



COMMONWEALTH *of* LEARNING

Report on the Baseline Study of Technology-Enabled Learning at the University of Papua New Guinea



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Foreword

The technology-enabled learning (TEL) initiative at the University of Papua New Guinea (UPNG) is supported by the Commonwealth of Learning (COL). Under a partnership agreement, COL supported UPNG in undertaking a systemic approach to ensure that TEL is integrated as an institutional activity through research, consultation, capacity building, and monitoring and evaluation. A baseline survey of the stakeholders was conducted as an essential part of the TEL initiative.

The UPNG TEL initiative is the first of its kind in the country. TEL brings exciting opportunities for UPNG. It is a privilege to be engaged in such a project and involved in the implementation of this TEL initiative. It is the way forward now and for the future. As UPNG moves out of traditional pedagogies and into emerging open, flexible learning pedagogies with TEL strategies, contextual challenges are evident. These challenges include being receptive to current traditional practices of learning creatively, and pursuing innovations through a culture of change. TEL has to be our passion and the way forward in the 21st century in UPNG's higher education space. It promotes relevance and meaningful alignment with the changing landscape of practices in the modern work environment.

The TEL policy for UPNG will serve as a framework for all academic activities in the university in the areas of teaching and learning within a blended learning model. The core TEL team or emerging "Technology Committee" is elated that we are already into the first phase of the project. We have established a core UPNG TEL team from all the schools, which has the support of UPNG management. TEL enthusiasts are excited and are willing to learn and teach with user-friendly technology tools. By undertaking this TEL initiative, UPNG becomes a member of a global TEL community of practice (CoP) and practitioners, some of whom met in December 2018 in New Delhi. UPNG can potentially lead in the creation of a PNG TEL CoP that might also become a member of a regional Pacific or Oceania CoP.

This baseline survey was conducted during the last quarter of 2018 and the early months of 2019. The findings of the study were presented at the TEL policy development workshop in March 2019.

We are indebted to the valuable contributions of Dr Sanjaya Mishra, whose passionate vision is for TEL strategies that enable greater partnerships, policy crafting, an appreciation of open-source culture, capacity building for technology integration, and the rethinking of models/frameworks to improve current practices. This initiative paves the way forward and sets an example for other universities and institutions of higher learning in PNG to follow.

Dr Janet Bulumaris Rangou
UPNG TEL Team

Executive Summary

This baseline survey report offers insights about the perceptions, practices and enabling environment of technology-enabled learning (TEL) at UPNG, including the requisite knowledge, skills, and conceptual and contextual realities. It arises from a survey that was made available online as well as offline for participants with limited access to reliable Internet connectivity. The report addresses the current level of literacy and other abilities at UPNG in relation to the competencies, skills and knowledge required in 21st-century higher education spaces. The purpose of the report is to highlight the need to adopt affordable and appropriate technologies so UPNG can improve learning outcomes through updating its institutional approach. The three objectives of the baseline survey were:

1. to establish an understanding of the contextual realities of TEL at UPNG by analysing teachers' and students' perceptions about the use and/or readiness of information and communication technologies (ICT) for teaching and learning
2. to complete an institutional Policy Review and Infrastructure Audit (PRIA) on technologies used for learning
3. to compile a report that will inform TEL policy and activities at UPNG

The contextual realities in Papua New Guinea were taken into account with respect to the opportunities, limitations and pertaining challenges. These are highlighted in this report.

The general perspective is that learners are eager to learn how to use TEL strategies. The readiness of teachers/academics varies, so there is need for receptiveness, nurturing and capacity building around teaching and learning in a digital age. This baseline survey has also revealed the need for institutional or systemic scaling up of TEL policy, resources and infrastructure if UPNG is to embrace the digital readiness of its learners and academics.

Four recommendations arise from this report, in the areas of policy development, technology and infrastructure improvement, capacity building for TEL, and preparation of students to leverage the affordances of available ICT. These are presented in the report's concluding section.

Acronyms

COL	Commonwealth of Learning
CoP	community of practice
ICT	information and communication technologies
LMS	learning management system
MOOC	massive online open course
OER	open educational resources
OERu	Open Educational Resources Universitas
PRIA	Policy Review and Infrastructure Audit
SBPP	School of Business and Public Policy
SHSS	School of Humanities and Social Sciences
SMHS	School of Medicine and Health Sciences
SNPS	School of Natural and Physical Sciences
SOL	School of Law
TEL	technology-enabled learning
UPNGOC	University of Papua New Guinea Open College

1.0 Introduction

The implementation of the technology-enabled learning (TEL) project at the University of Papua New Guinea (UPNG) is supported by the Commonwealth of Learning (COL). Recognising the significance of TEL within UPNG's strategic plan, the university through UPNG Open College (UPNGOC) approached COL to enter into a partnership agreement and assist with the institutionalisation of TEL through a systematic process of research, consultation, capacity building, and monitoring and evaluation. A baseline survey of the stakeholders was conducted as an essential part of the TEL initiative. This reports presents the findings of the baseline survey.

1.1 Research Purpose

The purpose of the TEL baseline survey is to support the adoption and implementation of appropriate policies and strategies for TEL. The TEL project aims to improve the quality of learning outcomes and foster innovation by undertaking a systemic approach to extend TEL throughout the university.

1.2 Objectives

The main objectives of the TEL baseline survey were to:

- establish insights into the contextual realities of TEL at UPNG by analysing teachers' and students' perception about the use and/or readiness of information and communication technologies (ICT) for teaching and learning
- complete an institutional Policy Review and Infrastructure Audit (PRIA) on technologies used for learning
- compile the present report to inform TEL policy and activities at UPNG

2.0 Methodology

2.1 Research Instruments

Three survey questionnaires were used for data collection, as supplied by COL (Kirkwood & Price, 2016): institutional, faculty and learner. These were posted online on Survey Monkey with the intention that participants were to complete them if and when they had Internet access. Questionnaires were also printed and distributed to those students and staff who had no or limited Internet access; their responses were then entered online by research assistants.

2.2 Data Samples

For data collection and sample size determination, we followed the advice of Krejcie and Morgan (1970). Details of the population and sample for the learner and faculty surveys are given in Table 1.

Table 1. Populations and samples for learner and faculty surveys

Surveys	Population	Responses	Percentage	Recommended by Krejcie and Morgan (1970)
Learner survey	3370	322	9.5	341–346
Faculty survey	300	119	39.6	169

2.3 Limitations and Challenges

This baseline survey had limitations and posed challenges in the areas of timing, sample sizes and contextual relevance of the survey questions.

- The initial schedule could not be followed. The original time frame for data collection was September–October 2018, but this was the end of the semester, so students were already writing exams and then leaving for holidays.
- Although the TEL survey was a university-wide project, it was a challenge to gain cooperation from different stakeholders to administer the survey questionnaires. Not all staff and students were willing participants in the data collection. With UPNGOC taking the lead in pursuing the TEL initiative, UPNG-wide advocacy should have been done, with directives from university management as to where the TEL project should be housed. Some academics did not see the significance of TEL, so participating in the survey was not a priority for them.
- There were initial efforts to contextualise the questionnaires, as some aspects needed to be reframed to capture local realities. For example, in the faculty survey, the options for positions had titles not used at UPNG, such as Senior Lecturer and Associate Professor.

Some items in the questionnaire did not provide options suitable for the different schools and programmes, such as UPNGOC certificate programmes.

- The online and printed questionnaire were not identical.
- In the context of PNG, learners' backgrounds would have very interesting to capture in terms of places of origin (rural or urban), prior access to technology, whether they live in residence or off campus, and their means and degree of access to technology.
- The learner and faculty sample sizes were not quite sufficient to be representative of the populations. This was in part due to limitations on Internet access, willingness to participate, readiness to embrace the notion of TEL, and lack of motivation to participate in the survey.
- Varying levels of uncertainty surrounding leadership and management affected the good intentions of the TEL initiative. Stability in leadership and management are essential ingredients to successful implementations of a project involving international partnership agreements.
- Readiness to adopt technology differed among the different schools. There was evidence of humble pockets of innovation in some schools, such as the School of Medical Health Sciences, the School of Natural and Physical Sciences, and UPNGOC, where the Moodle learning management system (LMS) is already used to some extent.

The current challenge is to build an integrated mind set and system for using technology in teaching and learning.

3.0 TEL at UPNG

UPNG is the oldest university in Papua New Guinea. Established in 1965, it is a thriving state-owned establishment that has graduated Papua New Guineans since its establishment and continues to do so today, 54 years later. The university website is www.upng.ac.pg. UPNG is a dual-mode university, offering programmes and courses in the campus-based face-to-face mode and via an open, flexible, distance mode. Its student population is approximately 17,000, with 5,000 enrolled in the conventional face-to-face mode of delivery and 12,000 enrolled through the UPNGOC. Its staff consists of about 300 academics and 600 non-academic and technical staff.

UPNG consists of six schools: the School of Business and Public Policy (SBPP), the School of Humanities and Social Sciences (SHSS), the School of Natural and Physical Sciences (SNPS), the School of Law (SOL), the School of Medicine and Health Sciences (SMHS) and the Open College. The university is situated on two main campuses. The main campus, Waigani, is comprised of the Central Admission Offices, SBPP, SHSS, SNPS, SOL and UPNGOC. The Taurama campus hosts SMHS.

UPNG offers undergraduate, post-graduate and PhD programmes through its six schools and their respective faculties. The Open College offers certificate, diploma and degree programmes through a network of campuses throughout the country in 22 provinces; there are currently five open campuses, 17 university centres and three franchise centres. TEL integration is highly needed to respond to current trends in higher education.

As part of the baseline study, an institutional review of the technology at UPNG was carried out. The university has about 600 desktops, no tablets, and 154 laptops available for staff and students. It provides broadband connectivity at all the schools on both campuses, for officials, teachers and learners, as well as researchers upon request. Internet access is provided in classrooms, the library, faculty rooms, laboratories, seminar halls and open areas. Unfortunately, the Internet is not accessible in the halls of residence. Broadband connectivity is provided through a government-supported Internet service provider. The current level of Internet bandwidth available in the university is 50 Gbps. This is expected to increase soon.

The university provides limited Wi-Fi access on campus. Access control restricts access to and downloading of some online content (such as large videos, adult content, and social media).

The university does not maintain an official profile on social media platforms such as Facebook and YouTube. That said, a few of the schools and academics use Facebook, WhatsApp and Google Classroom to stay connected with their learners. These cohorts of technology enthusiasts are TEL champions who need encouragement by way of the university showcasing their projects.

Some of the specific areas of UPNG's technological infrastructure are highlighted below.

- **e-Classrooms**

UPNG has approximately five e-classroom facilities. These are limited to an LCD projector fitted with a desktop computer in the main lecture theatres, some SMART boards, and a public address system.

- **Educational e-content creation**

UPNG has an educational e-content production unit or multimedia studio at UPNGOC that produces and disseminates audio lessons. The studio has produced videos for an MBA programme offered by SBPP and is ambitiously producing more video lectures for its flexible, open and distance learners. This audiovisual studio was refurbished in 2018 with the intention of producing at least ten lecture videos for each course offered via the flexible, open and distance mode. In the flexible, open and distance learning space, the videos complement the printed materials and face-to-face academic counselling and mentoring offered by the open campuses and study centres.

Only two audio lessons and three video lessons were produced for certificate-level programmes last year, by UPNGOC. The university produced no multimedia or online content in 2017. UPNG has not produced any online courses. This is not to discount the efforts of some schools — SMHS and SNPS — and staff to use Moodle within their local area networks. Schools are being encouraged to produce e-content to complement their current printed courses.

- **Open educational resources**

The concept of open educational resources (OER) is new to UPNG. As an institution it has yet to participate in creating any e-content or an audiovisual repository/content-sharing platform for disseminating its educational services, learning resources and courses. However, there are schools and divisional efforts to embrace OER in the university. Examples include UPNGOC's use of OER from COL. In addition, a partnership agreement with the Open Educational Resources Universitas (OERu) is being negotiated through UPNGOC for greater realisation and implementation of OER initiatives. The Physics Division within SNPS has also adopted an OER course from OpenStax, which they are currently using in their physics foundation-year courses.

- **Library**

The UPNG library has access to e-journals, e-books, citation databases, bibliographic databases, e-theses and e-dissertations. The library has recently upgraded its services to an online platform, which is now accessible for those registered with the library.

- **Training in TEL**

Training in TEL is very minimal and is done as and when required. No training was conducted in 2018. In 2017, five staff from UPNGOC were trained in the use of technology for teaching and learning. However, with the ongoing discourse on digital education and resources, there is now a general sense of interest in fostering training, seminars and workshops on digital literacy and fluency.

