

## **ASSESSMENT OF FEMALE STUDENTS' PERCEPTION AND INTEGRATION OF ICT COURSES IN TANZANIA'S HIGHER EDUCATION INSTITUTIONS**

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### **ABSTRACT**

Information and communication technology (ICT) is regarded as the key building block for accelerating development in the contemporary world. The rate of female integration in the ICT area continues to be low, despite the tremendous growth of science and technology. Using Mbeya University of Science and Technology as a case study, this study examined how female students perceive ICT courses in Tanzanian higher education institutions. A sample size of 203 female respondents, chosen at random, were included in the study. Purposive sampling, meanwhile, was utilized to select participants to gather qualitative data for this study. The results of the descriptive analysis of the collected data are presented using figures, tables, and percentages. According to the study findings, women enroll in higher education institutions in ICT fields at a relatively low rate. The low enrollment rate is exacerbated by a variety of challenges, including the lack of a stronger ICT curriculum from primary to secondary school and a lack of career guidance from parents/guardians. Accordingly, the study findings suggest that the government strengthen the ICT curriculum from primary schools to secondary schools. This will lay the foundation for encouraging female participation in the ICT field.

**Keywords:** *Female ICT Tanzania; Female ICT Experts; University Female ICT; Female integration on ICT*

### **INTRODUCTION**

Despite the rapid pace of innovation in the field of Information and Communication Technology (ICT), the engagement of female students in ICT is not encouraging globally, requiring measures to encourage females' engagement in the ICT field. In contrast, the socio-economic development of many fields has been facilitated by the integration of ICT. Despite the crucial role that ICT plays in fostering national and global development, women are still underrepresented in the field of Information and Communication Technology, which is a crucial tool for fostering socioeconomic growth in any state. In the modern world, initiatives that aim to empower women in the ICT field should be regarded as crucial. Peter et al., (2020) emphasized how ICT helps women have a better status and equips them to prosper as computer professionals. ICTs are recognized as the fundamental technology that fosters socioeconomic growth since they facilitate increased awareness and connect the world to allow people to interact in various fields as a single village. It also serves as a forum for discussion and promotes literacy and education. To ensure that women are integrated in Information and Communication Technologies, the state must develop strategies. By doing this, both national and global development will be accelerated. Hussain (2016) found in his study on women's empowerment in the ICT field that women's access to the field has fundamental benefits since it allows women to have their voices heard at various levels, including local, national, and international levels.

In a quantitative study on gender differences in ICT at higher education institutions (universities), conducted in Belgium, female students generally had a less positive attitude toward computers (Tondeur et al., 2016). However, the findings also indicated that computer use is more enjoyable during leisure time than it is when used for academic purposes. Further, Sumanjeet et al., (2018) in a study of how women perceive and have access to ICT applications in India, found that women have less access to these applications than males do. The study emphasized how

important it is to make sure that ICT is more widely available and affordable so that women in India can be inspired by the field and gain advantages from it. Additionally, the study by Andre et al., (2020) on the impact of culture on women's ICT career choices revealed that the cultural context has an impact on women's ICT career choices. The study emphasized the importance of taking initiatives to educate young women to ensure that there are enough female ICT experts available in the future.

Ghavitekr and Rosdy (2015) in a study on teaching and learning with technology in Malaysia, and the effectiveness of ICT integration in schools, found that integration has a significant impact on ensuring the effectiveness for both teachers and students. The study also emphasized the need for strengthened ICT strategic planning and policy to ensure effective ICT integration for both teachers and students. Similarly, the study conducted by Bhatti et al., (2021), which was based on research on re-imaging digital technology and media for young children through parents or guardians, revealed that information and communication technology enhances educational opportunities for children. As a result, parents and guardians should give young children career guidance so they can be integrated into the ICT field from primary school. However, the study by Peter et al., (2020), which was based on research on women's performance and inclusivity in computer science, found that to ensure female integration in computer science, curriculum designers and teachers must make sure that there is an ICT infrastructure that will make it easier for women to be integrated into the field. This finding is in line with the study by Willy (2016), which examined the use of e-learning in higher education.

In research on how men and women use information and communication technology in secondary schools in Tanzania, Manyilizu and Gilbert (2015) noted the importance of women's participation in the field of ICT. The results showed that there is a gender gap in the knowledge of using ICT among male and female teachers. Male teachers appeared to grasp and apply ICT tools in science and non-science subjects more than female teachers, who were less familiar with ICT applications. Additionally, Muro and Gabriel (2016) examined the challenges and opportunities for women working in the ICT field. According to the findings of their study, the main factors preventing women from pursuing ICT education included a lack of understanding of the profession among women and a lack of financial support. Along with the absence of role models that will encourage female students to choose jobs in the sector, a poor background in STEM topics was also cited as a barrier to female students' determination of their carrier in the ICT field.

