**Original Research Article**

# Digital Literacy Skills among Students in Technical Education and Training (TET) Institutions, Tanzania

**Abstract**

*Digital literacy skills (DLS) are one of the essential factors which facilitate academic and non-academic life. The TET institutions remain relevant and attractive if they apply DLS in this era of the changing world. One of the major beneficiaries of DLS in TET are students. However, little is known about the extent to which the students are equipped with DLS. The particular angle of life in which such students apply DLS is as well not yet established. Therefore, this study evaluated the extent to which the TET students are equipped with DLS; and the angle of life from which the DLS are applied by the given students. The DLS of this study are theoretically grounded from digital literacy indicators for undergraduate students by Techataweewan and Prasertsin (2017). This study used a quantitative approach with a descriptive research design. The data were collected using questionnaires from 500 final-year students of four TET institutions sampled through a stratified random sampling technique. The collected data were analysed using descriptive statistics. The findings indicate that the students acquired operation skills (cognition, invention and presentation) and collaboration skills (teamwork, networking and sharing) to a large extent. On the other hand, the students acquired thinking skills (analysis, evaluation and creativity) and awareness skills (ethics, legal literacy and safeguarding self) to a small extent. Furthermore. The TET institutions should advocate more DLS to their students for them to balance the application in academic and non-academic life.*

***Key Words***

*Digital literacy skills, academic life, non-academic life, TET institutions*



## 1. INTRODUCTION

Digital literacy skills (DLS) are one of the essential factors which facilitate academic and non-academic life (Techataweewan & Prasertsin, 2017). In other words, the DLS are increasing day by day in our society because of helping in solving problems towards attainment of sustainable developments in all ramifications of life (Ojo et al., 2018). The DLS facilitate students to easy access to various information needed to solve problems, create new habit for students to seek

information, become more critical and communicate a lot with other parties and can make it easier for teachers in the learning process especially in processing the information from various sources (Muh, 2023). The DLS are the essential skills for the current learners to communicate and express their ideas excellently using digital media (Chan et al., 2017). They are among the required abilities to any learner and represents an essential ingredient in effective professionalization especially in making possible accessibility of digital services and carry out numerous activities and assignments (Vod ˇa et al., 2022). The DLS are used by the learners in learning activities such as reading and sending email, accessing learning management systems, reading e-journals or e-books, doing online quizzes and participating in discussion forums (Tang & Chaw, 2016). The DLS are progressively prevalent in the 21st century due the growing demands from the work sector for individuals to be digitally literate (Reddy et al., 2023).

The above importance of DLS has prompted several researchers to conduct studies and inform the policy. For instance, Giannikas (2022) investigated on how schools can promote digital literacy skills throughout their classrooms. In so doing, it was noted that the students can be exposed to learning activities for promoting DLS through producing media, gaming, coding, and creating; coaching them to reach the point of digital literacy; assign groups/pairs of students to work together on various assignments by applying digital tools and promotion of the 6 Ps (*passwords, private Information, photos, property, permission and protection*) of digital citizenship in their digital coaching. Furthermore, Vod ˇa et al. (2022) explored digital literacy skills in social sciences and humanities students and found that, communication, critical thinking, problem-solving, and technical digital skills are more present in the case of students enrolled in social sciences, while other digital skills (i.e., creativity and information) are more prevalent in the case of humanities students. Moreover, Reddy et al. (2023) explored a digital literacy model to narrow the digital literacy skills gap and revealed that, there is a positive attitude and perception on the use of the tool for DLS among students in the South Pacific. Besides, Muh (2023) analysed students' digital literacy skill to solve learning problems. The study findings show that, the DLS in education has a positive impact on students. Chama and Subaveerapandiyan (2023) examined the challenges encountered in teaching digital competencies among school students in Zambia at the secondary level from a teacher's perspective. The given study found that, lack of alignment, high cost, and limited availability of technology are vital obstacles in effectively integrating DLS into the curriculum and instruction. Yoleri and Anadolu (2022) determined the digital literacy skills of undergraduate students studying in different departments of the university according to the variables of gender, type of faculty, and daily internet use. The given study pointed out that the digital literacy levels of the students were moderate; there is a significant difference was found between female and male students in the sub-dimensions of digital literacy levels, Daily Use, Professional Production, and Privacy and Security as far as gender and faculty are concerned.

