachers/instructors who do not like students with disabilities to opt out of their courses				
31	In this institution, teachers do not know how to use braille or sign language				
32	I use smartphones to record lectures				
33	I use smartphones to access learning materials on the internet				
34	Course contents which are taught in higher education are relevant and appropriate				
35	In this institution, the Special Education Unit is helpful even to students without 'disabilities'				

**PART TWO: This section reflects students' learning experiences in higher education. You are kindly asked to respond based on your experiences. There is no wrong response.**

Q1. What factors promote access to knowledge and skills in higher learning institutions?

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Q2. What teaching methods are used in higher education?

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Q3. What learning approaches do students use in higher education? Why?

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Q4. What motivates you to study the degree programme you are studying?

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**PART THREE: Read the following questions and respond accordingly.**

No.	Read the following questions then tick (✓) appropriately	Yes [ ]	No [ ]
1.	Do you get funds from the Higher Education Students' Loan Board (HESLB)? If yes, what percent do you get?		
2.	Do you have accommodation from the University of Dar es Salaam Accommodation Bureau (USAB)?		
3.	Do you own a smartphone?		
4.	Do you use eyeglasses/spectacles for reading?		
5.	Is higher education inclusive?		
6.	Do you own a laptop or desktop for learning purposes?		
7.	Did you get computer training on how to access internet services before joining university education?		
8.	Did you get computer training on how to use word processing before joining university education?		

9. Do you have any problem with any of the following senses which affects your learning? (Tick (✓) where appropriate?)

SENSES	Yes [ ]	No [ ]
<i>Visual/seeing</i>		
<i>Hearing</i>		
<i>Touching/tactile</i>		
<i>Smelling</i>		
<i>Tasting</i>		

**Thank you for your cooperation!**



## **Research ethics considerations**

### **Appendix 8: Information provided to participants about the study and consent form**

Request for participation in research project

#### **‘Universal design for learning and inclusive education in higher education’**

##### **Background and Purpose**

I am a research fellow (PhD candidate) from the Faculty of Educational Sciences, Department of Education, University of Oslo. I am working with NORHED-ENABLE: Higher Education and Multimedia in Special Needs Education and Rehabilitation project. In this specific research, the researcher will explore how universal design for learning is conceptualized in the course material design and the way it facilitates students’ learning opportunities. The sample includes university lecturers, university students, and experts in the Special Education Unit. The sample will be drawn from one public university in Tanzania.

##### **What does participation in the project imply?**

The study will include ordinary observations of activities in the classroom, computer laboratory and Special Education Unit which will be noted for discussion with students to find out how accessible learning materials are and how they promote access to equal learning opportunities. Next, interviews will be conducted with university lecturers, students and experts in the Special Education Unit to explore the issues of universal design for learning and inclusive education in higher learning institutions. And finally, some students will be asked to fill out the questionnaire, and a few of them will be requested and randomly selected to participate in focus-group interviews, which again intends to explore about inclusion of students in higher education to examine how UDL is conceptualized in the learning material and practices and the effects it has on providing access to equal learning opportunities.

##### **What will happen to the information about you?**

All personal data will be treated confidentially. Our role as researchers means that we are subject to strict ethical rules for how data can be used. The collected data will be used only for research purposes. We would like your permission to observe, take notes and make audio recordings. The data will be stored in the university server. I and my supervisors are the ones who will have access to the collected data, which will be encrypted. No personal data like names will be identified. The data will be deleted at the end of the project, in 2017.

##### **Voluntary participation**

It is voluntary to participate in the study, and you can at any time choose to withdraw your consent without stating any reason or justifying further. If you decide to withdraw, all your personal data will be made anonymous. And it will not affect your learning situation at this institution whether you want to participate in this study or not, or if at a later point you decide to withdraw.

