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Report of the Baseline Study on Technology-Enabled Learning Implementation at Nakuru Training Institute

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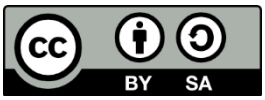
The Commonwealth of Learning (COL) is an intergovernmental organisation created by Commonwealth Heads of Government to promote the development and sharing of open learning and distance education knowledge, resources and technologies.



This report was prepared by Joseph Mwangi Wamuga on behalf of Nakuru Training Institute, Kenya under the guidance of Dr Sanjaya Mishra, Director, Education, Commonwealth of Learning.

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Abbreviations

CBET	Competency-Based Education and Training
COL	Commonwealth of Learning
ICT	Information and Communication Technologies
KNQA	Kenya National Qualifications Authority
LMS	Learning Management System
MOOC	Massive Open Online Course
NTI	Nakuru Training Institute
OER	Open Educational Resources
TEL	Technology-Enabled Learning
TVET	Technical, Vocational Education and Training

Executive Summary

This report presents the findings of a baseline study conducted at Nakuru Training Institute (NTI), Kenya, to establish the status of access to and use of information and communication technologies (ICT) for teaching and learning. The purpose of the study was to assess how prepared NTI is to implement technology-enabled learning (TEL) by adopting a systematic approach of policy formulation, capacity building and infrastructure improvement. The findings will help identify the gaps in the skills of NTI instructors and learners and support the policy development process for TEL.

The baseline study consisted of three surveys conducted via questionnaires: one on instructors' use of technology for teaching and learning (conducted among faculty), one on learners' use of technology (conducted among learners) and one to assess the TEL environment and enabling policies (conducted among administrative staff). The Commonwealth of Learning (COL) provided the survey instruments, which are available in the *Technology-Enabled Learning Implementation Handbook* (Kirkwood & Price, 2016), and the surveys were administered via LimeSurvey. Fifty-three learners and 17 instructors responded.

NTI provides Internet access to both instructors and learners. However, the baseline study established that NTI had a total score of 103 on institutional preparedness, which represents Developing Preparedness. It scored very low on Policy, Strategic Plan and Documentation, so those are the areas that NTI needs to prioritise for improvement in anticipation of TEL implementation.

Instructors have positive attitudes towards the use of TEL. However, they have concerns about faculty workload, lack of training on TEL and lack of time to develop courses for delivery through technology.

Learners have been attending traditional face-to-face classes, despite the Internet access that NTI provides and the fact that a significant percentage have smartphones. The learners indicated the need for increased bandwidth and for more desktop computers to be available in non-ICT courses for them to access and use for learning.

The study also analysed the current situation at NTI in terms of potential TEL implementation and identified a series of gaps in skill sets among instructors and learners. These gaps can be addressed through training on TEL, development of a TEL policy and an implementation strategy.

Chapter 1: Introduction

1.1 About Nakuru Training Institute

Nakuru Training Institute (NTI) is a registered technical and vocational education and training (TVET) institution located in Nakuru, Kenya, about 156 kilometres from the capital city, Nairobi. It was established in 2002 by the Nakuru Christian Professionals Association, which founded the institution to address the issue of skill gaps in local high school graduates, and offers competency-based education and training (CBET) courses. NTI envisions a vibrant, holistically transformed community living in dignity. Its mission is to provide quality training to the community of Nakuru and beyond, guided by Christian values and with the goal of transforming local society. Since its inception, NTI has trained over 5,000 youths in, for example:

- Plumbing and pipe fitting
- Electrical work
- Hairdressing and beauty
- Fashion design
- Project management
- Information and communications technology
- Business management
- Human resources management
- Accounting
- Food and beverage sales and services

The courses are offered from Government Trade Test 3 (Level 2) to Diploma (Level 6) in accordance with the Kenya National Qualifications Framework.[1]

1.2 Technology-Enabled Learning at NTI

The use of technology at NTI is extremely important for equipping our learners with 21st-century skills. NTI is focused on the premise that learners should acquire skills in the use of modern technologies as part of their education to help them transition to the workplace. Such skills training makes them tech-savvy and more employable than learners who have not been exposed to the use of technology. In addition, staff need to have ICT skills to effectively and efficiently disseminate knowledge to their learners via modern educational technologies.

In 2021, NTI started implementing technology-enabled learning (TEL) in collaboration with the Commonwealth of Learning (COL). Under the terms of that collaboration, COL committed to providing technical assistance to NTI for mainstreaming the use of TEL at the institute. The implementation will be executed through a three-phase process that includes a baseline study, adoption of a TEL policy, capacity building of instructors to develop blended courses, use of a learning management system (LMS) and open repositories, research on student learning, networking and collaboration through a TEL community of practice, and TEL benchmarking.

1.3 The Baseline Survey Report

[1] See https://www.knqa.go.ke/index.php/level-descriptors/

1.3.1 Purpose of the report

The purpose of this report is to document the preparedness of NTI to systematically integrate ICT into teaching and learning at the college.

1.3.2 Objectives of the report

This report has five objectives:

1. To determine if NTI has the requisite infrastructure to support the implementation of TEL.
2. To establish how accessible TEL resources are to learners and instructors at NTI.
3. To determine teachers' skill levels in terms of their ability to integrate ICT into their teaching practices.
4. To determine learners' and instructors' perceptions about the use of ICT for teaching and learning.
5. To determine how motivated learners and instructors are to use ICT in learning and teaching.

The findings will be used to make recommendations to support the development of a TEL policy and TEL implementation at NTI.

1.3.3 Methodology

We used a case study approach for this baseline survey, as it allows for an in-depth, multifaceted understanding of an issue in a specific location and real-life context. We conducted a baseline investigation of TEL at NTI in terms of infrastructure availability and accessibility to both learners and instructors. Learners' and instructors' motivation to use and perceptions about TEL were also investigated.

The survey used two online research instruments in the form of questionnaires administered to instructors and learners. In addition, there was a self-review of institutional facilities related to technology at NTI. The questionnaires were distributed via email.

The target population of the project was all the instructors (20) and learners (125) at NTI. The responding population, who formed the project study sample, comprised 17 instructors and 53 learners. This sample was considered to be representative of the population of NTI, and the findings will therefore be generalised to the institution.

The population and sample size/response rate was varied as shown in Table 1.

Table 1. Number of survey respondents

Survey population	Total population	No. of responses	Response rate
Learners	125	53	42.4%
Instructors	20	17	85.0%

1.3.4 Challenges and limitations

The major challenge encountered was that the surveys were sent to learners at the end of the academic year when national examinations were ongoing. This timing could be a contributing factor to the 42.4% response rate by learners, as learners were more focused on their examinations at that time. Furthermore, some learners had already left for home, where they had limited or no access to connectivity and therefore found it more challenging to participate in the online survey. Some of the instructors were invigilating the examinations, which could also have affected the response rate among the instructors.

Chapter 2: Policy Review and Infrastructure Audit at NTI

The institutional questionnaire was completed by the principal of Nakuru Training Institute (NTI). The aim of the questionnaire was to ascertain the status of the infrastructure and policies at NTI in terms of readiness to support technology-enabled learning (TEL) at the institute.

2.1 Institutional Profile

NTI is a registered private not-for-profit technical and vocational education and training (TVET) institution in Nakuru, Kenya, with a current enrolment of 125 learners and a team of 20 instructors and six support staff. It offers training at certificate and diploma levels.

2.1.1 ICT hardware and Internet connectivity

NTI has 51 desktop computers and two laptops, all of which are connected to the Internet. The institute has a broadband Internet connection that can be accessed by the staff, faculty members, learners and visitors in most areas of the campus: in classrooms, the library, faculty rooms, laboratories, the reception lounge, seminar halls, learners' common rooms and open areas. The connection comes via a private provider who supplies a bandwidth that is below 1 gigabit per second and is made available through a wireless network. There are controls in place to restrict learners from accessing and downloading material from certain sites, such as sites that are deemed to contain unethical content. Social media accounts, YouTube, chat/messenger apps, massive downloads, emails and software downloads are not included in the list of blocked sites or actions.

NTI maintains official profiles on Facebook, Twitter and Google+. It does not have profiles or any other type of presence on YouTube, LinkedIn or photo-sharing sites and does not have a blog.

2.2.2 Educational e-content creation

Regarding the use of technology in teaching, only one classroom is equipped with an LCD projector and desktop computers/laptop. NTI does not have an educational e-content creation production studio and thus did not produce any e-content in 2021. NTI has not shared any content in any digital repository.

2.2.3 Open educational resources

NTI has not produced any educational e-content or audio-visual materials with a Creative Commons licence and does not have an institutional repository for open educational resources (OER). Furthermore, NTI is not a member of any OER consortia or OER network.

2.2.4 Online courses

NTI has not produced or designed any online courses, whether completely online, with limited face-to-face contact or in blended mode. It has not worked with any external partners to collaborate on, design or deliver an online course.

2.2.5 Other online facilities

Table 2 shows the online facilities — resources, services and spaces — that NTI currently offers, is planning to offer in the future and currently does not offer.

Table 2. Online facilities provided by NTI

Resources available	Resources planned for	Resources not available
e-classroom facilities	Learning management systems	Data visualisation software
Computer labs	e-portfolios	Citation databases
Email services	Online or virtual technologies — e.g., cloud-base storage systems	Bibliographic databases
Wi-Fi access	Access to software — e.g., MATLAB, GIS applications, statistical software	e-thesis and dissertations
Download and use of free and open sources software for teaching and learning	Access to data storage	
Support for maintenance and repair of ICT	Institutional repository for sharing research	
	e-newspapers	
	Patent database	
	e-proceedings	
	Statistical databases	

2.2.6 Training on technology-enabled learning

The survey findings revealed that 25 hours were allocated to train six instructors in the use of technology in teaching and learning in 2020. NTI is planning to conduct regular training on TEL on a quarterly basis.

Policy issues relating to technology-enabled learning

The findings also revealed that NTI has neither a policy on ICT use in teaching and learning, nor a strategy for implementing and using TEL. It is in the process of developing an ICT policy whose scope will include the recommended technologies to use in teaching and learning. The institution has a privacy and data protection policy in place and is in the process of developing a policy to deal with plagiarism.

2.2.7 Internet connectivity

NTI's institutional preparedness has a score of 103. This score represents Developing Preparedness. The institute has put in place some aspects of a TEL system, of policies and of infrastructure, and is in the process of developing a robust system based on the range of 95–129 described in the *Technology-Enabled Learning Implementation Handbook* (Kirkwood & Price, 2016, p. 88). The findings revealed that NTI scored poorly on Policy, Strategic Plan and Documentation, as indicated in Table 3. NTI must prioritise the improvement of these critical areas in preparation for implementing TEL.

Table 3. Institutional preparedness score

Policy	Score
There is a well-documented TEL policy.	1
The vision and mission of the TEL policy are aligned with the mission of the organisation.	1
The vision and mission of the TEL policy are well understood across the organisation.	1
There is a commitment on the part of the institutional leaders to use technology to achieve strategic academic goals.	4
Sub-total	7
Strategic plan	
There is a strategic plan for the implementation of TEL.	1
The strategic plan for TEL has measurable goals and outcomes.	1
The strategic plan for TEL is approved by the senior management of the organisation and is supported by adequate financial provisions.	1
Sub-total	3

IT support	
The organisation has an IT department that handles procurement, installation and maintenance of technologies for teaching and learning.	4
There is an ICT policy in place that is implemented by a high-powered committee in the organisation.	4
The head of the IT support department reports to senior management and is responsible for the overall functioning of the technologies for teaching and learning in the organisation.	4
The head of the IT support department is well qualified and up to date with current developments and best practices so they can manage the technological requirements of the organisation.	4
Sub-total	16
Technology	
There is adequate hardware infrastructure for teaching and learning (e.g., access to computers for instructors and learners).	2
There are adequate applications and software for teaching and learning (e.g., access to appropriate software, intranet, learning management system, etc.).	2
There is adequate networking infrastructure in the organisation (e.g., access to adequate bandwidth).	2
There are adequate policies and procedures in place to protect privacy and organisation data.	4
Sub-total	10
Content	
There is support available for the creation of digital multimedia content in the organisation (e.g., production of e-courses, audio-visual materials, animation, etc.).	4
There are instructional designers in the organisation or faculty members are trained to organise and present learning content appropriately.	3
Teachers have adequate access to the online system to develop courses for TEL.	4
Sub-total	11
Documentation	
There is a variety of help available to support teachers and learners in using technology effectively.	2
Lessons learned in the implementation of TEL are stored and shared within the organisation for others to access and learn from.	2
The workflow processes and responsibilities for implementing TEL are well documented in the organisation.	2
Sub-total	6
Organisational culture	
Faculty and staff members in the organisation are willing to learn about new technology.	3
Faculty and staff members support each other.	3
There is a culture of knowledge creation and sharing in the organisation.	3
Sub-total	9
Leadership	
Leaders in the organisation are involved in the implementation of TEL.	4
Senior management in the organisation regularly review, monitor and evaluate the progress of TEL.	4
The top level of leadership within the organisation is supportive of TEL and provides encouragement and motivation to the faculty and staff to achieve the organisation's academic goals.	4
Sub-total	12
Human resources and training	
Faculty members are qualified and trained to use technology for teaching and learning.	3
Faculty and staff members receive regular training to update them in the use of TEL.	3
There are adequate staff to support TEL.	3
The organisation has a structure in place to create teams for content development and delivery of TEL.	2
Faculty members can rely on the support of instructional designers and technology support staff while developing and delivering the courses.	2
The IT staff are highly skilled and trained to provide the needed support.	3
Sub-total	16
TEL champions	

There are early adopters of TEL in the organisation.	4
There are TEL champions in the organisation who support and care about pedagogic innovations.	3
There are faculty members who can take leadership roles in developing appropriate policies and a TEL strategy for the organisation.	3
There are TEL champions to research and disseminate good practices in TEL.	3
Sub-total	13
Total score	103

Chapter 3: Instructors' Use of Technologies for Teaching

3.1 Instructor Profile

3.1.1 Gender and age distribution

Seventeen instructors, nine male and eight female (see Figure 1), at NTI responded to the technology-enabled learning (TEL) usage faculty survey. The age distribution of the respondents shows that a significant number of those who responded are under 40 years old (see Figure 2).

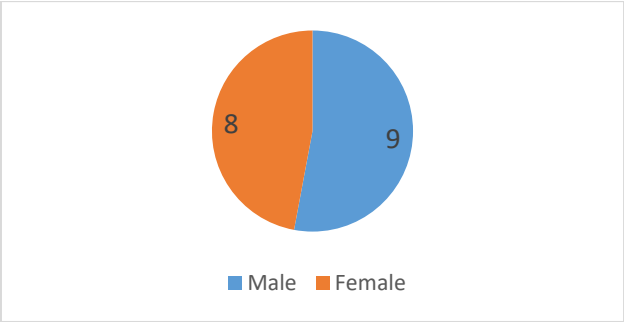

Figure 1. Gender ratios at NTI.

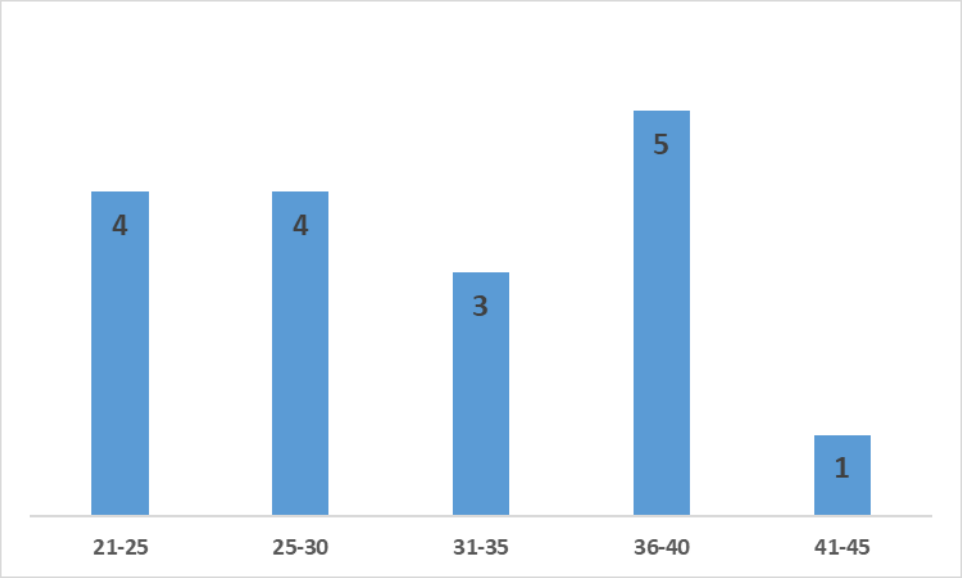

Figure 2. Age ranges of instructors at NTI.

3.1.2 Faculty positions and qualifications

Positions

The faculty comprises 16 instructors and one intern (see Figure 3).

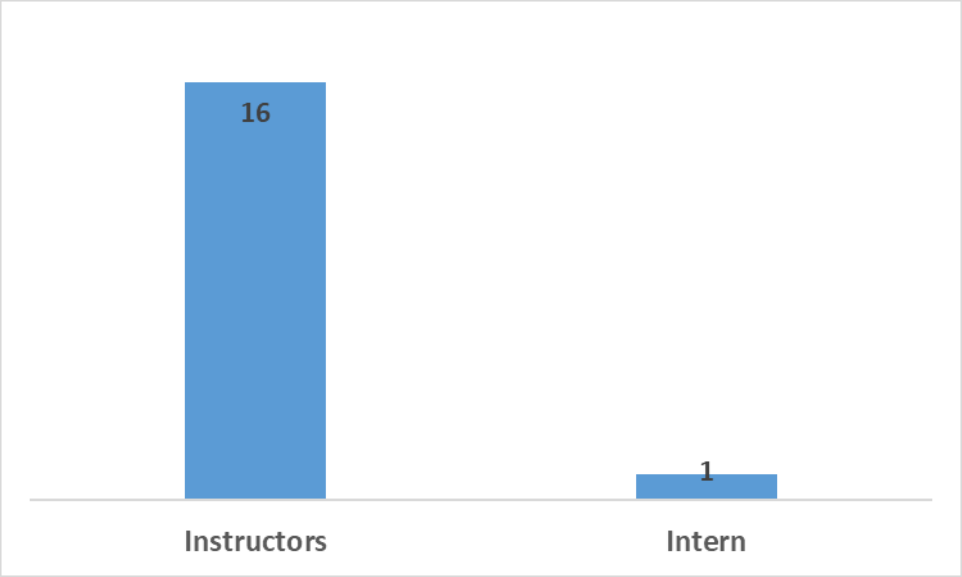

Figure 3. Position of instructors.