Although most of the above studies concentrated in higher learning institutions and secondary schools, the technical and vocational education and training (TVET) institutions including TET institutions remain relevant and attractive in apply DLS in this era of the changing world. This argument is supported by Ojo et al. (2018) who stresses that, survival and achievements of aim and objectives of TVET can only be accomplished through DLS. In addition, Utami and

Marsakawati (2023) reveal that, DLS help TET help to connect students with the outside world by view the material, interact with it by asking questions, drawing connections, drawing conclusions, and applying it to their own needs; helps students learn and cope with the changing of the world: information literacy, media literacy and ICT. The given importance of DLS in TET institutions has prompted targeted interventions and innovations from the education sector to instill DLS for their current studies and for future as workforce (Reddy et al., 2023). However, little is known about the extent to which the students are equipped with DLS. The particular angle of life in which such students apply DLS is as well not yet established. Therefore, this study evaluated the extent to which the TET students are equipped with DLS; and the angle of life from which the DLS are applied by the given students.

## 2. METHODOLOGY

### 2.1 Approach of the Study

This study used quantitative approach due to the nature of the main objectives. The given objectives demanded the study to be approached quantitatively with support from quantitative data. The approach likewise facilitated the establishment of statistics on digital literacy skills among students in TET institutions, Tanzania.

### 2.2 Research Design

This study applied descriptive cross-sectional survey designs as they facilitated studying individual TET students as a unit of analysis. The designs assisted in covering large geographical area while measuring the individual tourists' views, attitudes and characteristics. The designs produced the easy way of analyzing the information from the surveyed students regarding digital skills in TET institutions.

### 2.3 Research Area

This study was conducted at four TET institutions such as Arusha Technical College (ATC), Dar es Salaam Institute of Technology (DIT), National Institute of Transport (NIT) and Karume Institute of Technology (KIST). The institutes were chosen due to their similar operating characteristics and history. They offer almost similar academic programmes and courses including engineering, science and technology. Just like other TVET institutions, they were expected to undergo digital transformation based on their insistence on technologies in teaching-learning process, research and consultant
cy.

### 2.4 Population and Sampling

The primary data of this study were collected from the final year-students of the identified (above) TET institutions. The range of ages of surveyed students were between 21 and 35 and above years. All these students have been taught ICT modules as core or cross-cutting modules. The final year students were already knowledgeable on the subject matter (digital literacy) of this study following their experience of staying in the TET institutions for either three or four years of studying.

This study applied principally multi-sampling (purposive, stratified, simple random and convenient) technique. It began with purposive sampling technique which was used to identify the population purposively. The purpose here based on the students who are in the final year and

studied ICT modules as either core or cross-cutting modules. Secondly, the given year students were stratified into strata based on institution (ATC, DIT, NIT or KIST), course programme being pursued (engineering or science and technology), gender (female or male) and level of education being pursued (Ordinary Diploma or Bachelor Degree). This stratified sampling technique ensured that every category of the population (final year students) is included in the study.

Thirdly, a simple random sampling technique was used to pick up elements of each strata randomly. The technique ensured that, every element in the given strata had an equal chance to be considered for the study at hand. Finally, the convenient sampling technique was used to approach every final year student who was ready, willing and available to participate in the study. Lack of immediate population size from the surveyed institutions during the study caused the researchers to obtain the sample size conveniently. The convenient sampling technique yielded to 500 respondents.

### 2.5 Data Collection

The primary data of this study were collected principally using the questionnaire. The questionnaire was used as it offered a fast, efficient and inexpensive means of collecting large amount of data regarding the DLS among students in TET institutions in Tanzania. The four surveyed institutions were geographically located in different far cities and final year students were so many hence the questionnaire fitted the study at hand. The questions and items used in the given questionnaire (structured and close-ended) used in this study were theoretically grounded from digital literacy indicators for undergraduate students by Techataweewan and Prasertsin (2017) with 5 Likert scales (1-very small extent to 5-very large extent).

### 2.6 Data Analysis

The collected data were analysed using Descriptive Statistics. The descriptive statistics was used to quantify and describe the background information of the respondents and their data set at general about the DLS among students in TET institutions in Tanzania. The descriptive statistics results were presented using frequencies and standard percentages, means and standard deviation. In fact, the descriptive statistics helped to describe the reality on the extent to which the TET Students are equipped with DLS and the angle of life from which the DLS are applied by the TET Students in Tanzania.

## 3. Result

### 3.1 Background Information

Among the surveyed TET students, 70% were male while 30% were female (**Table 1**). The majority of the surveyed students were the male. This implies that, the male students were till leading in TET institutions compared to female students.

The range of ages of surveyed students were between 21 and 35 and above years. The results of surveyed students demonstrate that, 23% of the students were had the age between 21-24 years, 39% between 25-29 years, 28% between 30-34 years, and 10% between 35 and above years (**Table 1**). The majority of the surveyed students had therefore the age between 25 and 29 years old.