With the Moodle LMS soon to be available, capacity-building efforts are vital, and open, frequent communication strategies must be fostered to effectively manage and sustain the use of Moodle and the delivery of online courses to UPNG learners.

- **Policy issues for TEL**

A TEL strategy needs to be visible, so a policy for ICT use in teaching and learning at UPNG is under development, specifying what technologies to use and not use for teaching and learning. The following are also needed:

- a privacy and data protection policy
- a plagiarism policy
- an OER policy

There is no system in place for the use of open-source software at UPNG. There is, however, a workflow and escalation procedure for the repair and maintenance of ICT.

In summary, there is a need to approach the learning environment at UPNG from the perspective of policy, technology, staff capacity building, and an implementation strategy for creating an optimal TEL environment. According to the PNG National Standards for Higher Education Institutional Registration (Department of Higher Education, Research, Science and Technology, 2016), a higher education institution must have plans, budgets, and resources for staff and learners, such as computers:

An institution need to have relevant software; every staff member should have a computer and an institutional email account; and reliable internet access should be available at a speed of not less than 5mbps. The campus should plan for an integrated IT system, adequate servers and, if possible, wireless access in selected spaces. (p. 9)

In UPNG’s case, computer laboratories must be available for use by staff and students as well as to provide training in computer literacy for greater fluency with technology that affords learning. Internet connectivity is essential, along with constructivist approaches to the digital creation of learning resources, the creation of OER, the establishment of an OER digital space for quality learning resources, and of course, leadership to champion all of these initiatives.

3.1 Preparedness for TEL

Table 2 shows UPNG’s institutional preparedness scores in ten dimensions.

Table 2. Institutional preparedness for TEL at UPNG

Areas	Score (1–5)
Policy	
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 TEL are well understood across the organisation.	1

Areas	Score (1–5)
There is a commitment on the part of institutional leaders to use technology to achieve strategic academic goals.	2
Strategic plan	
There is a strategic plan for the implementation of TEL.	4
The strategic plan for TEL has measurable goals and outcomes.	4
The strategic plan for TEL is approved by the senior management of the organisation and is supported by adequate financial provisions.	1
IT support department	
The organisation has an IT department that handles the procurement, installation and maintenance of technologies for teaching and learning.	4
There is an ICT policy in place, which is implemented by a high-powered committee in the organisation.	3
The head of the IT support department reports to senior management and is responsible for the overall functioning of technology in the organisation.	4
The head of the IT support department is well qualified and up to date in order to manage the technological requirements of the organisation	4
Technology	
There is adequate hardware infrastructure for teaching and learning (e.g., access to computers for students and other learners).	2
There are adequate applications and software for teaching and learning (e.g., access to appropriate software, intranet, learning management system, etc.).	3
There is adequate networking infrastructure in the organisation (e.g., access to adequate bandwidth).	4
There are adequate policies and procedures in place to protect privacy and organisational data.	4
Content	
There is support available for the creation of digital multimedia content in the organisation (e.g., production of e-courses, audio and video materials, animation, etc.).	3
There are instructional designers in the organisation, or faculty members are trained to organise learning content appropriately.	4
Teachers have adequate access to the online system to develop courses for TEL.	4
Documentation	
There is a variety of support to help teachers and students use technology effectively.	3
Lessons learned in the implementation of TEL are stored and shared within the organisation for others to access and learn from.	4
The workflow processes and responsibilities to implement TEL are well documented in the organisation.	1
Organisational culture	
Faculty and staff members are willing to learn about new technology in the organisation.	1
Faculty and staff members support each other easily.	1
There is a culture of knowledge creation and sharing in the organisation.	1
Leadership	
Leaders in the organisation are involved in implementing TEL.	2
Senior management in the organisation regularly review, monitor and evaluate the progress of TEL.	1
The top leadership of the organisation is supportive of TEL and provides encouragement and motivation to the faculty and staff to achieve academic goals.	1
Human resources and training	
Faculty members are qualified and trained to use technology for teaching and learning.	1

Areas	Score (1–5)
Faculty and staff members receive regular training to update them in the use of TEL.	1
There are adequate staff to support TEL.	3
The organisation has a structure in place to create teams for content development and the delivery of TEL.	1
Faculty members trust the support received from instructional designers and technology support staff while developing and delivering courses.	4
The IT staff members are highly skilled and trained to provide the needed support.	3
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.	4
Total	95

a. Policy

The university lacks a well-documented TEL policy. However, its leadership is committed to using technology appropriately to provide access to quality education.

b. Strategic plan

UPNG has no strategic plan for the specific implementation of TEL. The baseline survey and resulting TEL policy will link to the UPNG Strategic Plan 2017–2032. This will then be translated into a Strategic Plan of Activities pertaining to the implementation of the policy document.

c. IT support department

The university has an IT department that handles the procurement, installation and maintenance of technologies for teaching and learning. However, responsibility for ICT is quite fragmented, with different schools handling their own procurement. Such a practice results in duplication of IT roles. A university ICT policy is yet to be developed, and there is no evidence of a high-power committee in place for its implementation. There is a University Planning and Resources Committee. The IT Director is well qualified and reports directly to the senior management of the university on matters relating to ICT. The IT support department's leadership is thriving and has the potential for development in areas such as adaptive, strategic and transformational leadership styles to drive change for the better use of technology.

d. Technology

The university currently lacks an appropriate and adequate hardware infrastructure for integrating technology in teaching and learning. Learners have limited access to computers. Adequate software and other applications for teaching and learning are lacking. That said, the university provides access to appropriate limited software, it has an intranet, and the Moodle

LMS is in place but has yet to be integrated and used for online courses. There is a fragmented approach to using Moodle in the university's various schools and divisions.

e. Content

There is support available for the creation of digital multimedia content. However, the university presently focuses on the production of courses for the print mode and has yet to embark on e-courses. There is evidence of audio, video and animation materials. Within its multimedia unit, UPNGOC has a programmes and production team that includes instructional designers and an audiovisual officer. The multimedia unit has a multimedia studio, a Moodle server and an audiovisual officer, and there are established but currently vacant positions for a learning management officer and a graphic designer. There is also support available for the creation of digital multimedia content in the organisation (e.g., the production of e-courses, audio and video materials, animation, etc.) in some of the schools, including UPNGOC. With the current absence of a graphic designer, graphic works are outsourced locally and overseas.

f. Documentation

The workflow processes and responsibilities for implementing TEL are not well documented. There is a need for properly documented training manuals and capacity-building training programmes to support teachers and learners in using technology effectively.

g. Organisational culture

UPNG is in need of a vibrant organisational culture with the persistence and drive to sustain its vision, values and mission. For UPNG to be innovative and creative in the 21st century, an attitude supportive of change, adaptation and transformation is needed to foster an organisational culture of care, dedication and passion. There is evidence that schools and staff members are willing to bring new technology into the university. When a culture of knowledge creation and sharing is promoted in the university, there will be excitement about embracing TEL; currently, this is not evident.

h. Leadership

Leaders in the university speak about technology but are not really involved in the implementation of TEL. At the time of the baseline study, it was not evident that senior management regularly reviewed, monitored and evaluated the progress of TEL in the university. The university's top leadership is supportive of TEL and provides encouragement and motivation to faculty and staff to achieve their academic goals, but more engagement is needed.

i. Human resources and training

Faculty have not received much training in how to use technology for teaching and learning. They need to receive regular training to build their capacity in the use of TEL. The university does not have a structure in place to create teams for content development and TEL delivery. Instructional designers and IT staff need capacity-building training to provide staff with effective

support in developing and delivering TEL courses. IT staff therefore need to be highly skilled and trained to provide the necessary support. TEL champions

The university has some early adopters of TEL, who support and care about pedagogical innovations for teaching and learning. These faculty members in SNPS, SHSS, SMHS and UPNGOC are TEL champions. There are also faculty members who can take leadership roles in developing appropriate policies and a TEL strategy for the organisation. The TEL champions in the various schools need capacity building and motivation to research the advocacy and dissemination of good practice through TEL. If adequately encouraged, these faculty can be role-model practitioners of blended learning through the use of TEL options.

3.2 Summary

UPNG's overall score in institutional preparedness stands at 95, which is borderline between "developing preparedness" and "limited preparedness." This means UPNG has much to do to integrate TEL in teaching and learning. It also emphasises that UPNG has put in place some of the aspects of an effective TEL system — some policies and infrastructure — and is in the process of developing a robust system. The willingness to partner with COL to systematically implement TEL is one aspect of this process. The institutional technology review also revealed that UPNG needs to strengthen the existing infrastructure to successfully implement TEL. One requirement is to host a centralised service for an LMS (e.g., Moodle) to enable all faculty to create blended courses for their students. Developing a TEL policy will pave the way for strengthening the university's infrastructure by providing mechanisms within UPNG to coordinate activities for TEL implementation.

4.0 Faculty Use of Technology at UPNG

4.1 Demographic Profiles of Teachers

Academics were recruited on a voluntary basis from all schools, including UPNGOC. Despite every effort, only 119 responses were received from the university's ~300 teachers, giving a response rate of 39.6%.

Of the academics who responded, 45.95% were female and 54.05% were male (Table 3). The responses from female and male academics were almost the same.

The age ranges of the respondents offer interesting insights: 24.78% were aged 46–50, followed by 18.58% in the 51–55 range and 14.16% in the 41–45 range (Table 3).

Table 3. Demographic profile of teacher respondents at UPNG

Demographic Feature	Frequency	Percentage
Gender (n = 111)		
Male	60	54.05%
Female	51	45.95%
Age group (n = 113)		
21–25	1	0.88%
26–30	5	4.42%
31–35	9	7.96%
36–40	15	13.27%
41–45	16	14.16%
46–50	28	24.78%
51–55	21	18.58%
56–60	8	7.08%
61–65	6	5.31%
66–70	4	3.54%
Job level (n = 108)		
Professor	10	9.26%
Assistant professor	2	1.85%
Lecturer	66	61.11%
Senior tutor	11	10.19%
Tutor	15	13.89%
Teaching fellow	4	3.70%
Highest qualification (n = 110)		
PhD	19	17.27%
MPhil or MTech	6	5.45%
Master's	51	46.36%
Undergraduate	17	15.45%
Honours	7	6.36%
Graduate diploma	10	9.09%
Primary role (n = 104)		
Undergraduate teaching	88	84.62%
Graduate or postgraduate teaching	13	12.50%
Doctoral research	3	2.88%

It is interesting to note that only about 25% of the respondents were under 40, which indicates that UPNG may have an older academic population. In terms of their job level, 61.11% respondents were lecturers, followed by 13.89% tutors and 10.19% senior tutors. Only 9.26% were professors. There are not many professors at UPNG, and capacity building beyond the lecturer level could be an area for professional development. The advantage, though, is that TEL appreciation and implementation maybe linked to a grassroots strategy or approach, whereby lecturers and tutors can drive the paradigm and shift teaching practices towards TEL.

The majority of the academics (46.36%) had a master’s degree, followed by 17.27% with a doctoral degree in their discipline (Table 3); 84.62% were involved in undergraduate-level teaching, followed by 12.5% in postgraduate-level teaching.

Figure 1 shows that 28.97% of the respondents had less than five years of experience, followed by 19.63% with six to ten years and 15.89% with 11 to 15 years. On average, the respondents’ average length of experience was about 14 years.

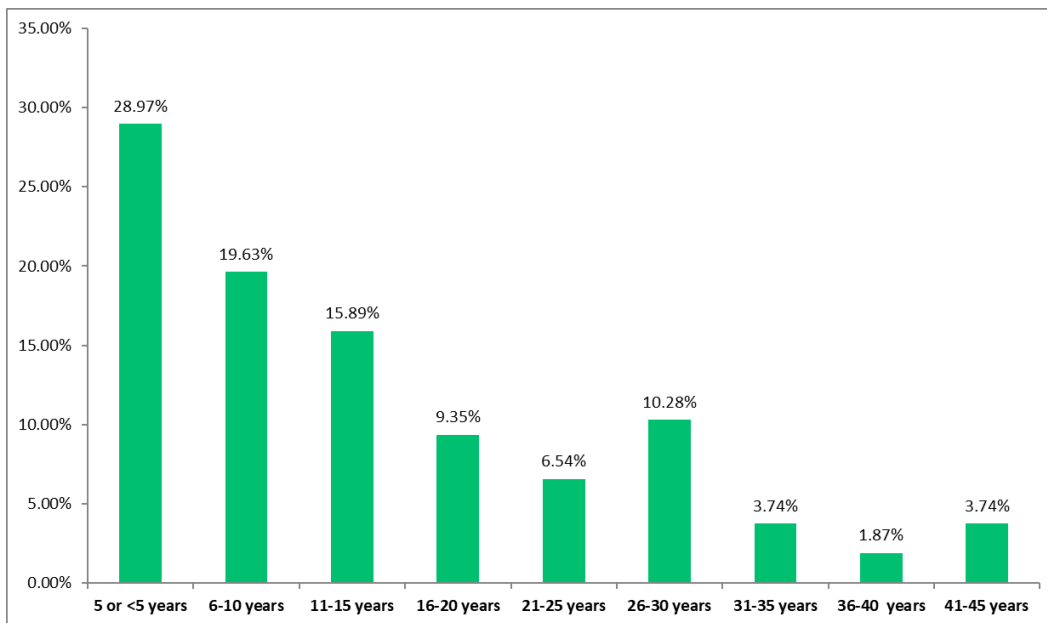


Figure 1. Teaching experience

All six schools are represented in the survey (Figure 2). SHSS provided 39.45% of the responses, followed by SNPS (33.94%), then the Open College (11.01%).