Qualifications

Nine of the instructors who responded have a bachelor's degree, four have a Higher National Diploma and four have a diploma (see Figure 4).

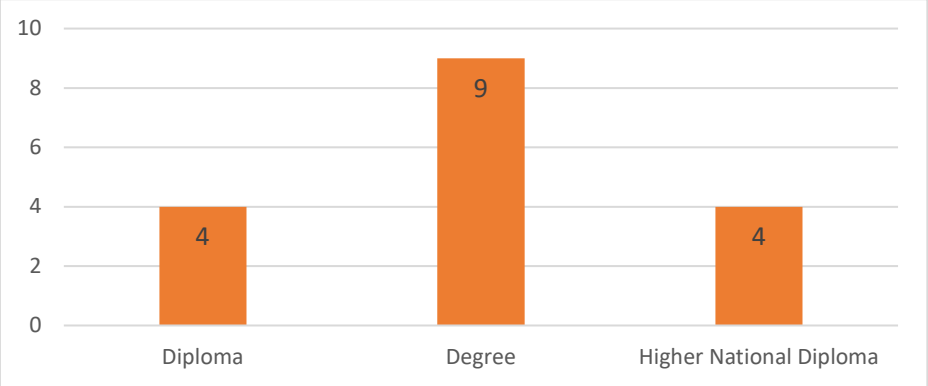

Figure 4. Instructors' qualifications.

3.1.3 Teaching level and experience

Teaching level

The study shows that 13 instructors are involved in teaching diploma-level courses and four are involved in teaching certificate-level courses (see Figure 5).

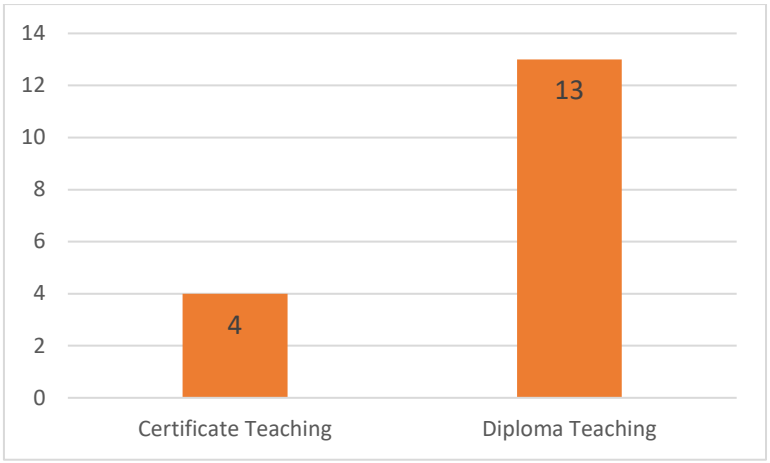

Figure 5. Levels at which instructors teach.

Teaching experience

One instructor has between 11 and 15 years of teaching experience, eight have six to 10 years of experience and eight have five years or less (see Figure 6).

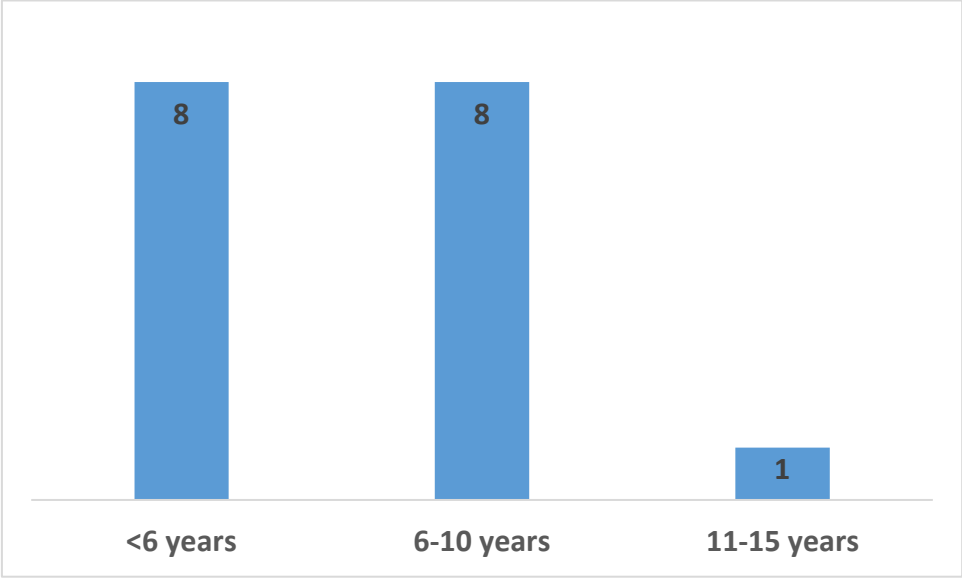

Figure 6: Instructors' years of teaching experience.

3.1.4 Faculties of the respondents

Nine of the instructors came from the Accounts and Business faculty, four from Information Technology, two from Food and Beverage, and one each from Hairdressing and Beauty and Fashion Design (see Figure 7).

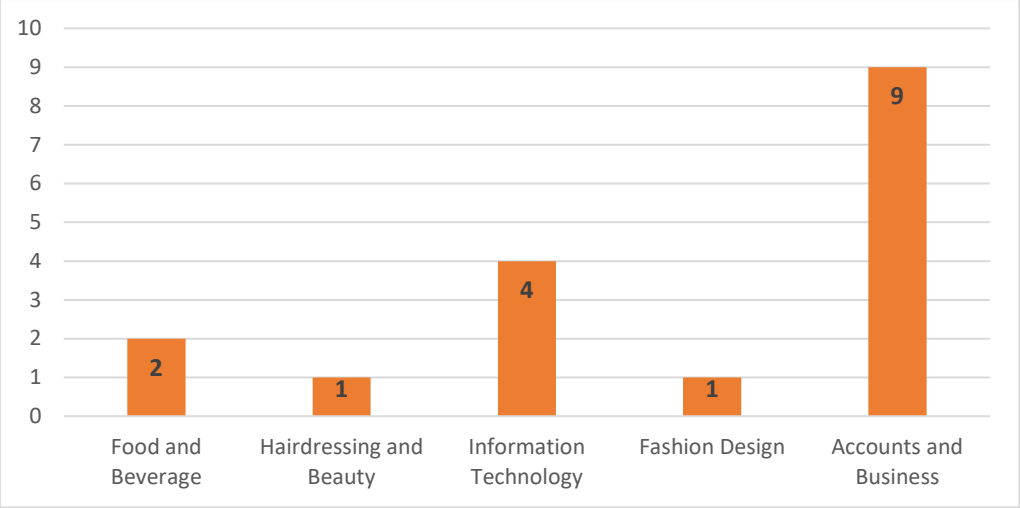

Figure 7. Faculty or discipline of instructors.

3.2 Access to and Use of Information and Communications Technology

3.2.1 Ownership of and access to ICT

Thirteen instructors own a smartphone and nine own or have access to a laptop. Six instructors own a desktop computer but only two own a tablet (see Figure 8).

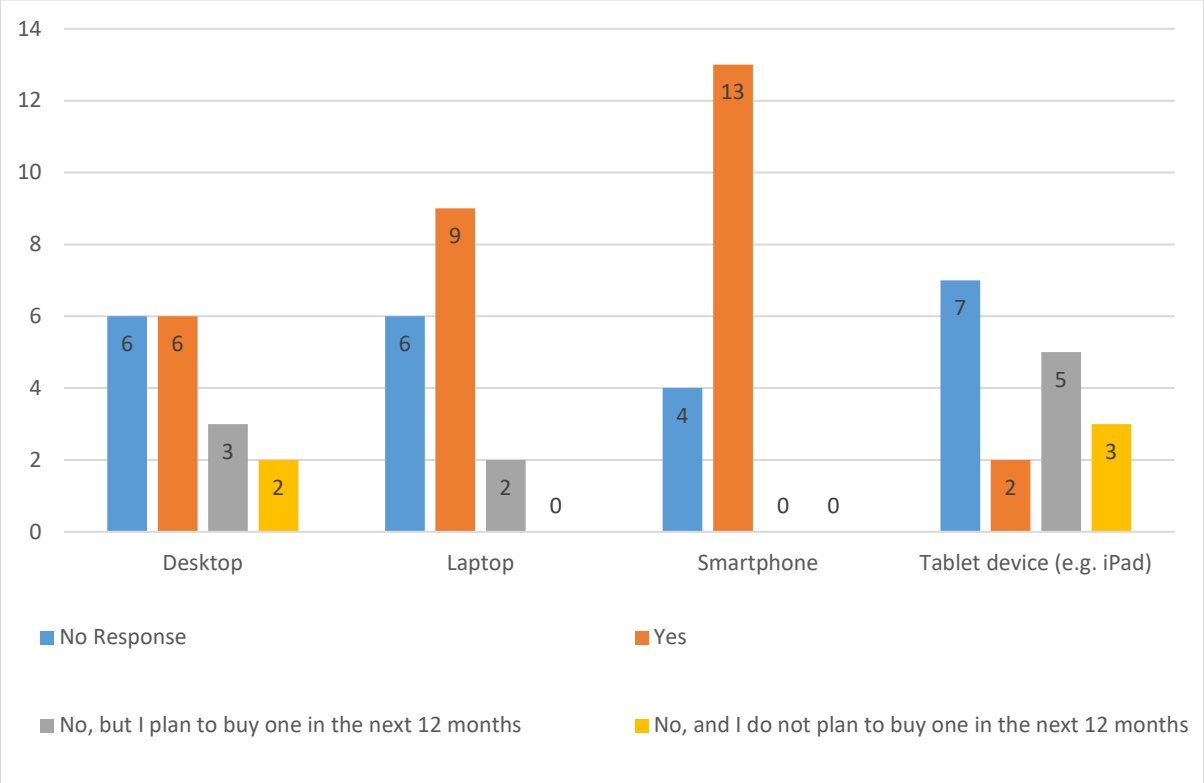

Figure 8. Ownership of devices among instructors.

3.2.2 Access to devices

Figure 9 shows that nine instructors use desktop computers provided by NTI, seven use their personal laptops and nine use their own smartphones. Ten instructors did not respond to whether they access tablet devices provided by NTI.

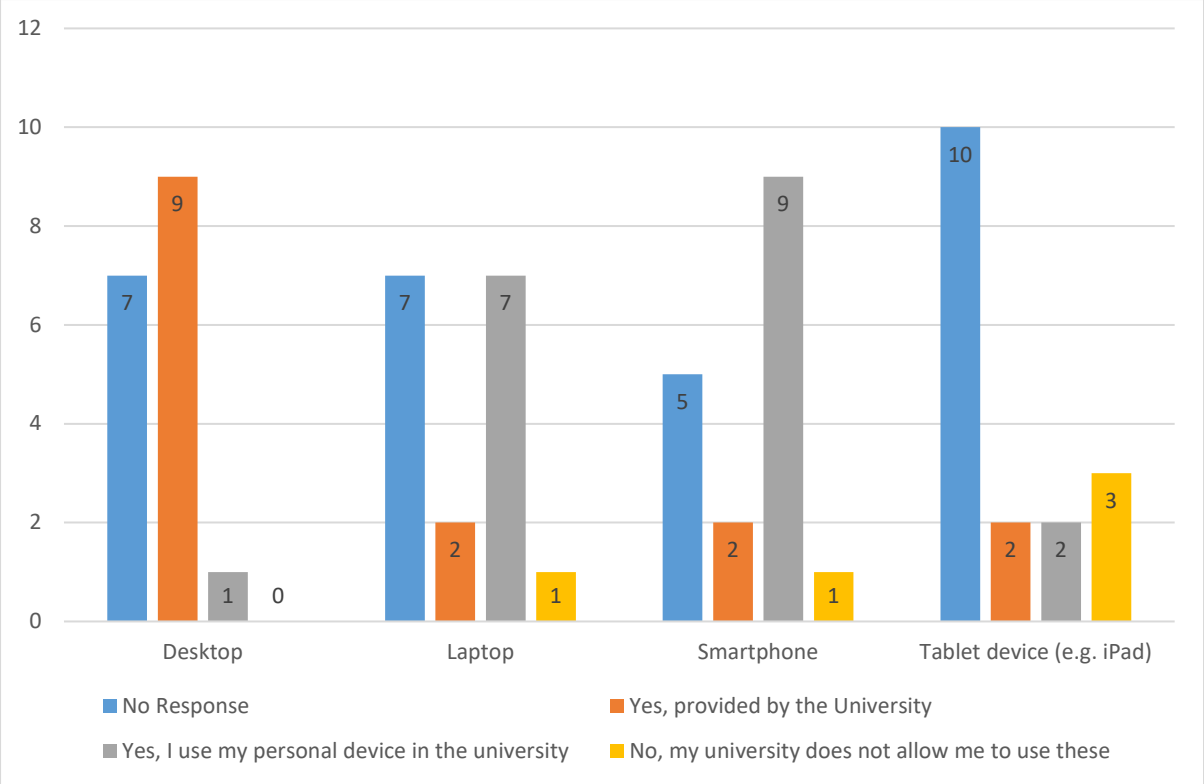

Figure 9. Instructors' access to devices.

3.2.3 Internet access: Location

All the instructors have Internet access. None of those who responded indicated having no access. Ten instructors indicated that they access the Internet at the school office and nine have Internet access at home. Only four instructors indicated that they access the Internet at a cyber café (see Figure 10).

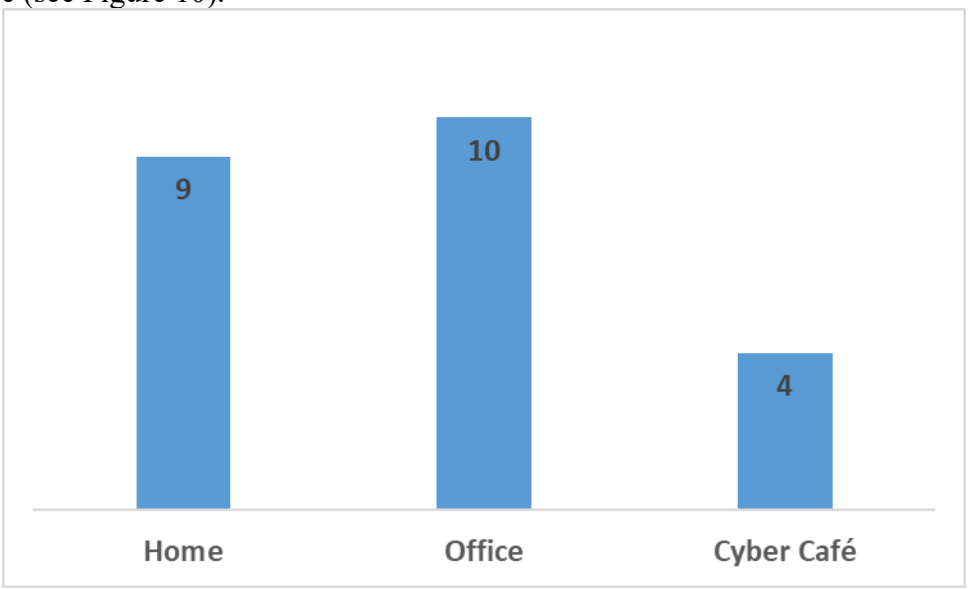

Figure 10. Internet access: Location.

3.2.4 Internet access: Type

A significant number of the instructors (11) access the Internet through wireless and mobile devices. Fifteen instructors do not access the Internet by either dial-up or ADSL connection (see Figure 11).

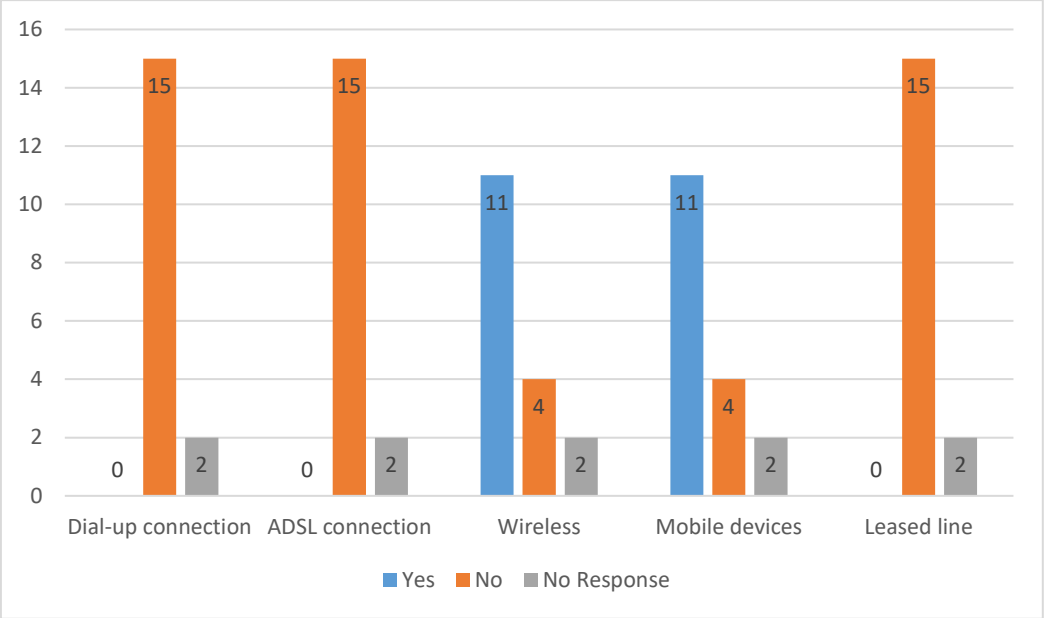

Figure 11. Internet access: Type.