If you have any questions, please contact research fellow Suitbert Emil Lyakurwa at tel: +47 228 44476 or send an e-mail to: [s.e.lyakurwa@iped.uio.no](mailto:s.e.lyakurwa@iped.uio.no)

We hope you will give us the necessary permission by signing this letter.

The study has been notified to the Data Protection Official for Research, Norwegian Social Science Data Services.

# Consent for Participation in the Study

**‘Universal design for learning and inclusive education in higher education’**

I have received information about the study and I am willing to participate.

Name of participant: \_\_\_\_\_ (writing a name is optional)

Signature of the participant: \_\_\_\_\_

Date: \_\_\_\_\_ Place: \_\_\_\_\_



## Appendix 9: Approval from Norwegian Social Sciences Data Services (NSD)

Norsk samfunnsvitenskapelig datatjeneste AS  
NORWEGIAN SOCIAL SCIENCE DATA SERVICES



Harald Hårfagres gate 29  
N-5007 Bergen  
Norway  
Tel: +47-55 58 21 17  
Fax: +47-55 58 96 50  
nsd@nsd.uib.no  
www.nsd.uib.no  
Org.nr: 985 321 884

Suitbert Lyakurwa  
Institutt for pedagogikk Universitetet i Oslo  
Postboks 1092 Blindern  
0317 OSLO

Vår dato: 03.12.2015

Vår ref: 45570 / 3 / MHM

Deres dato:

Deres ref:

### TILBAKEMELDING PÅ MELDING OM BEHANDLING AV PERSONOPPLYSNINGER

Vi viser til melding om behandling av personopplysninger, mottatt 09.11.2015. Meldingen gjelder prosjektet:

45570	<i>This study is assumed to be a sub-project in the project called 'Higher Education and multimedia in special needs education and rehabilitation'. The general purpose is to enhance quality education to students regardless of students disabilities</i>
Behandlingsansvarlig	Universitetet i Oslo, ved institusjonens øverste leder
Daglig ansvarlig	Suitbert Lyakurwa

Personvernombudet har vurdert prosjektet, og finner at behandlingen av personopplysninger vil være regulert av § 7-27 i personopplysningsforskriften. Personvernombudet tilrår at prosjektet gjennomføres.

Personvernombudets tilråding forutsetter at prosjektet gjennomføres i tråd med opplysningene gitt i meldeskjemaet, korrespondanse med ombudet, ombudets kommentarer samt personopplysningsloven og helseregisterloven med forskrifter. Behandlingen av personopplysninger kan settes i gang.

Det gjøres oppmerksom på at det skal gis ny melding dersom behandlingen endres i forhold til de opplysninger som ligger til grunn for personvernombudets vurdering. Endringsmeldinger gis via et eget skjema, <http://www.nsd.uib.no/personvern/meldeplikt/skjema.html>. Det skal også gis melding etter tre år dersom prosjektet fortsatt pågår. Meldinger skal skje skriftlig til ombudet.

Personvernombudet har lagt ut opplysninger om prosjektet i en offentlig database, <http://pvo.nsd.no/prosjekt>.

Personvernombudet vil ved prosjektets avslutning, 01.07.2018, rette en henvendelse angående status for behandlingen av personopplysninger.

Vennlig hilsen

Katrine Utaaker Segadal

Marianne Høgetveit Myhren

Kontaktperson: Marianne Høgetveit Myhren tlf: 55 58 25 29

*Dokumentet er elektronisk produsert og godkjent ved NSDs rutiner for elektronisk godkjenning.*

*Avdelingskontorer / District Offices:*

OSLO: NSD, Universitetet i Oslo, Postboks 1055 Blindern, 0316 Oslo. Tel: +47-22 85 52 11. [nsd@uio.no](mailto:nsd@uio.no)  
TRONDHEIM: NSD, Norges teknisk-naturvitenskapelige universitet, 7491 Trondheim. Tel: +47-73 59 19 07. [kymre.svarva@svt.ntnu.no](mailto:kymre.svarva@svt.ntnu.no)  
TROMSØ: NSD, SVF, Universitetet i Tromsø, 9037 Tromsø. Tel: +47-77 64 43 36. [nsdmaa@sv.uib.no](mailto:nsdmaa@sv.uib.no)