## **STATEMENT OF THE PROBLEM**

Tanzania has made several efforts to promote information and communication technology, including increasing ICT in education, including passage of the National ICT Policy (2003). The policy documents acknowledged the limited number of computer labs and ICT infrastructure in higher education institutions. Despite the development of official secondary school ICT curricula in Tanzania in 1996, there are still several challenges that hinder students from pursuing careers in the field. The adoption of ICT studies in secondary schools has encountered several difficulties, including a lack of ICT teachers, resources, and infrastructure, as outlined in the ICT policy. The promotion of ICT courses in primary and secondary schools is hampered by these challenges. Despite the field of information and communication technology (ICT) expanding at a promising rate on a global scale, the integration of women into higher education institutions that focus on ICT is still unsatisfactory. This study sought to investigate the female integration and perception of ICT courses in Tanzanian higher education institutions.

## METHODOLOGY

Using the survey as a data collection method, a cross-sectional study was conducted among a sample of two hundred and three (203) respondents at Mbeya University of Science and Technology in Tanzania. A structured questionnaire was supplemented by an interview for data collection. Simple random and purposive sampling were employed to identify respondents for this study. Simple random sampling was used to select female students to respond on the survey while purposive sampling was employed to sample admission officers at Mbeya University of Science and Technology to respond on the administered interview guide. Female participants were used in this study for avoidance of bias as recommended by Yin (2003). Finally, the data extracted were analyzed and reported on using figures, tables, frequency and percentage distributions.

## RESULTS

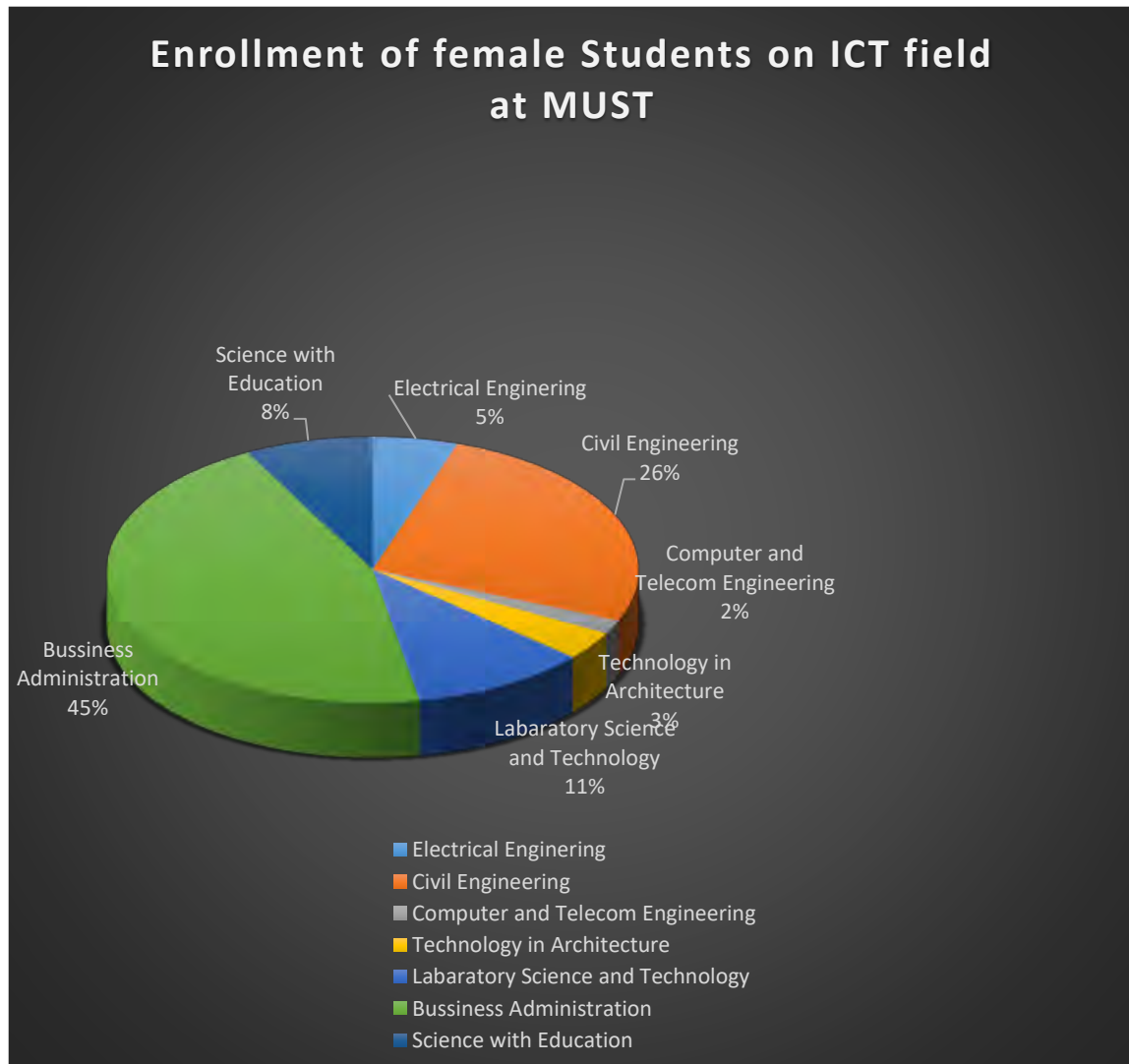
### **Assessing the female integration on ICT courses in higher education institution**