3.2.5 Internet access: Devices used

The study findings revealed that 11 instructors access the Internet using smartphones, two use desktop computers and one uses a laptop (see Figure 12).

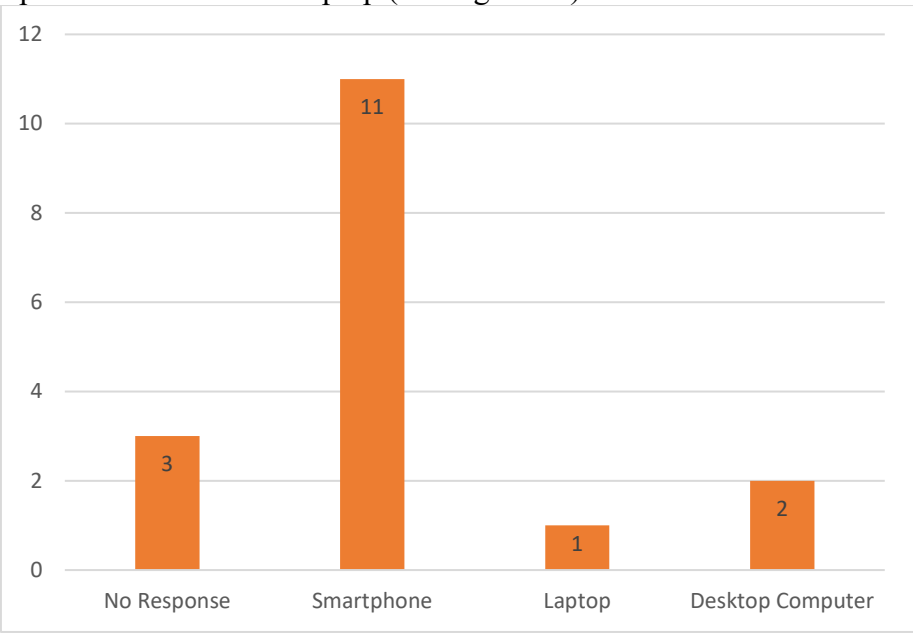

Figure 12. Internet access: Devices used.

3.2.6 Internet access: Broadband

The findings showed that 13 instructors have broadband Internet access; only one indicated that they do not have broadband access. Three instructors did not respond to this question

(see Figure 13). Figure 14 shows that most of the instructors (9) access the Internet within NTI in the library, eight access it in the classrooms and eight in the reception lounges. Instructors rarely access the Internet from learners' common rooms.

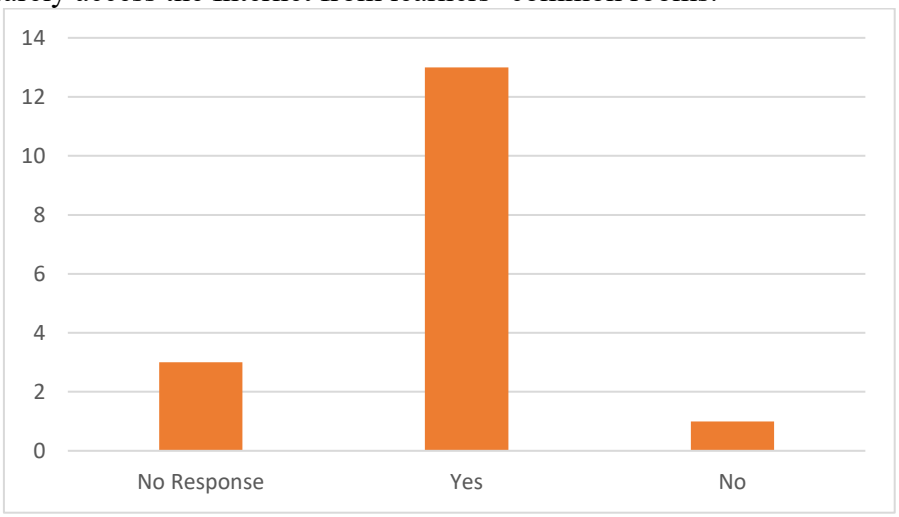

Figure 13. Internet access: Broadband.

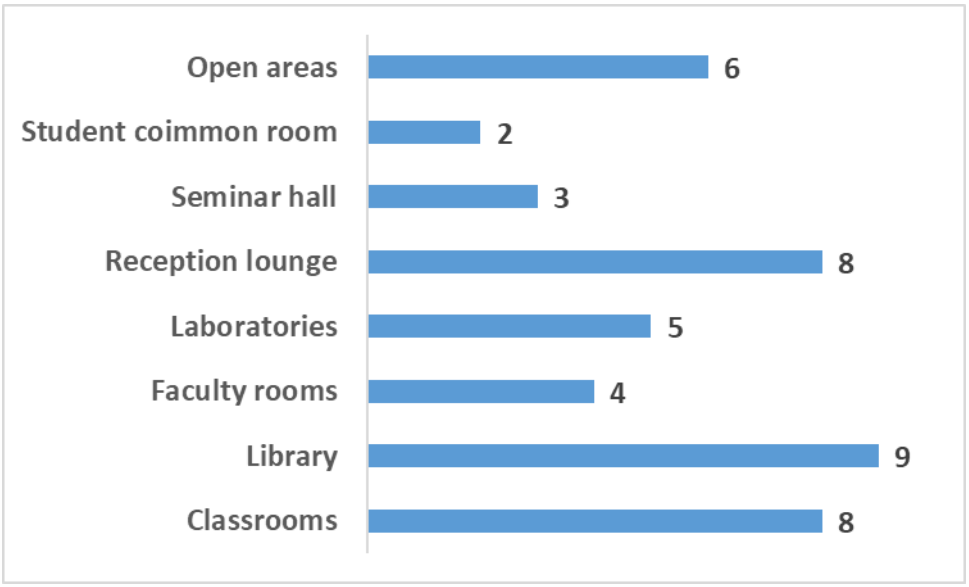

Figure 14. Internet access on campus: Location.

3.2.7 Internet access: Wi-Fi

The findings showed that 14 instructors access the Internet at NTI via Wi-Fi (see Figure 15). This demonstrates that there is a basic level of infrastructure in place to accommodate the use of technology in teaching and learning.

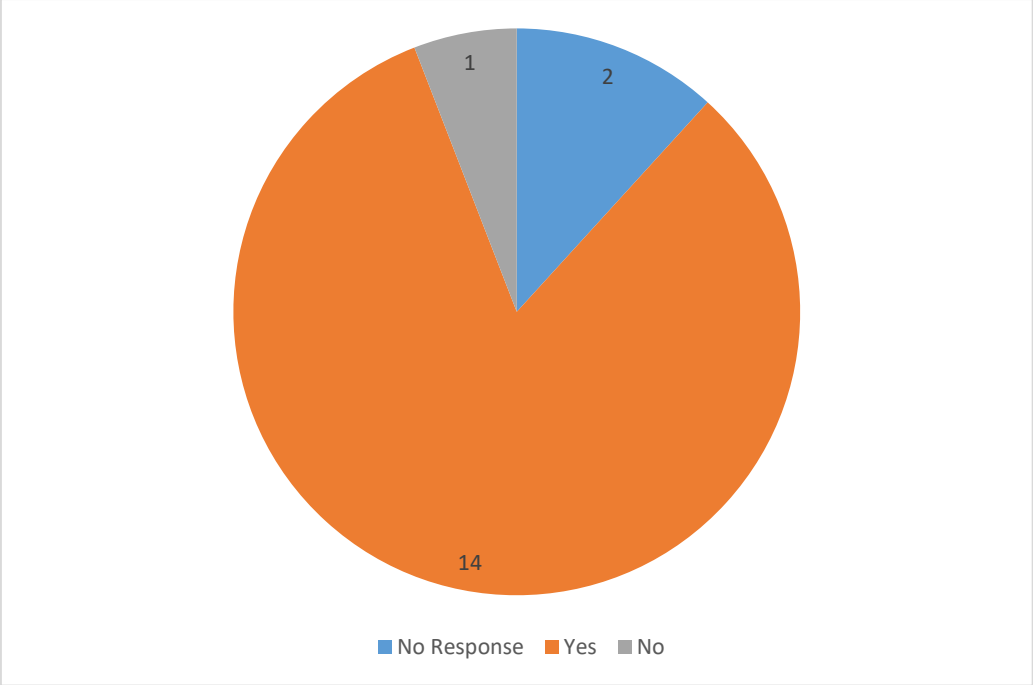

Figure 15. Internet access: Wi-Fi.

3.2.8 Internet access: Frequency

The findings showed that 13 instructors use the Internet daily, and only one uses it sporadically.

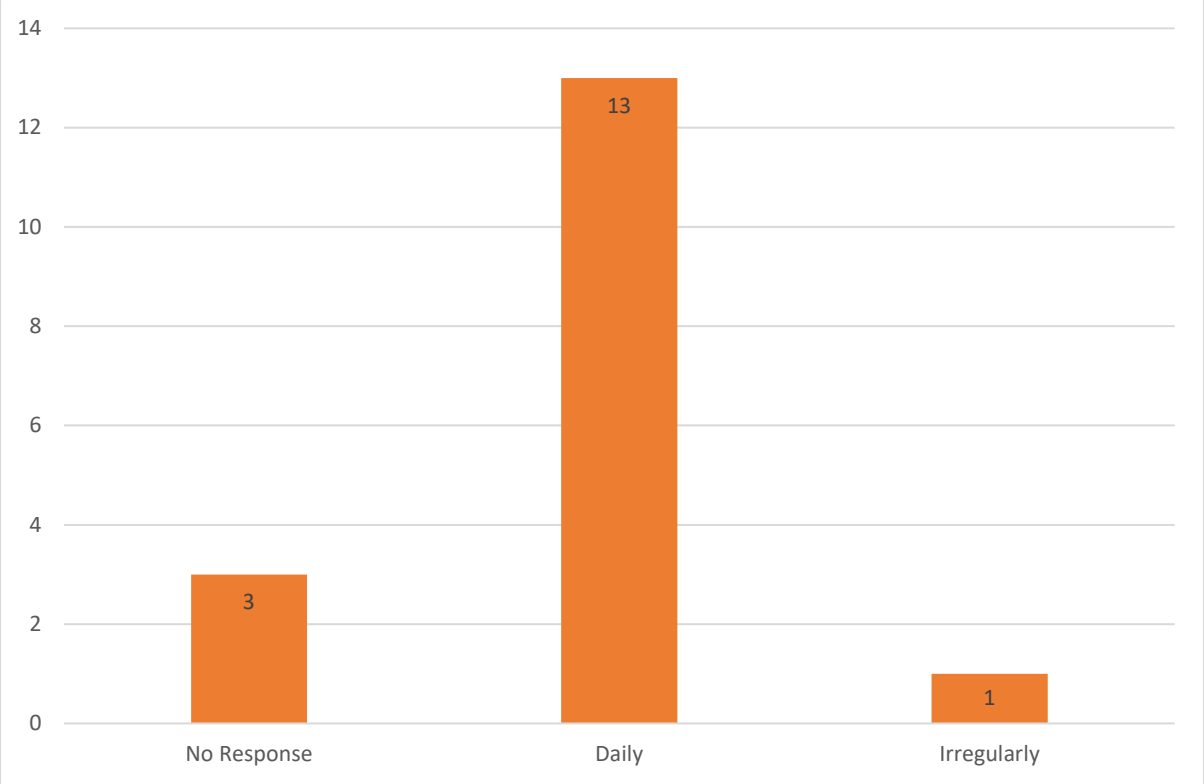

Figure 16. Internet access: Frequency.

3.2.9 Instructors' comfort level with computer-related skills

Respondents were asked to rate their level of comfort with using various computer-related skills. Table 4 shows that eight of the instructors who responded are very comfortable with word processing and email. However, significantly fewer respondents were comfortable with or skilled in the areas of graphics, video and audio editing, and web page design. Instructors at NTI require further training in these areas in order to use TEL effectively.

Table 4: Comfort level with various computer-related activities

	No response	Trainer	Advanced	Intermediate	Basic level	Non-user
Word processing (e.g., Microsoft Word)	4	8	3	1	1	0
Spreadsheets (e.g., Microsoft Excel)	4	4	5	0	4	0
Presentation (e.g., Microsoft PowerPoint)	4	7	0	0	6	0
Email	4	8	4	0	1	0
Databases	4	6	4	0	3	0
Multimedia authoring	4	4	1	1	5	2
Graphic editing	3	4	1	2	5	2
Digital audio	3	3	2	2	5	2
Video editing	3	4	0	2	6	2
Web page design	3	5	1	2	3	3
Learning management system	4	5	3	1	2	2
Web 2.0 tools (Wikis, blogs, social networking)	3	4	4	3	1	2

3.2.10 Use of social media

The findings of the study revealed that 15 of the instructors owned a social media account (see Figure 17). As indicated in Table 5, the two most commonly used social media platforms are Facebook (14 instructors) and Google+ (9 instructors). When asked how often they update their social media accounts, eight instructors indicated that they do not update their social media accounts frequently. Three instructors update their accounts several times a day, two once a day and one once a week (see Figure 18).

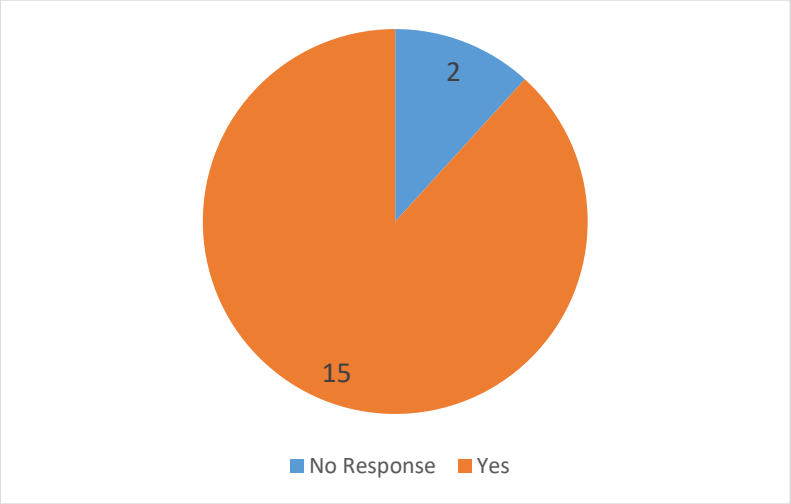

Figure 17. Social media account ownership.

Table 5: Social media platforms used by instructors

Social media platform	No. of respondents who use the platform	Percentage
Facebook	14	82.4%
Twitter	8	47.1%
Google+	9	52.9%
Blog (using Blogger or WordPress or within institutional website/CMs)	4	23.5%
Slideshare or similar presentation platform	4	23.5%
Photo-sharing (Instagram/Flickr/Picasaweb, etc)	7	41.2%
Research-Sharing site (Academic.edu, Researchgate.net, etc.)	7	41.2%
Social bookmarking sites (Delicious, Scoop.it, Pinterest, etc.)	4	23.5%
Goodreads.com (for connecting with authors and readers) or similar	2	11.8%

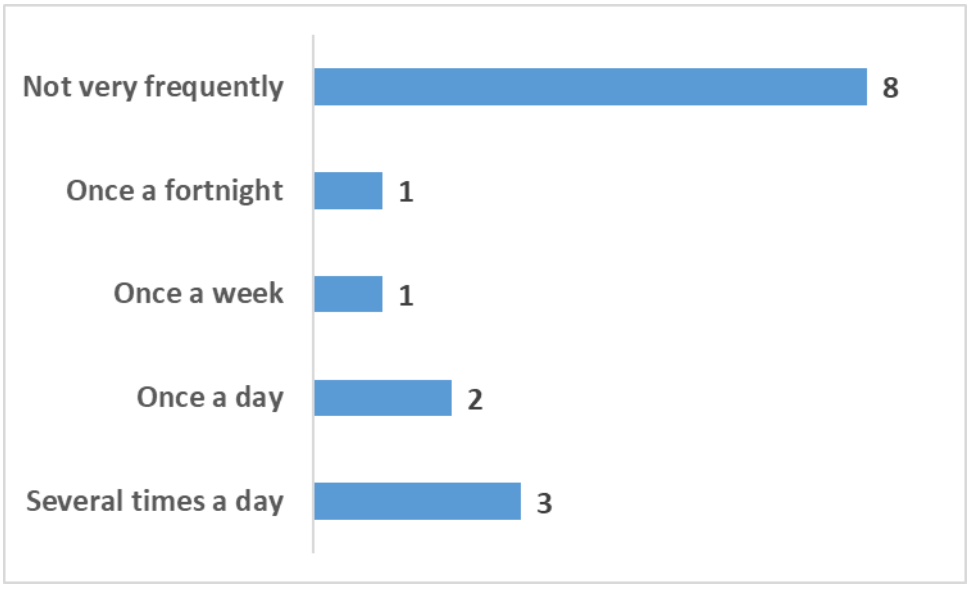

Figure 18. How frequently instructors update their social media accounts.

3.2.11 Membership of and participation in mailing lists and discussion forums

Instructors' involvement and participation in mailing lists and discussion forums was also captured in the survey. Eleven instructors were on a mailing list, four were not on a mailing list and two did not respond to the questions (see Figure 19).

