



COMMONWEALTH *of* LEARNING

Report of the Baseline Study
on Technology-Enabled
Learning at Model Institute
of Education and Research



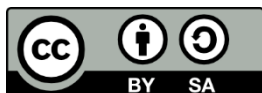
Report of the Baseline Study on Technology-Enabled Learning at Model Institute of Education and Research



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Acronyms

BC	British Columbia
CET	Centre for Educational Technology
COL	Commonwealth of Learning
ELMS	electronic learning management system
ICT	information and communication technologies
IT	information technology
MCE	MIER College of Education
MERLOT	Multimedia Educational Resources for Learning and Online Teaching
MIER	Model Institute of Education and Research
MIET	Model Institute of Engineering and Technology
MOOC	massive open online course
NA	not answered/applicable
NAAC	National Assessment and Accreditation Council
NPTEL	National Programme on Technology Enhanced Learning
OER	open educational resources
TEL	technology-enabled learning
UGC	University Grants Commission (India)
UK	United Kingdom

Chapter 1: Introduction

1.1 Background to the MIER group of institutions

The Model Institute of Education and Research (MIER) was founded as a “Model Academy” in 1936 by the eminent educationist Professor H.L. Gupta (1912–1983). Along with his life partner, the able educationist Mrs. Shanti Gupta (1919–1999), he nurtured the institution with selfless dedication and vision before it was incorporated in 1975 as the Model Institute of Education and Research.

MIER is an autonomous, non-profit, non-governmental organisation devoted to the promotion of education (general, technical and professional), research, training, social welfare and new technologies. The institute has emerged as a prestigious and trend-setting organisation for optimal human resource development at different levels in diverse spheres, utilising formal and non-formal techniques based on the principles of excellence, quality, self-reliance, collaboration, innovation, sharing, networking and service to society. The policies of MIER are administered on the advice of an assembly of top educationists who are represented on its various advisory bodies and committees.

The institute has two campuses with modern facilities, at B.C. Road and Kot Bhalwal, Jammu (J&K State, 180001, India), where the learning needs of over 4,000 students are met, from the preschool to the post-doctoral levels. The staff of the institute number over 300 and are highly qualified, experienced and competent. There are three flagship institutions within the MIER group:

- Model Academy: MIER’s prestigious 10+2 school
- MIER College of Education (autonomous)
- Model Institute of Engineering and Technology (MIET)

MIER College of Education (autonomous)

Since its inception in 1981, the college has established itself as a trend-setting educational institution utilising both formal and non-formal techniques founded on the principles of excellence, quality, self-reliance, collaboration and service to society. The college is recognised by the Government of J&K and is permanently affiliated with the University of Jammu. It is also recognised by the University Grants Commission (UGC) under sections 2(f) and 12B of the UGC Act. The college has twice received grade A accreditation and once received A+ from the National Assessment and Accreditation Council (NAAC). The college is the first to have received autonomous status as well as “college with potential for excellence” status from the UGC.

MIER College of Education emphasises the pursuit of high ideals — namely, excellence in teaching and learning, high achievement levels, all-round development of personality, self-reliance, innovation and the introduction of new technologies — as well as ensuring the professional growth of teachers. The college has been offering teacher education programmes for over 38 years and has trained nearly 7,000 teachers, who are spread across the country doing excellent jobs in the field of education as nation builders. Due to its excellent staff and physical facilities, well-equipped and fully automated libraries, provision for extracurricular activities, rich tradition of rigorous curricular transactions, emphasis on ICT, status as a 10+2 experimental school attached to the College of Education, and above all its rich tradition of research activities, the college is one of the most reputable institutions in northern India, and students seek admission to it as their first choice.

Model Institute of Engineering and Technology (autonomous)

The Model Institute of Engineering and Technology (MIET), Jammu was the first private engineering college in J&K, established in 1999. It is also the first autonomous college of engineering in J&K and

has received grade A accreditation from the NAAC. MIET offers undergraduate programmes in computer science and engineering, electronics and communication engineering, civil engineering, and electrical engineering, as well as an MTech programme in computer science, plus MBA and MCA programmes. MIET faculty have published over 650 research papers and filed 25 patents in diverse domains. The institute has strong links with industry, including Amazon, IBM, Cisco, Dell, Mitsubishi, Bentley, NVIDIA and UiPath. MIET alumni work for tech giants such as Google, Amazon, Apple and Cisco USA, as well as top corporations in India.

1.2 Background to technology-enabled learning at MIER

The use of technology at the MIER group of institutions, especially MIER College of Education and MIET, is extremely important for imparting 21st-century skills to our students. MIER works on the premise that our learners should be skilled in the use of modern technologies during their education to help them transition to job scenarios in actual schools and industries. This makes them tech savvy and more employable than other learners who have not been exposed to technology. The use of technology is also important from the faculty point of view, as in order to use the latest software and educational technologies in class, staff need to have the requisite ICT skills to be successful educators and easily disseminate knowledge to their trainees.

MIER has provided an excellent technology infrastructure for its students in terms of state-of-the-art computer labs, on-campus Wi-Fi, and a mobile learning platform that empowers our students to learn independently. The institute is also in the process of providing a mobile app for students to cater to their learning needs. Besides these initiatives, the institute makes use of the Google Classroom platform to enable online learning and share educational resources such as PowerPoint presentations, PDF documents and assignments. All students are connected to their respective teachers through Google Classroom.

In 2020, MIER started implementing technology-enabled learning (TEL) in collaboration with the Commonwealth of Learning (COL). Within this agreement, COL will provide technical assistance to MIER for mainstreaming the use of TEL at the College of Education and MIET. This will be a three-phase process and will include a baseline study, adoption of a TEL policy, capacity building of teachers to develop blended courses, use of a learning management system and open repositories, research on student learning, networking and collaboration through a TEL Community of Practice, and TEL benchmarking.

1.3 TEL governance and the Centre for Educational Technology

The MIER group has a Centre for Educational Technology (CET), which is the catalyst for making information and communication technologies (ICT) an effective tool for educational transformation in the institute. The centre is devoted to the integration and utilisation of hardware and software related to technologies in the areas of teaching, learning, evaluation, guidance, training, institutional management, and research. The main goal of the CET is to improve the quality of instruction and make the teaching–learning process more effective by adopting a learner-centred approach. To this end, efforts are directed at making learners, teacher trainees and educators aware of modern technologies and their uses in the classroom, by giving them hands-on experiences during the training process. The CET is also making efforts to popularise practices such as eLearning (both online and offline) and educational use of mobile and allied technologies. It collaborates with external agencies to introduce the latest innovative technological trends. The centre also maintains and promotes the presence of the college on various social media sites and provides support for the adoption and usage of the college’s mobile app.

1.4 A baseline survey report

A baseline study on TEL was conducted at MCE and MIET, and this report presents the findings of the associated institutional survey as well as a review of the current status of TEL at both these institutions. The information in this report constitutes the most comprehensive dataset ever generated about TEL at MCE and MIET.

For this purpose, three surveys were conducted, based on a questionnaire provided by COL,¹ to collect information from students and teachers at the two institutions. The results of the study provide an objective assessment of the impact of a systematic and scholarly approach to implementing TEL, which MCE and MIET will adopt with support from COL. The following chapters present the survey results at the faculty, student and institutional levels.

At the time of the study, the faculty strength at MCE and MIET was 22 and 110, respectively, and the student strength was approximately 350 and 1,400 respectively. The response rates to the faculty and student surveys at both institutions were as follows:

Institution	Population	Responses	%
MCE (teachers)	22	18	81.81
MIET (teachers)	110	62	56.36
MCE (students)	350	273	78.0
MIET (students)	1400	1142	81.57

The responses were very encouraging and will be useful for developing relevant policies and adopting suitable technologies to improve teaching and learning at MIET.

¹ Kirkwood, A., & Price, L. (2016). *Technology-enabled learning implementation handbook*. COL. <http://oasis.col.org/handle/11599/2363>

Chapter 2: Faculty Use of Technology for Teaching and Learning

2.1 Background information

Faculty members from MCE and MIET participated in a survey on the use of technology for teaching–learning. A total of 80 faculty members participated in this survey, with 18 teachers from MCE and 62 from MIET completing it. Background data on the respondents are provided in Table 1.

Table 1. Background data for faculty at MCE and MIET

Variable	Group	MCE (%)	MIET (%)	Total (%)
Gender	Female	14(17.5)	27(33.75)	41(51.25)
	Male	4(5)	35(43.75)	39(48.75)
Age group	Not answered	1(1.25)	0(0)	1(1.25)
	26–30	0(0)	16(20)	16(20)
	31–35	2(2.5)	14(17.5)	16(20)
	36–40	4(5)	11(13.75)	15(18.75)
	41–45	4(5)	12(15)	16(20)
	46–50	5(6.25)	3(3.75)	8(10)
	51–55	1(1.25)	3(3.75)	4(5)
	61–65	0(0)	2(2.5)	2(2.5)
	66–70	1(1.25)	1(1.25)	2(2.5)
Position	Not answered	1(1.25)	0(0)	1(1.25)
	Assistant Professor	12(15)	45(56.25)	57(71.25)
	Associate Professor	4(5)	13(16.25)	17(21.25)
	Professor	1(1.25)	4(5)	5(6.25)
Highest qualification	Not answered	0(0)	1(1.25)	1(1.25)
	Master’s	7(8.75)	10(12.5)	17(21.25)
	MPhil or MTech	1(1.25)	33(41.25)	34(42.5)
	PhD	10(12.5)	18(22.5)	28(35)
Level of Teaching	Doctoral research	0(0)	1(1.25)	1(1.25)
	Graduate or postgraduate teaching	9(11.25)	25(31.25)	34(42.5)
	Undergraduate teaching	9(11.25)	36(45)	45(56.25)
Teaching Experience	11–15 years	7(8.75)	11(13.75)	18(22.5)
	16–20 years	2(2.5)	11(13.75)	13(16.25)
	21–25 years	2(2.5)	4(5)	6(7.5)
	36–40 years	1(1.25)	1(1.25)	2(2.5)
	5 or <5 years	1(1.25)	21(26.25)	22(27.5)
	6–10 years	5(6.25)	14(17.5)	19(23.75)
Faculty Discipline	Commerce and Management	0(0)	7(8.75)	7(8.75)
	Engineering and Technology	0(0)	51(63.75)	51(63.75)
	Humanities	4(5)	3(3.75)	7(8.75)
	Natural Sciences	0(0)	1(1.25)	1(1.25)
	Social Sciences	14(17.5)	0(0)	14(17.5)

MCE: N = 18 ; MIET: N = 62. Data in parentheses are percentages.

In terms of gender distribution, 51% of faculty were female and 49% male. The majority of the faculty members (88%) fell in the 26–50 age group, showing there is a good mix of young, mid-level and senior faculty in both institutions. Data also revealed that 71% of the study sample were at the position of assistant professor, 21% were associate professors and 6% were professors; 35% of the faculty had a doctoral degree in their area of expertise and 64% a master’s. Out of the total faculty in both institutions, 56% were teaching at the undergraduate level while 43% were teaching at the

graduate and postgraduate levels. In terms of teaching experience, 39% of the faculty had 11–20 years, while 27% had five years or less, 24% had 6–10 years, and only 10% had 21–40 years. With regard to disciplines, 64% of the faculty belonged to engineering and technology, 18% were from the social sciences, and 19% were from natural sciences, humanities, commerce or management.

2.2 Access to and use of ICT

a. Ownership of and access to ICT

The data collected on this aspect of faculty reveal that all have access to and ownership of IT equipment, with over 96% having smartphones and laptops, 51% having access to desktop computers and about 40% having access to tablets (Table 2).