Since the unit of analysis of this study was four TET institutions in Tanzania, the students were asked to identify the particular TET institution they were pursuing in. In so doing, 26% of the students were at ATC, 27% were studying at DIT, 24% were studying at NIT and 23% were studying at KIST (**Table 1).** The majority of the surveyed students were therefore studying at DIT though minimum difference between the four TET institutions is noted.

The study intended to survey final year-students of 2022/2023. The results display that, 63.0% of the students were pursuing engineering and 37% of the students were pursuing science and technology **(Table 1).** The majority of the surveyed students were pursuing engineering in the surveyed TET institutions in Tanzania.

The study intended to survey both diploma and bachelor degree final year-students. The results exhibit that, 54.0% of the surveyed students were pursuing ordinary diploma level while 46% of them were pursuing bachelor degree level (**Table 1**). The majority of the surveyed students were pursuing ordinary diploma level however with insignificant difference with the ones pursuing bachelor degree level. This implies that, all levels of pursuit among the surveyed students were taken into account in the study at hand.

**Table 1: Background Information**

| Information | Scale | Frequency | Percent |
|---|---|---|---|
| Sex | 1. Male | 350 | 70.0 |
| | 2. Female | 150 | 30.0 |
| | **Total** | **500** | **100.0** |
| Age | 1. 21-24 years | 115 | 23.0 |
| | 2. 25-29 years | 195 | 39.0 |
| | 3. 30-34 years | 140 | 28.0 |
| | 4. 35-39 years | 50 | 10.0 |
| | **Total** | **500** | **100.0** |
| Institution | 1. ATC | 130 | 26.0 |
| | 2. DIT | 133 | 27.0 |
| | 3. NIT | 122 | 24.0 |
| | 4. KIST | 115 | 23.0 |
| | **Total** | **500** | **100.0** |
| Specialization/Course Pursued | 1. Engineering | 315 | 63.0 |
| | 2. Science and Technology | 185 | 37.0 |
| | **Total** | **500** | **100.0** |
| Education Level being Pursued | 1. Ordinary Diploma | 272 | 54.0 |
| | 2. Bachelor Degree | 228 | 46.0 |
| | | **500** | **100.0** |

**Source:** Field Survey Data, 2023

### 3.2 The Extent to which the TET Students are Equipped with DLS

The DLS here include four skills such as operation skills (*cognition, invention and presentation*), collaboration skills (*teamwork, networking and sharing*), thinking skills (*analysis, evaluation and creativity*) and awareness skills (*ethics, legal literacy and safeguarding self*). The results in **Table 2** indicate that, the operation skills were acquired by the TET institutions' students to the very large extent by18%, large extent by 58%, small extent by 6%, very small extent by 8% and

neutral by 10%. The majority of the surveyed students acquired the DLS to the large extent (58%) in four surveyed TET institutions in Tanzania.

The results in **Table 2** further signpost that, the collaboration skills were acquired by the TET institutions' students to the very large extent by23%, large extent by 62%, small extent by 3%, very small extent by 2% and neutral by 12%. The majority of the surveyed students acquired the DLS to the large extent (62%) in four surveyed TET institutions in Tanzania.

On the other hand, the results in **Table 2** pinpoint that the thinking skills were acquired by the TET institutions' students to the very large extent by 8%, large extent by 12%, small extent by 61% and very small extent by 19%. The majority of the surveyed students acquired the DLS to the small extent (62%) in four surveyed TET institutions in Tanzania

In addition, the results in **Table 2** portray that the awareness skills were acquired by the TET institutions' students to the very large extent by 7%, large extent by 17%, small extent by 60%, and very small extent by 12% and neutral by 4%. The majority of the surveyed students acquired the DLS to the small extent (60%) in four surveyed TET institutions in Tanzania.

**Table 2: The Extent to which the TET Students are Equipped with DLS**

| Scale | Operation Skills | | Collaboration Skills | | Thinking Skills | | Awareness Skills | |
|---|---|---|---|---|---|---|---|---|
| | **F** | **%** | **F** | **%** | **F** | **%** | **F** | **%** |
| Very large Extent | 89 | 18 | 108 | 23 | 40 | 8 | 31 | 7 |
| Large Extent | 292 | **58** | 311 | **62** | 58 | 12 | 93 | 17 |
| Neutral | 49 | 10 | 60 | 12 | 0 | 0 | 20 | 4 |
| Small Extent | 32 | 6 | 13 | 3 | 305 | **61** | 299 | **60** |
| Very Small Extent | 38 | 8 | 8 | 2 | 97 | 19 | 57 | 12 |
| **Total** | **500** | **500** | **500** | **100** | **500** | **100** | **500** | **100** |

**Source:** Field Survey Data, 2023

### 3.3 The Angle of Life from which the DLS are Applied by the TET Students

This section submits the results on which angle of life the DLS are applied by the TET students in Tanzania. The results in **Table 3** display that, 71% of students applied operation skills in academic issues while 29% of them applied the same operation skills in non-academic skills. The majority of the TET students (71%) applied operation skills in academic issues.