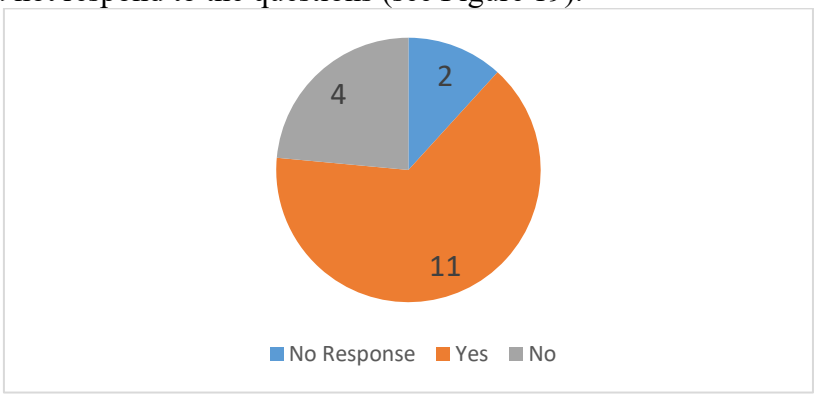

Figure 19. Instructors' membership of mailing lists.

Only 14 instructors subscribe to between one and five email-based discussion forums. Three instructors did not respond to this question (see Table 6). Of those instructors who participate

in email-based discussion forums, 59% describe their participation as moderate. One instructor posts daily, five post once a week and five post infrequently (see Figure 20).

Table 6. Membership of email-based discussion forums

How many email-based discussion forums are you subscribed to?	No. of responses	Percentage
No response	3	18%
1–5	14	82%

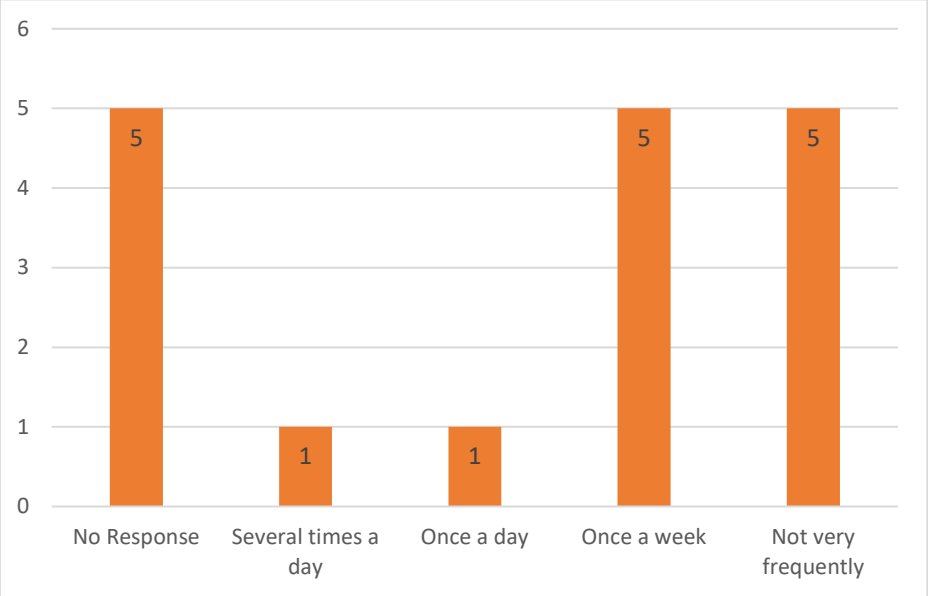

Figure 20. Frequency of posting in forums.

3.2.12 Experiences with ICT-related resources, services and spaces

The instructors were asked to evaluate their experiences with a range of ICT-related resources, services and spaces. Their experiences were rated on a Likert scale, where 0 = no response, 1 = poor, 2 = fair, 3 = neutral, 4 = good, 5 = excellent and 6 = not available. The survey results revealed that the instructors had good experiences in the use of e-classrooms, computer labs and email services and with the ICT support services provided at NTI. However, four of the instructors had no access to e-portfolios or software (see Table 7). This indicates that to enhance the teachers' experiences of TEL, the TEL environment needs to be improved by filling gaps and training instructors in the various services at NTI, including developing and using e-portfolios and the use of various software and hardware options for teaching and learning activities.

3.3 Using ICT for Teaching

3.3.1 Nature of classes taught

The teaching modes currently used by instructors are predominantly traditional face-to-face modes. Twelve instructors use traditional face-to-face, only one uses online modes and six use blended modes (see Figure 21). This indicates that there is a need to encourage a shift from traditional teaching and learning to blended or online modes.

Table 7. Experiences with ICT-related resources, services and spaces

Experience of ICT-related resources, services and spaces provided by NTI	Poor	Fair	Neutral	Good	Excellent	Not available	Mean	Std deviation
E-classroom facilities	1	0	2	6	3	2	3.41	2.002
Computer labs (for practical and Internet access)	0	3	1	5	4	0	2.88	1.933
Email services (institutional)	0	3	1	5	4	0	2.88	1.933
Learning management system	2	1	1	5	2	2	2.88	2.176
E-portfolio	2	0	1	3	2	4	3.00	2.500
Network bandwidth/speed of Internet (download and upload)	0	5	1	4	3	0	2.59	1.839
Wi-Fi access	0	3	0	5	5	0	3.00	2.000
Online or virtual technologies	1	4	1	3	3	1	2.65	2.029
Access to software (e.g. MATLAB, GIS applications)	1	2	0	2	4	4	3.35	2.422
Download and use of free and open source software for teaching and learning	2	3	0	4	4	1	2.94	2.045
Support for maintenance and repair of ICTs	1	3	1	3	5	1	3.12	2.027

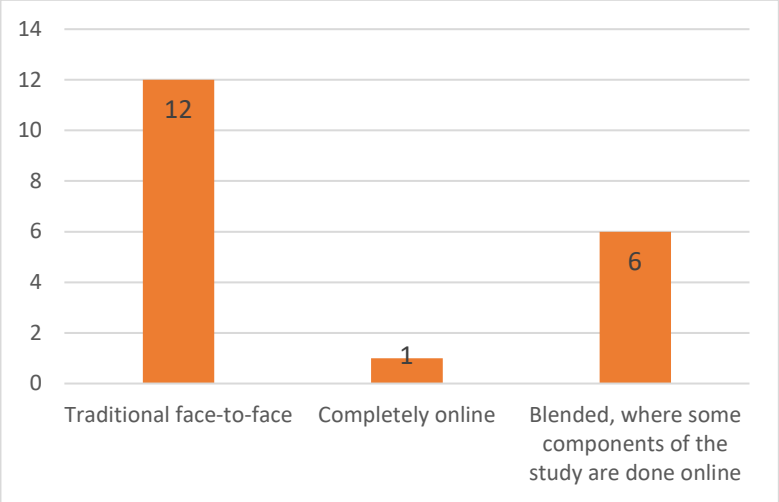

Figure 21. Nature of classes taught.

3.3.2 Types of resources used

The instructors were asked to indicate how frequently they used a range of digital resources and platforms in their teaching. The frequency was rated on a Likert scale from 0 to 5, where 0 = no response, 1 = always, 2 = often, 3 = sometimes, 4 = rarely and 5 = never. Table 7 shows that the NTI instructors use a range of digital resources and platforms for teaching. The most popular resources are presentations (6 instructors), learning management systems (6), images (9) and Word files (9). In contrast, six instructors never used simulations, six never used social bookmarking, six never used blogs, five never used microblogging and four

never used audio recordings. NTI plans to improve the instructors' capacities in the use of the various platforms and resources as part of the implementation of TEL.

Table 8. Types of resources used by instructors at NTI

Resource	No response	Always	Often	Sometimes	Rarely	Never
Images (pictures, photographs, including from the Web)	4	6	3	2	1	1
Presentations (e.g., PowerPoint, including from the online sources)	4	4	1	1	6	1
Word files (activity sheets, handouts, notes)	4	6	3	2	2	0
Digital films/video (e.g., YouTube)	4	3	4	3	1	2
Audio recordings	4	2	1	5	1	4
Simulations and 2D/3D animation	5	1	2	2	1	6
Learning management system	4	2	3	1	4	3
Blogs	4	0	2	2	3	6
Social bookmarking	4	1	2	1	3	6
Microblogging (Twitter, Facebook, etc.)	4	2	2	2	2	5
Open textbooks	4	4	5	0	2	2
Open access research papers	4	3	3	3	1	3

The respondents were asked to indicate the types of teaching and learning materials they have created and shared. Table 9 shows that they have created some form of teaching material: 12 instructors created images, four created presentations and six created Word files. However, only 23.5% of images, 35.3% of presentations and 41.2% of Word files were shared with an open licence. Six instructors have not created any simulations, blogs or social bookmarking. This shows that instructors at NTI need to use more interactive tools and social media to share their work with learners and other stakeholders.

Table 9. Created or shared teaching and learning resources

Resource	No response	Always	Often	Sometimes	Rarely	Never
Images (pictures, photographs, including from the Web)	4	6	3	2	1	1
Presentations (e.g., PowerPoint, including from the online sources)	4	4	1	1	6	1
Word files (activity sheets, handouts, notes)	4	6	3	2	2	0
Digital films/video (e.g., YouTube)	4	3	4	3	1	2
Audio recordings	4	2	1	5	1	4
Simulations and 2D/3D animation	5	1	2	2	1	6
Learning Management System	4	2	3	1	4	3
Blogs	4	0	2	2	3	6
Social bookmarking	4	1	2	1	3	6
Microblogging (Twitter, Facebook, etc.)	4	2	2	2	2	5
Open textbooks	4	4	5	0	2	2
Open access research papers	4	3	3	3	1	3

3.3.3 Awareness of OER

The findings revealed that 13 instructors at NTI are aware of OER. Only one instructor had no knowledge of OER (see Figure 22).

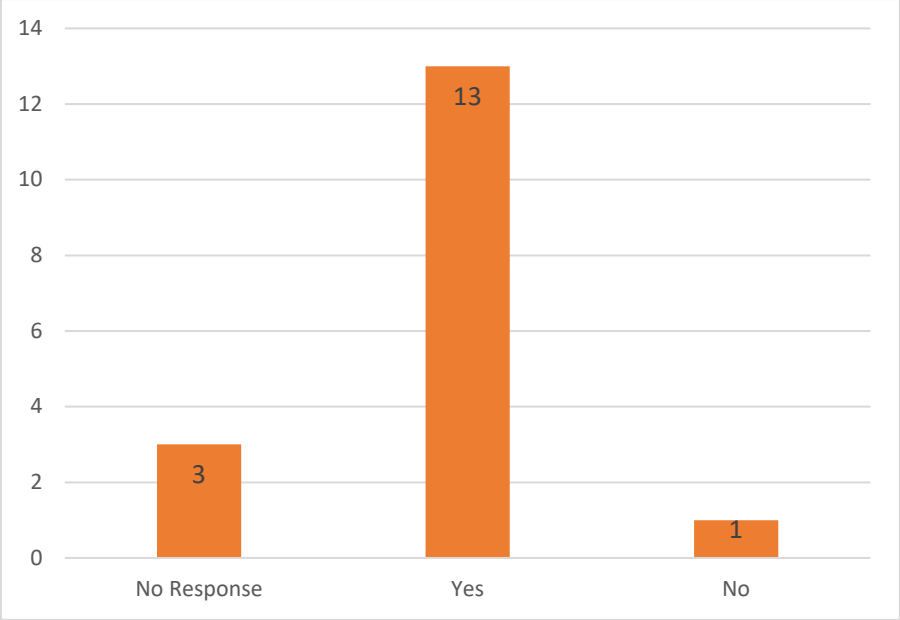

Figure 22. Awareness of OER.

3.3.4 Frequency of using OER platforms

The instructors were asked to indicate how often they used OER platforms during their teaching. The frequency was rated on a Likert scale from 0 to 4, where 0 = no response, 1 = always, 2 = often, 3 = sometimes and 4 = rarely. The findings in Table 10 show that most OER platforms are rarely used at NTI by the majority of the instructors.

Table 10. Frequency of using OER platforms

OER platform	No response	Always	Often	Sometimes	Rarely
OER Commons	4	1	3	1	8
Saylor Academy	4	0	3	0	10
WikiEducator	5	0	4	3	5
OpenStax College	4	0	2	1	10
BCCampus Open Textbooks	5	1	1	4	6
NPTEL, India	5	1	3	1	7
MIT Open Courseware	4	1	2	1	9
OpenLearn, UK	5	0	4	0	8
CollegeOpenTextbook	4	3	4	1	5
Directory of Open Access Journals	5	0	3	2	7
Director of Open Access Books	4	2	3	1	7
MERLOT	4	0	2	1	10

3.3.5 Skill levels in using various technologies

The findings suggest that the instructors are confident in the use of most technologies in each of the categories shown in Figure 23. This indicates strong self-efficacy in the use of technologies among the instructors, and so with the relevant training and support, they are likely to use them effectively in their teaching.

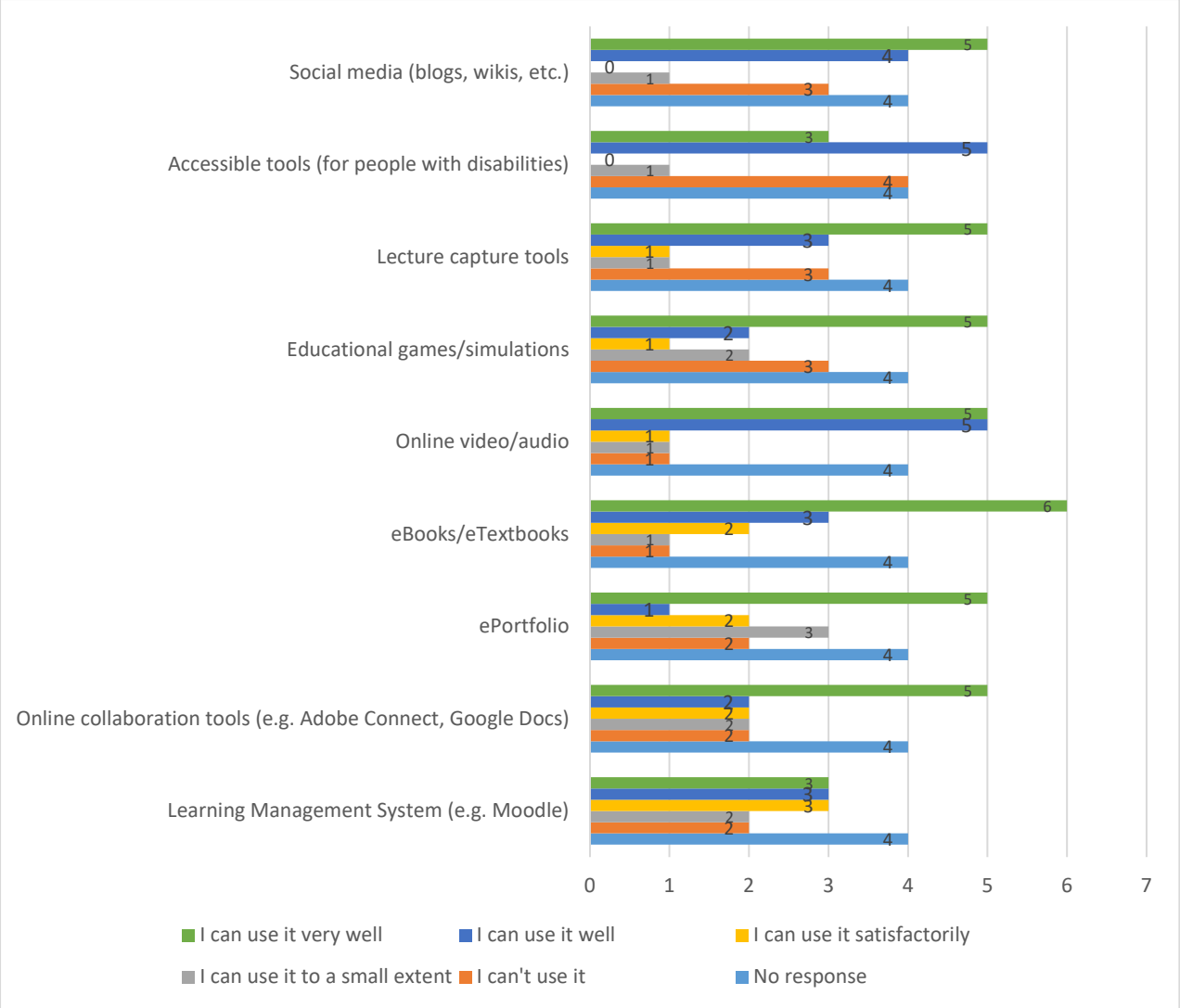

Figure 23. Skill levels in using various technologies.

3.3.6 Training and staff development

Eleven instructors had received training on the use of ICT for teaching (see Table 11) and eight confirmed that NTI provides regular training on the use of new ICT for teaching and learning (see Table 12). Eleven instructors had participated in online training (see Table 13) and seven had attended a massive open online course (MOOC) (see Table 14).

Table 11. Training on the use of ICT for teaching and learning

Training on the use of ICT for teaching and learning	No. of responses	Percentage
No response	3	17.6%
Yes	11	64.7%
No	3	17.6%
Total	17	100.0%

Table 12. Frequency of training

Regular training on the use of new ICT for teaching and learning	No. of responses	Percentage
No response	3	17.6%
Yes	8	47.1%
No	6	35.3%
Total	17	100.0%

Table 13. Participation in online training

Participation in online training	No. of responses	Percentage
No response	3	17.6%
Yes	11	64.7%
No	3	17.6%
Total	17	100.0%

Table 14. Attendance at MOOCs

Massive open online course (MOOC) attendance	No. of responses	Percentage
0	3	17.6%
Yes	7	41.2%
No	7	41.2%
Total	17	100.0%

3.3.7 MOOCs at NTI

The instructors were shown a list of MOOC platforms and asked to indicate which ones they were aware of. Seven instructors indicated they were not aware of any of the listed platforms. Only four were aware of Coursera and iVersity, and three were aware of FutureLearn. This suggests that there is a need to expose the NTI instructors to the rich opportunities for teaching and learning provided by MOOCs.