Table 2. Ownership of ICT devices by faculty

Devices	Do you own any of these devices?	MCE (%)	MIET (%)	Total (%)
Desktop	NA	1(1.25)	7(8.75)	8(10)
	No, and I do not plan to buy one in the next 12 months	3(3.75)	24(30)	27(33.75)
	No, but I plan to buy one in the next 12 months	1(1.25)	3(3.75)	4(5)
	Yes	13(16.25)	28(35)	41(51.25)
Laptop	No, but I plan to buy one in the next 12 months	0(0)	3(3.75)	3(3.75)
	Yes	18(22.5)	59(73.75)	77(96.25)
Smartphone	NA	0(0)	2(2.5)	2(2.5)
	No, but I plan to buy one in the next 12 months	1(1.25)	0(0)	1(1.25)
	Yes	17(21.25)	60(75)	77(96.25)
Tablet (e.g., iPad)	NA	3(3.75)	8(10)	11(13.75)
	No, and I do not plan to buy one in the next 12 months	4(5)	22(27.5)	26(32.5)
	No, but I plan to buy one in the next 12 months	1(1.25)	10(12.5)	11(13.75)
	Yes	10(12.5)	22(27.5)	32(40)

MCE: N = 18; MIET: N = 62. Data in parentheses are percentages.

Table 3. ICT devices provided by the college and used by the faculty

Devices	Do you have access to any of these devices at your university?	MCE (%)	MIET (%)	Total (%)
Desktop	NA	1(1.25)	7(8.75)	8(10)
	No, my university does not allow me to use these	0(0)	2(2.5)	2(2.5)
	Yes, I use my personal device in the university	1(1.25)	3(3.75)	4(5)
	Yes, provided by the university	16(20)	50(62.5)	66(82.5)
Laptop	NA	1(1.25)	1(1.25)	2(2.5)
	No, my university does not allow me to use these	1(1.25)	2(2.5)	3(3.75)
	Yes, I use my personal device in the university	2(2.5)	42(52.5)	44(55)
	Yes, provided by the university	14(17.5)	17(21.25)	31(38.75)
Smartphone	NA	2(2.5)	5(6.25)	7(8.75)
	No, my university does not allow me to use these	0(0)	4(5)	4(5)
	Yes, I use my personal device in the university	11(13.75)	49(61.25)	60(75)
	Yes, provided by the university	5(6.25)	4(5)	9(11.25)
Tablet (e.g., iPad)	NA	7(8.75)	18(22.5)	25(31.25)
	No, my university does not allow me to use these	4(5)	12(15)	16(20)
	Yes, I use my personal device in the university	4(5)	26(32.5)	30(37.5)
	Yes, provided by the university	3(3.75)	6(7.5)	9(11.25)
	Total	18(22.5)	62(77.5)	80(100)

MCE: N = 18; MIET: N = 62. Data in parentheses are percentages.

The data in Table 3 show that with respect to ICT devices provided by the college, 83% of the faculty used desktop computers in their workplace, 39% used laptops and only 11% used a tablet. An interesting point to emerge from this data was that almost 55% of the faculty brought their own laptops to the workplace to complete their work. Hence, laptops appear to be the preferred choice for the faculty in both organisations.

b. Internet access

Around 96% of the faculty had Internet connectivity at both home and workplace. Over 50% of the faculty accessed Internet on their smartphones, and about 39% used laptops (Tables 4 and 5).

Table 4. Internet access by location

Where do you access the Internet?	Yes / No	MCE (%)	MIET (%)	Total (%)
Home	No	1(1.25)	2(2.5)	3(3.75)
	Yes	17(21.25)	60(75)	77(96.25)
Office	No	0(0)	5(6.25)	5(6.25)
	Yes	18(22.5)	57(71.25)	75(93.75)
Do not access	No	18(22.5)	62(77.5)	80(100)
	Yes	0	0	0

MCE: N = 18; MIET: N = 62. Data in parentheses are percentages.

Table 5. Internet access by device

Device	MCE (%)	MIET (%)	Total (%)
Desktop computer	5(6.25)	1(1.25)	6(7.5)
Laptop	5(6.25)	26(32.5)	31(38.75)
Smartphone	7(8.75)	35(43.75)	42(52.5)
Tablet or iPad	1(1.25)	0(0)	1(1.25)

MCE: N = 18; MIET: N = 62. Data in parentheses are percentages.

Table 6. Internet connectivity and access on campus

Location	Option	MCE (%)	MIET (%)	Total (%)
Broadband Internet connectivity on your campus	NA	4(5)	3(3.75)	7(8.75)
	Yes	14(17.5)	59(73.75)	73(91.25)
Classrooms	No	0(0)	23(28.75)	23(28.75)
	Yes	18(22.5)	39(48.75)	57(71.25)
Library	No	1(1.25)	23(28.75)	24(30)
	Yes	17(21.25)	39(48.75)	56(70)
Hostels	No	10(12.5)	59(73.75)	69(86.25)
	Yes	8(10)	3(3.75)	11(13.75)
Faculty rooms	No	0(0)	4(5)	4(5)
	Yes	18(22.5)	58(72.5)	76(95)
Laboratories	No	10(12.5)	27(33.75)	37(46.25)
	Yes	8(10)	35(43.75)	43(53.75)
Reception lounge	No	9(11.25)	48(60)	57(71.25)
	Yes	9(11.25)	14(17.5)	23(28.75)
Seminar halls	No	4(5)	32(40)	36(45)
	Yes	14(17.5)	30(37.5)	44(55)
Students' common room	No	6(7.5)	47(58.75)	53(66.25)
	Yes	12(15)	15(18.75)	27(33.75)
Open areas	No	9(11.25)	41(51.25)	50(62.5)
	Yes	9(11.25)	21(26.25)	30(37.5)

MCE: N = 18; MIET: N = 62. Data in parentheses are percentages.

The survey also revealed that over 90% of the faculty had access to high-speed Internet via broadband connectivity and Wi-Fi at their home and workplace. High-speed Internet connectivity was also available in classrooms, libraries, faculty rooms and laboratories, along with shared areas such as seminar halls, common rooms, etc. Over 97% of faculty indicated they had campus-wide Wi-Fi Internet connectivity. The data are presented in Tables 6 and 7.

Table 7. Wi-Fi access on campus

Variable	Option	MCE	MIET	Total (%)
Wi-Fi Access	No	0(0)	2(2.5)	2(2.5)
	Yes	18(22.5)	60(75)	78(97.5)

MCE: N = 18; MIET: N = 62. Data in parentheses are percentages.

c. Use of ICT

In terms of the usage of various ICT applications, it was found that for Microsoft Office applications, 24% of faculty had trainer-level skills, 53% advanced skills and 15% intermediate skills, while only 8% of faculty indicated having basic skills. Similarly, the percentage of faculty who had advanced skills in PowerPoint presentations was about 74%, whereas only 57% had high-level skills in Excel. With regards to using email, over 86% of the faculty had advanced or trainer-level skills. However, an interesting outcome of the survey was that faculty lacked the skills required for multimedia authoring, video and audio editing, graphic editing and webpage design, with 60% of the faculty expressing they had only basic or intermediate skills. The faculty indicated being comfortable with using a learning management system (LMS) and social media networks, with over 70% identifying as having intermediate, advanced or trainer-level skills. Webpage design emerged as a weak area (Table 8).

Table 8. Faculty's comfort level with using ICT

Computer-Related Activities	Level	MCE (%)	MIET (%)	Total (%)
Word processor (e.g., Microsoft Word)	N/A	0	0	0
	User level (basic)	2(2.5)	4(5)	6(7.5)
	User level (intermediate)	1(1.25)	11(13.75)	12(15)
	User level (advanced)	12(15)	31(38.75)	43(53.75)
	Expertise level (trainer)	3(3.75)	16(20)	19(23.75)
Spreadsheets (e.g., Microsoft Excel)	N/A	1(1.25)	0(0)	1(1.25)
	User level (basic)	3(3.75)	6(7.5)	9(11.25)
	User level (intermediate)	8(10)	16(20)	24(30)
	User level (advanced)	4(5)	28(35)	32(40)
	Expertise level (trainer)	2(2.5)	12(15)	14(17.5)
Presentation (e.g., Microsoft PowerPoint)	N/A	0	0	0
	User level (basic)	2(2.5)	3(3.75)	5(6.25)
	User level (intermediate)	3(3.75)	13(16.25)	16(20)
	User level (advanced)	10(12.5)	32(40)	42(52.5)
	Expertise level (trainer)	3(3.75)	14(17.5)	17(21.25)
Email	User level (basic)	2(2.5)	1(1.25)	3(3.75)
	User level (intermediate)	1(1.25)	7(8.75)	8(10)
	User level (advanced)	9(11.25)	37(46.25)	46(57.5)
	Expertise level (trainer)	6(7.5)	17(21.25)	23(28.75)
Databases	N/A	1(1.25)	3(3.75)	4(5)
	User level (basic)	3(3.75)	12(15)	15(18.75)
	User level (intermediate)	6(7.5)	11(13.75)	17(21.25)
	User level (advanced)	6(7.5)	21(26.25)	27(33.75)
	Expertise level (trainer)	2(2.5)	13(16.25)	15(18.75)

Computer-Related Activities	Level	MCE (%)	MIET (%)	Total (%)
Multimedia authoring	N/A	1(1.25)	6(7.5)	7(8.75)
	User level (basic)	4(5)	14(17.5)	18(22.5)
	User level (intermediate)	3(3.75)	13(16.25)	16(20)
	User level (advanced)	10(12.5)	18(22.5)	28(35)
	Expertise level (trainer)	0(0)	6(7.5)	6(7.5)
Graphic editing	N/A	4(5)	12(15)	16(20)
	User level (basic)	5(6.25)	19(23.75)	24(30)
	User level (intermediate)	5(6.25)	14(17.5)	19(23.75)
	User level (advanced)	4(5)	9(11.25)	13(16.25)
	Expertise level (trainer)	0(0)	4(5)	4(5)
Digital audio	N/A	2(2.5)	9(11.25)	11(13.75)
	User level (basic)	6(7.5)	17(21.25)	23(28.75)
	User level (intermediate)	6(7.5)	13(16.25)	19(23.75)
	User level (advanced)	4(5)	12(15)	16(20)
	Expertise level (trainer)	0(0)	4(5)	4(5)
Video editing	N/A	6(7.5)	14(17.5)	20(25)
	User level (basic)	5(6.25)	18(22.5)	23(28.75)
	User level (intermediate)	4(5)	14(17.5)	18(22.5)
	User level (advanced)	2(2.5)	8(10)	10(12.5)
	Expertise level (trainer)	1(1.25)	3(3.75)	4(5)
Webpage design	N/A	10(12.5)	22(27.5)	32(40)
	User level (basic)	4(5)	9(11.25)	13(16.25)
	User level (intermediate)	1(1.25)	13(16.25)	14(17.5)
	User level (advanced)	3(3.75)	9(11.25)	12(15)
	Expertise level (trainer)	0(0)	4(5)	4(5)
Learning management system	N/A	2(2.5)	7(8.75)	9(11.25)
	User level (basic)	2(2.5)	15(18.75)	17(21.25)
	User level (intermediate)	10(12.5)	14(17.5)	24(30)
	User level (advanced)	2(2.5)	16(20)	18(22.5)
	Expertise level (trainer)	2(2.5)	6(7.5)	8(10)
Web 2.0 tools (wikis, blogs, social networks)	N/A	0(0)	5(6.25)	5(6.25)
	User level (basic)	3(3.75)	15(18.75)	18(22.5)
	User level (intermediate)	9(11.25)	19(23.75)	28(35)
	User level (advanced)	5(6.25)	13(16.25)	18(22.5)
	Expertise level (trainer)	1(1.25)	7(8.75)	8(10)

MCE: N = 18; MIET: N = 62. Data in parentheses are percentages.

d. Social media

As indicated in Table 9, Facebook was the most commonly used social media platform, with over 90% of the faculty using it for status updates and social interactions. This was followed by Twitter and Google+, with around 50% of faculty using these platforms. Blogs were the least preferred forms of social media, with over 85% of faculty not using them. About 45% used platforms such as SlideShare and photo-sharing platforms such as Instagram and Flickr. Academic sites such as Academia and ResearchGate were being used by almost 70% of the faculty.