## Appendix 10: Research clearance at the institutional level (University of Oslo)

UiO : **Department of Education**  
Faculty of Educational Sciences

To whom it may concern

Date: 03.11.2015  
Your ref.:  
Our ref.:

### Confirmation

This is to introduce to you and certify that Suitbert Emil Lyakurwa from Tanzania is a Research fellow (PhD Candidate) at the Faculty of Educational Sciences, Department of Education, University of Oslo. His PhD scholarship is funded by Norhed Project ENABLE: Higher Education and Multimedia in Special Needs Education and Rehabilitation.

Our PhD students are required to produce a thesis. The thesis should preferably be based on field work conducted in the student's country of origin. The field work may incorporate interviews with university lecturers, special needs education staff, and students, focus group discussions with students, classroom observation, questionnaires as well as document analysis especially policy. It is our hope that the work produced by the candidate will not only benefit his academic career but also of use to the future of his home country.

The candidate will conduct his field work in two main phases:

This year Suitbert Emil Lyakurwa will conduct his first phase field work from December, 2015 to February 2016.

Next phase the candidate will conduct his field work from October, 2016 to December 2016. The working title of his research is "*Universal design for learning and inclusive education*".

The University of Oslo requests whoever it concerns to provide Suitbert Emil Lyakurwa with assistance in conduction of his field work to facilitate him to achieve his research objectives.

Sincerely,



Ola Erstad  
Professor  
Head of Department



**Department of Education**  
Postal address: P.O. Box 1092, Blindern,  
0317 Oslo  
Visiting address: Sem Sælends vei 7  
Helga Engs hus, 5. floor

Phone: (+47) 22 84 44 75  
Telefax: (+47) 22 85 42 50  
postmottak@uv.uio.no  
<http://www.uv.uio.no/iped/>  
Org. no.: 971 035 854



## Appendix 11: Research clearance at the institutional level (University of Dar es Salaam)

**UNIVERSITY OF DAR-ES-SALAAM**  
**OFFICE OF THE VICE CHANCELLOR**  
**P.O. BOX 35091 ♦ DAR ES SALAAM ♦ TANZANIA**

General: +255 22 2410500-8 ext. 2001  
Direct: +255 22 2410700  
Telefax: +255 22 2410078



Telegraphic Address: UNIVERSITY OF DAR ES SALAAM  
E-mail: [vc@admin.udsm.ac.tz](mailto:vc@admin.udsm.ac.tz)  
Website address: [www.udsm.ac.tz](http://www.udsm.ac.tz)

Ref. No: AB3/12(B)

Date: 15<sup>th</sup> December 2015

Deputy Vice Chancellor-Administration  
University of Dar es Salaam  
**Dar es Salaam Region**

**RE: REQUEST FOR RESEARCH CLEARANCE**

The purpose of this letter is to introduce to you **Mr. Suitbert Lyakurwa** who is a bonafide staff of the University of Dar es Salaam and who is at the moment required to conduct research. Our staff members undertake research activities as part of their core functions.

In accordance with government circular letter Ref. No. MPEC/R/10/1 dated 4<sup>th</sup> July 1980, the Vice-Chancellor of the University of Dar es Salaam is empowered to issue research clearances to staff members and students of the University of Dar es Salaam on behalf of the government and the Tanzania Commission for Science and Technology (COSTECH). I am pleased to inform you that I have granted a research clearance to **Mr. Lyakurwa**.

I therefore, kindly request you to grant him any help that may enable him achieve his research objectives. Specifically we request your permission for him to meet and talk to the leaders and other relevant stakeholders in your institution in connection with his research.