Table 15. Awareness of MOOC platforms among instructors

MOOC platform	No. of respondents aware of the platform	Percentage
Coursera	4	18.2%
Udacity	2	9.1%
EdX	2	9.1%
iVersity	4	18.2%
FutureLearn	3	13.6%
None	7	31.8%

3.3.8 TEL policies

The survey collected information on the instructors' knowledge of TEL-related policy issues. Only six instructors were aware of the policy for the use of open source software at NTI. It was observed that the instructors have inadequate knowledge of most of the policy issues presented to them in the survey (see Figure 24). This indicates a need to raise awareness of TEL and related policies among NTI instructors.

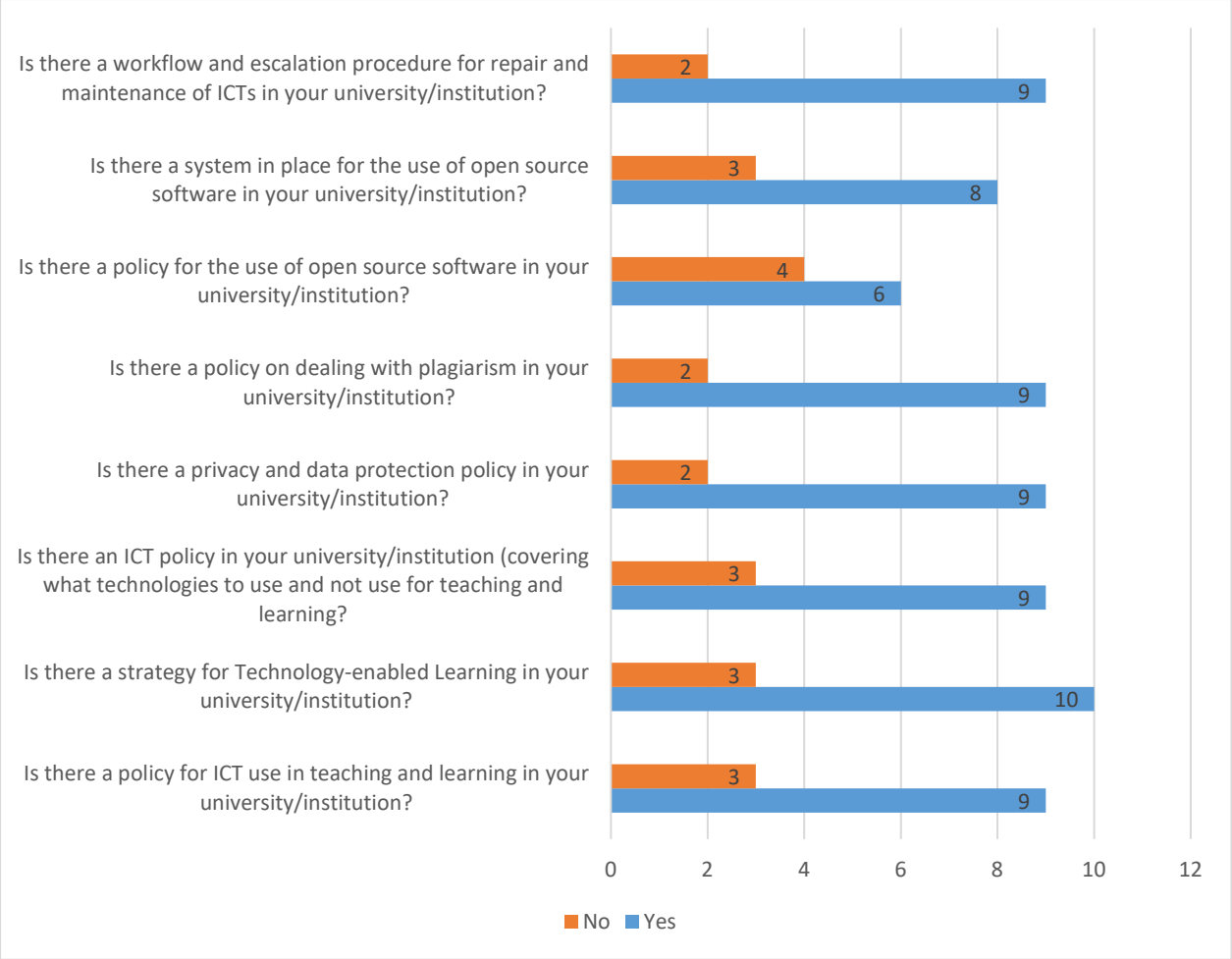

Figure 24. TEL policies at NTI.

3.4 Using ICT for Research and Scholarship

When asked if the library provides access to subscription-based e-resources, nine instructors indicated there was no such provision and five indicated that the library provides access to subscription-based e-resources. Three instructors did not respond to the question (see Figure 25).

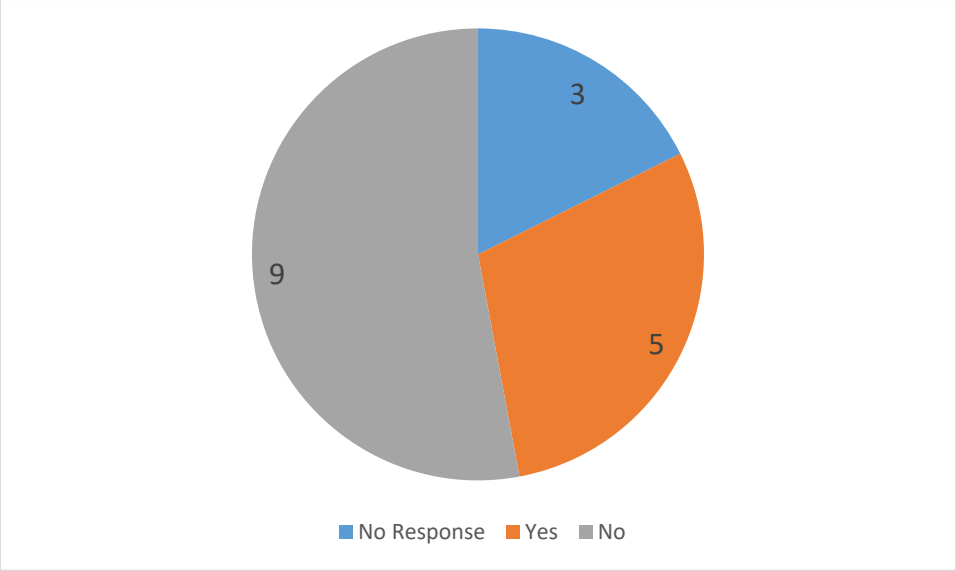

Figure 25. Access to subscription-based e-resources via the library.

3.4.1 E-Resource use at NTI

Regarding the types of e-resources accessed by the instructors, e-books were always and often used by six respondents. An average of just over 20% of the instructors have never used e-journals, e-books, citation databases, e-newspapers, or e-theses or dissertations (see Table 16).

Table 16. E-resources accessed by instructors

	No response	Always	Often	Sometimes	Rarely	Never
E-journals	8	2	2	0	1	4
E-books	8	3	3	0	0	3
Citation databases	8	1	1	0	3	4
E-newspapers	8	1	3	0	1	4
E-theses and dissertations	9	1	1	0	1	5
Patent databases	8	1	1	0	2	5
E-proceedings of conferences	8	1	1	1	2	4
Statistical databases	8	2	0	1	1	5

3.4.2 Availability of research support

Six instructors indicated there is poor or no funding available to support the sharing of research at NTI (see Table 17). There is a need for NTI to make research resources available and support the instructors in using the resources to harness their potential for future TEL implementation.

Table 17. Availability of research support

	Poor	Fair	Neutral	Good	Excellent	Not available	Mean	Std dev.
Access to data storage	1	5	1	4	2	0	2.35	1.766
Data visualisation software	2	2	1	3	3	1	2.47	2.154
Citation/reference management software	2	2	0	5	2	1	2.47	2.125
Plagiarism detection software	1	3	3	3	1	2	2.65	2.029
Institutional repository for sharing of research	3	0	0	2	5	3	3.18	2.455
Funds to support open access publications	2	2	1	3	1	4	2.94	2.358

3.4 Perceptions about and Attitudes towards the Use of TEL

3.4.1 Attitudes

The study looked at the instructors' attitudes towards the use of TEL. These were assessed by evaluating the respondents' responses to a variety of statements, using a Likert scale with responses coded as 0 = no response, 1 = strongly agree, 2 = agree, 3 = neither agree nor disagree, 4 = disagree and 5 = strongly disagree. The results indicate that the instructors have a generally positive attitude towards TEL. It is worth noting that none (0%) of the instructors strongly disagreed with the attitude statements provided. NTI should therefore actively work towards adopting more TEL to increase the quality of teaching and learning and thus benefit its learners (see Table 18).

Table 18. Instructors' attitudes towards the use of TEL

	No response	Strongly agree	Agree	Disagree	Strongly disagree	Mean	Std dev.
Technology-enabled learning can solve many of our educational problems.	4	8	5	0	0	1.06	.748
Technology-enabled learning will bring new opportunities for organising teaching and learning.	4	8	5	0	0	1.06	.748
Technology-enabled learning saves time and effort for both teachers and learners.	4	9	4	0	0	1.00	.707
Technology-enabled learning increases access to education and training.	4	10	3	0	0	.94	.659
Technology-enabled learning increases my efficiency in teaching.	5	9	2	0	0	.94	.827
Technology-enabled learning enables collaborative learning.	4	9	3	0	0	1.06	.827
Technology-enabled learning can engage learners more than other forms of learning.	4	7	5	1	0	1.24	1.033

Technology-enabled learning increases the quality of teaching and learning because it integrates all forms of media: print, audio, video and animation.	4	10	2	0	0	1.00	.791
Technology-enabled learning increases the flexibility of teaching and learning.	4	7	5	0	0	1.18	.883
Technology-enabled learning improves communication between learners and teachers.	4	7	5	0	0	1.18	.883
Technology-enabled learning enhances the pedagogic value of a course.	4	8	5	0	0	1.06	.748
Universities should adopt more and more technology-enabled learning for the benefit of their learners.	4	9	4	0	0	1.00	.707

3.4.2 Motivation to use TEL

Generally, the survey results showed that the instructors were highly and strongly motivated to use TEL (see Table 19). Their motivation to use TEL was assessed by evaluating their responses to a variety of statements using a Likert scale with the responses coded as 0 = no response, 1 = very strong motivator, 2 = strong motivator, 3 = average motivator, 4 = weak motivator and 5 = very weak motivator. The findings are very encouraging, as they show staff are highly motivated to integrate TEL into their teaching. A critical analysis of the different factors revealed that personal interest, training and self-gratification, technical support, training in TEL, technical support, trend-setting and improved infrastructure were the main motivators. Credit towards promotion and peer recognition and status were considered to be comparatively less significant, which is a positive indicator. However, it is clear that almost all the listed factors play a role in motivating instructors to adopt TEL at NTI.

Table 19. Motivation to use TEL

	Very strong motivator	Strong motivator	Average motivator	Weak motivator	Very weak motivator	Mean	Std dev.
Personal interest in using technology	6	6	0	1	0	1.29	1.047
Intellectual challenge	4	4	4	0	0	1.41	1.176
Self-gratification	3	6	3	0	1	1.71	1.359
Training on TEL	6	2	5	0	0	1.47	1.179
Better Internet bandwidth at workplace	5	4	2	0	2	1.71	1.572
Credit towards promotion	3	4	3	0	3	2.06	1.749
Professional incentives to use TEL	6	1	5	0	0	1.35	1.222
Technical support	7	3	2	0	1	1.41	1.326
Peer recognition, prestige and status	2	3	4	0	3	2.06	1.819

Improved infrastructure (hardware and software) deployment	5	4	2	1	1	1.65	1.455
Release time/Reduction in existing workload	4	4	4	0	1	1.71	1.404
To be a trendsetter by early adoption of technology in education	6	3	3	0	1	1.53	1.375

3.5 Barriers to the Use of TEL

Based on the responses shown in Table 20, concern about faculty workload, lack of training on TEL, lack of time to develop e-courses and lack of technical support in the institution top the list of barriers. NTI should restructure the instructors' timetables to provide them with ample time to develop e-courses. Furthermore, training instructors on TEL and the use of technology could help break the barriers indicated by the instructors.

Table 20. Barriers to the use of TEL

	No response		Very strong barrier		Strong barrier		Average barrier		Weak barrier		Very weak barrier		
	No.	**%**	**No.**	**%**	**No.**	**%**	**No.**	**%**	**No.**	**%**	**No.**	**%**	**Mean**
Concern about faculty workload	4	23.5%	4	23.5%	4	23.5%	4	23.5%	0	0.0%	1	5.9%	1.71
Concern about learners' access to technology	5	29.4%	4	23.5%	3	17.6%	3	17.6%	2	11.8%	0	0.0%	1.59
Lack of training on TEL	4	23.5%	5	29.4%	3	17.6%	3	17.6%	1	5.9%	1	5.9%	1.71
Lack of technical support in the university	5	29.4%	5	29.4%	3	17.6%	3	17.6%	0	0.0%	1	5.9%	1.47
Lack of institutional policy for TEL	4	23.5%	3	17.6%	3	17.6%	3	17.6%	2	11.8%	2	11.8%	2.12
Lack of professional prestige	4	23.5%	3	17.6%	2	11.8%	6	35.3%	1	5.9%	1	5.9%	2
Concern about the quality of e-courses	4	23.5%	1	5.9%	4	23.5%	4	23.5%	2	11.8%	2	11.8%	2.29
Lack of incentives to use TEL	4	23.5%	2	11.8%	5	29.4%	2	11.8%	3	17.6%	1	5.9%	2.06
Lack of credit towards promotion	5	29.4%	2	11.8%	4	23.5%	2	11.8%	1	5.9%	3	17.6%	2.06
Intimidated by technology	4	23.5%	2	11.8%	3	17.6%	3	17.6%	3	17.6%	2	11.8%	2.29
Concerns about security issues on the Internet	4	23.5%	1	5.9%	3	17.6%	4	23.5%	2	11.8%	3	17.6%	2.47
Inadequate availability of hardware and software	4	23.5%	4	23.5%	1	5.9%	4	23.5%	2	11.8%	2	11.8%	2.12

Poor Internet access in the university	4	23.5%	4	23.5%	1	5.9%	4	23.5%	2	11.8%	2	11.8%	2.12
Lack of time to develop e-courses	4	23.5%	4	23.5%	4	23.5%	2	11.8%	3	17.6%	0	0.0%	1.76
Lack of instructional design support for TEL	4	23.5%	3	17.6%	3	17.6%	3	17.6%	2	11.8%	2	11.8%	2.12
No role models to follow	4	23.5%	2	11.8%	1	5.9%	5	29.4%	3	17.6%	2	11.8%	2.41

3.6 Open Responses

In the open responses, ten instructors gave their feedback, summarised in Table 21. All the instructors gave positive responses that demonstrate their willingness to embrace and integrate TEL at NTI.

Table 21. Open responses from instructors

Technology-enabled learning shall enable our institution to train 21st century learners using the appropriate technologies that are current and relevant in today's world.
Yes there is a need to develop technology-enabled learning policy and strategy in our institution since it will enable virtual access of learning materials by students and interaction with students will have easier. With this kind of learning a lot will be covered in our institute and it will be of significant impact to our college. It will be one of the interesting thing to embrace in institute. We are actually looking for to have this program being implemented as soon as possible. Thank you.
Need to improve the computer labs to modern facility.
Need to improve blended mode of study.
Indeed there is... especially blended learning system where both face-to-face and e-learning takes place in the institution.
Yes. In 21st century, technology has become an integral part in learning.
Yes, learning technology should be introduced this will avoid overcrowding in our institution.
TEL will improve teaching.
Technology-enabled learning will make work easier for instructors especially when it comes to providing notes and references.
I look forward to have this systems developed in our institution.

3.7 Summary

The instructors at NTI who responded to the survey indicated that they have good access to technological devices. It was noted that they use both their own devices and desktops provided by NTI. NTI has Internet provision and instructors access it through their smartphones and desktops.

The findings also indicate that the instructors have a reasonable level of ICT capabilities with basic technologies such as word processing, spreadsheets and presentation software. However, many have inadequate skills in graphics, video and audio editing, website design and Web 2.0 tools.

Chapter 4: Learners' Use of Technologies for Learning

4.1 Learner Profile

4.1.1 Gender, age and education level of the respondents

Figure 26 shows the gender composition of the learners who participated in the survey. Thirty-three of the learners were female (62.3%), 16 were male (30.2%) and four (7.5%) did not respond to the gender question.

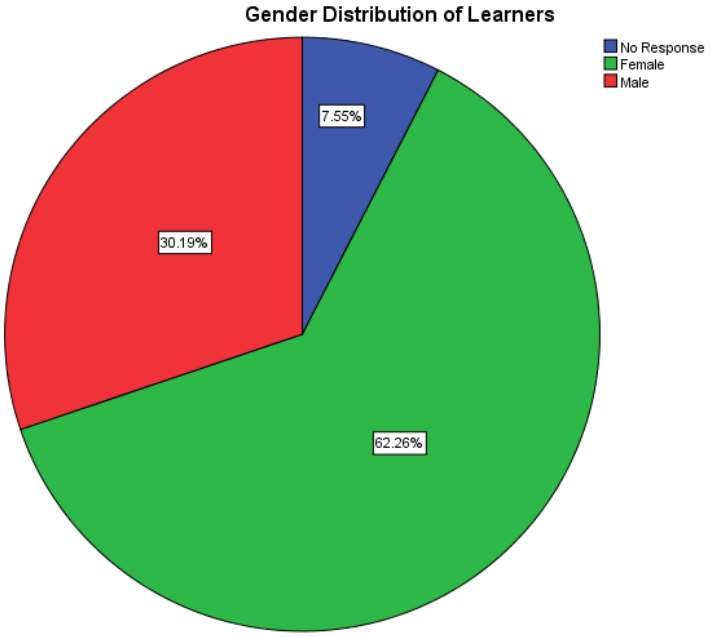

Figure 26. Gender distribution of the learners.