Table 9. Faculty’s social media platform preferences

Social Media Platforms	Use	MCE (%)	MIET (%)	Total (%)
Facebook	No	0(0)	7(8.75)	7(8.75)
	Yes	18(22.5)	55(68.75)	73(91.25)
Twitter	No	9(11.25)	33(41.25)	42(52.5)
	Yes	9(11.25)	29(36.25)	38(47.5)
Google+	No	9(11.25)	27(33.75)	36(45)
	Yes	9(11.25)	35(43.75)	44(55)
Blog (using Blogger or WordPress or within institutional website/CMS)	No	16(20)	52(65)	68(85)
	Yes	2(2.5)	10(12.5)	12(15)
SlideShare or similar presentation platform	No	5(6.25)	40(50)	45(56.25)
	Yes	13(16.25)	22(27.5)	35(43.75)
Photo sharing (Instagram/Flickr/Picasa Web, etc.)	No	8(10)	33(41.25)	41(51.25)
	Yes	10(12.5)	29(36.25)	39(48.75)
Research sharing site (Academia.edu, Researchgate.net, etc.)	No	6(7.5)	19(23.75)	25(31.25)
	Yes	12(15)	43(53.75)	55(68.75)
Social bookmarking sites (Delicious, Scoop.it, Pinterest, etc.)	No	11(13.75)	52(65)	63(78.75)
	Yes	7(8.75)	10(12.5)	17(21.25)
Goodreads.com (for connecting with authors and readers) or similar	No	15(18.75)	53(66.25)	68(85)
	Yes	3(3.75)	9(11.25)	12(15)

MCE: N = 18; MIET: N = 62. Data in parentheses are percentages.

e. Experience with TEL environment

Questions on the overall TEL environment had a six-point rating scale, and the results of this section are reported in terms of mean scores for faculty experience with using the various technology resources (Table 10).

Table 10. Faculty experience with using various technology resources

TEL Environment	MCE	MIET	Total
e-Classroom facilities (e.g., computers, projection systems, lecture capture systems, SMART boards, etc.)	4.44	4.31	4.34
Computer labs (for practical and Internet access)	4.28	4.44	4.4
Email services (institutional)	4.81	4.65	4.68
Learning management system (e.g., Moodle, etc.)	4.28	4.2	4.22
ePortfolio	3.83	3.83	3.83
Network bandwidth/speed of Internet (download and upload)	4.39	4.27	4.3
Wi-Fi access	4.5	4.08	4.18
Online or virtual technologies (e.g., network or cloud-based file storage system, Web portals, etc.)	4.06	4.18	4.15
Access to software (e.g., MATLAB, GIS applications, statistical software, qualitative data analysis, graphics software, textual or image analysis applications, etc.)	3.67	4.05	3.96
Download and use of free and open-source software for teaching and learning	4.33	4.32	4.32
Support for maintenance and repair of ICT	4.22	4.27	4.26
Total	4.26	4.24	4.24

Data represent mean scores.

Table 10 shows that most of the technology resources have a high mean score, indicating faculty in both the institutions were experienced in using e-classroom facilities, the computer labs, the institution’s email service and the LMS. The faculty also rated as very good the Internet speed, Wi-Fi connectivity, use of virtual technologies, download and use of free open-source software, and support

and maintenance for ICT facilities at their workplaces. The two aspects that received low experience ratings from faculty are the use of ePortfolio services and access to software for various applications such as MATLAB, statistical software, qualitative data analysis, image analysis, etc.

2.3 Use of ICT for teaching and learning

a. Nature of classroom teaching

The results in Table 11 show that 50% of the faculty had conducted traditional face-to-face classes, 41% had been conducting classes through a completely online mode, and 72% had used a blended mode for teaching and learning in their classrooms.

Table 11. Nature of classroom teaching

Nature of Classes	Use	MCE (%)	MIET (%)	Total (%)
Traditional face-to-face	No	10(12.5)	30(37.5)	40(50)
	Yes	10(12.5)	30(37.5)	40(50)
Completely online	No	11(13.75)	36(45)	47(58.75)
	Yes	7(8.75)	26(32.5)	38(41.25)
Blended, where some study components are done online	No	4 (5)	18(22.5)	22(27.5)
	Yes	14(17.5)	44(55)	58(72.5)

MCE: N = 18; MIET: N = 62. Data in parentheses are percentages.

b. Usage of digital resources/platforms

To understand faculty preferences in the use of digital resources/platforms for teaching purposes, a descriptive analysis was done. The results are presented in Table 12.

Table 12. Usage of digital resources/ platform

Types of Resources	MCE	MIET	Total
Presentations (e.g., PowerPoint, including from online sources)	3.28	3.32	3.31
Word files (activity sheets/handouts/notes)	3	3.05	3.04
Digital films/video (e.g., YouTube)	2.5	2.39	2.41
Audio recordings	2	2.03	2.03
Simulations and 2D/3D animation	1.72	2.08	2
Learning management system	2.71	2.59	2.62
Blogs	1.33	1.51	1.47
Social bookmarking	1.44	1.47	1.47
Microblogging (Twitter, Facebook, etc.)	2.06	1.55	1.67
Open textbooks	2.39	2.5	2.47
Open-access research papers	2.72	2.58	2.61

Data represent mean scores (4 = always, 3 = often, 2 = sometimes, 1 = rarely, 0 = never).

The data given in Table 12 show that the teachers in both institutions were most often using digital resources such as PowerPoint presentations and Word files to provide activity sheets and handouts. The second most preferred resources were YouTube, the LMS, open textbooks and open-access research papers, and audio recordings. Teachers rarely used blogs, social bookmarking sites, or microblogging sites such as Twitter and Facebook in the teaching-learning process.

c. Awareness and usage of OER

Almost 96% of the faculty members were aware of open educational resources (Table 13). This is a positive sign for further integrating OER in teaching and learning.

Table 13. OER awareness amongst faculty

OER Awareness	MCE (%)	MIET (%)	Total (%)
No	0	3(3.75)	3(3.75)
Yes	18(22.5)	59(73.75)	77(96.25)

MCE: N = 18; MIET: N = 62. Data in parentheses are percentages.

Table 14. Usage of OER platforms in teaching and learning

OER Platforms/Sources	MCE	MIET	Total
OER Commons	2.44	2.11	2.2
Saylor Academy	1.56	1.51	1.52
Wiki Educator	2.17	2	2.04
OpenStax College	1.61	1.5	1.53
BCcampus open textbooks	1.56	1.49	1.51
NPTEL, India	2.22	3.44	3.16
MIT OpenCourseWare	1.67	2.31	2.14
Open Learn, UK	1.72	1.82	1.79
College Open Textbook	1.67	2.24	2.09
Directory of Open Access Journals	2.5	2.3	2.35
Director of Open Access Books	2.22	2.16	2.18
MERLOT	1.5	1.52	1.51
Total	1.9	2.03	2.0

Data represent mean scores (4 = always, 3 = often, 2 = sometimes, 1 = rarely, 0 = never).

Data on teachers' usage of OER platforms in teaching and learning (Table 14) show the NPTEL platform was used by most of the faculty in both institutions on a very regular basis, as it has a mean score of 3.16. The faculty have sometimes used platforms such as OER Commons, WikiEducator, MIT OpenCourseWare, College Open Textbook, Directory of Open Access Journals, and Directory of Open Access Books. However, respondents had rarely used the Saylor Academy platform, OpenStax College, BCcampus open textbooks, OpenLearn UK or MERLOT. While OER awareness is high, teachers at MIER institutions are not necessarily using a diverse range of the resources available for teaching and learning.

d. Skills for integrating technologies in teaching–learning

When asked about skills for integrating various technologies in their teaching–learning processes, faculty reported having satisfactory abilities in using a learning management system such as Moodle, software such as Google Docs, e-books, online audio and video, lecture capture tools and social media sites. However, they indicated having little or no ability to use ePortfolio services (Table 15).

Table 15. Skills for integrating technologies in teaching–learning

Technologies	MCE	MIET	Total
Learning management system (e.g., Moodle)	1.9	2.0	2.0
Online collaboration tools (e.g., Adobe Connect, Google Docs)	2.5	2.6	2.6
ePortfolio	1.6	1.8	1.7
e-books/e-textbooks	2.6	2.8	2.8
Online video/audio	2.4	2.9	2.7
Educational games/simulations	2.1	2.1	2.1
Lecture capture tools	2.3	2.4	2.4
Accessibility tools (for people with disabilities)	1.5	1.5	1.5
Social media (blogs, wikis, etc.)	1.9	2.2	2.1

Data represent mean scores (0 = I can't use it, 1 = I can use it to a small extent, 2 = I can use it satisfactorily, 3 = I can use it well, 4 = I can use it very well).

Over 90% of the faculty indicated that they had received adequate training on the use of ICT for teaching and learning, and that they attended regular training programmes both online and on campus to learn about new technologies in education. They also had participated in massive open online courses (MOOCs) on various platforms, such as Coursera, Udacity, EdX, etc.

e. Training and staff development

The survey data on training and staff development show that 95% of faculty had received training on the use of ICT in teaching and learning. Over 97% indicated that the institution provides regular training on using ICT in teaching and learning and that they have participated in online training programmes. About 94% had attended MOOCs on various online platforms (see Table 16).

Table 16. Training and staff development

Area	Use	MCE (%)	MIET (%)	Total (%)
Have you received training on the use of ICT for teaching and learning?	No	1(1.25)	3(3.75)	4(5)
	Yes	17(21.25)	59(73.75)	76(95)
Does your university/institution provide regular training on the use of new technologies for teaching and learning?	No	1(1.25)	1(1.25)	2(2.5)
	Yes	17(21.25)	61(76.25)	78(97.5)
Have you ever participated in any online training?	No	1(1.25)	1(1.25)	2(2.5)
	Yes	17(21.25)	61(76.25)	78(97.5)
Have you attended any massive open online courses (MOOCs)?	No	3(3.75)	2(2.5)	5(6.25)
	Yes	15(18.75)	60(75)	75(93.75)

MCE: N = 18; MIET: N = 62. Data in parentheses are percentages.

f. Policy issues related to TEL

For policy issues regarding TEL, a descriptive analysis of the data was done, and means were computed. Results are given in Table 17.

Table 17. Policy issues related to TEL

Policy issues	MCE	MIET	Total
Is there a policy for ICT use in teaching and learning in your university/institution?	2.44	3.0	2.87
Is there a strategy for technology-enabled learning in your university/institution?	2.83	2.98	2.95
Is there an ICT policy in your university/institution covering what technologies to use and not use for teaching and learning?	2.5	2.83	2.76
Is there a privacy and data protection policy in your university/institution?	2.67	2.81	2.78
Is there a policy on dealing with plagiarism in your university/institution?	2.72	2.57	2.6
Is there a policy on the use of open-source software in your university/institution?	2.5	2.71	2.66
Is there a system in place for the use of open-source software in your university/institution?	2.61	2.71	2.69
Is there a workflow and escalation procedure for repair and maintenance of ICT in your university/institution?	2.78	2.92	2.88
Totals	2.63	2.82	2.77

Note: Yes = 3, No = 2, Do not know = 1.