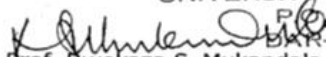
The title of his research is **"Universal Design for Learning and Inclusive Education in Higher Education"**.

The period of his research is from **December 2015 to March 2016** and the research will cover **University of Dar es Salaam School of Education**.

Should there be any restrictions, you are kindly requested to advise us accordingly. In case you require further information, please do not hesitate to contact us through the Directorate of Research, Tel. 2410500-8 Ext. 2084 or 2410727 and E-mail: [research@udsm.ac.tz](mailto:research@udsm.ac.tz).

Yours sincerely,

VICE CHANCELLOR  
UNIVERSITY OF DAR-ES-SALAAM  
P.O. Box 35091  
DAR-ES-SALAAM

  
Prof. Rwekaza S. Mukandala  
**VICE-CHANCELLOR**

QUOTATION OF REF. NO. IS ESSENTIAL



**Appendix 12: Institutional introductory letter to the participants**



**UNIVERSITY OF DAR ES SALAAM**  
**SCHOOL OF EDUCATION**  
CENTRE FOR EDUCATIONAL RESEARCH AND PROFESSIONAL DEVELOPMENT  
**(CERPD)**

Our Ref: SOED/CERPD

5<sup>th</sup> January, 2016

All Staff Members,  
**School of Education**

**RE: MR SUITBERT LYAKURWA**

This is to kindly inform you that the University Administration has granted Mr. Lyakurwa permission to conduct research within our premises i.e. permission to interact with any staff member and students pursuing courses in education.

Please give him maximum support.

Thank you.

A handwritten signature in black ink, appearing to read 'G. Kahangwa'.

Dr. G. Kahangwa  
**Ag. Director, CERPD**





## Appendix 13: Institutional communication to the regional office

# UNIVERSITY OF DAR-ES-SALAAM

## OFFICE OF THE VICE CHANCELLOR

P.O. BOX 35091 ♦ DAR ES SALAAM ♦ TANZANIA

General: +255 22 2410500-8 ext. 2001  
Direct: +255 22 2410700  
Telefax: +255 22 2410078



Telegraphic Address: UNIVERSITY OF DAR ES SALAAM  
E-mail: [vc@admin.udsm.ac.tz](mailto:vc@admin.udsm.ac.tz)  
Website address: [www.udsm.ac.tz](http://www.udsm.ac.tz)

Ref. No: AB3/12(B)

Date: 16<sup>th</sup> October 2015

Regional Administrative Secretary  
**Dar es Salaam Region**

### RE: REQUEST FOR RESEARCH CLEARANCE

The purpose of this letter is to introduce to you **Mr. Suitbert Lyakurwa** who is a bonafide staff of the University of Dar es Salaam and who is at the moment required to conduct research. Our staff members undertake research activities as part of their core functions.

In accordance with government circular letter Ref. No. MPEC/R/10/1 dated 4<sup>th</sup> July 1980, the Vice-Chancellor of the University of Dar es Salaam is empowered to issue research clearances to staff members and students of the University of Dar es Salaam on behalf of the government and the Tanzania Commission for Science and Technology (COSTECH). I am pleased to inform you that I have granted a research clearance to **Mr. Lyakurwa**.

I therefore, kindly request you to grant him any help that may enable him achieve his research objectives. Specifically we request your permission for him to meet and talk to the leaders and other relevant stakeholders in your region in connection with his research.

The title of his research is "**Universal Design for Learning and Inclusive Education in Higher Education**".

The period of his research is from **December 2015 to March 2016** and the research will cover **Dar es Salaam Region**.

Should there be any restrictions, you are kindly requested to advise us accordingly. In case you require further information, please do not hesitate to contact us through the Directorate of Research, Tel. 2410500-8 Ext. 2084 or 2410727 and E-mail: [research@udsm.ac.tz](mailto:research@udsm.ac.tz).