Figure 27 shows that 73.6% of the learners were between 21 and 25 years old and 1.9% were between 26 and 30.

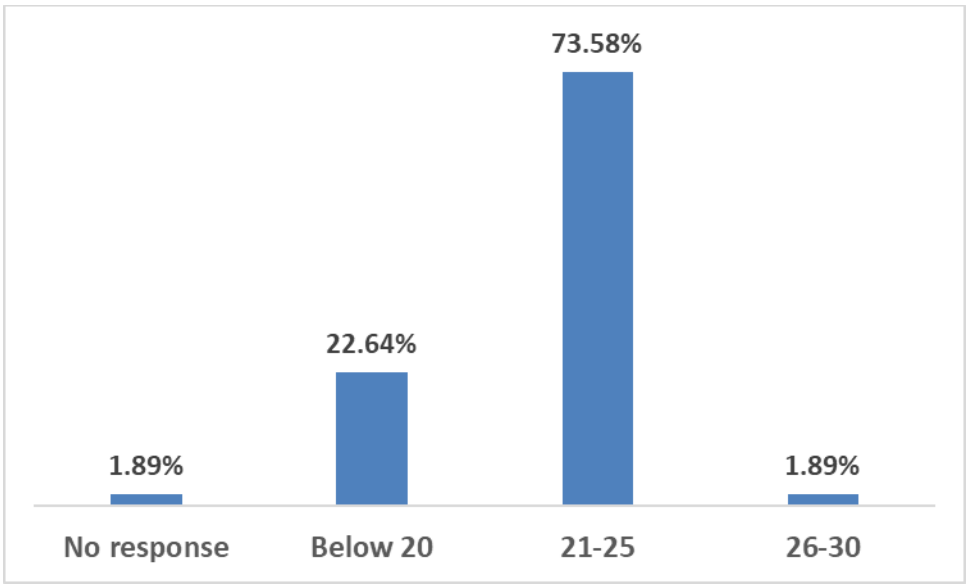

Figure 27: Age ranges of the learners.

Figure 28 shows that 67.92% of the learners were enrolled in certificate courses and 32.08% were enrolled in diploma courses.

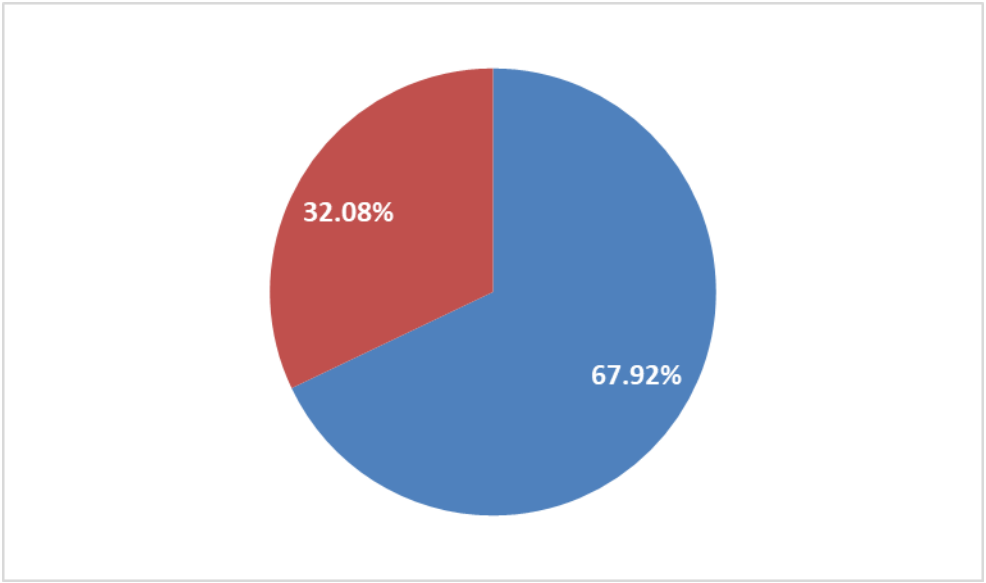

Figure 28: Level of study.

The ICT department has the highest proportion of learners who responded to the survey (22.6%) and the building and construction department has the lowest (7.5%) (see Table 21).

Table 22. Distribution of learners per faculty

Faculty	No. of responses	Percentage
No response	10	18.9%
Food and Beverage	7	13.2%
Hairdressing and Beauty	10	18.9%
Information Technology	12	22.6%
Building and Construction	4	7.5%
Fashion Design	10	18.9%
Total	53	100.0%

4.1.2 Mode of course delivery

The most common delivery mode for courses at NTI was traditional face-to-face teaching (84.91% of courses). Blended delivery accounted for 11.32% of courses and completely online courses accounted for the balance of less than 4% (see Figure 29).

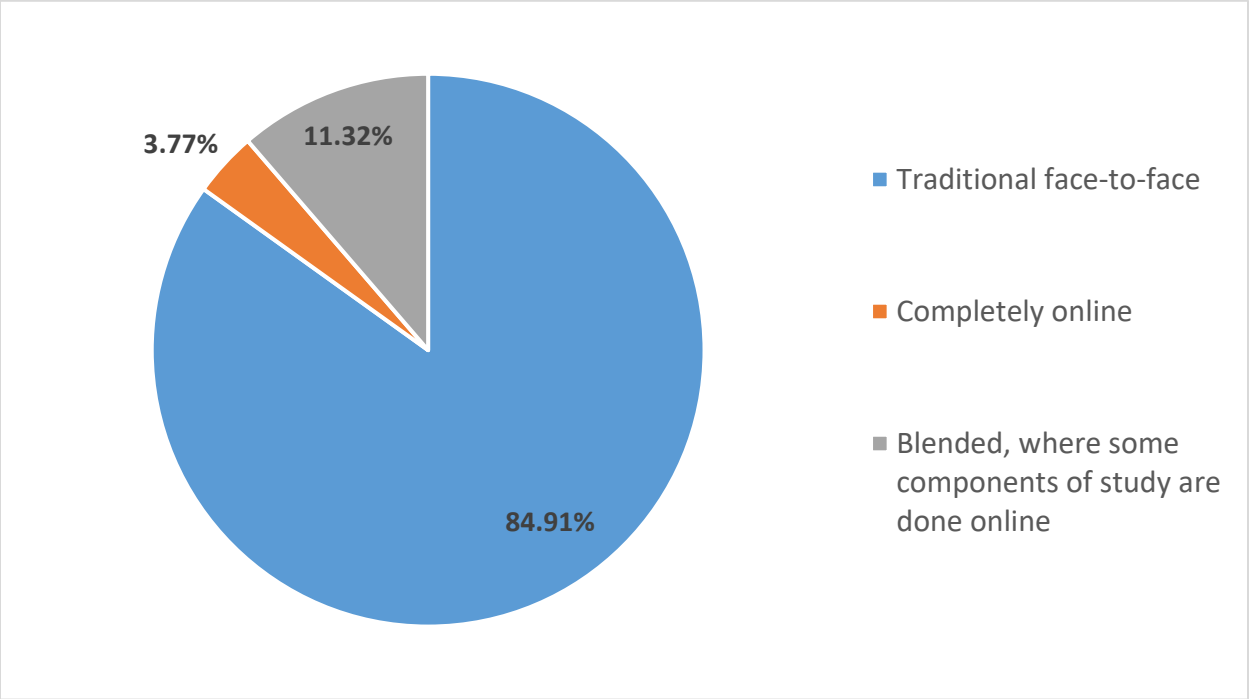

Figure 29. Mode of course delivery.

4.2 Learners' Access to and Ability to Use Technology

4.2.1 Ownership of devices

The learners were asked about their ownership of digital devices (desktops, laptops, smartphones and tablets). The findings revealed that 88.7% own a smartphone, 9.4% own a laptop, 7.5% own a desktop and 1.9% own a tablet (see Figure 30). Among the learners who did not own one of these devices, 22.6% were planning to buy a laptop, 3.8% a desktop and 5.7% a tablet within the next 12 months.

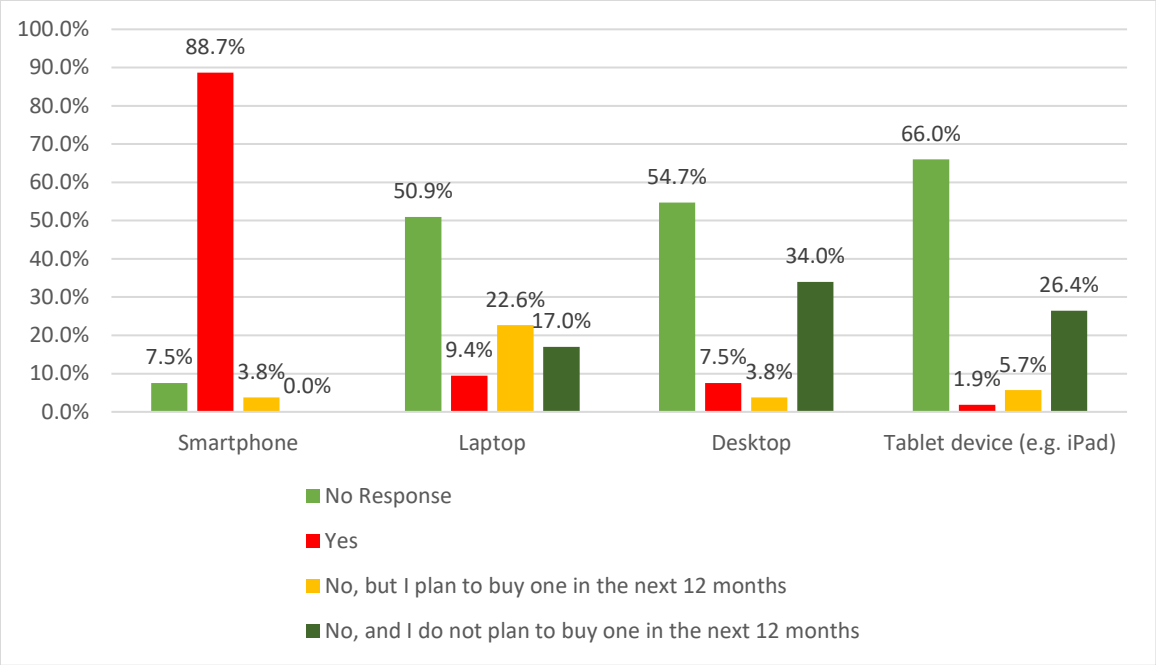

Figure 30. Learners' ownership of devices.

4.2.2 Access to devices at NTI

Regarding device access on NTI premises, 64.2% of the learners who responded have access to a desktop computer through NTI; 13.2%, 49.1% and 13.2% (respectively) indicated they use their own laptops, smartphones and tablets. There seem to be some misconceptions about the institute's policy on using private devices on campus, as 1.9%, 17.0%, 1.9% and 15.1% (respectively) of the learners indicated that they are not allowed to use their own desktop, laptop, smartphone or tablet on campus (see Figure 31). The results suggest that a policy that allows learners to use their own devices on campus should be developed and widely publicised to all learners to facilitate the implementation of technology-enabled learning (TEL) at NTI.

4.2.3 Internet access: Location

When asked where they access the Internet, 55.3% of the learners indicated that they access it on campus, 30.6% have Internet access at home, 12.9% access it at a cyber café and 1.2% have no Internet access (see Figure 32).

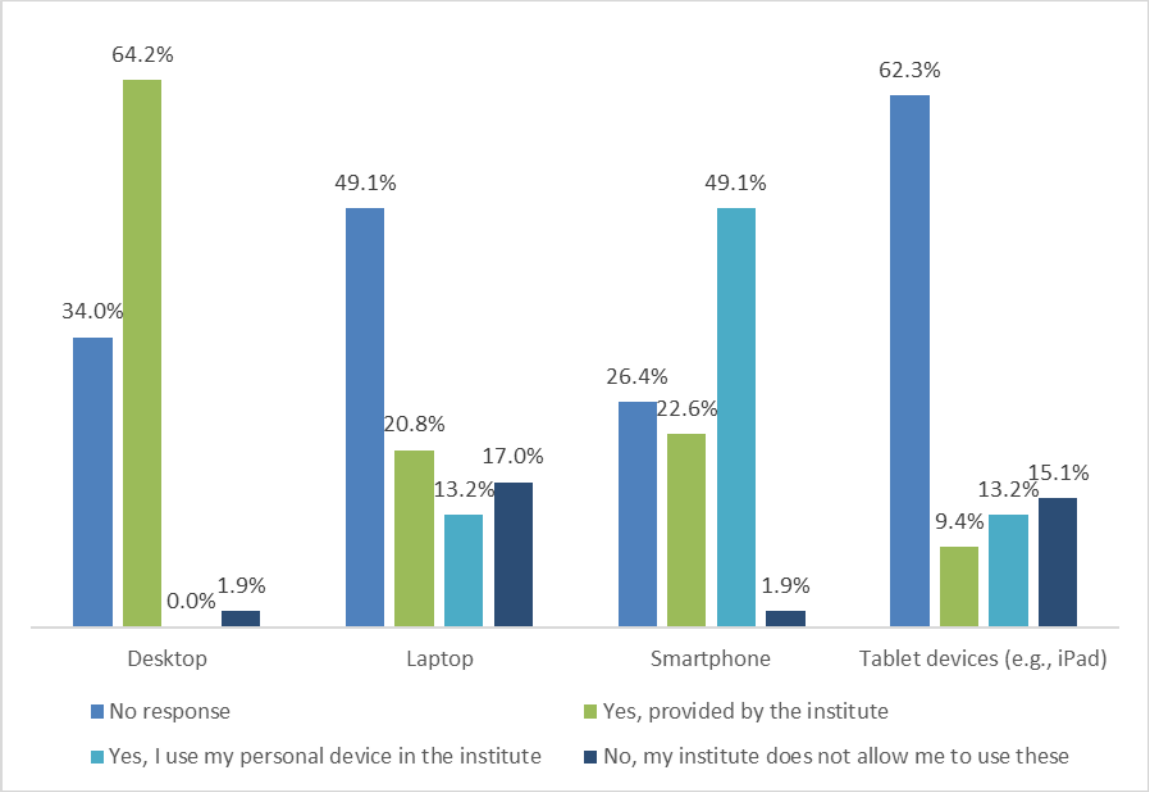

Figure 31. Access to devices at NTI.

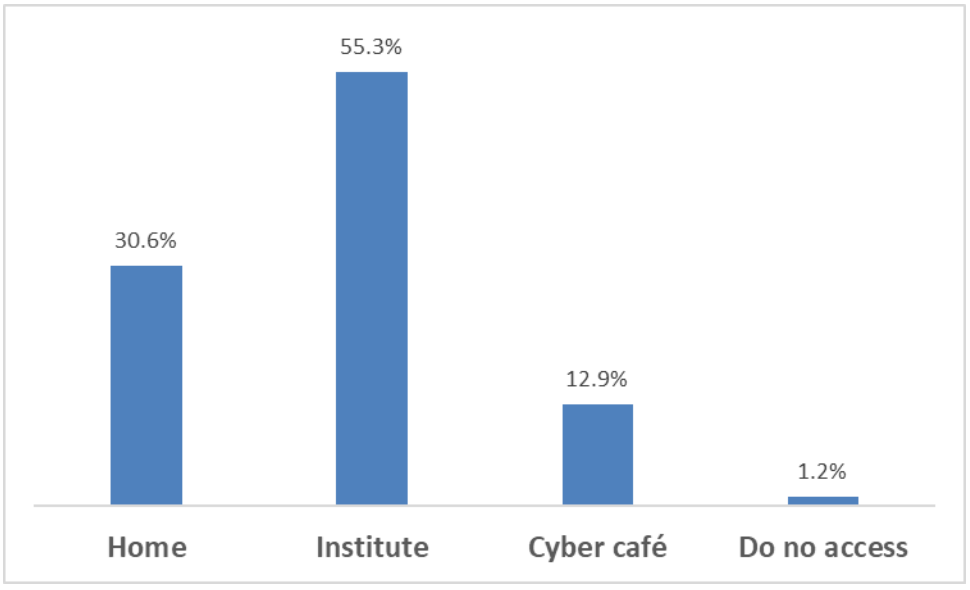

Figure 32. Internet access: Location

4.2.4 Internet access: Type

The most commonly used medium to access the Internet is Wi-Fi (54.8%), followed closely by mobile devices (39.3%). Dial-up connections, ADSL connections and leased lines are used by about 3.6%, 1.2% and 1.2% of the learners respectively (see Figure 33).