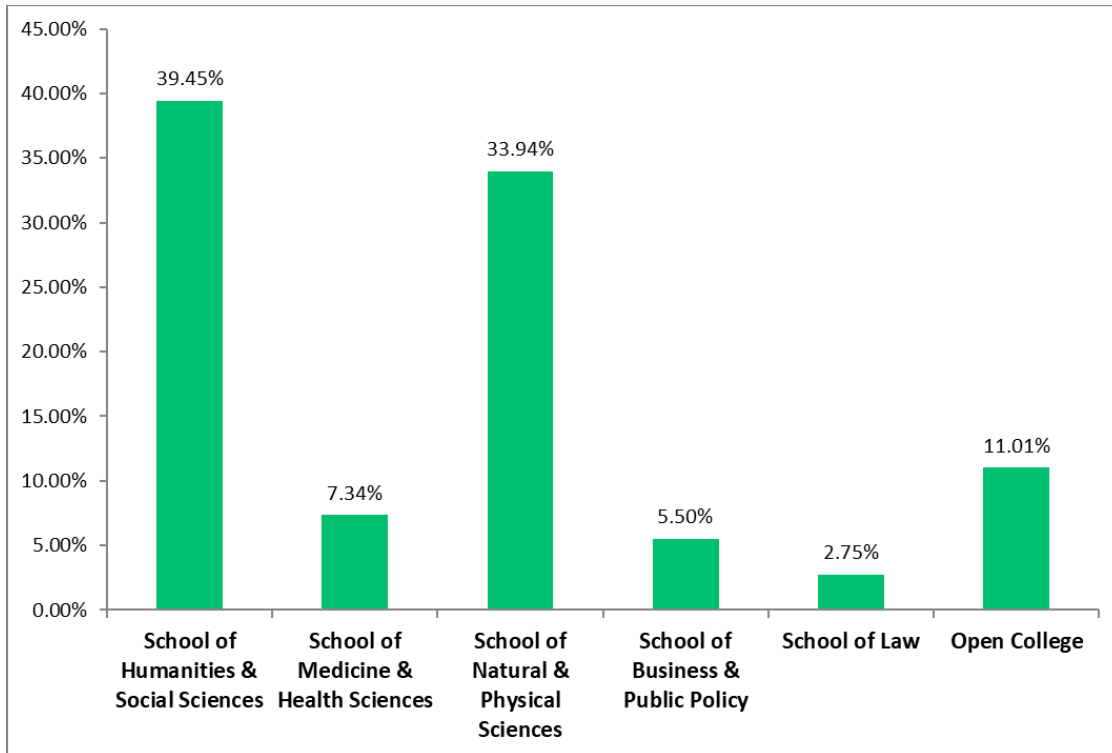


Figure 2. Where respondents taught

4.2 Access to and Availability of Technology

This section discusses data on the availability of and access to various ICT devices and facilities on campus and off campus. This included teachers' ownership of devices, Internet access, and what devices they used to access the Internet.

Devices Owned by Teachers

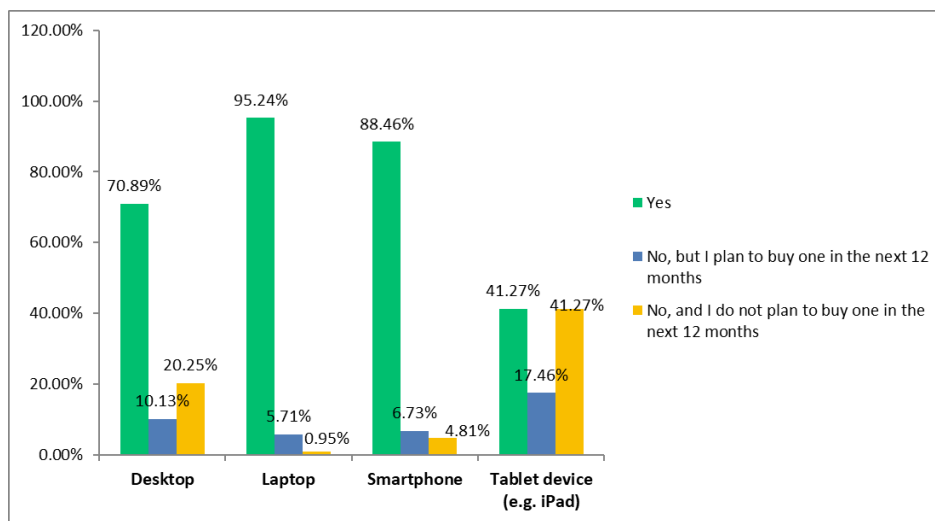


Figure 3. Devices owned by teachers

Figure 3 shows that over 95% of the academics at UPNG have a laptop, and 88.46% have smartphones. This means that most teachers have access to mobile devices that can facilitate flexible approaches to teaching and learning.

Internet Access

Figure 4 shows that Internet access from the office was high (99.05%), followed by access from home (60%) and cybercafés (8.57%). This indicates that academics at UPNG depend on the university to access Internet. Further probing about their mode of accessing the Internet showed that over 75% use mobile devices, followed by wireless (45.19%; see Figure 5). Interestingly, most of the teachers use the Wi-Fi on the campus through their mobile devices. Over 62% of teachers indicated accessing the Internet in faculty rooms, followed by the library (37.14%). Over 90% of the teachers said they use the Internet daily.

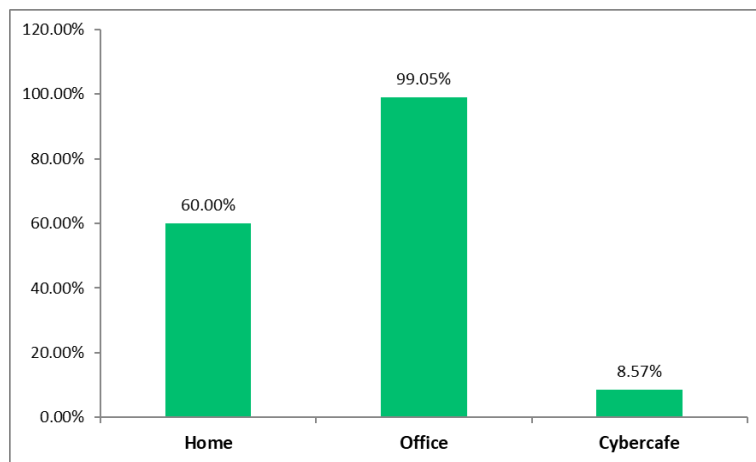


Figure 4. Access to the Internet

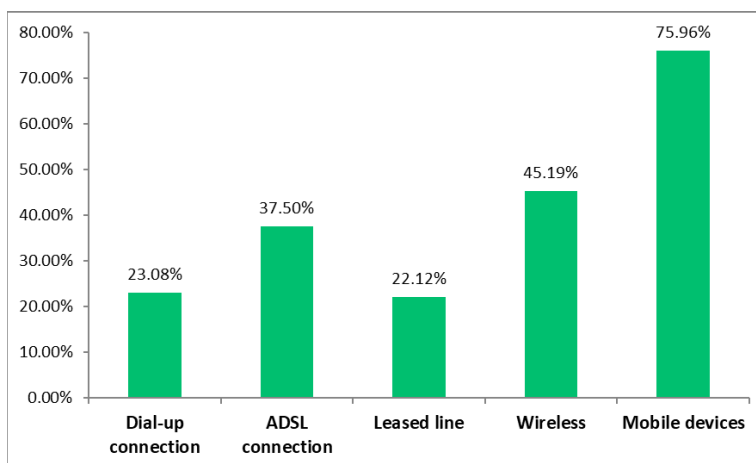


Figure 5. Technology used to access the Internet

4.3 Use of Technologies

Teachers' Computer Skill Levels

Table 4 shows the comfort levels of users, from expert (trainer level) to non-user. Some teachers rated themselves expert in most of the skills. The average weighted score for the different activities reveal that the teacher respondents at UPNG have an advanced skills in using word processors, presentation tools and email, followed by intermediate skills in using spreadsheets and databases. Interestingly, advanced ICT skills such as video editing and webpage design were rated very low. Also, their use of multimedia authoring and an LMS was at a basic level.

Table 4. Skills in computer-related activities

Skill Level	Expert	Advanced	Intermediate	Basic	Non-user	Weighted Average
Computer Skill						
Word processor (e.g., Word)	27.18%	40.78%	27.18%	3.88%	0.97%	4.3
Spreadsheets (e.g., Excel)	20.59%	27.45%	19.61%	30.39%	1.96%	3.62
Presentation (e.g., PowerPoint)	23.30%	42.72%	23.30%	8.74%	1.94%	4.19
Email	29.41%	44.12%	23.53%	2.94%	0.00%	4.44
Databases	15.00%	19.00%	17.00%	35.00%	14.00%	3.05
Multimedia authoring	7.14%	13.27%	20.41%	34.69%	24.49%	2.57
Graphic editing	8.08%	8.08%	13.13%	36.36%	34.34%	2.27
Digital audio	6.12%	7.14%	16.33%	27.55%	42.86%	2.13
Video editing	6.12%	5.10%	11.22%	24.49%	53.06%	1.92
Webpage design	7.29%	2.08%	13.54%	17.71%	59.38%	1.82
Learning management system	9.18%	11.22%	13.27%	24.49%	41.84%	2.33
Web 2.0 tools (wikis, blogs, social networks)	8.16%	15.31%	16.33%	26.53%	33.67%	2.53

Use of Social Media

About 79% of the respondents indicated that they have a social media profile. Table 5 shows that of these, 76.83% indicated having a Facebook account, followed by Google+ (60.98%) and academic research-sharing sites (43.9%). However, Figure 6 shows that the teachers at UPNG are not frequent users of social media. Only about 10% use it either several times a day or once a day. Table 6 shows that about 74.5% had memberships in mailing lists and/or discussion forums. Most (81.82%) were member of one to five such groups. However, only 23% were moderators in such forums.

Table 5. Social media profile

Social Media Used	Percentage
Facebook	76.83%
Twitter	25.61%
Google+	60.98%
Blog (using Blogger or WordPress or within institutional website/CMS)	14.63%
SlideShare or similar presentation platform	14.63%
Photo sharing (Instagram/Flickr/Picasa Web, etc.)	9.76%
Research-sharing sites (Academic.edu, Researchgate.net, etc.)	43.90%
Social bookmarking sites (Delicious, Scoop.it, Pinterest, etc.)	7.32%
Goodreads.com (for connecting with authors and readers) or similar	10.98%

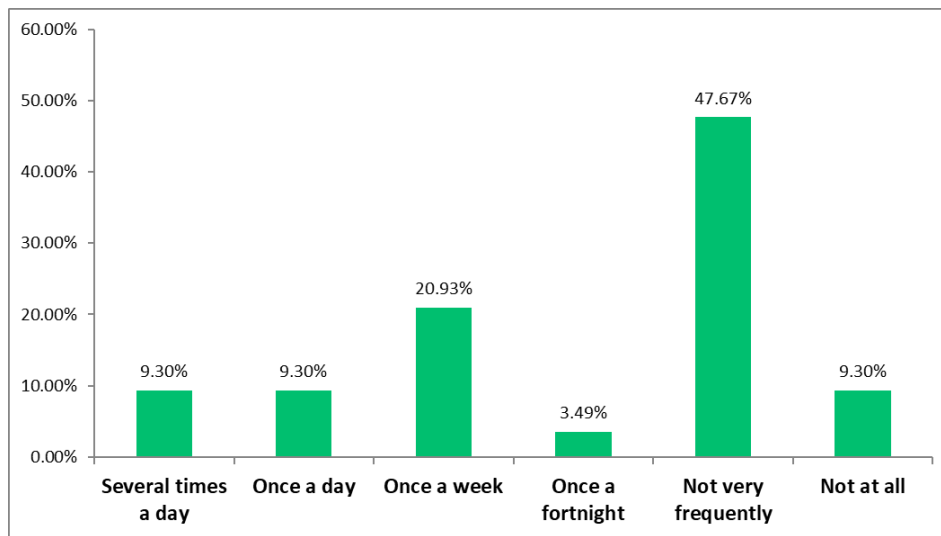


Figure 6. Frequency of social media use

Table 6. Membership in discussion forum

Membership in Discussion Forum	Percentage
Yes	74.49%
No	25.51%
Number of Forums	
1–5	81.82%
More than 5	18.18%
Moderator of Discussion Forum	
Yes	23.08%
No	76.92%

4.4 Experiences with ICT Facilities at the University

As part of the survey, we asked teachers to indicate which facilities are available in the university and to rate their experiences (Table 7). In terms of satisfaction with the experiences, teachers rated most of the facilities as either fair or poor. Only the email services received a neutral rating. This indicates that there is huge scope for improvement of UPNG's ICT facilities.