Yours sincerely,

VICE CHANCELLOR  
UNIVERSITY OF DAR-ES-SALAAM  
P.O. Box 35091  
DAR-ES-SALAAM

  
Prof. Rwekaza S. Mukandala  
VICE-CHANCELLOR

QUOTATION OF REF. NO. IS ESSENTIAL



### 3.0 Special Education Unit

The Department of Educational Psychology and Curriculum studies hosts the Special Education Unit, which coordinates the provision of services to students with disabilities at the University of Dar es Salaam.

The main function of the unit is to ensure that students with disabilities access basic academic, administrative and social services that, as far as possible, enable them to undertake their studies and enjoy life on campus like other students.

The first students with disabilities to enrol at the University of Dar es Salaam were two visually impaired students in the academic year 1978/79. By 2011/2012, a total of 234 students with disabilities were enrolled at the University of Dar es Salaam, with 194 male (83%) and 40 female (17%). The majority of students with disabilities enrolled at the University of Dar es Salaam are in the categories of physical disabilities (58%), blindness (30%), albinism and low vision (6%), and hearing impairment (5%).

The day to day activities of the unit are supervised by a Head assisted by the staff members in the unit. The Head of Special Education Unit is responsible to the Dean of the School of Education through the Head of the Department of Educational Psychology and Curriculum Studies.

Further information about the programmes and services offered by the department, please contact:

**Head of Department,  
Department of Educational Psychology and Curriculum Studies,  
School of Education, University of Dar es Salaam,  
Tel: +255 222 410608 Email: [dean@edu.udsm.ac.tz](mailto:dean@edu.udsm.ac.tz).**



<b>Errata list</b>		
<b>PhD Candidate:</b> Suitbert Emil Lyakurwa		
<b>Title of thesis:</b> Universal Design for Learning Towards Achieving Inclusive Higher Education in Tanzania.		
<b>Page</b>	<b>Original text</b>	<b>Corrected text</b>
p.26	For example, in one study, the issue of equity based on socioeconomic background in private higher education institutions was framed in terms of access for female students (p.69).	“For example, in one study, the issue of equity based on socioeconomic background in private higher education institutions was framed in terms of access for female students” (Ishengoma,2011 p.69).
p.34	“the ways in which the triangular model inadequately reflects social and historical aspects have been demonstrated”	“The ways in which the triangular model inadequately reflects social and historical aspects have been demonstrated (Engeström, 2001, Yamagata-Lynch, 2010).
p.43	Figure 4. Analytical framework applied to guide the investigation.	Figure 4. Analytical framework applied to guide the investigation. Adapted from (Engeström, 2001; Uden, 2006).
p.43	“were hard to found”	“were hard to find”
pp.51-52	“For this study I used non-probabilistic sampling, meaning that not all teachers and students in the institution under investigation had an equal chance of being selected and that the sample was selected purposefully”.	“For this study I used non-probabilistic sampling, meaning that not all teachers and students in their institution under investigation had an equal chance of being selected. The sample was purposefully selected” .
p.61	“data obtained from the questionnaires were significant”	“data obtained from the questionnaires were important”
p.128	“From an interview with a visually impaired student, the following is an excerpt which reflects the use of boards by less supportive teachers.”	“From an interview with a visually impaired student, excerpt 6-41 reflects the use of boards by less supportive teachers.”
p.161	“whose function was assist students with disabilities”	“whose function was to assist students with disabilities”
p.166	“the use of typewrite was”	“the use of typewriter was”
p.174	“drawings to illustrating concepts”	“drawings to illustrate concepts”
p.175	“provide options or executive functions”	“provide options for executive functions”
p.176	“...were positively viewed by the majority of higher learning institution practitioners”.	“...were positively viewed by the majority of informants”.
p.178	“What does a database looked like?”	“What does a database look like?”
p.182	“I will present in chapter 7”	“I will present in chapter 8”