Furthermore, the results in **Table 3** exhibit that, 38% of students applied collaboration skills in academic issues while 62% of them applied the same collaboration skills in non-academic skills. The majority of the TET students (62%) applied collaboration skills in academic issues.

Moreover, the results in **Table 3** reveal that, 67% of students applied thinking skills in academic issues while 33% of them applied the same thinking skills in non-academic skills. The majority of the TET students (67%) applied thinking skills in academic issues.

Also, the results in **Table 3** expose that, 40% of students applied awareness skills in academic issues while 60% of them applied the same awareness skills in non-academic skills. The majority of the TET students (60%) applied awareness skills in academic issues.

**Table 3: The Angle of Life from which the DLS are Applied by the TET Students**

| Scale | Academic Issues | | Non-academic Issues | |
|---|---|---|---|---|
| | **Frequency** | **Percent** | **Frequency** | **Percent** |
| Operation Skills | 355 | 71 | 145 | 29 |
| Collaboration Skills | 189 | 38 | 311 | 62 |
| Thinking Skills | 335 | 67 | 165 | 33 |
| Awareness Skills | 201 | 40 | 299 | 60 |
| **Total** | **500** | **500** | **500** | **100** |

**Source:** Field Survey Data, 2023

## 4. DISCUSSION

The results of background information of the surveyed final year students in the TET institutions indicate the consideration of all categories of students in this study regarding DLS. Being that the case, the results of background information clearly provide the readers with the vital context helping in understanding the research problem being presented in the study at hand. In that light, the results show that almost every category of sex, age, institution, specialization/course programme pursued and education level being pursued is taken on board in this study. These balanced information likewise justify the study regarding DLS is relevant and important to the surveyed population and unit of analysis (final year students of TET institutions) in Tanzania. In fact, the background information assisted in identifying and describing the history and nature of defining the research problem well (DLS) with reference to context of the population studied.

Regarding the extent to which the TET students are equipped with DLS, the results in section 3.2 portray that some skills were acquired to a large extent while others were acquired to a small extent. Specifically, the surveyed students acquired operation skills and collaboration skills to a large extent while the thinking skills and awareness skills to a small extent. These results are likewise supported by Vod ˇa et al. (2022) who identified communication, critical thinking, problem-solving, and technical digital skills and other digital skills (i.e., creativity and information) being applied by social sciences and humanities students. This may further implies that, the DLS acquired in small extent need to be improved something supported Öncül, G. (2021) stressing that although students possess variety of skills, the DLS need be raised as they are fundamental in this era of science and technology.

Apart from acquisition of the DLS, the angle of life in which the surveyed students applied the skills is as well noted in the results. Generally, operation and thinking skills were applied to academic issues to a large extent while collaboration and awareness skills were applied in non-academic issues to a large extent by the TET students in Tanzania. Academically, these results are consistent to what is noticed by Techataweewan and Prasertsin (2017 who show that, the students apply DLS in easy seeking and accessing to information needed to solve problems and become more critical and communicate a lot with their friends about the information. Muh (2023) further show that the students apply DLS to solve learning and life problems in general.

The college students over 50 acquire DLS and they support them as they reported as helpful in various endeavors of life (Milton-Smith, 2022).

## 5. CONCLUSION AND RECOMMENDATION

The findings of this study conclude that, the majority of surveyed students in the two TET institutions in Tanzania acquired operation skills and collaboration skills to a large extent while the students acquired thinking skills and awareness skills to a small extent. The majority of the TET students applied operation and thinking skills in academic issues while collaboration and awareness skills were applied in non-academic issues. The findings of this study advocate the TET institutions to continuously impart more DLS to their students for them to balance the application in academic and non-academic life. This calls for both private and public investment in DLS in TET institutions in Tanzania.

## DISCLAIMER (ARTIFICIAL INTELLIGENCE)

We authors hereby declare that NO generative AI technologies such as Large Language Models (ChatGPT, COPILOT, etc.) and text-to-image generators have been used during the writing or editing of this manuscript.

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