Table 7. Experience with ICT facilities

Experience Rating	Poor	Fair	Neutral	Good	Excellent	Not Available	Weighted Average
Facility							
e-Classroom facilities (e.g., computers, projection systems, lecture-capture systems, SMART boards, etc.)	36.96%	13.04%	13.04%	13.04%	9.78%	14.13%	2.03
Computer labs (for practical and Internet access)	34.41%	16.13%	9.68%	19.35%	10.75%	9.68%	2.27
Email services (institutional)	5.26%	20.00%	10.53%	35.79%	28.42%	0.00%	3.62
LMS (e.g., Moodle)	41.30%	8.70%	8.70%	8.70%	8.70%	23.91%	1.63
ePortfolios	48.31%	5.62%	13.48%	6.74%	4.49%	21.35%	1.49
Network bandwidth, speed of Internet (download and upload)	22.58%	23.66%	16.13%	23.66%	9.68%	4.30%	2.61
Wi-Fi access	34.78%	18.48%	11.96%	16.30%	13.04%	5.43%	2.38
Online or virtual technologies (e.g., network- or cloud-based file storage system, Web portals, etc.)	33.70%	18.48%	13.04%	16.30%	3.26%	15.22%	1.91
Access to software (e.g., MATLAB, GIS applications, statistical software, qualitative data analysis, graphics software, textual or image analysis programs, etc.)	48.91%	11.96%	17.39%	8.70%	2.17%	10.87%	1.71
Download and use of free and open-source software for teaching and learning	32.26%	13.98%	16.13%	19.35%	11.83%	6.45%	2.45
Support for maintenance and repair of ICT	36.17%	23.40%	20.21%	12.77%	6.38%	1.06%	2.27

Nature of the Classes Taught

The university has yet to offer courses online, but 4.6% teachers indicated that they teach online, which refers to distance courses offered by UPNGOC. The majority of the respondents (80.46%) indicated that they teach in the traditional face-to-face mode, followed by the blended mode (33.33%) and print-based distance education (26.44%). It is encouraging to see that about one-third of the respondents are already using the blended mode; these early champions can assist UPNG with mainstreaming the advantages of blended learning.

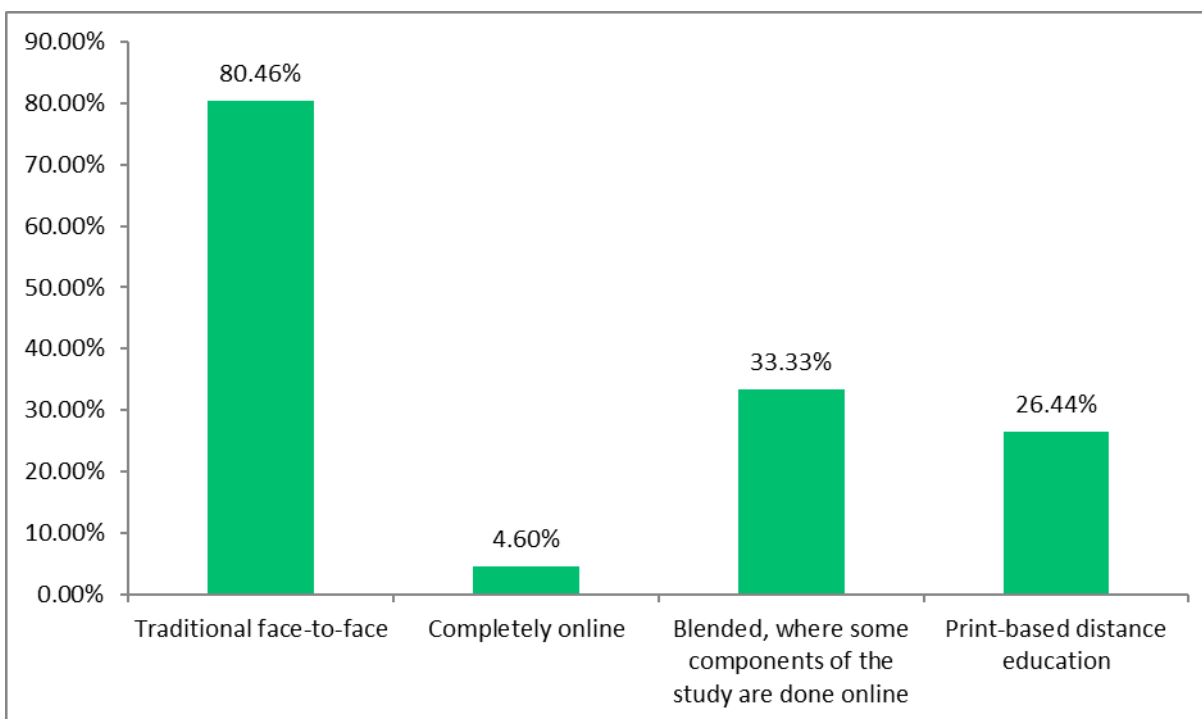


Figure 7. Nature of courses taught

Usage, Creation and Sharing of Digital Resources/Platforms in Teaching

Table 8 presents data on the frequency of teachers' use of digital resources in teaching. This is also in line with their competencies in using digital technologies. For the most part, teachers are using office productivity tools, with limited use of blogs, an LMS, animation software, etc. In terms of the creation and sharing of digital resources, they mostly create presentations and share Word files (Table 9). The key issue here is a lack of understanding of open licensing; this is an important aspect that needs to be clarified through capacity building at UPNG. Only about 38% of the respondents were aware of OER. This was also clear from the fact that over 60% of the respondents were not aware of any OER repository or platform (Table 10).

Table 8. Use of digital resources by teachers

Frequency of Use	Always	Often	Sometimes	Rarely	Never	Weighted Average
Resource						
Images (pictures, photographs, including from the Web)	30.49%	28.05%	21.95%	12.20%	7.32%	3.62
Presentations (e.g., PowerPoint, including from online sources)	52.33%	18.60%	15.12%	9.30%	4.65%	4.05
Word files (activity sheets/handouts/notes)	51.76%	30.59%	10.59%	5.88%	1.18%	4.26
Digital films/video (e.g., YouTube)	7.32%	19.51%	24.39%	25.61%	23.17%	2.62
Audio recordings	6.10%	6.10%	18.29%	34.15%	35.37%	2.13
Simulations and 2D/3D animation	3.66%	6.10%	10.98%	24.39%	54.88%	1.79
LMS	9.76%	7.32%	9.76%	24.39%	48.78%	2.05
Blogs	3.80%	1.27%	7.59%	30.38%	56.96%	1.65
Social bookmarking	2.56%	1.28%	6.41%	21.79%	67.95%	1.49
Microblogging (Twitter, Facebook, etc.)	7.69%	7.69%	12.82%	14.10%	57.69%	1.94
Open textbooks	30.95%	23.81%	16.67%	17.86%	10.71%	3.46
Open-access research papers	16.67%	14.29%	28.57%	19.05%	21.43%	2.86

Table 9. Creation and sharing of digital resources

Frequency of Creation and Sharing	Never	Yes, but not shared with others	Yes, and shared through an open licence
Resource			
Images (pictures, photographs, including from the Web)	25.61%	51.22%	23.17%
Presentations (e.g., PowerPoint, including from online sources)	14.63%	56.10%	29.27%
Word files (activity sheets/handouts/notes)	9.76%	52.44%	37.80%
Digital films/video (e.g., YouTube)	60.49%	22.22%	17.28%
Audio recordings	76.00%	16.00%	8.00%
Simulations and 2D/3D animation	79.49%	14.10%	6.41%
LMS	70.89%	15.19%	13.92%
Blogs	78.67%	16.00%	5.33%
Course packs	52.56%	21.79%	25.64%

Table 10. Use of OER platforms

OER Platform	Always	Often	Sometimes	Rarely	Never
OER Commons	4.05%	2.70%	10.81%	18.92%	63.51%
Saylor Academy	1.32%	1.32%	9.21%	13.16%	75.00%
WikiEducator	5.13%	1.28%	11.54%	16.67%	65.38%
OpenStax College	6.49%	1.30%	6.49%	14.29%	71.43%
BCcampus Open Textbooks	2.70%	0.00%	8.11%	13.51%	75.68%
NPTEL, India	2.63%	1.32%	5.26%	17.11%	73.68%
MIT OpenCourseWare	4.00%	2.67%	6.67%	21.33%	65.33%
OpenLearn, UK	3.95%	1.32%	10.53%	15.79%	68.42%
College Open Textbooks	3.95%	6.58%	7.89%	17.11%	64.47%
Directory of Open Access Journals	5.41%	4.05%	9.46%	14.86%	66.22%
Directory of Open Access Books	4.05%	4.05%	9.46%	14.86%	67.57%
MERLOT	1.33%	0.00%	4.00%	14.67%	80.00%

Skills for Integrating ICT in Teaching–Learning

Apart from awareness and actual usage, capacity building in teachers is an important aspect of TEL implementation. Table 11 presents data regarding the teachers’ skills for integrating ICT in teaching–learning. It is important to note that their skill levels are abysmally low. This indicates the need for immediate staff development programmes on ICT integration. Of particular note is that the 81.71% of the respondents indicated UPNG does not provide regular training on ICT.

Table 11. Skills to integrate ICT in teaching and learning

Skill Level	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	Weighted Average
ICT for Teaching and Learning						
LMS (e.g., Moodle)	33.33%	23.46%	13.58%	16.05%	13.58%	1.53
Online collaboration tools (e.g., Adobe Connect, Google Docs)	23.46%	28.40%	14.81%	17.28%	16.05%	1.74
ePortfolios	41.56%	23.38%	10.39%	15.58%	9.09%	1.27
eBooks, eTextbooks	18.52%	19.75%	16.05%	23.46%	22.22%	2.11
Online video/audio	21.69%	20.48%	20.48%	19.28%	18.07%	1.92
Educational games, simulations	34.57%	23.46%	16.05%	12.35%	13.58%	1.47
Lecture-capture tools	30.49%	26.83%	17.07%	8.54%	17.07%	1.55
Accessibility tools (for people with disabilities)	48.10%	29.11%	7.59%	6.33%	8.86%	0.99
Social media (blogs, wikis, etc.)	20.99%	22.22%	20.99%	16.05%	19.75%	1.91

The faculty survey also explored teachers' experiences with using online learning. Only about 30% had received some online training, and 87.65% were unaware of massive open online courses (MOOCs), available freely to be accessed by anyone.

4.5 Library Resources for Teaching and Learning

Interestingly, most of the respondents skipped the library-related questions. Table 12 therefore shows data from only 38 respondents. This indicates a lack of interest and/or awareness about library services. Amongst the available services, e-journals and e-books are the most used. Table 13 shows that most of the responding teachers are not satisfied with the research support facilities at UPNG. Focusing in particular on introducing an institutional repository, a reference management system and plagiarism detection software would contribute to successful TEL implementation.