The mean scores are highest for statements on there being a policy for ICT usage, a strategy for TEL, a privacy policy, and a workflow and escalation procedure for the repair and maintenance of ICT in

the institute. Faculty gave low ratings for a data protection policy, a plagiarism policy, and an open-source software policy.

This shows that the institute needs to develop a holistic policy for TEL implementation that should be inclusive in nature and widely circulated.

2.4 Using ICT for research and scholarship

Data on the use of ICT in research and scholarship indicate that over 97% of the faculty agree access to subscription-based e-resources is being provided in the institutions. Regarding the regularity with which faculty accessed the libraries' e-resources, descriptive analysis via computation of mean scores was done. Table 18 shows that the highest mean scores were for accessing e-journals and e-books, followed by citation databases, e-newspapers, e-theses and dissertations, e-proceedings of conferences, and statistical databases. Most faculty indicated they rarely accessed patents databases.

Table 18. Access to e-resources in libraries

Library Resource	MCE	MIET	Total Mean Score
e-Journals	3.33	3.08	3.14
e-Books	3.39	3.31	3.33
Citation databases	3	2.43	2.57
e-Newspapers	3.06	2.7	2.78
e-Theses and dissertations	3	2.29	2.45
Patent databases	1.72	2.04	1.96
e-Proceedings of conferences	2.11	2.5	2.41
Statistical databases	2.39	2.11	2.18
Totals	2.75	2.56	2.6

Data represent mean scores (4 = always, 3 = often, 2 = sometimes, 1 = rarely, 0 = never).

The survey also assessed institutional support for research. Over 50% of faculty reported that they had access to data storage, citation management software and plagiarism detection software in their workplace. However, there was a lack of support when it came to data visualisation software, an institutional repository for sharing research, and funds to support open-access publications.

2.5 Perceptions of using TEL

a. Faculty attitudes towards technology

As demonstrated by the high mean values in Table 19, it can be said with confidence that most of the faculty agreed the use of TEL:

- solves many of their educational problems
- brings new opportunities for organising teaching and learning
- saves both time and effort and increases the flexibility of teaching and learning
- increases access to education and training
- increases their efficiency and enables collaborative learning
- enhances learner engagement and improves communication
- helps in integrating all forms of media
- enhances the pedagogic value their courses

Table 19. Faculty attitudes towards technology

Statement	MCE	MIET	Total Mean Score
TEL can solve many of our educational problems.	4.44	4.58	4.55
TEL will bring new opportunities for organising teaching and learning.	4.5	4.57	4.56
TEL saves time and effort for both teachers and students.	4.65	4.57	4.59
TEL increases access to education and training.	4.67	4.57	4.59
TEL increases my efficiency in teaching.	4.44	4.52	4.5
TEL enables collaborative learning.	4.44	4.52	4.5
TEL can engage learners more than other forms of learning.	4.17	4.34	4.3
TEL increases the quality of teaching and learning because it integrates all forms of media: print, audio, video and animation.	4.44	4.51	4.49
TEL enhances the pedagogic value of a course.	4.61	4.43	4.47
Universities should adopt more and more TEL for the benefit of their students.	4.56	4.28	4.34
Totals	4.47	4.47	4.47

Data represent mean scores (5 = strongly agree, 4 = agree, 3 = neither agree nor disagree, 2 = disagree, 1 = strongly agree).

b. Motivators for technology adoption

The survey showed that most of the faculty were motivated by the following factors, as the mean scores (see Table 20) were high for these:

- personal interest in technology
- intellectual challenge
- self-gratification
- better training on using technology in teaching–learning processes
- better Internet bandwidth and IT infrastructure at workplace
- helps in promotion and provides professional incentives
- quality of technical support
- peer recognition, prestige and status
- reduction in existing workload
- becoming a trendsetter for others by early adoption of technology

Table 20. Motivators for technology adoption

Motivator	MCE	MIET	Total Mean Score
Personal interest in using technology	4.39	4.25	4.28
Intellectual challenge	4.11	4.07	4.08
Self-gratification	4.22	4.05	4.09
Training on TEL	4.39	4.13	4.19
Better Internet bandwidth at workplace	4.22	4.13	4.15
Credit towards promotion	4.22	4.18	4.19
Professional incentives to use TEL	4.17	4.05	4.08
Technical support	4.22	4.13	4.15
Peer recognition, prestige and status	4.28	4.1	4.14
Improved infrastructure (hardware and software) deployment	4.22	4.2	4.21
Release time or reduction in existing workload	4.06	4.03	4.04
To be a trendsetter by early adoption of technology in education	4.11	4.21	4.18
Totals	4.22	4.13	4.15

c. Barriers to using TEL

The following barriers account for more than 70% of the responses with a mean score over 3 (see Table 21):

- concerns about students’ access to technology
- lack of training on TEL
- concerns about the quality of e-courses
- lack of incentives to use TEL
- inadequate availability of hardware and software
- concerns about faculty workload
- poor Internet access

Table 21. Barriers to the use of TEL

Barriers	MCE	MIET	Total Mean Score
Concern about faculty workload	3.5	3.07	3.17
Concern about students’ access to technology	3.61	3.13	3.24
Lack of training on TEL	3.39	2.95	3.05
Lack of technical support in the university	3.44	2.87	3
Lack of institutional TEL policy	3.44	2.72	2.88
Lack of professional prestige	3.5	2.67	2.86
Concern about the quality of e-courses	3.67	2.86	3.05
Lack of incentives to use TEL	3.56	2.88	3.04
Lack of credit towards promotion	3.61	2.81	3
Intimidated by technology	3.33	2.75	2.88
Concern about security issues on the Internet	3.28	2.97	3.04
Inadequate availability of hardware and software	3.56	3.03	3.15
Poor Internet access and networking in the university	3.67	3.14	3.26
Lack of time to develop e-courses	3.61	2.93	3.09
Lack of instructional design support for TEL	3.61	2.9	3.07
No role models to follow	3	2.69	2.76
Totals	3.5	3.0	3.03

2.6 Summary and implications

The faculty survey results can be summarised as follows:

1. The faculty is enthusiastic about using TEL in their classrooms, but they require more training programmes on the use of modern educational technologies, to improve their skills further.
2. The teachers feel motivated to use technology in their teaching–learning processes, but they require constant support and guidance to move ahead, especially in the use of various software and hardware options.
3. The faculty were interested in creating e-content in their respective subjects and wanted more training and support to accomplish this task.
4. With more focus on being online most of the time and using the Internet for their academic work, the faculty expressed concerns about data privacy and security issues.
5. The faculty also expressed the need for an inclusive policy for implementing TEL in the two institutions, one that can ensure the effective use of technology, be cognisant of teachers’ workloads, and provide opportunities to celebrate teachers as TEL champions.

Chapter 3: Survey on Learners' Use of Technology

3.1 Background information

Learners at MCE and MIET participated in a survey on the use of technology. A total of 1,462 students participated, of whom 273 were from MCE and 1,142 from MIET. Of the 1,462 respondents, 47 did not complete the survey. Approximately 94% of the learners were 25 or younger; 72% were undergraduates, while 26% were pursuing graduate or postgraduate programmes. The gender distribution was 40% female and 58% male. In terms of disciplines, 72% were in engineering and technology, 12% in the humanities and social sciences, 9% in commerce and management, and 3% in the natural sciences. With respect to study method, 29% indicated they were studying in a blended learning environment, 53% were studying completely online, and 17% were in a traditional face-to-face classroom environment. These data are presented in Tables 22–26.

Table 22. Ages of learners

Your age group	NA		MCE		MIET		Total	
	N	%	N	%	N	%	N	%
NA	7	0.48	0	0.00	3	0.21	10	0.68
21–25	25	1.71	197	13.47	709	48.50	931	63.68
26–30	4	0.27	55	3.76	11	0.75	70	4.79
31–35	0	0.00	8	0.55	0	0.00	8	0.55
36–40	0	0.00	1	0.07	1	0.07	2	0.14
Below 20	11	0.75	12	0.82	418	28.59	441	30.16
Totals	47	3.21	273	18.67	1142	78.11	1,462	100

NA: Not answered

Table 23. Level of study

Your level of study	NA		MCE		MIET		Total	
	N	%	N	%	N	%	N	%
NA	7	0.48	2	0.14	7	0.48	16	1.09
Graduate or postgraduate	12	0.82	189	12.93	179	12.24	380	25.99
Research	0	0.00	7	0.48	3	0.21	10	0.68
Undergraduate	28	1.92	75	5.13	953	65.18	1056	72.23
Totals	47	3.21	273	18.67	1142	78.11	1462	100

NA: Not answered

Table 24. Genders of learners

Gender	NA		MCE		MIET		Total	
	N	%	N	%	N	%	N	%
Female	20	1.37	248	16.96	324	22.16	592	40.49
Male	20	1.37	21	1.44	803	54.92	844	57.73
NA	7	0.48	4	0.27	15	1.03	26	1.78
Totals	47	3.21	273	18.67	1142	78.11	1462	100

NA: Not answered

Table 25: Learners' areas of study

Your faculty discipline	NA		MCE		MIET		Total	
	N	%	N	%	N	%	N	%
NA	14	0.96	13	0.89	7	0.48	34	2.33
Agriculture and Natural Resources	0	0.00	1	0.07	0	0.00	1	0.07
Commerce and Management	5	0.34	16	1.09	112	7.66	133	9.10
Engineering and Technology	21	1.44	18	1.23	1009	69.02	1048	71.68
Fine and Performing Arts	1	0.07	13	0.89	0	0.00	14	0.96
Health and Medical Services	1	0.07	1	0.07	2	0.14	4	0.27
Humanities	3	0.21	90	6.16	9	0.62	102	6.98
Natural Sciences	1	0.07	44	3.01	2	0.14	47	3.21
Social Sciences	1	0.07	77	5.27	1	0.07	79	5.40
Totals	47	3.21	273	18.67	1142	78.11	1462	100

NA: Not answered

Table 26. Nature of courses currently being studied

Most of the courses you are currently studying are:	NA		MCE		MIET		Total	
	N	%	N	%	N	%	N	%
NA	6	0.41	2	0.14	11	0.75	19	1.30
Blended, where some components of study are done online	11	0.75	159	10.88	247	16.89	417	28.52
Completely online	18	1.23	18	1.23	736	50.34	772	52.80
Traditional face-to-face	12	0.82	94	6.43	148	10.12	254	17.37
Totals	47	3.21	273	18.67	1142	78.11	1462	100

NA: Not answered

3.2 Access to and use of ICT

a. Ownership of and access to ICT

Results of the survey show that in terms of ownership of ICT devices, students preferred laptops and smartphones: 72% owned laptops and 17% were planning to buy a new one in the next 12 months; 97% owned a smartphone, while the rest were planning to purchase a new one shortly. Desktops and tablets were not popular in comparison (Table 27).