The proportion of female students enrolled in the ICT courses compared to other science and business administration courses at the university are shown in Figure 1 below.

The data in Figure 1 confirm that the business administration field comprises the largest number of female enrollments in the institution compared to other fields of study, accounting for 45% of enrollments. Of significance, the enrollment specific to the ICT field, of 2% does not suggest a sustainable future for female ICT experts.

The responses from the interviews in regard to awareness of female integration in ICT courses in higher education institutions, does not suggest the presence of sufficient female ICT experts in Tanzania in the future. One of the admission officers noted;

*"It's true to argue that, the admission to female students to the field of ICT in our university is not promising compared to other STEM subjects however the courses from laboratory science and Technology as well as in the Business field are experiencing promising female enrollment contrary to the field of ICT"*



**Figure 1:** Female enrollment in Computer science and Telecommunication Engineering Courses (Field Data, 2021)

#### Determining the Challenges facing female integration in ICT subjects

The challenges that hinder female students from participating in ICT courses at the higher education institution are indicated in Table 1 below.

The data indicates that the challenges are associated with contextual learning environments from the primary and secondary education levels, in which the learning environment does not prepare female students to be well integrated into ICT subjects. This was reported to be the critical issue in ensuring sustainable integration of females in the field of Information, Communication and Technology. The other significant challenges were work-life imbalance between girls and boys, lack of exposure in ICT subjects, gender stereotype, and poor career guidance and determination

from the parents/guardians. These were all identified as the setbacks toward ensuring sustainable engagement of females in the field of ICT.

**Table 1: Challenges to Integration of Female Students in ICT Courses**

| Challenges to integration of female students in ICT courses         | Frequency  | Percent    |
|---|------------|------------|
| Absence of strengthened curriculum from primary to secondary school | 40         | 19.7       |
| Absence of female ICT mentors and role models                       | 37         | 18.2       |
| Work-life imbalance between girls and boys                          | 34         | 16.7       |
| Lack of exposure to ICT courses                                     | 27         | 13.3       |
| Gender stereotype   | 33         | 16.2       |
| Poor career guidance and determination from the parents/guardian    | 32         | 15.7       |
| <b>Total</b>  | <b>203</b> | <b>100</b> |

Field Data (2021)

The responses on the interviews suggest that stereotyping and insufficient preparation at the primary and secondary school levels has impacted the integration of female students in ICT subjects in higher education. One of the admission officers noted;

*“Despite the initiatives made by female students to learn with efforts in ICT courses still the mentality of society disappoint such effort through gender stereotype hence it leads many female students to give up on STEM subjects so this situation is the setbacks towards ensuring enrollment of female students in ICT Courses in higher education institution”*

Another of the respondents noted that;

*“ The learning environment from primary and secondary schools most of schools do not favor the female engagement in ICT subjects due to insufficient teaching and learning materials as well as infrastructure which set to be difficult for many female students to apply for ICT courses at higher learning institution since there is no better background for such subjects from primary and secondary schools”.*

The response from the interviews also indicates that despite the initiatives taken by female students on science subjects particularly ICT subjects, the lack of career guidance from their parents/guardians, shortage of learning infrastructure as well as the lack of support in their environments accelerates drop out from the STEM subjects in general. This limits the scope of female admission in ICT subjects in higher education institutions.