Table 12. Use of library resources

Frequency of Use Resource	Always	Often	Sometimes	Rarely	Never	Weighted Average
e-Journals	36.84%	15.79%	21.05%	15.79%	10.53%	3.53
e-Books	28.57%	20.00%	20.00%	11.43%	20.00%	3.26
Citation databases	20.00%	11.43%	20.00%	17.14%	31.43%	2.71
e-Newspapers	20.59%	17.65%	17.65%	20.59%	23.53%	2.91
e-Theses and e-dissertations	17.65%	8.82%	20.59%	29.41%	23.53%	2.68
Patent databases	12.12%	3.03%	18.18%	30.30%	36.36%	2.24
e-Proceedings of conferences	14.71%	8.82%	29.41%	17.65%	29.41%	2.62
Statistical databases	14.71%	8.82%	26.47%	20.59%	29.41%	2.59

Table 13. Satisfaction with research support facilities

Rating Facilities	Poor	Fair	Neutral	Good	Excellent	Not available
Access to data storage	39.47%	17.11%	10.53%	6.58%	3.95%	22.37%
Data visualisation software	42.11%	13.16%	9.21%	3.95%	1.32%	30.26%
Citation/reference management software	40.79%	6.58%	11.84%	6.58%	1.32%	32.89%
Plagiarism detection software	44.16%	3.90%	7.79%	2.60%	1.30%	40.26%
Institutional repository for sharing of research	42.67%	12.00%	9.33%	2.67%	1.33%	32.00%
Funds to support open-access publications	53.95%	3.95%	9.21%	0.00%	1.32%	31.58%

4.6 Perceptions about TEL

Policy Related to TEL

Table 14. Awareness of policies related to TEL

Policies Related to TEL	Yes	No	Do not know
Is there a policy for ICT use in teaching and learning in your university/institution?	15.00%	21.25%	63.75%
Is there a strategy for TEL in your university/institution?	12.50%	23.75%	63.75%
Is there an ICT policy in your university/institution covering what technologies to use and not use for teaching and learning?	13.75%	23.75%	62.50%
Is there a privacy and data protection policy in your university/institution?	20.25%	21.52%	58.23%
Is there a policy on dealing with plagiarism in your university/institution?	58.23%	8.86%	32.91%
Is there a policy for the use of open-source software in your university/institution?	11.39%	25.32%	63.29%
Is there a system in place for the use of open-source software in your university/institution?	15.00%	27.50%	57.50%
Is there a workflow and escalation procedure for repair and maintenance of ICT in your university/institution?	13.75%	25.00%	61.25%

Table 14 shows that UPNG teachers are not very aware of policies related to TEL. The most commonly known policy is about plagiarism (58.3%). This clearly indicates that developing a TEL policy would not be sufficient; it would also be necessary to widely disseminate information about the policy through strong faculty involvement in the policy development process.

Attitude towards TEL

Table 15 shows that the respondent teachers, despite having low skills in ICT integration, are very positive about the impact of ICT in teaching and learning. The low percentage of “disagree” and “strongly disagree” is also evidence of how teachers perceive technology for teaching and learning. This suggests new opportunities for UPNG to improve the quality of teaching and learning by appropriately positioning the use of ICT through policy, improving its technology infrastructure and building capacity in teachers.

Table 15. Attitude towards TEL

	Strongly Agree	Agree	Neither Agree nor Disagree	Disagree	Strongly Agree
TEL can solve many of our educational problems.	44.16%	40.26%	9.09%	3.90%	2.60%
TEL will bring new opportunities for organising teaching and learning.	61.54%	34.62%	1.28%	1.28%	1.28%
TEL saves time and effort for both teachers and students.	60.26%	32.05%	3.85%	1.28%	2.56%
TEL increases access to education and training.	57.69%	33.33%	5.13%	2.56%	1.28%
TEL increases my efficiency in teaching.	57.69%	32.05%	7.69%	1.28%	1.28%
TEL enables collaborative learning.	56.41%	34.62%	6.41%	1.28%	1.28%

TEL can engage learners more than other forms of learning.	43.59%	37.18%	16.67%	2.56%	0.00%
TEL increases the quality of teaching and learning because it integrates all forms of media: print, audio, video and animation.	53.85%	34.62%	8.97%	2.56%	0.00%
TEL increases the flexibility of teaching and learning.	61.84%	28.95%	7.89%	1.32%	0.00%
TEL improves communication between students and teachers.	52.56%	32.05%	11.54%	2.56%	1.28%
TEL enhances the pedagogical value of a course.	52.56%	32.05%	11.54%	2.56%	1.28%
Universities should adopt more and more TEL for the benefit of their students.	60.26%	29.49%	7.69%	1.28%	1.28%

Motivators for and Barriers to Using TEL

Even though teachers expressed highly positive attitudes about integrating TEL, it was essential to identify motivating factors for teachers to integrate TEL in their work. Table 16 presents data on teachers' motivations for using TEL.

Table 16. Motivators for using TEL

	Very Strong Motivator	Strong Motivator	Average Motivator	Weak Motivator	Very Weak Motivator	Weighted Average
Personal interest in using technology	59.74%	28.57%	10.39%	0.00%	1.30%	4.45
Intellectual challenge	48.72%	39.74%	10.26%	0.00%	1.28%	4.35
Self-gratification	36.00%	33.33%	24.00%	2.67%	4.00%	3.95
Training in TEL	44.74%	31.58%	17.11%	1.32%	5.26%	4.09
Better Internet bandwidth at workplace	50.00%	19.74%	22.37%	5.26%	2.63%	4.09
Credit towards promotion	35.06%	22.08%	24.68%	7.79%	10.39%	3.64
Professional incentives to use TEL	38.96%	27.27%	19.48%	7.79%	6.49%	3.84
Technical support	42.86%	22.08%	20.78%	11.69%	2.60%	3.91
Peer recognition, prestige and status	28.95%	23.68%	25.00%	13.16%	9.21%	3.5
Improved infrastructure (hardware and software) deployment	40.79%	15.79%	25.00%	10.53%	7.89%	3.71
Release time or reduction in existing workload	50.00%	21.05%	19.74%	5.26%	3.95%	4.08
To be a trendsetter by early adoption of technology in education	48.05%	22.08%	18.18%	3.90%	7.79%	3.99

The following were rated as “very strong motivators” for using TEL: personal interest (59.74%), intellectual challenge (48.72%), better Internet bandwidth (50%), release time or reduction in existing workload (50%) and being a trendsetter by the early adoption of technology in education (48.05%).

In terms of the weighted average of the scores, personal interest in using technology for teaching and learning, intellectual challenge, training in TEL, better bandwidth, and release time or reduction in workload are prime motivators for integrating TEL at UPNG.

Table 17. Barriers to using TEL

	Very Strong Barrier	Strong Barrier	Average Barrier	Weak Barrier	Very Weak Barrier	Weighted Average
Concern about faculty workload	22.37%	28.95%	28.95%	10.53%	9.21%	3.45
Concern about students’ access to technology	41.33%	33.33%	16.00%	4.00%	5.33%	4.01
Lack of training on TEL	50.65%	29.87%	11.69%	5.19%	2.60%	4.21
Lack of technical support in the university	54.55%	28.57%	11.69%	1.30%	3.90%	4.29
Lack of institutional policy for TEL	46.75%	31.17%	14.29%	2.60%	5.19%	4.12
Lack of professional prestige	26.67%	25.33%	25.33%	12.00%	10.67%	3.45
Concern about the quality of e-courses	33.33%	25.33%	24.00%	9.33%	8.00%	3.67
Lack of incentives to use TEL	40.00%	24.00%	20.00%	8.00%	8.00%	3.8
Lack of credit towards promotion	24.66%	26.03%	19.18%	19.18%	10.96%	3.34
Intimidated by technology	22.67%	16.00%	21.33%	21.33%	18.67%	3.03
Concern about security issues on the Internet	35.14%	22.97%	20.27%	8.11%	13.51%	3.58
Inadequate availability of hardware and software	44.00%	37.33%	12.00%	2.67%	4.00%	4.15
Poor Internet access and networking in the university	49.33%	22.67%	17.33%	4.00%	6.67%	4.04
Lack of time to develop e-courses	28.00%	32.00%	24.00%	9.33%	6.67%	3.65
Lack of instructional design support for TEL	41.33%	29.33%	18.67%	6.67%	4.00%	3.97
No role models to follow	34.67%	26.67%	12.00%	16.00%	10.67%	3.59

It is important to promote motivating factors but also important to remove barriers to the use of technology for teaching and learning. The barriers to implementing TEL at UPNG are, from greatest to least: lack of technical support in the university, lack of training in TEL, inadequate availability of hardware and software, lack of institutional policy, poor Internet access, concern about student access to technology, concern about the quality of e-courses, lack of time to develop e-courses, lack of role models, and concern about security issues.

While most of these are issues related to the physical environment, it is expected that the policy issues will be resolved soon by UPNG instituting an appropriate policy. Taking into

consideration the identified motivators and barriers, to mainstream TEL at the university, UPNG should focus on strengthening its technology and support services to provide reliable access to technology.

Comments or Feedback on TEL from Teachers

Participants were requested to provide their comments about TEL. Only a small group of respondents answered this open-ended question. The comments, positive and negative, can be organised under seven themes, as follows:

1. **Standards:** Under this theme, we have categorised feedback related to competencies in technology, digital competency/digital literacy and global competency skills, ICT infrastructure, policy and strategy for ICT, TEL policy, and staff training.

The feedback related to TEL serves as a platform that can assist faculties or schools with attaining standards in teaching and learning required in the 21st century. TEL will contribute to the attainment of relevant competencies necessary for integrating technology in teaching and learning, such as digital competencies, digital fluencies and even global competency.

2. **Sustainability of TEL:** Under this theme, the participants suggested that the sustainability of the TEL initiative must be considered so that it becomes a reality at UPNG. This could be achieved with ongoing TEL advocacy to upscale measures or to develop a strategy for the UPNG IT division. One suggestion was for UPNG to overhaul and greatly improve its IT services. It was noted that the emerging TEL policy for UPNG needs to capture strategies for change and development in the higher education landscape of the 21st century. It was also suggested to consider providing Wi-Fi in staff residential areas.

3. **Policy:** Most of the participants commented on the need for a TEL policy at UPNG. It was also suggested that such a policy should be visible to enable guidance in policy implementation or strategic direction. It was suggested that where possible, the TEL policy should capture relevant professional development activities for TEL. One teacher wrote:

“University seriously need a policy on this [TEL]. If any ICT policy exist it is not visible to the staff.”

4. **Deficiencies in access to technology:** There were a number of comments about the barriers to or deficiencies of TEL at UPNG. The sub-themes included poor a Wi-Fi connection that needs improvement, and limited access to YouTube and social media platforms, which can be utilised for teaching and learning. The comment below reflects the current situation:

“Staff need [unhindered] access to all relevant technology and services once introduced for teaching and learning through these means to be effective.”

5. **Funding:** Under this theme, comments were made about the high costs of Internet access for both staff and students. This is a contextual reality that needs to be addressed if TEL is to be sustained in the long run. Another comment pertained to adequate support for technology and enabling environments for staff and students in the use of TEL strategies and tools.

“The government should help the university to cut down on the cost of internet services and increase the access by the citizens of PNG.”

6. **Innovation and creativity:** As TEL becomes a normal practice at UPNG, innovation and creativity will become increasingly important, as practitioners are challenged to rethink what they do. Under this theme, comments were made about innovative approaches for flexible learning, contemporary curricula, and UPNG becoming a paperless university. TEL encourages a mind set of embracing change for the benefit of all stakeholders in higher educational institutions such as UPNG.
7. **TEL readiness:** Comments about TEL readiness stood out as a theme. These included sub-themes such as UPNG needing to embrace TEL, learner readiness for TEL, TEL solving some of PNG’s higher-education problems, and TEL being essential for UPNG. One academic commented:

“Technology-enabled learning policy and strategy is a MUST for UPNG. The other institutions have moved with technology nationally and global-wise. UPNG is yet to catch up with technology-enabled learning.”

To conclude, the survey has helped identify several aspects of ICT policy and issues that need to be considered. The contextual realities in schools and divisions are important when planning the way forward for TEL and the initial steps to establish the foundations for TEL at UPNG. Some of the key issues requiring attention when framing and implementing an ICT policy at the university are the availability of new infrastructure, good connectivity, improvements to the existing infrastructure, proper training, and scaffolding.

5.0 Students' Use of Technology at UPNG

5.1 Overview of the Student Respondents

Table 18. Response rates from UPNG campuses

Campus	Response %	Response No.
Balimo Sub-Centre	0.31%	1
Hela University Centre	0.31%	1
Kainantu University Centre	0.31%	1
Kokopo Open Campus	0.31%	1
Madang Open Campus	1.86%	6
Main Campus, UPNG	45.96%	148
Mt. Hagen Open Campus	0.62%	2
NCD Open Campus	13.04%	42
Taurama Medical Campus	37.27%	120

As UPNG has several open campuses across the country, the survey was distributed everywhere. However, as Table 18 shows, the responses came largely from the main campus and the Taurama Medical Campus. The largest proportions of respondents were as follows: 45.96% from the UPNG Main Campus, 37.27% from the Taraba Medical Campus, and 13.04% from the NCD Open Campus. While not all of the open college centres were represented, it is important to note that face-to-face teaching largely takes place on the main and Taurama campuses.