Table 27. Ownership of and access to ICT devices

Devices	Do you own any of these devices?	MCE		MIET		Total	
		N	%	N	%	N	%
Desktop	NA	30	2.05	129	8.82	164	11.22
	No, and I do not plan to buy one in the next 12 months	114	7.80	649	44.39	780	53.35
	No, but I plan to buy one in the next 12 months	32	2.19	125	8.55	163	11.15
	Yes	97	6.63	239	16.35	355	24.28
Laptop	NA	14	0.96	18	1.23	36	2.46
	No, and I do not plan to buy one in the next 12 months	46	3.15	87	5.95	135	9.23
	No, but I plan to buy one in the next 12 months	55	3.76	180	12.31	242	16.55
	Yes	158	10.81	857	58.62	1049	71.75
Smartphone	NA	3	0.21	10	0.68	17	1.16

	No, and I do not plan to buy one in the next 12 months	3	0.21	9	0.62	12	0.82
	No, but I plan to buy one in the next 12 months	11	0.75	10	0.68	21	1.44
	Yes	256	17.51	1113	76.13	1412	96.58
Tablet (e.g., iPad)	NA	32	2.19	136	9.30	174	11.90
	No, and I do not plan to buy one in the next 12 months	169	11.56	779	53.28	976	66.76
	No, but I plan to buy one in the next 12 months	40	2.74	158	10.81	206	14.09
	Yes	32	2.19	69	4.72	106	7.25

NA: Not answered

In terms of ICT device usage in the institution, over 60% of the students indicated using desktops, 50% used their own personal laptop, and more than 65% used their smartphone. Only 3% said tablets were being provided in the institution, making these the least preferred ICT device (Table 28).

Table 28. Ownership of and access to ICT devices used at the institution

Devices	Do you have access to any of these devices at your university?	MCE		MIET		Total	
		N	%	N	%	N	%
Desktop	NA	22	1.50	108	7.39	136	9.30
	No, my university does not allow me to use these	45	3.08	221	15.12	275	18.81
	Yes, I use my personal device in the university	34	2.33	129	8.82	169	11.56
	Yes, provided by the university	172	11.76	684	46.79	882	60.33
Laptop	NA	30	2.05	132	9.03	166	11.35
	No, my university does not allow me to use these	81	5.54	268	18.33	363	24.83
	Yes, I use my personal device in the university	90	6.16	604	41.31	716	48.97
	Yes, provided by the university	72	4.92	138	9.44	217	14.84
Smartphone	NA	25	1.71	122	8.34	151	10.33
	No, my university does not allow me to use these	40	2.74	220	15.05	272	18.60
	Yes, I use my personal device in the university	190	13.00	746	51.03	965	66.01
	Yes, provided by the university	18	1.23	54	3.69	74	5.06
Tablet (e.g., iPad)	NA	41	2.80	220	15.05	268	18.33
	No, my university does not allow me to use these	160	10.94	606	41.45	794	54.31
	Yes, I use my personal device in the university	59	4.04	282	19.29	351	24.01
	Yes, provided by the university	13	0.89	34	2.33	49	3.35

NA: Not answered

b. Internet access and usage

With regards to Internet access, over 90% of the learners used the Internet at their home, compared to only 22% using it at the institute. Only 2% did not have access to the Internet. In terms of the type of connectivity, 80% indicated they accessed the Internet on their mobile

devices, whereas only 56% had wireless broadband Internet connectivity at their home. Notably, over 80% did not know they had high-speed broadband Internet connectivity in their institution. When it came to accessing the Internet on campus, around 30% of learners had access in the classroom, 49% in a library, and 19% in the laboratories. Very few students accessed the Internet in the seminar halls, students' common room, open areas or hostels; overall, 56% indicated they used Wi-Fi Internet connectivity on campus (Table 29). When asked about the average amount of time they spent on Internet-related activities, almost 68% said they accessed the Internet for one to five hours daily (Table 30).

Table 29. Internet access in the institution

Variable	Option	MCE		MIET		Total	
		N	%	N	%	N	%
Classrooms	No	90	6.16	909	62.18	1034	70.73
	Yes	183	12.52	233	15.94	428	29.27
Library	No	140	9.58	576	39.40	743	50.82
	Yes	133	9.10	566	38.71	719	49.18
Hostels	No	239	16.35	1099	75.17	1380	94.39
	Yes	34	2.33	43	2.94	82	5.61
Faculty rooms	No	228	15.60	970	66.35	1242	84.95
	Yes	45	3.08	172	11.76	220	15.05
Laboratories	No	223	15.25	928	63.47	1185	81.05
	Yes	50	3.42	214	14.64	277	18.95
Reception lounge	No	246	16.83	1080	73.87	1369	93.64
	Yes	27	1.85	62	4.24	93	6.36
Seminar halls	No	222	15.18	1037	70.93	1301	88.99
	Yes	51	3.49	105	7.18	161	11.01
Students' common room	No	234	16.01	1082	74.01	1361	93.09
	Yes	39	2.67	60	4.10	101	6.91
Open areas	No	209	14.30	982	67.17	1232	84.27
	Yes	64	4.38	160	10.94	230	15.73

Table 30. Average Internet usage

Variable	Frequency	MCE		MIET		Total	
		N	%	N	%	N	%
On a daily basis, I use the Internet...	NA	2	0.14	11	0.75	17	1.16
	< 1 hour	38	2.60	125	8.55	166	11.35
	> 5 hours	26	1.78	202	13.82	234	16.01
	1–2 hours	113	7.73	426	29.14	556	38.03
	3–5 hours	89	6.09	334	22.85	440	30.10
	Do not use daily	5	0.34	44	3.01	49	3.35

NA: Not answered

3.3 Learners' ICT skills

Students were asked to rate their skills in various computer-related activities. The results of the survey are given in Table 31 and can be summarised as follows:

1. Over 40% of learners indicated being able to use Microsoft Office applications with ease, especially Word and PowerPoint, but they had poor skills in Excel and databases.
2. Over 70% considered themselves proficient in using email.

3. More than 75% indicated being deficient in multimedia authoring skills, which include graphic editing, audio and video editing, webpage design, and using a learning management system. They also had poor skills in using Web 2.0 tools.
4. Over 85% were confident about using online search engines in their studies.

Table 31. ICT skills in various computer-related activities

Activities	Level	NA		MCE		MIET		Total (80)	
		NA	%	N	%	N	%	N	%
Word processor (e.g., Microsoft Word)	NA	4	0.03	6	0.04	21	0.14	31	0.21
	I can use it satisfactorily	12	0.08	52	0.36	271	1.85	335	2.29
	I can use it to a small extent	5	0.03	73	0.50	246	1.68	324	2.22
	I can use it very well	7	0.05	41	0.28	183	1.25	231	1.58
	I can use it well	9	0.06	77	0.53	318	2.18	404	2.76
	I can't use it	10	0.07	24	0.16	103	0.70	137	0.94
Spreadsheets (e.g., Microsoft Excel)	NA	4	0.03	5	0.03	21	0.14	30	0.21
	I can use it satisfactorily	8	0.05	45	0.31	295	2.02	348	2.38
	I can use it to a small extent	11	0.08	82	0.56	301	2.06	394	2.69
	I can use it very well	3	0.02	20	0.14	129	0.88	152	1.04
	I can use it well	8	0.05	50	0.34	248	1.70	306	2.09
	I can't use it	13	0.09	71	0.49	148	1.01	232	1.59
Presentation (e.g., Microsoft PowerPoint)	NA	4	0.03	6	0.04	26	0.18	36	0.25
	I can use it satisfactorily	7	0.05	45	0.31	264	1.81	316	2.16
	I can use it to a small extent	10	0.07	50	0.34	188	1.29	248	1.70
	I can use it very well	6	0.04	77	0.53	242	1.66	325	2.22
	I can use it well	13	0.09	72	0.49	327	2.24	412	2.82
	I can't use it	7	0.05	23	0.16	95	0.65	125	0.85
Email	NA	5	0.03	4	0.03	17	0.12	26	0.18
	I can use it satisfactorily	6	0.04	45	0.31	210	1.44	261	1.79
	I can use it to a small extent	4	0.03	37	0.25	71	0.49	112	0.77
	I can use it very well	14	0.10	88	0.60	428	2.93	530	3.63
	I can use it well	16	0.11	89	0.61	398	2.72	503	3.44
	I can't use it	2	0.01	10	0.07	18	0.12	30	0.21
Databases	NA	4	0.03	8	0.05	42	0.29	54	0.37
	I can use it satisfactorily	10	0.07	50	0.34	239	1.63	299	2.05
	I can use it to a small extent	8	0.05	78	0.53	323	2.21	409	2.80
	I can use it very well	1	0.01	15	0.10	73	0.50	89	0.61
	I can use it well	10	0.07	45	0.31	154	1.05	209	1.43
	I can't use it	14	0.10	77	0.53	311	2.13	402	2.75
Multimedia authoring	NA	4	0.03	8	0.05	48	0.33	60	0.41
	I can use it satisfactorily	10	0.07	53	0.36	227	1.55	290	1.98
	I can use it to a small extent	9	0.06	65	0.44	293	2.00	367	2.51
	I can use it very well	2	0.01	22	0.15	64	0.44	88	0.60
	I can use it well	12	0.08	53	0.36	164	1.12	229	1.57
	I can't use it	10	0.07	72	0.49	346	2.37	428	2.93
Graphic editing	NA	4	0.03	7	0.05	36	0.25	47	0.32
	I can use it satisfactorily	4	0.03	49	0.34	147	1.01	200	1.37
	I can use it to a small extent	12	0.08	71	0.49	305	2.09	388	2.65
	I can use it very well	1	0.01	11	0.08	35	0.24	47	0.32
	I can use it well	5	0.03	23	0.16	114	0.78	142	0.97
	I can't use it	21	0.14	112	0.77	505	3.45	638	4.36
Digital audio	NA	4	0.03	6	0.04	44	0.30	54	0.37
	I can use it satisfactorily	5	0.03	40	0.27	160	1.09	205	1.40
	I can use it to a small extent	11	0.08	80	0.55	304	2.08	395	2.70

	I can use it very well	2	0.01	13	0.09	47	0.32	62	0.42
	I can use it well	6	0.04	49	0.34	111	0.76	166	1.14
	I can't use it	19	0.13	85	0.58	476	3.26	580	3.97
Video editing	NA	4	0.03	6	0.04	31	0.21	41	0.28
	I can use it satisfactorily	9	0.06	41	0.28	237	1.62	287	1.96
	I can use it to a small extent	9	0.06	85	0.58	324	2.22	418	2.86
	I can use it very well	3	0.02	19	0.13	103	0.70	125	0.85
	I can use it well	10	0.07	46	0.31	192	1.31	248	1.70
	I can't use it	12	0.08	76	0.52	255	1.74	343	2.35
Webpage design	NA	4	0.03	8	0.05	34	0.23	46	0.31
	I can use it satisfactorily	7	0.05	29	0.20	162	1.11	198	1.35
	I can use it to a small extent	10	0.07	64	0.44	275	1.88	349	2.39
	I can use it very well	4	0.03	4	0.03	44	0.30	52	0.36
	I can use it well	4	0.03	24	0.16	113	0.77	141	0.96
	I can't use it	18	0.12	144	0.98	514	3.52	676	4.62
Learning management system	NA	4	0.03	7	0.05	49	0.34	60	0.41
	I can use it satisfactorily	9	0.06	52	0.36	206	1.41	267	1.83
	I can use it to a small extent	6	0.04	78	0.53	297	2.03	381	2.61
	I can use it very well	1	0.01	13	0.09	38	0.26	52	0.36
	I can use it well	9	0.06	35	0.24	93	0.64	137	0.94
	I can't use it	18	0.12	88	0.60	459	3.14	565	3.86
Web 2.0 tools (wikis, blogs, social networking)	NA	4	0.03	7	0.05	39	0.27	50	0.34
	I can use it satisfactorily	7	0.05	51	0.35	231	1.58	289	1.98
	I can use it to a small extent	10	0.07	86	0.59	290	1.98	386	2.64
	I can use it very well	2	0.01	11	0.08	105	0.72	118	0.81
	I can use it well	10	0.07	40	0.27	158	1.08	208	1.42
	I can't use it	14	0.10	78	0.53	319	2.18	411	2.81
Search engine	NA	6	0.04	7	0.05	38	0.26	51	0.35
	I can use it satisfactorily	10	0.07	49	0.34	213	1.46	272	1.86
	I can use it to a small extent	7	0.05	46	0.31	185	1.27	238	1.63
	I can use it very well	6	0.04	43	0.29	269	1.84	318	2.18
	I can use it well	5	0.03	63	0.43	262	1.79	330	2.26
	I can't use it	13	0.09	65	0.44	175	1.20	253	1.73

NA: Not answered

a. Social media and technology-enabled resources

Students were also asked about their social media profiles and preferences. The data reveal that 90% of the students had a social media profile, with 63% on Facebook, 35% on Twitter and 47% on Google+. About 12% of learners used SlideShare or a similar presentation platform, 54% used Instagram or similar photo-sharing services, but less than 10% used blogging sites, academic and research sites, or sites connecting authors and readers, such as Goodreads.com (Table 32). Regarding the amount of time spent on social media, over 60% of the students spent one to five hours daily, and about 23% spent less than one hour (Table 33). Despite spending an average of two to three hours daily on social media, only 14% updated their social media status on a daily basis, whereas almost 60% updated it every seven to ten days. Few of them were part of any mailing lists or discussion forums.