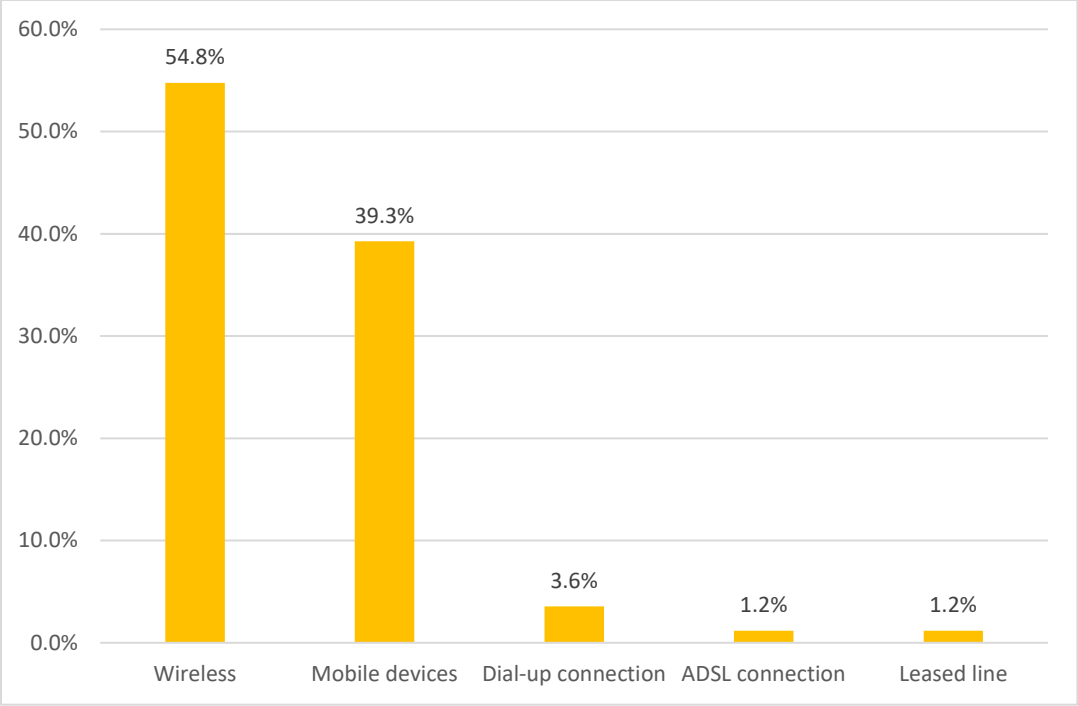

Figure 33. Internet access: Type.

4.2.5 Internet access: Devices used

Learners at NTI predominantly access the Internet using smartphones (86.79%). Note though that 13.21% of the respondents did not respond to this question (see Figure 34).

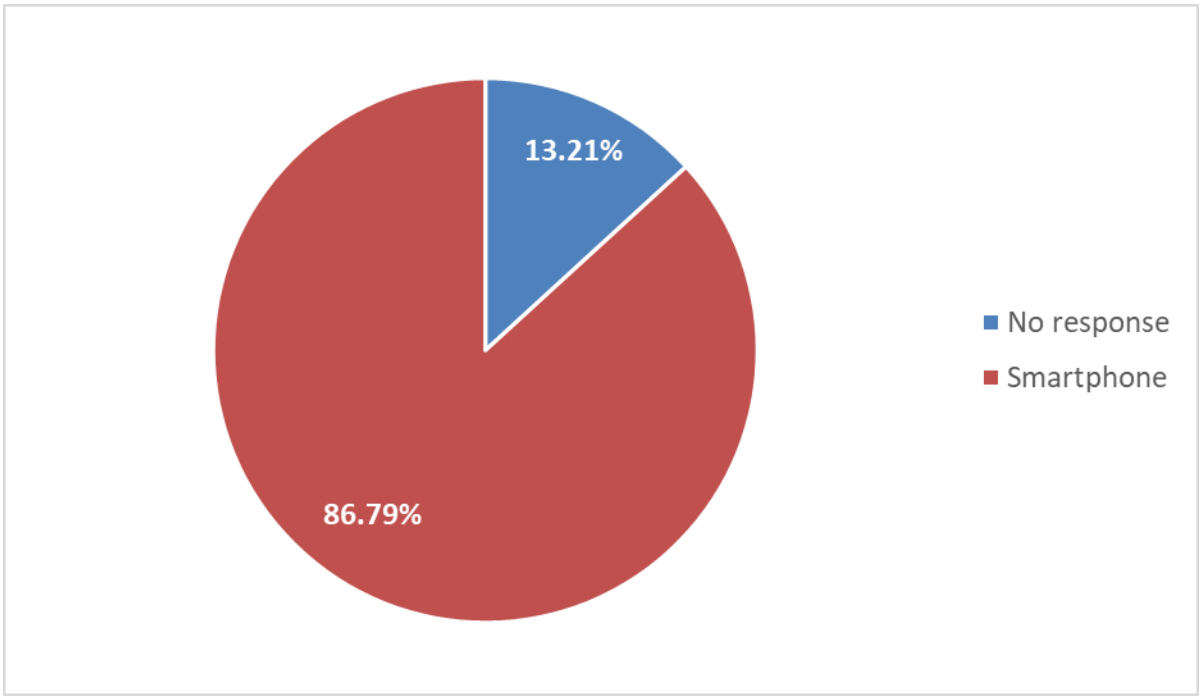

Figure 34. Internet access: Devices used most frequently for access.

4.2.6 Internet access: Broadband

When asked where they access broadband Internet connectivity, 88.7% of the learners indicated that they access it at school, 49.1% at home and 20.8% at a cyber café; 1.9% do not have any broadband access (see Table 23). This suggests that the respondents who have no broadband access would benefit from access while on campus at NTI.

Table 23. Internet access: Broadband

Place of access to broadband connectivity	No response	Yes	No
Home	5.7%	49.1%	45.3%
School	5.7%	88.7%	5.7%
Cyber café	5.7%	20.8%	73.6%
No access	5.7%	1.9%	92.5%

4.2.7 Access to broadband connection on campus

The learners indicated they access a broadband Internet connection at NTI in classrooms (13.3%), the library (13.3%), laboratories (11.7%), seminar halls (10.8%), faculty rooms (10.1%), the reception lounge (10.1%), open areas (10.1%) and learners' common rooms (9.8%) (see Figure 35). However, Internet throughput was not measured to ascertain the speed at which data travel on the network.

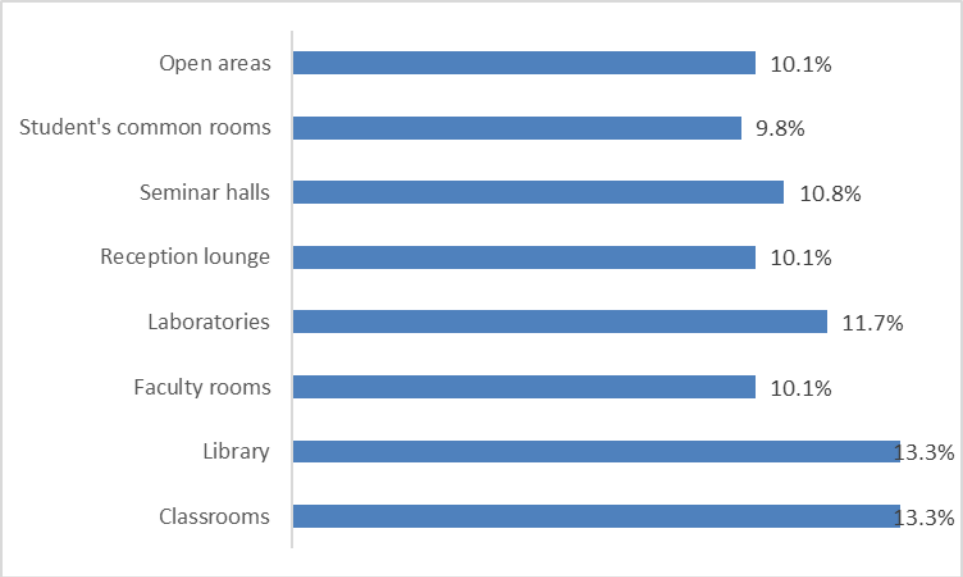

Figure 35. Where learners access a broadband connection on campus.

4.2.8 Wi-Fi/Wireless Internet connectivity at NTI

The learners were asked if they have access to Wi-Fi connectivity at NTI. As Table 24 shows, 90.6% indicated that they do have access on campus and only 3.8% indicated having no access.

Table 24. Learners' access to Wi-Fi connectivity on campus

Do you get Wi-Fi/wireless Internet connectivity on your campus?	No. of responses	Percentage
No response	3	5.7%
Yes	48	90.6%
No	2	3.8%
Total	53	100.0%

4.2.9 Frequency of Internet use

When asked how frequently they use the Internet, 79.25% of the learners responded that they use the Internet daily, 5.66% use it on alternate days and 3.77% use it once a week and irregularly (see Figure 36).

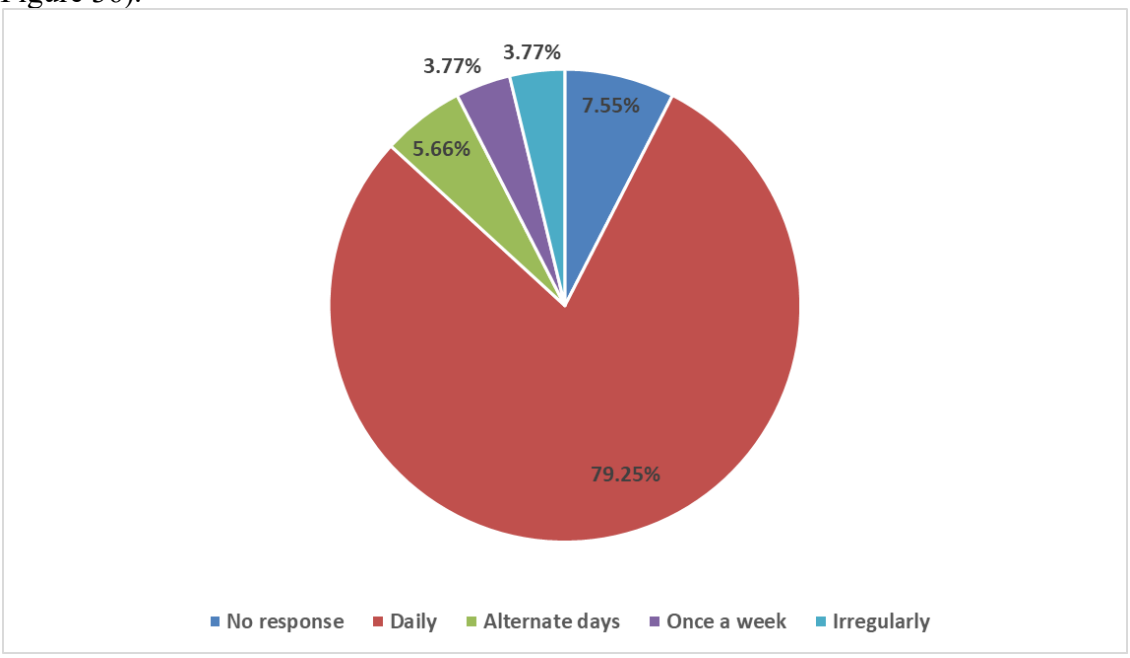

Figure 36. Frequency of learners' Internet use.

4.2.10 Time spent on Internet-related activities

Regarding the amount of time spent on the Internet, 45.28% of the learners spend more than five hours on the Internet every day, while 15.09% spend between three and five hours daily on it. No response was submitted by 39.62% of the learners.

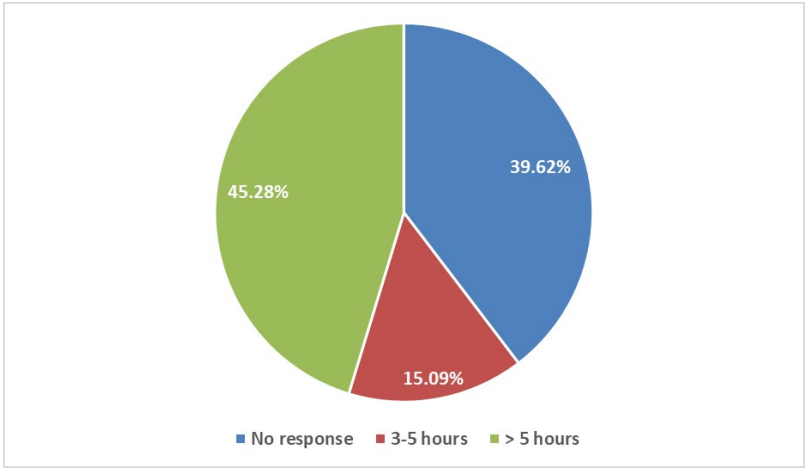

Figure 37. Time spent on Internet-related activities.

4.2.11 IT-related skills

The learners' competency in using a range of computer skills was evaluated with Likert scale items ranging from 0 to 4, where 0 = cannot use it, 1 = use to a small extent, 2 = use satisfactorily, 3 = use well and 4 = use very well. The results of the survey are shown in Figure 38 and can be summarised as follows:

1. More than 40% of the learners indicated being able to use presentation programs such as PowerPoint, spreadsheets, a word processor, email and search engines.
2. However, 26.4% of the learners indicated they cannot use a learning management system (LMS), and 38.4% cannot design a web page. Only 9.4% indicated they can use an LMS very well. This suggests that learners need more training in ICT skills in order to have better experience with TEL.

Table 25 Competency in ICT-related skills.

	No response	I can't use it	I can use it to a small extent	I can use it satisfactorily	I can use it well	I can use it very well
Word processor (e.g., Microsoft Word)	7.5%	13.2%	15.1%	7.5%	20.8%	35.8%
Spreadsheets (e.g., Microsoft Excel)	11.3%	13.2%	17.0%	9.4%	24.5%	24.5%
Presentation (e.g., Microsoft PowerPoint)	15.1%	7.5%	30.2%	0.0%	26.4%	20.8%
Email	7.5%	1.9%	20.8%	3.8%	30.2%	35.8%
Databases	17.0%	9.4%	26.4%	5.7%	30.2%	11.3%
Multimedia authoring	9.4%	17.0%	35.8%	7.5%	15.1%	15.1%
Graphic editing	11.3%	18.9%	32.1%	1.9%	18.9%	17.0%
Digital audio	13.2%	22.6%	18.9%	5.7%	18.9%	20.8%
Video editing	13.2%	17.0%	26.4%	11.3%	13.2%	18.9%
Webpage design	11.3%	35.8%	17.0%	7.5%	20.8%	7.5%
Learning Management System	18.9%	26.4%	17.0%	3.8%	24.5%	9.4%
Web 2.0 tools (Wikis, blogs, social networking)	17.0%	28.3%	15.1%	3.8%	18.9%	17.0%
Search engine	11.3%	18.9%	9.4%	3.8%	24.5%	32.1%

4.2.12 Use of social media

Social media is an integral part of the learners' daily life. It provides them with an easy way to engage and connect with others without meeting face-to-face. At NTI, 85.7% of the learners are on Facebook. The survey findings also revealed that 46.9% of the learners who responded to the survey use photo-sharing platforms, 22.4% use Twitter and 20.4% use research-sharing sites. Using the findings shown in Table 26, NTI can explore the social media platforms it should consider using to disseminate information about TEL.

Table 26. Social media platforms used by learners

Social media platform	Percentage of learners who use the platform
Facebook	85.7%
Photo-sharing site (Instagram/Flickr/Picasaweb, etc.)	46.9%
Twitter	22.4%
Research-sharing site (Academic.edu, Researchgate.net, etc.)	20.4%
Blog (using Blogger or WordPress or within institutional website/CMs)	14.3%
Slideshare or similar presentation platform	10.2%
Social bookmarking sites (Delicious, Scoop.it, Pinterest, etc.)	10.2%
Goodreads.com (for connecting with authors and readers) or similar	8.2%

Table 27 shows that 41.5% of the respondents update their social media account several times a day, while 26.4% update their account infrequently. This is reinforced by the data in Table 28, which show that 45.3% of the learners spend more than five hours daily on the Internet. NTI can use the learners' online presence to disseminate e-learning–related content.

Table 277. How frequently learners update their social media accounts

How frequently do you update your social media account?	No. of responses	Percentage
No response	4	7.5%
Several times a day	22	41.5%
Once a day	6	11.3%
Once a week	7	13.2%
Not very frequently	14	26.4%
Total	53	100.0%

Table 28. Time spent daily on social media

On average, how much time do you spend on social media daily?	No. of responses	Percentage
No response	20	37.7%
<1 hour	2	3.8%
1–2 hours	0	0.0%
3–5 hours	6	11.3%
>5 hours	24	45.3%
Do not use daily	1	1.9%

4.2.13 Membership of mailing lists and participation in online discussion forums

The learners were asked about their membership of mailing lists and participation in discussion forums. As Table 29 shows, 56.6% indicated that they are not members of any mailing lists, whereas 30.2% do belong to a mailing list. The responses to the subsequent subset of questions were not valid as 100% of the respondents answered all the questions despite only 30.2% having answered that they are members of any mailing list or discussion forum.

Table 28. Learners' membership of mailing lists and participation in online discussion forums

Are you a member of any mailing list or discussion forum?	No. of responses	Percentage
No response	7	13.2%
Yes	16	30.2%
No	30	56.6%
Total	53	100.0%

4.3 The TEL Environment

In this section, learners were asked to evaluate their experiences with a range of TEL-related resources, services and spaces. Their experiences were rated on a Likert scale, where 0 = no response, 1= poor, 2 = fair, 3 = neutral, 4 = good, and 5 = excellent.

The learners' experiences with TEL-related resources ranged from poor to not available (see Table 30), which suggests the need to improve and upgrade all the listed services to ensure that learners use them. NTI should actively incorporate the use of these critical resources in all departments in order to harness the benefits of TEL.

4.3.1 Learners' experience with online courses and MOOCs

Only 24.5% of the respondents had taken a massive open online course (MOOC) at the time of the survey, compared to 69.8% who had never attended an online course (see Table 31).

Table 291. Learners' experience with online courses

Have you ever taken an online course?	No. of responses	Percentage
No response	3	5.7%
Yes	13	24.5%
No	37	69.8%
Total	53	100.0%

When the learners were asked whether in the past year they had taken a MOOC through any institution, 24.5% did not respond, 35.8% indicated they did not know what a MOOC is, 28.5% knew what a MOOC is but had not taken one, 9.4% had attempted a MOOC but did not complete it and 1.9% had completed a MOOC (see Table 32). NTI needs to share information about MOOCs — preferably by mapping available MOOCs to courses offered at NTI — and actively encourage learners to take MOOCS to improve their learning experience.