Table 19 shows the profile of the student respondents. They were almost equally divided in terms of sex, with ~54% males and 46% females. UPNG primarily offers education at the graduate level, but 93.14% of the respondents were studying undergraduate courses/programmes and were predominantly (66.04%) in the 21–25 age group. The respondents were more or less equally distributed over different years of their study at UPNG, Year 2 and Year 4 students forming the majority with ~33% each. In terms of their disciplines, 43.28% came from the Medicine and Health Science field.

Table 19. Profile of the student respondents

Demographic Profile	Frequency	Percentage
Gender (n = 322)		
Male	173	53.73%
Female	149	46.27%
Age Group (n = 321)		
Below 20	44	13.71%
21–25	212	66.04%
26–30	31	9.66%
31–35	22	6.85%
36–40	6	1.87%
41 and above	6	1.87%

Level of study (n = 306)		
Undergraduate	285	93.14%
Graduate or postgraduate	7	2.29%
Certificate Programmed	14	4.58%
Year of study (n = 290)		
Year 1	45	15.52%
Year 2	98	33.79%
Year 3	51	17.59%
Year 4	96	33.10%
Discipline (n = 305)		
Humanities & Social Sciences	28	9.18%
Natural Sciences & Physical Sciences	37	12.13%
Business & Public Policy	38	12.46%
Medicine & Health Sciences	132	43.28%
Law	64	20.98%
Others (including CTS, CTCS, etc.)	6	1.97%

It is important to note that about 6% of the respondents indicated some form of disability that requires special support for them to successfully learn. This may be further studied separately to make appropriate decisions to improve the assistive technology support to be provided to such students. Recognising that some students have special needs, UPNG will be able to use technology to assist them, if the university plans accordingly.

When asked what mode of study they use in their current courses, 318 students responded while seven did not. Of those who responded, ~80% indicated traditional face-to-face, 16% selected blended learning, ~2% selected print based, and the remaining 2% indicated completely online. While UPNG currently offers no online courses, some students may have clicked “completely online” in reference to their distance education courses, as some of these have online components. Overall, the learners’ profile represents a typical student at UPNG.

5.2 Learners’ Access to and Use of ICTs

This section of the report presents the findings on students’ access to and use of ICT. Questions asked were related to their access to ICT devices, access to the Internet, and use of ICT.

Contrary to the teachers’ concerns (as indicated in the previous chapter, Table 17), most students own laptops and smartphones (Figure 8). While about 90% own laptops, another 9% intend to own laptops in the next 12 months. With respect to smartphones, about 86% own these, and 12% intend to have smartphones in the next 12 months. While about 27% of students own desktops, only 18% plan to buy one in the next 12 months, and ~55% do not. About 39% of students own tablets, 25% indicate they will buy a tablet the next 12 months, while 36% will not.

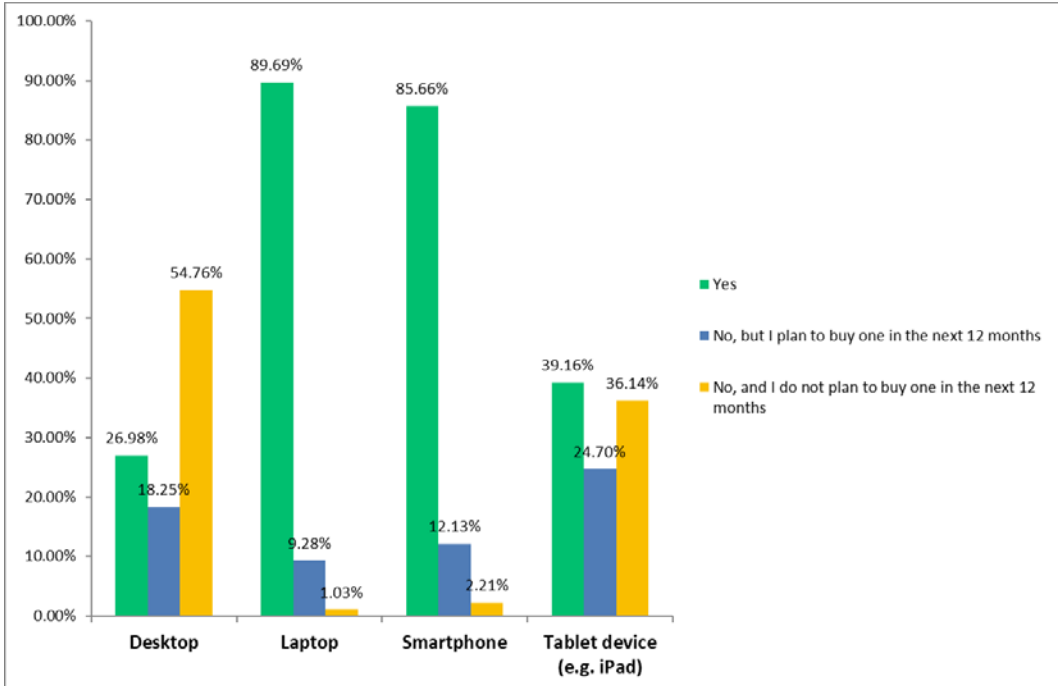


Figure 8. Devices owned by students

When asked whether the university provides access to these devices, students’ responses indicated that mostly desktop computers are provided. Other than that, at the university, more than 80% of students use their own laptops, 85% use their smartphones, and about 62% use their tablets (Figure 9).

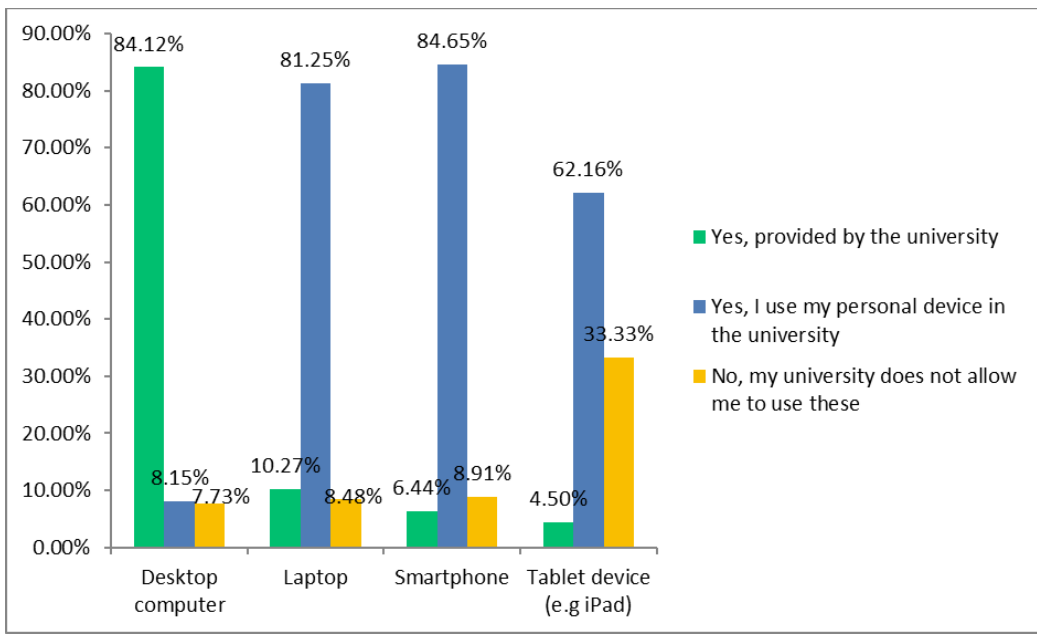


Figure 9. Access to various devices at the university

In terms of access, about 13% of the learners indicated that they do not have Internet access. However, when asked how they access the Internet, 85% responded they use their mobile data, followed by wireless (50%; Figure 10).

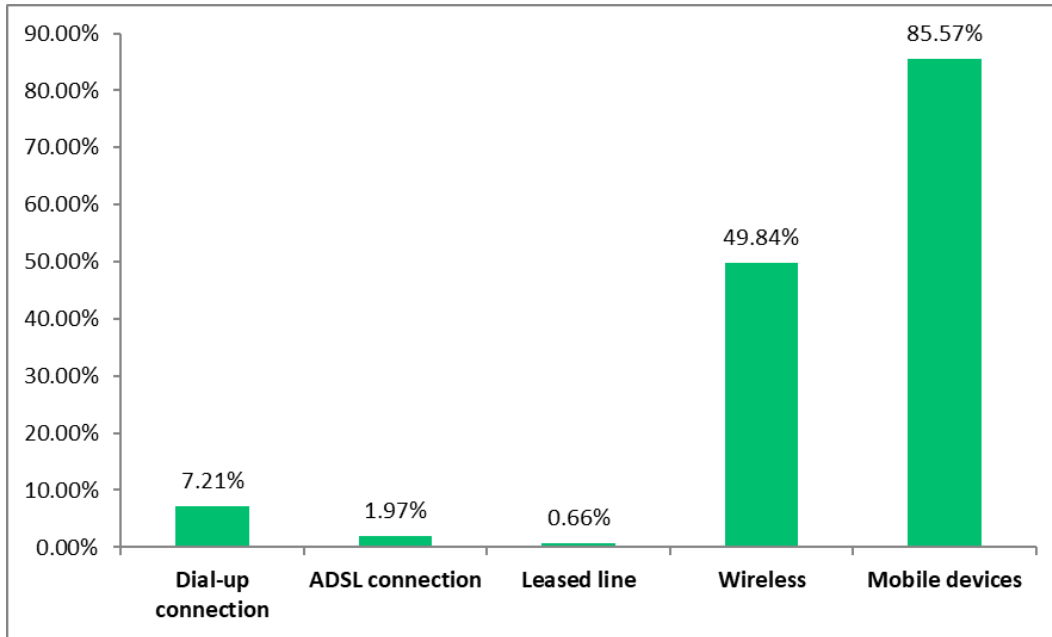


Figure 10. Modes of Internet access

In responding to which device is mostly used to access the Internet, 80% indicated that they use a smartphone, followed by laptop, tablet and desktop.

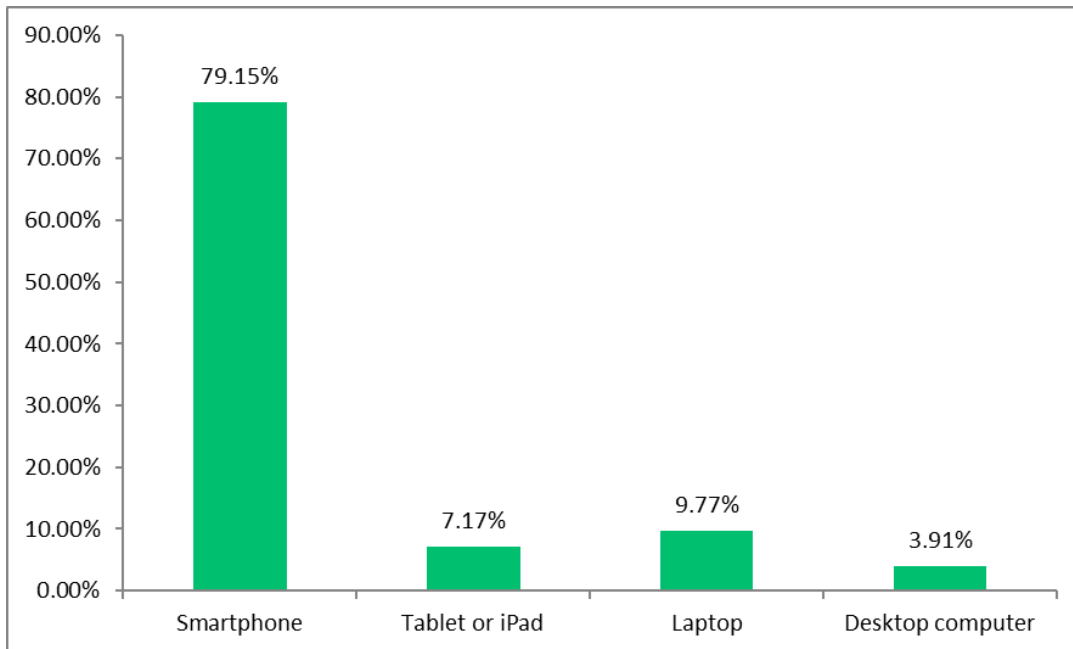


Figure 10. Primary devices to access the Internet

For broadband Internet access at the university, almost 80% indicated they use the library. Over 20% indicated open areas, 13% faculty rooms and 10% classrooms; less than 10% selected other areas in the school.