Table 32. Social media platform preferences

Variable	Option	MCE		MIET		Total	
		N	%	N	%	N	%
Facebook	No	128	8.76	398	27.22	548	37.48
	Yes	145	9.92	744	50.89	914	62.52
Twitter	No	238	16.28	682	46.65	952	65.12
	Yes	35	2.39	460	31.46	510	34.88
Google+	No	116	7.93	637	43.57	772	52.80
	Yes	157	10.74	505	34.54	690	47.20
Blog (using Blogger or WordPress or within institutional website/CMS)	No	265	18.13	1069	73.12	1378	94.25
	Yes	8	0.55	73	4.99	84	5.75
SlideShare or similar presentation platform	No	210	14.36	1033	70.66	1285	87.89
	Yes	63	4.31	109	7.46	177	12.11
Photo sharing (Instagram/Flickr/Picasa Web, etc.)	No	123	8.41	526	35.98	668	45.69
	Yes	150	10.26	616	42.13	794	54.31
Research sharing site (Academia.edu, Researchgate.net, etc.)	No	224	15.32	1053	72.02	1320	90.29
	Yes	49	3.35	89	6.09	142	9.71
Social bookmarking sites (Delicious, Scoop.it, Pinterest, etc.)	No	220	15.05	968	66.21	1229	84.06
	Yes	53	3.63	174	11.90	233	15.94
Goodreads.com (for connecting with authors and readers) or similar	No	260	17.78	1095	74.90	1400	95.76
	Yes	13	0.89	47	3.21	62	4.24

Table 33. Time spent on social media

Variable	Frequency	MCE		MIET		Total	
		N	%	N	%	N	%
Time spent on social media daily	NA	5	0.34	70	4.79	79	5.40
	<1 hour	64	4.38	272	18.60	341	23.32
	>5 hours	12	0.82	49	3.35	65	4.45
	1–2 hours	121	8.28	486	33.24	626	42.82
	3–5 hours	54	3.69	190	13.00	258	17.65
	Do not use daily	17	1.16	75	5.13	93	6.36

NA: Not answered

Learners were asked about the availability of technology resources in the institution. Most of them indicated good accessibility for the following: e-classrooms, computer labs, email services, learning management systems, Internet bandwidth and Wi-Fi, cloud-based storage systems, downloading free and open-source software, maintenance support for ICT equipment, software services for citation management and plagiarism detection, access to e-journals, e-Books, e-newspapers, e-theses and e-dissertations. Students were not very aware of data visualisation software, patent databases or statistical databases. When asked about taking an online course, 77% reported undertaking an online course or MOOC in the past year, and almost 60% had enrolled in a MOOC, out of whom approximately 49% had completed it (Tables 34–36).

Table 34. Experience with various technology resources

Resources/Services/Spaces	NA	MCE	MIET	Total
eClassroom facilities (e.g., computers, projection systems, lecture capture systems, SMART boards)	3.6	3.87	3.41	3.51
Computer labs (for practical and Internet access)	3.79	3.92	3.47	3.57
Email services (institutional)	3.86	3.97	3.92	3.93
Learning management system (e.g., Moodle)	3.76	3.65	3.22	3.32
ePortfolio	3.05	3.1	2.99	3.01
Network bandwidth/speed of Internet (download and upload)	3.2	3.27	2.82	2.92
Wi-Fi access	3.07	3.23	2.5	2.66
Online or virtual technologies (e.g., network or cloud-based file storage system, web portals)	3.43	3.44	3.05	3.14
Access to software (e.g., MATLAB, GIS applications, statistical software, qualitative data analysis, graphics software, textual or image analysis programmes)	3.33	3.17	2.98	3.03
Download and use of free and open-source software for teaching and learning	3.37	3.51	3.05	3.15
Support for maintenance and repair of ICT	3.36	3.54	2.93	3.06
Access to data storage	3.36	3.36	2.96	3.05
Data visualisation software	3.36	3.27	2.86	2.96
Citation/reference management software	3.14	3.2	2.78	2.87
Plagiarism detection software	3.21	2.99	2.7	2.77
Institutional repository for research sharing	3.37	3.33	3.01	3.08
e-Journals	3.39	3.41	2.96	3.06
e-Books	3.43	3.47	3.29	3.33
Citation databases	3.12	3.09	2.74	2.82
Bibliographic databases	3.08	3.14	2.72	2.81
e-Newspapers	3.22	3.27	2.88	2.97
e-Theses and dissertations	3.12	3.15	2.7	2.8
Patent databases	3.05	3.06	2.78	2.84
e-Proceedings of conferences	3.29	3.21	2.91	2.98
Statistical databases	3.44	3.29	2.78	2.91

NA: Not answered

Table 35. Online courses undertaken

Variable	Answer	MCE		MIET		Total	
		N	%	N	%	N	%
Online courses	N/A	13	0.89	60	4.10	80	5.47
	No	76	5.20	175	11.97	257	17.58
	Yes	184	12.59	907	62.04	1125	76.95

Table 36. MOOCs undertaken during the last year

Variable	Answer	MCE		MIET		Total	
		N	%	N	%	N	%
MOOCs	NA	26	1.78	119	8.14	151	10.33
	No, and I do not know what a MOOC is	83	5.68	135	9.23	222	15.18
	No, but I do know what a MOOC is	45	3.08	101	6.91	154	10.53
	Yes, and I completed it	56	3.83	635	43.43	709	48.50
	Yes, but I didn't complete it	63	4.31	152	10.40	226	15.46

3.4 Perceptions about using TEL

Table 37 presents data on MCE and MIET students' perceptions about the use of technology in their studies. The findings can be summarised as follows:

1. The majority felt that the use of technology in their studies helped them achieve better results in their subject and gain a better understanding of the subject materials.
2. The high mean scores also show that the students thought technology helped them complete their work conveniently and explore many new topics they had not previously studied.
3. Most of the students said technology has helped them collaborate with other students, both on and off campus, and has improved their IT management skills. They also felt using technology and improving their IT skills would enhance their career and employment prospects in the long run.

Table 37. Learners' use of technology in their studies

Please rate the following statements about technology use in your studies:	NA	MCE	MIET	Total
It will help me get better results in my subjects	4.26	4.21	4.06	4.10
It will help me understand the subject material more deeply	4.05	4.11	4.04	4.06
It makes completing work in my subjects more convenient	4.14	4.11	4.01	4.03
It motivates me to explore many topics I may not have seen before	4.00	4.13	4.03	4.05
It allows me to collaborate with others easily, both on and outside of the campus	3.91	4.02	3.98	3.98
It will improve my IT/information management skills in general	4.00	4.05	4.02	4.02
It will improve my career or employment prospects in the long term	4.05	4.06	4.03	4.03
Totals	4.06	4.1	4.02	4.04

NA: Not answered

Students also rated the usefulness of technology in their studies. Table 38 provides the mean scores for their responses, which can be summarised as follows:

1. The majority identified the following activities as extremely helpful, and easily done using technology: designing and building web pages, creating multimedia presentations, creating video presentations, accessing online lectures and videos, accessing web-based material on mobile devices, and completing college and university formalities through mobile apps.
2. Learners found the following useful: instant messaging and chat services for communicating with teachers and students; using the Web to share digital files related to courses; using web conferencing facilities; and using social media for sharing information and collaborating. They also wanted to receive RSS alerts about course information, timetables, assessments (grades, marking sheets, etc.), and other academic developments through the institute's web portal.

3. Most of the students also wanted to receive pre-class discussion questions, access information through the institution's intranet, and employ an e-portfolio system to record their achievements for future use beyond the present course of study.

Table 38. Learners' perceptions about the usefulness of various technologies

Technology Use Questions	NA	MCE	MIET	Total
Design and build web pages as part of your course?	3.07	2.73	3.20	3.11
Create and present multimedia shows as part of your course requirements (e.g., PowerPoint)?	3.42	3.60	3.55	3.55
Create and present audio/video as part of your course requirements?	3.40	3.49	3.42	3.43
Download or access online radio/video recordings of lectures you could not attend?	3.47	3.66	3.74	3.72
Download or access online audio/video recordings to revise content of lectures you have already been to?	3.51	3.75	3.78	3.76
Download or access online audio/video recordings of supplementary content materials?	3.54	3.71	3.66	3.67
Use the Web to access university-based services (e.g., enrolment, paying fees)?	3.62	3.55	3.74	3.70
Use your mobile phone to access web-based university services or information (e.g., enrolment, paying fees)?	3.72	3.63	3.79	3.76
Use instant messaging/chat (e.g., Skype, Messenger, Hangout, etc.) on the Web to communicate/collaborate with other students in the course?	3.37	3.51	3.62	3.59
Use a social media networking platform (e.g., Facebook) on the Web to communicate/collaborate with other students on the course?	3.56	3.46	3.48	3.48
Use microblogging (such as Twitter) to share information about class-related activities?	3.17	3.03	3.15	3.13
Keep your own blog as part of your course requirements?	3.21	2.79	3.08	3.03
Use instant messaging/chat (e.g., Skype, Messenger, Hangout, etc.) on the Web to communicate with teachers and administrative staff from the course?	3.35	3.39	3.46	3.45
Contribute to another blog as part of your course requirements?	3.28	2.98	3.12	3.10
Use the Web to share digital files related to your course (e.g., photos, audio files, movies, digital documents, websites, etc.)?	3.63	3.53	3.54	3.54
Use web conferencing or video chat to communicate/collaborate with other students in the course?	3.63	3.64	3.51	3.54
Receive alerts about course information (e.g., timetable changes, release of new learning resources, changes in assessment) via RSS feeds on the Web?	3.12	3.58	3.54	3.54
Receive alerts about course information (e.g., timetable changes, release of new learning resources, changes in assessment) via text message on your mobile phone?	3.47	3.64	3.71	3.69
Contribute with other students to the development of a wiki as part of your course requirement?	3.30	3.37	3.33	3.34
Receive grades/marks from your lecturer via text message on your mobile phone?	3.65	3.53	3.62	3.60
Receive pre-class discussion questions from your lecturer via text message on your mobile phone?	3.49	3.46	3.63	3.60
Use a personal dashboard on the university intranet to access all your academic information related to courses, grades, etc.?	3.47	3.29	3.58	3.52
Use an e-portfolio system to record your achievements for future use beyond the course of your studies?	3.19	3.20	3.41	3.36
Totals	3.42	3.41	3.51	3.49

NA: Not answered

In the last section of the survey, the students were asked to indicate their level of agreement with statements about the usefulness of technology in education and their course. The results are presented in Table 39 and summarised as follows:

1. The majority indicated they get actively involved in courses that use technology, and it makes them feel more connected with teachers and students.
2. Almost 30% of the students said they were likely to skip classes when materials from course lectures were available online.
3. Over 60% agreed they were adequately prepared to use technology when they entered college, but almost 46% indicated technology interfered with their ability to concentrate and think deeply about subjects.
4. Over 55% were concerned that technology advances might lead to invasion of their privacy and were afraid of hacking and other issues related to cybersecurity.
5. Approximately 57% agreed that the use of mobile devices distracted teachers in the classroom, but indicated that the use of tablets or laptops in class improved their engagement with the content and instructions.
6. Almost 60% fully agreed that multitasking with technology affected their concentration and indicated they needed to keep their academic and social life on social media platforms such as Facebook and LinkedIn separate. About the same number felt their teachers should use and integrate more technology in their teaching.
7. Almost 70% agreed technology made them feel connected to what was going on in the college. However, 49% indicated that the use of mobile devices in classes distracted them from their work.