Table 302. Learner enrolment in MOOCs

Have you taken a MOOC?	No. of responses	Percentage
No response	13	24.5%
No, and I do not know what a MOOC is	19	35.8%
No, but I do know what a MOOC is	15	28.3%
Yes, but I didn't complete it	5	9.4%
Yes, and I completed it	1	1.9%
Total	53	100.0%

Table 31. Resources, services and spaces provided to learners by NTI

Resources, services and spaces provided by NTI	No response	Poor	Fair	Neutral	Good	Excellent	Not available	Mean	Std dev.
E-classroom facilities (e.g., computers, projection systems)	7.5%	1.9%	17.0%	9.4%	32.1%	32.1%	0.0%	3.53	1.51
Computer labs (for practical work and Internet access)	7.5%	0.0%	5.7%	11.3%	26.4%	49.1%	0.0%	3.96	1.44
Email services (institutional)	5.7%	0.0%	17.0%	13.2%	22.6%	41.5%	0.0%	3.72	1.45
Learning management system (e.g., Moodle)	5.7%	9.4%	7.5%	17.0%	26.4%	28.3%	5.7%	3.57	1.61
E-portfolio	9.4%	11.3%	13.2%	28.3%	13.2%	18.9%	5.7%	3.04	1.70
Network bandwidth/speed of Internet (download and upload)	9.4%	0.0%	9.4%	15.1%	20.8%	43.4%	1.9%	3.75	1.59
Wi-Fi access	7.5%	0.0%	11.3%	13.2%	18.9%	45.3%	3.8%	3.87	1.56
Online or virtual technologies (e.g., network-based file storage system)	9.4%	7.5%	9.4%	24.5%	22.6%	20.8%	5.7%	3.28	1.67
Access to software (e.g., MATLAB, GIS applications, statistical software)	7.5%	7.5%	13.2%	15.1%	30.2%	18.9%	7.5%	3.40	1.66
Download and use of free/open source software for teaching and learning	7.5%	1.9%	13.2%	17.0%	26.4%	28.3%	5.7%	3.60	1.57
Support for maintenance and repair of ICT	7.5%	9.4%	13.2%	15.1%	18.9%	34.0%	1.9%	3.38	1.68
Access to data storage	7.5%	1.9%	20.8%	13.2%	20.8%	32.1%	3.8%	3.49	1.61
Data visualisation software	9.4%	3.8%	18.9%	22.6%	20.8%	17.0%	7.5%	3.23	1.66
Citation/reference management software	11.3%	5.7%	22.6%	26.4%	9.4%	17.0%	7.5%	2.98	1.73
Plagiarism detection software	7.5%	11.3%	17.0%	30.2%	13.2%	13.2%	7.5%	3.00	1.64
Institutional repository for sharing research	7.5%	11.3%	15.1%	13.2%	30.2%	15.1%	7.5%	3.23	1.69
E-journals	7.5%	9.4%	13.2%	24.5%	22.6%	15.1%	7.5%	3.21	1.65
E-books	11.3%	9.4%	15.1%	15.1%	30.2%	11.3%	7.5%	3.08	1.74
Citation databases	7.5%	9.4%	15.1%	20.8%	22.6%	17.0%	7.5%	3.23	1.67
Bibliographic databases	9.4%	11.3%	15.1%	20.8%	24.5%	11.3%	7.5%	3.04	1.70
E-newspapers	9.4%	13.2%	11.3%	22.6%	24.5%	11.3%	7.5%	3.04	1.71
E-theses and dissertations	13.2%	20.8%	20.8%	11.3%	13.2%	13.2%	7.5%	2.60	1.86
Patent databases	9.4%	11.3%	18.9%	24.5%	15.1%	13.2%	7.5%	2.94	1.70
E-proceedings of conferences	9.4%	13.2%	18.9%	18.9%	17.0%	15.1%	7.5%	2.96	1.75
Statistical databases	9.4%	7.5%	22.6%	7.5%	34.0%	11.3%	7.5%	3.13	1.70

4.4 Learners' Perceptions about the Use of Technology-Enabled Learning

The study also looked at the learners' perceptions about the use of TEL. The majority of the learners strongly agreed or agreed that using technology would increase efficiency in learning, provide motivation and ultimately improve their IT skills. In addition, they agreed that using technology would improve their career and employment prospects in the long term. None (0%) of the respondents disagreed that TEL would improve their career or employment prospects in the long term (see Table 33).

Table 33. Learners' perceptions about the benefits of TEL

	No response	Strongly agree	Agree	Neither agree nor disagree	Disagree	Strongly disagree
It will help me get better results in my subjects	7.5%	32.1%	58.5%	1.9%	0.0%	0.0%
It will help me understand the subject material more deeply	7.5%	35.8%	54.7%	0.0%	0.0%	1.9%
It makes completing work in my subjects more convenient	9.4%	28.3%	60.4%	1.9%	0.0%	0.0%
It motivates me to explore many topics I may not have seen before	7.5%	34.0%	54.7%	1.9%	1.9%	0.0%
It allows me to collaborate with others easily, both on and outside of the campus	7.5%	34.0%	56.6%	1.9%	0.0%	0.0%
It will improve my IT/information management skills in general	7.5%	41.5%	45.3%	1.9%	3.8%	0.0%
It will improve my career or employment prospects in the long term	7.5%	45.3%	41.5%	3.8%	0.0%	1.9%

4.4.1 Usefulness of technology for learners

The learners were asked to rate a range of technologies and tools in terms of level of use in their studies. The findings in Table 34 show that the learners indicated the technologies are useful or very useful in their learning process. NTI should leverage the learners' interests and the technologies they consider useful and implement them in TEL.

4.4.2. Learners' perceptions about using technology in education

In the last section of the survey, the learners were asked to indicate their level of agreement with statements about the usefulness of technology in education and their courses. For statements framed in positive terms, the responses were mostly positive, showing that the learners at NTI had positive perceptions about the use of technology in education. NTI should leverage those positive perceptions while putting in place mechanisms for TEL for improving student learning. When asked if they were more actively involved in courses that use technology, 64.2% agreed and 22.6% strongly agreed (see Table 35). This is an indication to NTI that using TEL would promote active learning. When asked if they were more likely to skip classes when lecture materials are available online, 56.6% of the respondents agreed, and 20.8% disagreed. This could be a result of the perception about everything being online, and indicates the need for the careful implementation of blended learning. The responses show that 71.7% of the learners feel adequately prepared to use the technology needed in their courses, and 69.8% and 58.5%, respectively, feel that technology makes them feel connected to other learners and instructors. About 83% of the learners indicated they wished instructors would use and integrate more technology in their teaching.

Table 324. Learners' perceptions about the usefulness of technologies to their studies

Technology/Application of technology	No response	Not at all useful	Useful to a limited extent	Neutral	Useful	Very useful	Do not know
Design and build Web pages as part of your course?	7.5%	3.8%	15.1%	24.5%	34.0%	15.1%	0.0%
Create and present multimedia shows as part of your course requirements (e.g., PowerPoint)?	7.5%	3.8%	13.2%	11.3%	32.1%	32.1%	0.0%
Create and present audio/video as part of your course requirements?	11.3%	3.8%	13.2%	11.3%	32.1%	28.3%	0.0%
Download or access online radio/video recordings of lectures you could not attend?	7.5%	5.7%	11.3%	5.7%	41.5%	28.3%	0.0%
Download or access online audio/video recordings to revise content of lecturers you have already been to?	7.5%	1.9%	11.3%	17.0%	35.8%	26.4%	0.0%
Download or access online audio/video recordings of supplementary content materials?	7.5%	1.9%	9.4%	15.1%	39.6%	26.4%	0.0%
Use the Web to access university-based services (e.g., enrolment, paying fees)?	9.4%	0.0%	13.2%	9.4%	39.6%	28.3%	0.0%
Use your mobile phone to access Web-based university services or information (e.g., enrolment, paying fees)?	7.5%	0.0%	9.4%	11.3%	35.8%	35.8%	0.0%
Use instant messaging/chat (e.g., Skype, Messenger, Hangout) on the Web to communicate/collaborate with other students in the course?	9.4%	0.0%	17.0%	7.5%	37.7%	28.3%	0.0%
Use a social media networking platform (e.g., Facebook) on the Web to communicate/collaborate with other students on the course?	7.5%	0.0%	11.3%	9.4%	37.7%	34.0%	0.0%
Use microblogging (e.g., Twitter) to share information about class-related activities?	7.5%	3.8%	11.3%	7.5%	45.3%	20.8%	3.8%
Keep your own blog as part of your course requirements?	7.5%	3.8%	11.3%	11.3%	35.8%	28.3%	1.9%
Use instant messaging/chat (e.g., Skype, Messenger, Hangout) on the Web to communicate with teachers and administrative staff from the course?	7.5%	1.9%	11.3%	7.5%	45.3%	26.4%	0.0%
Contribute to another blog as part of your course requirements?	7.5%	3.8%	9.4%	11.3%	37.7%	26.4%	3.8%
Use the Web to share digital flies related to your course (e.g., photos, audio files, movies, digital documents, websites)?	9.4%	1.9%	9.4%	9.4%	39.6%	30.2%	0.0%
Use Web-conferencing or video chat to communicate/collaborate with other students in the course?	7.5%	1.9%	11.3%	9.4%	41.5%	26.4%	1.9%
Receive alerts about course information (e.g., timetable changes, the release of new learning resources, changes in assessment) via RSS feeds on the Web?	7.5%	1.9%	7.5%	13.2%	41.5%	26.4%	1.9%
Receive alerts about course information (e.g., timetable changes, the release of new learning resources, changes in assessment) via text message on your mobile phone?	7.5%	0.0%	9.4%	11.3%	45.3%	26.4%	0.0%
Contribute with other students to the development of a wiki as part of your course requirement?	11.3%	0.0%	7.5%	11.3%	32.1%	35.8%	1.9%
Receive grades/marks from your lecturer via text message on your mobile phone?	7.5%	1.9%	7.5%	7.5%	50.9%	24.5%	0.0%
Receive pre-class discussion questions from your lecturer via text message on your mobile phone?	7.5%	0.0%	9.4%	5.7%	45.3%	30.2%	1.9%
Use a personal dashboard on the university intranet to access all your academic information related to courses, grades, etc.?	9.4%	0.0%	13.2%	5.7%	43.4%	24.5%	3.8%
Use an e-portfolio system to record your achievements for future use beyond the course of your studies?	7.5%	1.9%	9.4%	13.2%	45.3%	18.9%	3.8%

Table 35. Learners' perceptions about the use of technology in education

	Strongly agree	Agree	Neither agree nor disagree	Disagree
I get more actively involved in courses that use technology.	22.6%	64.2%	1.9%	3.8%
I am more likely to skip classes when materials from course lectures are available online.	3.8%	56.6%	3.8%	20.8%
When I entered college, I was adequately prepared to use the technology needed in my courses.	11.3%	71.7%	0.0%	7.5%
Technology makes me feel connected to other students.	20.8%	69.8%	0.0%	1.9%
Technology makes me feel connected to teachers.	22.6%	58.5%	3.8%	7.5%
Technology interferes with my ability to concentrate and think deeply about subjects I care about.	24.5%	43.4%	11.3%	11.3%
I am concerned that technology advances may increasingly invade my privacy.	13.2%	56.6%	9.4%	9.4%
I am concerned about cyber security (password protection and hacking).	15.1%	67.9%	1.9%	5.7%
In-class use of mobile devices is distracting to my teacher.	11.3%	56.6%	9.4%	13.2%
Use of tablets/laptops in class improves my engagement with the content and class.	20.8%	56.6%	5.7%	5.7%
Multitasking with my technology devices sometimes prevents me from concentrating on or doing the work that is most important.	24.5%	37.7%	7.5%	17.0%
When it comes to social media (e.g., Facebook, Twitter, LinkedIn), I like to keep my academic life and social life separate.	17.0%	64.2%	1.9%	9.4%
I wish my teachers in the university would use and integrate more technology in their teaching.	41.5%	41.5%	1.9%	7.5%
Technology makes me feel connected to what's going on at the college/university.	34.0%	54.7%	1.9%	1.9%

4.5 Open-Ended Responses

The learners were given an opportunity to give comments guided by the statement "There is a need to improve the technology-enabled learning environment at your institution."
The majority of the learners agreed with this statement and made additional remarks as summarised below:

- **Internet access:** The learners indicated that the bandwidth should be increased in the institution.
- **Computer access:** Some learners indicated more desktop computers are needed in non-ICT classes for learners to use.
- **Facility expansion:** Learners indicated that with improved TEL, the NTI facility should be improved to facilitate research and online classes and provide flexibility to those doing part-time classes. Part-time learners who have difficulty attending physical classes would have an easier time with TEL. Learners also indicated that improvements in TEL at NTI would lead to improved learning.
- **Online jobs:** Some learners indicated that TEL would increase their opportunities to do online jobs.

4.6 Summary

1. Learners want high-speed Wi-Fi access.
2. More OER should be developed for learners and distributed through a common platform.
3. Learners are generally positive about the use of technology for teaching and learning, and they look forward to the innovative use of ICT tools to improve their learning experiences at NTI.

Chapter 5: Key Findings, Conclusions and Recommendations

5.1 Key Findings

5.1.1 NTI preparedness for TEL

1. NTI has the basic infrastructure to support technology-enabled learning (TEL) and has been conducting regular training on TEL to instructors.
2. NTI had a total score of 103 on institutional preparedness. A score of 103 represents Developing Preparedness. The institution has put in place some aspects of a TEL system, policies and infrastructure, and is in the process of developing a robust system. The evaluation falls within the range of 95–129 as indicated in the *Technology-Enabled Learning Implementation Handbook* (Kirkwood & Price, 2016, p. 88).
3. The institution provides Internet access to both instructors and learners.

5.1.2 Instructors

1. The majority of the instructors are young (aged between 21 and 35) and have a bachelor's degree as their highest qualification.
2. Only a few instructors own laptops or desktops and the majority rely on their smartphones to access the Internet on campus.
3. The instructors' use of technology for teaching is very basic, as demonstrated by the predominant use of projectors and PowerPoint presentations.
4. The instructors are active on social media platforms.
5. The instructors' experience of the ICT resources, services and spaces is average.
6. Twelve instructors (63.16%) facilitate classes predominantly via traditional face-to-face methods.
7. Most of the instructors are aware of OER but they rarely create or share content.
8. The majority of the instructors have adequate skills in integrating technologies, despite the fact that they still use traditional face-to-face teaching approaches. A majority have been trained on the use of ICT for teaching and learning.
9. The instructors have positive attitudes towards the use of TEL.
10. Instructors at NTI are motivated in terms of TEL implementation at NTI.
11. Instructors see faculty workload, lack of training on TEL and lack of time to develop e-courses as barriers to the use of TEL at NTI.

5.1.3 Learners

1. A number of the learners attend face-to-face classes/experience traditional modes of education delivery.
2. A significant percentage of the learners have a smartphone.
3. A significant number of learners at NTI access the Internet on campus and only a few (1.2%) do not access the Internet at all.
4. The learners are very active on social media and many update their social media status several times a day. This indicates that they have basic skills in using devices to access or share resources online; these skills are transferrable to TEL.
5. Learners' satisfaction with the resources provided by NTI is average.

6. Learners have a positive perception about the use of TEL.
7. Learners strongly agreed and agreed that using technology would increase efficiency in learning, provide motivation and ultimately improve their IT skills and career and employment prospects.
8. A large proportion of learners at NTI consider technologies as useful or very useful in their studies.
9. All the learners agreed that there is a need to improve the TEL environment at NTI.

5.2 Conclusion

5.2.1 NTI's TEL environment

NTI has the potential to effectively and efficiently roll out TEL given its conducive environment which includes instructors who have a positive attitude towards and high self-efficacy in the use of technology in teaching and learning.

5.2.2 Learners

1. Smartphones are the most popular devices among the learners. This could be due to their affordability and portability.
2. The majority of learners spend more than five hours on Internet-related activities every day. These hours could be used for educational purposes if course material were available online.
3. The two most popular social media platforms with learners are Facebook and photo-sharing sites. These platforms could be used for educational purposes if course material were available online.

5.2.3 Instructors

1. In terms of the use of ICT disaggregated by gender, more male instructors integrate ICT into their teaching compared to female instructors at NTI.
2. Smartphones are the most popular devices for accessing the Internet; the same trend was observed among the learners. This could be because of their affordability and portability.
3. The two most popular social media platforms with instructors are, in order of preference, Facebook and Twitter. These platforms could be used for educational purposes if instructors developed course material for online teaching.
4. There is a need to sensitise instructors on the value of MOOCs for continuous professional development.
5. The majority of the instructors have a low comfort level with computer-related activities such as using spreadsheets and databases.

5.3 Recommendations

5.3.1 Policies

NTI should develop robust policies to support TEL implementation at NTI.

5.3.2 Learning management systems

Instructors should be trained on developing e-courses and using learning management systems to provide learners with quality blended learning options.

5.3.3 Open educational resources

Instructors should be trained on using OER and should build a repository to share knowledge resources created by the instructors at NTI.

5.3.4 Training

Instructors and learners need training and support in the use of advanced technologies so as to improve learning outcomes through participation, collaboration and information-sharing.

5.3.5 MOOCs

NTI should actively encourage its instructors and learners to use MOOCs for continuous professional development and lifelong learning and to maintain currency in the TVET sector. In addition, NTI should start offering MOOCs in some of the areas of its expertise to increase its enrolment, improve its sustainability and improve institutional visibility.

5.3.6 Infrastructure

Given that the majority of instructors and learners access the Internet on campus, NTI should improve its bandwidth. In addition, it should procure more devices that learners can use to improve the computer to learner ratio.

References

Kirkwood, A., & Price, L. (2016). *Technology-enabled learning implementation handbook*. Commonwealth of Learning. http://oasis.col.org/handle/11599/2363

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