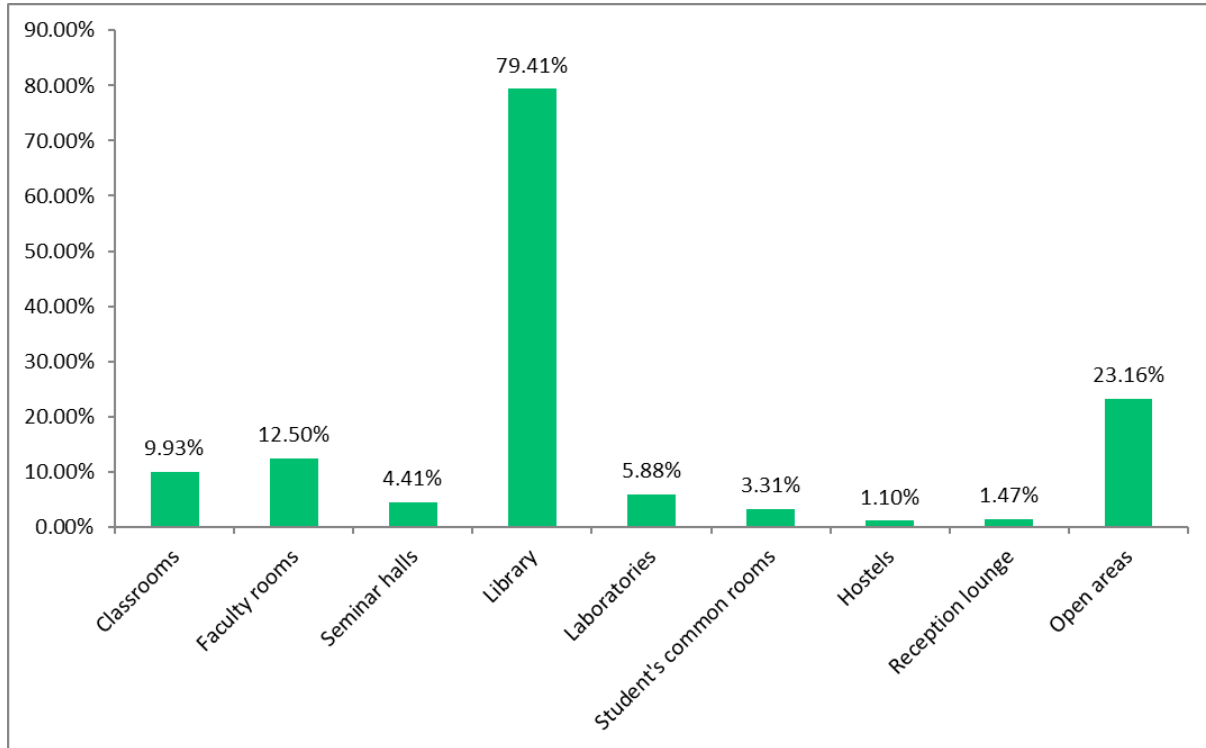


Figure 11. Broadband Internet connectivity within the university

When asked how often they use the Internet, only 311 students responded; 42% indicated daily, 27% on alternate days, 16% irregularly, 8% once a week, 6% rarely and 1% never.

On their average time spent on Internet-related activities, 309 answered while 16 did not. Most (almost 40%) spent one to two hours, 23% three to five hours, 14% more than five hours, 13% less than one hour, and 11% did not use the Internet daily.

When asked about their skills in certain computer-related activities, students rated themselves satisfactorily only for word processing (Table 20). This was followed by email, presentation software and search engines, in the “I can use it to a small extent” category. Most of the students indicated that they lack advanced ICT skills. This is a potential challenge to mainstreaming TEL at UPNG, so students will need to be provided with training to use technology effectively.

Table 20. Students' self-rating in ICT skills

	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	Weighted Average
Word processor (e.g., Word)	4.92%	5.90%	14.75%	31.80%	42.62%	3.01
Spreadsheets (e.g., Excel)	7.74%	21.55%	29.97%	27.61%	13.13%	2.17
Presentation (e.g., PowerPoint)	10.00%	10.00%	18.00%	26.00%	36.00%	2.68
Email	9.03%	7.36%	15.38%	26.42%	41.81%	2.85
Databases	29.63%	26.60%	24.24%	13.47%	6.06%	1.4
Multimedia authoring	33.22%	32.54%	18.64%	9.49%	6.10%	1.23
Graphic editing	35.57%	31.54%	20.47%	5.70%	6.71%	1.16
Digital audio	36.36%	27.61%	20.88%	7.41%	7.74%	1.23
Video editing	40.20%	29.05%	17.91%	6.08%	6.76%	1.1
Webpage design	65.78%	18.27%	9.63%	3.99%	2.33%	0.59
LMS	54.42%	26.53%	9.86%	4.08%	5.10%	0.79
Web 2.0 tools (wikis, blogs, social networking)	36.79%	19.40%	15.38%	15.05%	13.38%	1.49
Search engines	18.21%	14.24%	14.90%	19.21%	33.44%	2.35

In relation to their use of social media platforms, 91% of learners indicated that they have accounts on social media platforms, while 9% did not.

Of those having social media accounts, about 90% use Facebook, 53% Google+, 31% photo-sharing sites, 22% research-sharing sites, and a minority use other platforms, as shown in Figure 12. However, their use of social media is not heavy: only 20% indicated using social media daily or several times a day, whereas about 50% said they do not use social media regularly.

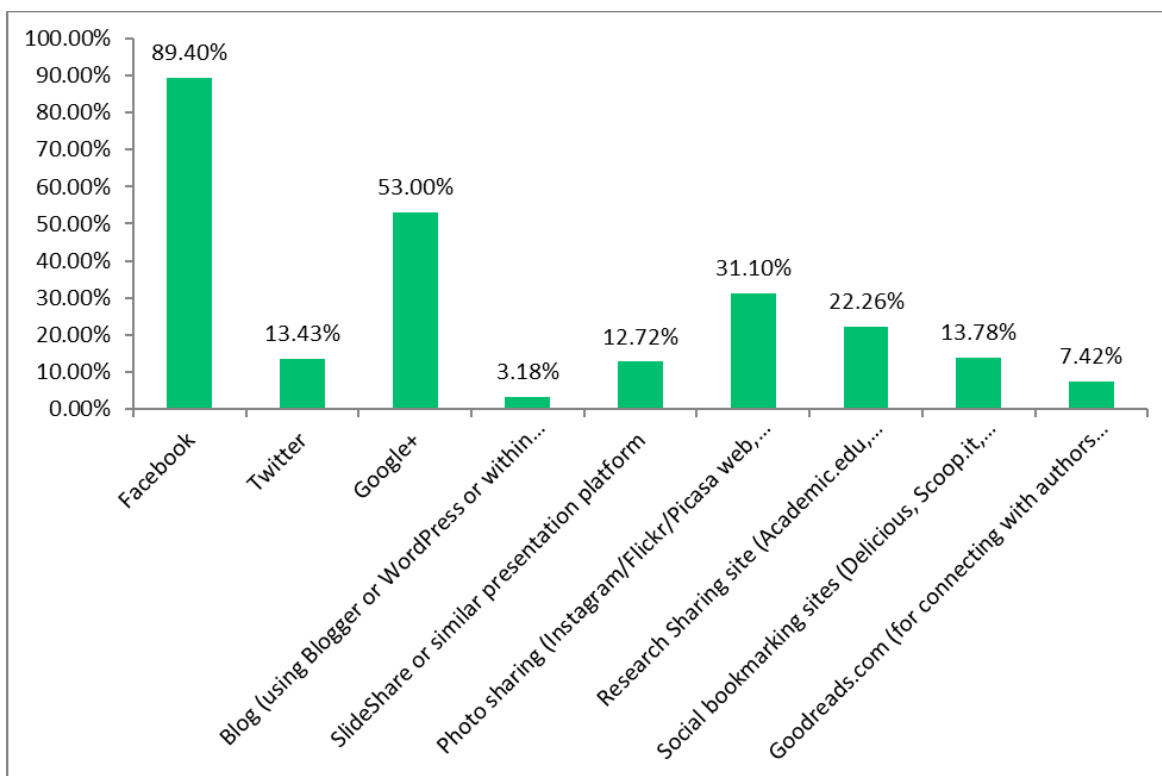


Figure 12. Social media usage

Asked whether they were members of mailing lists or discussion forums, 70% said no, while 30% said yes. This indicates that discussion forums as ways of learning and communicating are not prevalent amongst the learners at UPNG.

When asked about the resources, services and space provided by UPNG for the use of ICT, students rated most of the services as “fair” (Table 21), meaning there is huge scope for improvement. Only Wi-Fi was considered satisfactory (neutral).

Table 21. Responses to services provided by UPNG

	Poor	Fair	Neutral	Good	Excellent	Not Available	Weighted Average
e-Classroom facilities (e.g., computers, projection systems, lecture capture systems, SMART boards, etc.)	26.78%	20.00%	13.90%	24.07%	6.78%	8.47%	2.89
Computer labs (for practical and Internet access)	31.86%	16.95%	14.24%	23.39%	5.76%	7.80%	2.78
Email services (institutional)	27.49%	17.18%	13.06%	24.40%	9.97%	7.90%	2.96
LMS (e.g., Moodle, etc.)	33.57%	18.88%	11.19%	18.18%	4.55%	13.64%	2.82
ePortfolio	40.07%	16.54%	12.50%	9.56%	0.74%	20.59%	2.76

	Poor	Fair	Neutral	Good	Excellent	Not Available	Weighted Average
Network bandwidth/speed of Internet (download and upload)	34.74%	20.70%	10.18%	18.60%	6.67%	9.12%	2.69
Wi-Fi access	23.05%	19.86%	10.99%	24.11%	16.31%	5.67%	3.08
Online or virtual technologies (e.g., network- or cloud-based file storage system, Web portals, etc.)	34.97%	18.88%	9.79%	13.64%	2.45%	20.28%	2.91
Access to software (e.g., MATLAB, GIS applications, statistical software, qualitative data analysis, graphics software, textual or image analysis programs, etc.)	45.17%	14.48%	7.24%	12.07%	2.07%	18.97%	2.68
Download and use of free and open-source software for teaching and learning	35.84%	18.77%	8.87%	18.09%	3.75%	14.68%	2.79
Support for maintenance and repair of ICT	42.37%	23.39%	12.20%	11.19%	2.37%	8.47%	2.33
Access to data storage	31.16%	25.34%	12.33%	12.33%	3.08%	15.75%	2.78
Data visualisation software	36.36%	19.23%	10.14%	11.54%	2.10%	20.63%	2.86
Citation/reference management software	33.56%	21.58%	8.90%	11.30%	4.11%	20.55%	2.92
Plagiarism detection software	45.52%	11.38%	7.24%	6.90%	2.07%	26.90%	2.89
Institutional repository for sharing of research	36.21%	18.97%	10.34%	11.72%	2.41%	20.34%	2.86
e-Journals	26.21%	20.00%	14.14%	19.31%	3.79%	16.55%	3.04
e-Books	26.90%	22.76%	14.14%	16.55%	5.52%	14.14%	2.93
Citation databases	34.39%	21.40%	10.18%	10.88%	3.51%	19.65%	2.87
Bibliographic databases	35.64%	19.03%	11.76%	11.42%	4.50%	17.65%	2.83
e-Newspapers	43.40%	11.46%	8.68%	10.42%	3.47%	22.57%	2.87
e-Theses and e-dissertations	42.41%	16.90%	7.24%	9.31%	2.41%	21.72%	2.78
Patent databases	42.16%	15.33%	8.36%	10.10%	1.39%	22.65%	2.81
e-Proceedings of conferences	44.48%	14.83%	6.55%	7.59%	1.38%	25.17%	2.82
Statistical databases	41.61%	16.43%	9.09%	9.09%	2.45%	21.33%	2.78

Notably, 96% of the student respondents indicated they had never taken an online course. When asked whether they had taken a MOOC in the past year, 80% indicated not being aware of MOOCs. However, the rest were; some also had taken MOOCs, and about 3% had completed them.