Table 39. Students' responses to technology-related statements

Statement	Agreement	NA		MCE		MIET		Total	
		N	%	N	%	N	%	N	%
I get more actively involved in courses that use technology	NA	4	0.27	5	0.34	83	5.68	92	6.29
	Agree	22	1.50	150	10.26	558	38.17	730	49.93
	Disagree	3	0.21	13	0.89	53	3.63	69	4.72
	Do not know	3	0.21	12	0.82	30	2.05	45	3.08
	Neither agree nor disagree	7	0.48	44	3.01	230	15.73	281	19.22
	Strongly agree	7	0.48	44	3.01	162	11.08	213	14.57
	Strongly disagree	1	0.07	5	0.34	26	1.78	32	2.19
I am more likely to skip classes when materials from course lectures are available online	NA	4	0.27	6	0.41	84	5.75	94	6.43
	Agree	15	1.03	80	5.47	258	17.65	353	24.15
	Disagree	13	0.89	95	6.50	280	19.15	388	26.54
	Do not know	4	0.27	8	0.55	43	2.94	55	3.76
	Neither agree nor disagree	6	0.41	48	3.28	329	22.50	383	26.20
	Strongly agree	3	0.21	12	0.82	63	4.31	78	5.34
	Strongly disagree	2	0.14	24	1.64	85	5.81	111	7.59
When I entered college, I was adequately prepared to use the technology needed in my courses	NA	4	0.27	7	0.48	83	5.68	94	6.43
	Agree	22	1.50	179	12.24	551	37.69	752	51.44
	Disagree	3	0.21	6	0.41	60	4.10	69	4.72
	Do not know	4	0.27	9	0.62	54	3.69	67	4.58
	Neither agree nor disagree	8	0.55	37	2.53	272	18.60	317	21.68
	Strongly agree	6	0.41	28	1.92	109	7.46	143	9.78
	Strongly disagree	0	0.00	7	0.48	13	0.89	20	1.37
Technology makes me feel connected to other students	NA	4	0.27	10	0.68	82	5.61	96	6.57
	Agree	20	1.37	154	10.53	632	43.23	806	55.13
	Disagree	0	0.00	5	0.34	33	2.26	38	2.60

	Do not know	4	0.27	7	0.48	22	1.50	33	2.26
	Neither agree nor disagree	6	0.41	32	2.19	178	12.18	216	14.77
	Strongly agree	13	0.89	57	3.90	178	12.18	248	16.96
	Strongly disagree	0	0.00	8	0.55	17	1.16	25	1.71
Technology makes me feel connected to teachers	NA	4	0.27	7	0.48	84	5.75	95	6.50
	Agree	19	1.30	162	11.08	611	41.79	792	54.17
	Disagree	0	0.00	8	0.55	43	2.94	51	3.49
	Do not know	4	0.27	3	0.21	16	1.09	23	1.57
	Neither agree nor disagree	8	0.55	28	1.92	179	12.24	215	14.71
	Strongly agree	11	0.75	61	4.17	192	13.13	264	18.06
	Strongly disagree	1	0.07	4	0.27	17	1.16	22	1.50
Technology interferes with my ability to concentrate and think deeply about subjects I care about	NA	4	0.27	8	0.55	92	6.29	104	7.11
	Agree	20	1.37	142	9.71	510	34.88	672	45.96
	Disagree	4	0.27	23	1.57	89	6.09	116	7.93
	Do not know	3	0.21	11	0.75	23	1.57	37	2.53
	Neither agree nor disagree	6	0.41	59	4.04	263	17.99	328	22.44
	Strongly agree	10	0.68	25	1.71	124	8.48	159	10.88
	Strongly disagree	0	0.00	5	0.34	41	2.80	46	3.15
I am concerned that technology advances may increasingly invade my privacy	NA	4	0.27	9	0.62	96	6.57	109	7.46
	Agree	20	1.37	135	9.23	477	32.63	632	43.23
	Disagree	3	0.21	28	1.92	81	5.54	112	7.66
	Do not know	5	0.34	13	0.89	45	3.08	63	4.31
	Neither agree nor disagree	7	0.48	65	4.45	283	19.36	355	24.28
	Strongly agree	7	0.48	19	1.30	139	9.51	165	11.29
	Strongly disagree	1	0.07	4	0.27	21	1.44	26	1.78
I am concerned about cyber security (password protection and hacking)	NA	4	0.27	7	0.48	91	6.22	102	6.98
	Agree	16	1.09	156	10.67	516	35.29	688	47.06
	Disagree	1	0.07	13	0.89	48	3.28	62	4.24
	Do not know	7	0.48	16	1.09	46	3.15	69	4.72
	Neither agree nor disagree	7	0.48	40	2.74	220	15.05	267	18.26
	Strongly agree	12	0.82	39	2.67	205	14.02	256	17.51
	Strongly disagree	0	0.00	2	0.14	16	1.09	18	1.23
In-class use of mobile devices is distracting to my teacher	NA	4	0.27	12	0.82	95	6.50	111	7.59
	Agree	22	1.50	148	10.12	471	32.22	641	43.84
	Disagree	3	0.21	22	1.50	79	5.40	104	7.11
	Do not know	3	0.21	11	0.75	52	3.56	66	4.51
	Neither agree nor disagree	5	0.34	46	3.15	249	17.03	300	20.52
	Strongly agree	10	0.68	29	1.98	157	10.74	196	13.41
	Strongly disagree	0	0.00	5	0.34	39	2.67	44	3.01
Use of tablets/laptops in class improves my engagement with the content and class	NA	4	0.27	10	0.68	99	6.77	113	7.73
	Agree	21	1.44	147	10.05	506	34.61	674	46.10
	Disagree	0	0.00	15	1.03	71	4.86	86	5.88
	Do not know	3	0.21	13	0.89	41	2.80	57	3.90
	Neither agree nor disagree	10	0.68	57	3.90	284	19.43	351	24.01
	Strongly agree	8	0.55	27	1.85	114	7.80	149	10.19
	Strongly disagree	1	0.07	4	0.27	27	1.85	32	2.19
Multitasking with my technology devices sometimes prevents me from concentrating on or doing the work that is most important	NA	4	0.27	7	0.48	97	6.63	108	7.39
	Agree	21	1.44	165	11.29	503	34.40	689	47.13
	Disagree	2	0.14	19	1.30	80	5.47	101	6.91
	Do not know	4	0.27	11	0.75	50	3.42	65	4.45
	Neither agree nor disagree	9	0.62	55	3.76	294	20.11	358	24.49
	Strongly agree	6	0.41	15	1.03	99	6.77	120	8.21
	Strongly disagree	1	0.07	1	0.07	19	1.30	21	1.44

When it comes to social media (e.g., Facebook, Twitter, LinkedIn), I like to keep my academic life and social life separate	NA	4	0.27	7	0.48	89	6.09	100	6.84
	Agree	17	1.16	150	10.26	539	36.87	706	48.29
	Disagree	1	0.07	13	0.89	32	2.19	46	3.15
	Do not know	4	0.27	13	0.89	28	1.92	45	3.08
	Neither agree nor disagree	10	0.68	44	3.01	202	13.82	256	17.51
	Strongly agree	11	0.75	45	3.08	236	16.14	292	19.97
	Strongly disagree	0	0.00	1	0.07	16	1.09	17	1.16
I wish my teachers in the university would use and integrate more technology in their teaching	NA	4	0.27	9	0.62	91	6.22	104	7.11
	Agree	22	1.50	159	10.88	562	38.44	743	50.82
	Disagree	0	0.00	13	0.89	32	2.19	45	3.08
	Do not know	3	0.21	8	0.55	29	1.98	40	2.74
	Neither agree nor disagree	10	0.68	43	2.94	235	16.07	288	19.70
	Strongly agree	8	0.55	38	2.60	181	12.38	227	15.53
	Strongly disagree	0	0.00	3	0.21	12	0.82	15	1.03
Technology makes me feel connected to what's going on at the college/university	NA	4	0.27	6	0.41	88	6.02	98	6.70
	Agree	23	1.57	168	11.49	632	43.23	823	56.29
	Disagree	1	0.07	9	0.62	22	1.50	32	2.19
	Do not know	4	0.27	6	0.41	25	1.71	35	2.39
	Neither agree nor disagree	8	0.55	34	2.33	189	12.93	231	15.80
	Strongly agree	7	0.48	47	3.21	171	11.70	225	15.39
	Strongly disagree	0	0.00	3	0.21	15	1.03	18	1.23
In-class use of mobile devices is distracting to me	NA	4	0.27	6	0.41	88	6.02	98	6.70
	Agree	16	1.09	148	10.12	413	28.25	577	39.47
	Disagree	7	0.48	25	1.71	130	8.89	162	11.08
	Do not know	3	0.21	14	0.96	27	1.85	44	3.01
	Neither agree nor disagree	10	0.68	59	4.04	318	21.75	387	26.47
	Strongly agree	5	0.34	17	1.16	112	7.66	134	9.17
	Strongly disagree	2	0.14	4	0.27	54	3.69	60	4.10

3.5 Summary and implications

The findings of the student survey can be summarised as follows:

1. Students wish to have high-speed Wi-Fi access on campus, especially in common and open areas.
2. Students want more videos and interactive materials to be added to their lectures when teaching is being done through technology. They also want faculty to develop MOOCs and other e-content that will benefit students.
3. Students want an IT policy that is applicable to them and caters to their needs and requirements.
4. More OER should be developed for students and distributed through a common platform.
5. The institute should provide high-end software that can help students seek jobs in industry.
6. On the whole, the students enjoyed studying in a TEL environment. They were motivated to attend online classes and excited to use new technologies that enhanced their skills and made them ready for the world of work.
7. Males and females found the TEL environment equally stimulating and enriching and wanted more of such interventions in their day-to-day learning.

Chapter 4: Readiness of MIER Institutions

A survey was conducted at MCE and MIET to understand the TEL environments in both institutions. This chapter presents the resulting data.