## **DISCUSSION**

### **Assessing Female Perception and Integration in ICT courses in Higher Education Institution**

In assessing female enrollment in the ICT field in higher education institution the study findings from the field revealed that computer science and telecommunication engineering accounted for only 2% of the female enrollment at Mbeya University of Science and Technology. The female admission rate is low in the field of computer science and telecommunication engineering, compared to other science courses, and supports the findings of an earlier study by Manyilizu and Gilbert (2015) which noted the gender imbalance on the awareness of using ICT between male and female teachers. In that study male teachers seemed to be better able to understand and apply ICT tools in science and non-science subjects compared to female teachers who were not aware of ICT application.

The low enrollment of female students in the field of computer science and telecommunication engineering have accelerated the absence of female ICT teachers in many schools as the study of Manyilizu and Gilbert (2015) noted. If the enrollment data for the science courses in this study are compared to the field of business administration, the findings show that female enrolment in the field of business administration at 45% when compared to other fields, is significant and implies that female integration in the field of science courses is still not promising. Based on the discussion above the female perception of ICT courses is affiliated with the primary learning environment which does not provide a conducive environment toward preparing them for that field. The initiatives to strengthen the learning infrastructure and inspiring female engagement in ICT should be considered as important strategies to be adopted by government toward empowering female integration in the field of ICT.

### **Challenges of Integration of Female Students in ICT courses at Higher Education Institutions**

The study results also noted the setbacks which hinder female students' integration into the ICT courses at the university. The female student respondents at Mbeya University of Science and Technology (MUST) highlighted major challenge which hinders effective integration of female students in ICT courses.

The students noted the absence of strong curriculum in ICT subjects from the level of primary school. This view is supported by the results of the study by Peter et al., (2020). The researchers examined female performance and inclusiveness in the computer science field and found that to ensure female integration in computer science computer, curriculum designers and teachers must ensure that there is conducive ICT infrastructure which will enhance female integration into the field. This fuels the argument that most of the learning environments in public primary school are not equipped with ICT infrastructure, when compared to the learning materials used in some private schools. Most primary schools do not prepare students for ICT courses at the higher level of education due to the poor foundation from primary school.

Further, other challenges identified in the study such as lack of exposure to ICT subjects, absence of female ICT mentors or role models, and the lack of early exposure to the digital engagement, due to the work life imbalance - girls have to attend to domestic work once they are back from school, compared to boys - which hinder the female student from engagement with the ICT devices. The absence of female mentors who can inspire girls to take ICT subjects from the primary and secondary schools is another challenge that is stifling the growth of female professionals in the field of ICT. These findings correspond with the study by Muro and Gabriel

(2016) which noted setbacks, lack of opportunities and awareness of the ICT field to women. Together with the lack of financial support these served as dominant factors that restrict the engagement of women in the pursuit of ICT studies. Further, a poor background to STEM subjects was highlighted as a major impediment for females in determining a career in the field. The lack of role models to inspire females as ICT professionals was also noted.

Moreover, the issue of lack of career guidance and determination from parents/guardians was found to hinder female students from being engaged in ICT courses at the level of higher education. This lack of motivation which was noted as occurring from childhood also limits the success of female students in the courses related to computer science and telecommunication engineering. As noted in the study by Sumanjeet et al., (2018), the access to and perception of ICT indicate that this is limited for women when compared to men, and the study stresses that it is imperative to ensure that ICT is more accessible. Women should also be inspired through career guidance in the field of ICT. Also, the issue of gender stereotype was noted as a challenge since the mentality of the society assumes that computer studies is for males only. This ideology discourages the female from engaging in the computer studies filed in higher education.

## CONCLUSION

Based to the findings from the field, this study concludes that, female integration in computer courses in higher education institutions is not promising due to low female enrollment when compared to other field of science courses. This hinders development of sustainable and reliable female expertise in ICT in Tanzania, and any strategy to rescue the situation requires the government to strengthen the ICT curriculum in primary and secondary school, to ensure that all students to engage with computer related subjects from primary school. The implementation of a career guidance scheme on the importance of ICT subjects for female students is also required. This will propagate more female students to enroll in the ICT field in higher education institutions, having acquired the necessary foundation in their primary and secondary education.

## LIMITATION OF THE STUDY

The study is partial since it involves the single case and the findings cannot be generalized to all female students in ICT courses at all higher education institutions in Tanzania. More studies should be conducted at higher education institutions to explore the integration and perception of female students in ICT courses, to improve validity of the findings.

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