5.3 Learners' Perceptions about the Use of TEL

In responding to their perception of the use of technology in studies, majority of students either strongly agreed or agreed to the statements in Table 22. The weighted average above 4 for all the statements indicate that learners at UPNG are predisposed to use of TEL.

Table 22. Perceptions about technology

	Strongly Agree	Agree	Neither Agree nor Disagree	Disagree	Strongly Disagree	Weighted Average
It will help me get better results in my subjects.	51.39%	35.76%	10.07%	2.43%	0.35%	4.35
It will help me understand the subject material more deeply.	52.94%	36.68%	7.96%	2.08%	0.35%	4.4
It makes completing work in my subjects more convenient.	62.06%	30.85%	6.03%	0.35%	0.71%	4.53
It motivates me to explore many topics I may not have seen before.	62.85%	30.90%	5.21%	0.35%	0.69%	4.55
It allows me to collaborate with others easily, both on and outside of the campus.	48.44%	38.75%	11.76%	0.69%	0.35%	4.34
It will improve my IT/information management skills in general.	59.23%	32.75%	7.32%	0.35%	0.35%	4.5
It will improve my career or employment prospects in the long term.	58.68%	30.56%	9.03%	1.39%	0.35%	4.46

Table 23 shows the preferences of the learners to use different types of technological interventions in teaching and learning. The weighted average of the scores indicate that learners prefer the following most:

- Use your mobile phone to access web-based university services or information (administrative use)
- Download or access online audio/video recordings of classes attended for revision (academic use)
- Use the Web to access university-based services (administrative use)
- Download or access online audio/video recordings of supplementary content materials (academic use)
- Download or access online radio/video recordings of lectures you could not attend (academic use)

While the expectations of the use of ICTs are related to student experiences, some of these are indicative of the student readiness to use technology for teaching and learning.

Table 23. Preference for use of technology for teaching and learning

Response Technology-Related Activities	Not at All Useful	Useful to a Limited Extent	Neutral	Useful	Very Useful	Do Not Know	Weighted Average
Design and build Web pages as part of your course	4.91%	13.33%	17.89%	23.51%	32.28%	8.07%	3.41
Create and present multimedia shows as part of your course requirements (e.g., PowerPoint)	3.89%	8.13%	9.54%	35.34%	40.64%	2.47%	3.93
Create and present audio/video as part of your course requirements	4.96%	8.51%	16.31%	30.14%	36.88%	3.19%	3.76
Download or access online radio/video recordings of lectures you could not attend	2.82%	5.28%	7.04%	27.82%	54.93%	2.11%	4.2
Download or access online audio/video recordings to revise content of lecturers you have already been to	2.47%	4.95%	5.65%	26.50%	58.30%	2.12%	4.27
Download or access online audio/video recordings of supplementary content materials	2.46%	4.58%	8.45%	30.99%	52.11%	1.41%	4.21
Use the Web to access university-based services (e.g., enrolment, paying fees)	3.57%	4.64%	5.36%	25.00%	58.93%	2.50%	4.24
Use your mobile phone to access web-based university services or information (e.g., enrolment, paying fees)	3.56%	4.27%	6.41%	21.71%	62.28%	1.78%	4.3
Use instant messaging/chat (e.g., Skype, Messenger, Hangout, etc.) on the Web to communicate/collaborate with other students in the course	2.47%	8.48%	15.19%	22.26%	48.76%	2.83%	3.98
Use a social media networking platform (e.g., Facebook) on the Web to communicate/collaborate with other students on the course	3.53%	9.89%	14.49%	28.98%	41.34%	1.77%	3.89
Use microblogging (such as Twitter) to share information about class-related activities	9.15%	10.21%	19.72%	28.87%	25.35%	6.69%	3.31
Keep your own blog as part of your course requirements	10.18%	10.88%	22.11%	25.26%	22.11%	9.47%	3.1
Use instant messaging/chat (e.g., Skype, Messenger, Hangout, etc.) on the Web to communicate with teachers and administrative staff from the course	6.34%	11.27%	14.08%	31.34%	33.10%	3.87%	3.62
Contribute to another blog as part of your course requirements	7.02%	12.98%	21.40%	25.61%	24.56%	8.42%	3.22
Use the Web to share digital files related to your course (e.g.,	4.23%	10.92%	11.97%	30.99%	39.08%	2.82%	3.81

Response	Not at All Useful	Useful to a Limited Extent	Neutral	Useful	Very Useful	Do Not Know	Weighted Average
photos, audio files, movies, digital documents, websites, etc.)							
Use Web-conferencing or video chat to communicate/collaborate with other students in the course	7.72%	8.77%	15.79%	31.58%	33.68%	2.46%	3.67
Receive alerts about course information (e.g., timetable changes, the release of new learning resources, changes in assessment) via RSS feeds on the Web	5.24%	5.59%	10.14%	29.72%	46.85%	2.45%	4
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	2.44%	6.97%	7.67%	27.87%	52.61%	2.44%	4.14
Contribute with other students to the development of a wiki as part of your course requirement	7.02%	10.88%	14.04%	30.18%	30.18%	7.72%	3.42
Receive grades/marks from your lecturer via text message on your mobile phone	10.76%	7.64%	11.11%	24.31%	40.97%	5.21%	3.61
Receive pre-class discussion questions from your lecturer via text message on your mobile phone	5.61%	7.72%	13.68%	26.32%	42.46%	4.21%	3.8
Use a personal dashboard on the university intranet to access all your academic information related to courses, grades, etc.	4.51%	5.21%	9.72%	28.82%	45.83%	5.90%	3.89
Use an ePortfolio system to record your achievements for future use beyond the course of your studies	6.29%	4.90%	12.59%	29.72%	40.56%	5.94%	3.76

Table 24 shows some of the key opinions about the use of technology for teaching and learning that need to be taken into consideration.

Table 24. Learners’ opinions about the use of technology for learning

	Strongly Agree	Agree	Neither Agree nor Disagree	Disagree	Strongly Disagree	Do not know
I get more actively involved in courses that use technology.	22.30%	35.54%	29.27%	5.57%	0.70%	6.62%
I am more likely to skip classes when materials from course lectures are available online.	14.69%	28.67%	20.63%	22.38%	9.44%	4.20%
When I entered college, I was adequately prepared to use the technology needed in my courses.	17.54%	32.98%	24.56%	15.79%	3.86%	5.26%
Technology makes me feel connected to other students.	24.47%	45.04%	18.09%	7.80%	1.77%	2.84%
Technology makes me feel connected to teachers.	23.32%	39.58%	20.85%	12.01%	1.41%	2.83%
Technology interferes with my ability to concentrate and think deeply about subjects I care about.	16.43%	27.27%	31.47%	16.43%	5.59%	2.80%
I am concerned that technology advances may increasingly invade my privacy.	23.40%	36.88%	22.34%	12.06%	1.06%	4.26%
I am concerned about cyber security (password protection and hacking).	43.86%	38.60%	10.53%	2.81%	0.70%	3.51%
In-class use of mobile devices is distracting to my teacher.	31.82%	37.06%	19.23%	6.29%	0.70%	4.90%
Use of tablets/laptops in class improves my engagement with the content and class	27.62%	41.61%	20.98%	6.99%	1.05%	1.75%
Multitasking with my technology devices sometimes prevents me from concentrating on or doing the work that is most important	24.83%	45.45%	18.53%	7.69%	0.70%	2.80%
When it comes to social media (e.g., Facebook, Twitter, LinkedIn), I like to keep my academic life and social life separate	35.66%	37.06%	18.88%	3.50%	1.40%	3.50%
I wish my teachers in the university would use and integrate more technology in their teaching.	36.84%	41.40%	17.54%	0.70%	0.70%	2.81%
Technology makes me feel connected to what’s going on at the college/university.	35.66%	43.71%	13.64%	3.15%	0.35%	3.50%
In-class use of mobile devices is distracting to me.	26.13%	31.36%	25.78%	11.15%	2.79%	2.79%

While these results are a snapshot in time, they reveal important indicators that should be addressed to make TEL implementation at UPNG successful. Some of these are:

- The majority of learners are concerned about cyber security issues, which can easily be overcome through a sustained campaign about or training on how to safeguard digital identities.
- Most students are not in favour of in-class use of mobile phone and prefer the use of tablets and laptops in class, feeling that laptop use improves engagement.
- Use of technology makes learners feel connected to the university, other students and their teachers. This is what can be leveraged the most to build a learning community through the use of various technologies.
- About 43% of learners either agreed or strongly agreed that they might skip classes if lectures were available online. This is an interesting finding from the point of view of reimagining the classroom, and changing the teaching and learning strategies to involve more group learning, project learning and flipped-classroom approaches.
- Most students want to keep their social and academic lives separate on social media. It is important to note that presently, social media is used least for learning purposes, but the social media features of an LMS could be leveraged to increase learners' participation and involvement in the community and foster connectedness.

5.4 Analysis of the Open-Ended Questions

An encouraging 93% of the respondents participated in the open-ended questions and provided comments. Overall, ~60% of students expressed great concern about the existing Wi-Fi, which is currently restricted to certain places, provides a slow Internet speed, and has a weak infrastructure.

About 20% of the respondents also expressed how TEL would specifically assist with improving their learning as well as the communication between lecturers and students.

Overall, the comments from students show their readiness and desire to embrace TEL.

6. Conclusions and Recommendations

This TEL baseline survey report encompasses the contextual realities at UPNG in terms of policy, resources, infrastructure, the realities of the various faculties and schools, barriers and challenges, and learners' insights into TEL. The data and results presented within speak to there being great interest, positivity and readiness amongst faculty and learners to embrace TEL.

The key recommendations for UPNG are as follows:

Recommendation 1: Policy development

It is essential to have policies at UPNG for the appropriate use of ICT. Accordingly, it is also important to develop a TEL policy that is aligned with the pedagogic requirements and future needs of the learners at UPNG. Support from COL will be useful in this respect. But university administrators and the executive deans of schools also have major roles in the development and mainstreaming of TEL at UPNG.

Recommendation 2: Technology and infrastructure improvement

While some students and teachers at the university have adequate access to digital tools (laptops and smartphones), there are also many students who lack such access. To make UPNG an inclusive institution providing equitable access for everyone, it is important to strengthen the university's ICT infrastructure, especially by providing access to high-speed Internet connectivity, a learning management system, open resource repositories, etc. COL's advice in this respect will be useful, though COL does not provide infrastructural support. There are many open-source solutions that UPNG can adopt to reduce the total cost of ownership. It is also important to note that UPNG has a strong and capable IT team that can handle new technologies and provide appropriate support that is aligned to teaching and learning.

Recommendation 3: Improved capacity building for TEL

Currently, there is very limited focus on developing organisational capacity to use ICT for teaching and learning. Pockets of innovation exist within the university, and these can be supported to become champions for TEL. A strategy to provide training for teachers in using the learning management system and offering blended courses will help strengthen TEL at UPNG. COL's support in capacity building should be leveraged, but a nodal agency to continue the training efforts is also required.

Recommendation 4: Preparing students to leverage technological affordances

Students at UPNG are very enthusiastic about the possibility of using ICT for teaching and learning. But by their own descriptions, their current skill levels in using advanced ICT are low. It is therefore important to provide ICT training to all students who enrol at UPNG. Such training can be conducted using different strategies, such as an online course, or a face-to-face programme.

7. References

- Bates, A. W. (2015). *Teaching in a digital age: Guidelines for designing teaching and learning*. Available at <https://www.tonybates.ca/teaching-in-a-digital-age/>
- Cleveland-Innes, M., & Wilton, D. (2018). *Guide to blended learning*. Burnaby, Canada: Commonwealth of Learning. Available at <http://oasis.col.org/handle/11599/3095>
- Department of Higher Education, Research, Science and Technology. (2016). *PNG national standards for higher education institutional registration*. Port Moresby, Papua New Guinea: PNG Government Printer. Available at https://web.dherst.gov.pg/images/Sector_Policy_Documents/National_Standards_for_Higher_Education_Institutional_Registration.pdf
- Kirkwood, A., & Price, L. (2016). *Technology-enabled learning implementation handbook*. Burnaby, Canada: Commonwealth of Learning. Available at <http://oasis.col.org/handle/11599/2363>
- Kember, D., & Ginns, P. (2012). *Evaluating teaching and learning*. New York: Routledge.
- Krenjcie, R. V., & Morgan, D. W. (1970). Determining sample size for research activities. *Educational and Psychological Measurement*, 30, 607–610.
- Rangou, J. B. (2017). Quality assurance in higher education for flexible open distance learning/education in Papua New Guinea. Unpublished doctoral dissertation. University of Sydney, Australia.



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