4.1 Background information

a. Background

The data presented in Table 40 shows that both institutions have their respective websites and are not-for-profit organisations. A total of 350 students are enrolled at MCE and 1,400 at MIET. MCE has 22 faculty members and academic staff, while MIET has 110. Non-teaching and support staff number 16 at MCE and 120 at MIET.

Table 40. Background information about MCE and MIET

Background	MIER College of Education	Model Institute of Engineering and Technology
Website	miercollege.in	www.mietjmu.in
No. of students enrolled	350	1,400
Status	Private not-for-profit	Private not-for-profit
No. of non-teaching & support staff	16	120
Level of teaching	Graduate to PG, doctoral research	Graduate to PG
Number of faculty & academic staff employed	22	110

PG = postgraduate

4.2 Technology-enabled environment in the institutions

b. ICT infrastructure and Internet connectivity

In terms of the ICT infrastructure and Internet connectivity at both institutions, we can see from Table 41 that MCE has 150 desktop computers and MIET 650. Both institutions have very few tablets, while MCE has 45 laptops and MIET 50. The institutions have high-speed broadband Internet connectivity on their premises, which is made available for faculty, staff and students. The broadband Internet facilities are available in all classrooms, libraries, hostels, faculty rooms, laboratories, seminar halls and student common rooms. The Internet connectivity at both institutions is supplied by a private Internet service provider, and the current bandwidth is less than 1 Gbps. Wireless Internet connectivity through Wi-Fi is being provided on both campuses, with access control in place to restrict access to online content, as per the institute's policy. Both institutions have official profiles on social media, but neither has email-based discussion forums.

Table 41. ICT infrastructure and Internet connectivity at MCE and MIET

ICT Infrastructure and Internet Connectivity	MC	MIET
Number of desktop computers connected to the Internet	150	650
Number of tablets connected to the Internet	3	5
Number of laptops connected to the Internet	45	50
Broadband Internet connectivity on the premises	Yes	Yes
For whom is broadband Internet made available?	All except visitors	All except visitors
Where do you provide access to broadband Internet? Classrooms, library, hostels, faculty rooms, laboratories, reception lounge, seminar halls, students' common rooms, open areas	All	All
How do you get broadband Internet connectivity at the university/institution?	Through a private Internet service provider	Through a private Internet service provider
Current level of Internet bandwidth available in the university/institution	< 1 Gbps	< 1 Gbps
Do you have Wi-Fi or wireless Internet connectivity on campus?	Yes	Yes
Any access control in place for restricting any particular kind of online content from being accessed or downloaded?	Yes	Yes
If yes, what kind of content do you not allow users to access or download?	Massive downloads of videos, audio, references books, software; no adult content	Massive downloads of videos, audio, references books, software; no adult content
Does your university maintain any official profile/institutional group on social media platforms? Facebook, Twitter, Google+, YouTube, Vimeo or similar; blog (using Blogger or WordPress or within institutional website/CMS); email-based discussion forums; LinkedIn; institutional wiki pages; Flickr, Picasa Web, Instagram or similar photo-sharing sites	All except email- based discussion forums	All except email- based discussion forums

c. ICT facilities

Table 42 provides data on the ICT facilities at MCE and MIET. Both institutions have the requisite e-classroom facilities, and all classrooms contain adequate hardware, such as a PA system, LCD projector, SMART board, etc. MCE has 30 e-classrooms, while MIET has 45. The survey also shows that both institutions are involved in educational e-content creation. MIET has developed 400 pieces of e-content in the form of course-related textbooks as well as 100 audio lessons. MCE has not created such content but has generated over 350 video lessons and 30 multimedia lessons, which MIET has not. However, MIET has produced two online courses, whereas MCE has an institutional video channel on YouTube. Neither institution has an audio-visual repository or content-sharing platform. The e-content developed by the institutions is not made available under a Creative Commons licence.

Table 42. ICT facilities at MCE and MIET

ICT Facilities	MCE	MIET
e-Classroom facilities	Yes	Yes
Hardware in e-classroom facilities (PA system, LCD projector, SMART board)	All	All
Number of e-classrooms	30	45
Educational e-content creation	Yes	Yes
Number of e-content materials produced: course-related textbooks	0	400
Number of e-content materials produced: audio lessons	0	100
Number of e-content materials produced: video lessons	350	0
Number of e-content materials produced: multimedia lessons	30	0
Number of e-content materials produced: online courses	0	2
Do you participate in any e-content or audio-visual repository/content-sharing platform?	No	No
Do you have an institutional video channel?	Yes	No
Are the educational e-contents or audio-visual materials produced by your institute available with a Creative Common licence?	No	No

d. OER and MOOCs

Neither MCE nor MIET has an institutional repository for OER, nor have they produced any online courses, although MIET has offered three MOOCs. In terms of offering online courses, MIET has some that are completely online, while MCE has courses that are online but also have limited face-to-face contact. The data are presented in Table 43.

Table 43. OER and MOOCs at MCE and MIET

OER and MOOCs	MCE	MIET
Do you have an institutional repository for OER?	No	No
Has your institution produced or designed any online courses?	No	No
How many online courses (incl. MOOCs) do you offer in the current year?	0	3
What is the total number of learners studying online in your institution?	350	1,500
Nature of online courses: completely online	No	Yes
Nature of online courses: online (with limited face-to-face contact)	Yes	No

e. TEL facilities

The availability of TEL facilities at the institutions is shown in Table 44. Both have a majority of the facilities, such as e-classrooms, computer labs, email services, LMS, Wi-Fi facilities, support for maintenance and repair of ICT, e-newspapers, e-theses and dissertations, e-proceedings of conferences, etc. Unavailable are e-portfolios, online or virtual technologies, access to certain analytical software for data visualisation, citation databases, patent databases and statistical databases. According to the survey, many of these facilities are in the planning or creation phase at both institutions.

Table 44. TEL facilities at MCE and MIET

Technology-Enabled Learning Facilities	MCE	MIET
e-Classroom facilities (e.g., computers, projection systems, lecture capture systems, SMART boards, etc.)	Available	Available
Computer labs (for practical and Internet access)	Available	Available
Email services (institutional)	Available	Available
LMS	Available	Available
Wi-Fi access	Available	Available
Online or virtual technologies (e.g., network or cloud-based file storage system, Web portals, etc.)	Not available	Available
Access to software (e.g., MATLAB, GIS applications, statistical software, qualitative data analysis, graphics software, textual or image analysis programmes, etc.)	Not available	Available
Download and use of free and open-source software for teaching and learning	Available	Available
Support for maintenance and repair of ICT	Available	Available
Access to data storage	Available	Available
Data visualisation software	Not available	Available
Citation/reference management software	Available	Not available
Institutional repository for sharing research	Not available	Not available
Citation databases	Not available	Available
Bibliographic databases	Available	Planned
e-Newspapers	Available	Available
e-Theses and dissertations	Available	Not available
Patent databases	Not available	Planned
e-Proceedings of conferences	Available	Available
Statistical databases	Not available	Planned

f. Training on TEL

Training on TEL has been a strong point at the institutions. The data reported in Table 45 show that both have organised regular trainings for faculty and learners to use technology effectively. The trainings are usually arranged on a quarterly basis at MCE, while MIET organises them when required. The total number of hours spent on training varies, with MCE conducting about 20 hours of training in the last year compared with over 150 at MIET. In terms of the total number of teachers trained in the use of technology for teaching and learning, 70 were trained at MCE and 100 at MIET.

Table 45. TEL training at MCE and MIET

Training on TEL	MCE	MIET
Organise regular training for faculty and learners to use technology effectively?	Yes	Yes
How often do you organise training?	Quarterly	As required
Total hours of training organised in the last year (in hours)	20	150
Total number of teachers trained in using technology for teaching and learning	70	100

4.3 Institutional preparedness for TEL

Institutional preparedness data were collected using ten sets of criteria and several statements, which were coded as follows:

- 1 = strongly disagree or does not exist
- 2 = disagree or only marginally demonstrates existence

3 = neither agree nor disagree, or existence or otherwise is difficult to explain

4 = agree or it does exist

5 = strongly agree or it definitely exists and is well established

The data gathered from the two institutions are presented in Table 46 and discussed in the sub-sections below.

a. TEL policy issues

Data regarding TEL policy issues indicate this to be a weak area at both institutions. Some aspects of the policy are developed or being developed at MIET, but MCE has no concrete policy for ICT usage in teaching and learning, privacy and data protection, plagiarism, the use of OER, or workflows for escalating ICT repair and maintenance. Both institutions have marginally demonstrated the existence of policy documentation. MCE has a vision and mission statement regarding TEL. Neither institution has developed a strategic plan for TEL implementation.

b. IT support department

Each institution has an IT support department that carries out various functions, from procurement to installation and maintenance of technologies for teaching and learning. The institute has an ICT policy in place, which is implemented by a high-powered committee — a MCE, this is the Centre for Educational Technology. The head of the IT support department reports to the senior management and is responsible for the overall functioning of technology in the organisation. The IT support staff are well qualified to manage the technological requirements of the organisation, especially at MCE.

c. Technology, content and documentation

With regards to the availability of technology at MCE and MIET, the data presented in Table 46 suggest that both institutions have adequate hardware infrastructures for teaching and learning, adequate applications and software, adequate networking infrastructures and adequate provisions for protecting the privacy of organisational data. In terms of content, the data suggest that at MCE, there is support available for the creation of digital multimedia content, whereas MIET lacks this support. Both institutions lack instructional designers, but teachers have adequate access to an online system to develop courses for TEL. With regards to documentation, both institutions offer a variety of help to support teachers and students in using technology effectively. However, they lack storage as well as a means of sharing lessons learned in the implementation of TEL. The workflow processes and responsibilities for implementing TEL are not well documented in either organisation.

d. Organisational culture and leadership

The survey revealed a very positive culture at MCE and MIET, especially regarding TEL, as faculty and staff members are willing to learn about new technology, and to help and support each other; there is a culture of knowledge creation and sharing in both organisations. With regards to organisational leadership, there is a strong will to implement TEL, with the leadership itself being involved in the process. Senior management regularly review, monitor and evaluate the progress of TEL projects. The top leadership is also reportedly supportive of TEL implementation and encourages and motivates faculty to achieve their academic goals.

e. Human resources and TEL champions

The survey indicated that faculty members are qualified and trained to use technology for teaching and learning, they receive regular trainings to update their skills, and adequate staff are available to

support TEL in both organisations. While MCE has dedicated teams for TEL content development and delivery, and its ICT staff members are highly trained to provide the requisite support for TEL implementation, this is not the case at MIET.

Data on TEL champions show MCE and MIET have early adopters of TEL. However, when it comes to TEL champions who support and care about pedagogic innovations, who take leadership roles in developing appropriate policies, and who conduct research to disseminate good practices in TEL, such individuals are only available at MCE.

MCE has clearly expressed a great need to develop a policy and strategy at the institutional level. Most of their endeavours are somewhat documented, but an actual policy is missing. Such a policy would help them streamline technology implementation in classroom teaching and assessment. TEL processes need to be developed to institutionalise TEL practices.

Table 46. Scores in institutional preparedness for TEL at MIER

1	Policy	MCE	MIET
1.1	There is a well-documented TEL policy	2	2
1.2	The vision and mission of the TEL policy are aligned with the mission of the organisation	3	3
1.3	The vision and mission of the TEL policy are well understood across the organisation	3	3
1.4	There is a commitment on the part of institutional leaders to use technology to achieve strategic academic goals	4	4
	Category score	12	12
2	Strategic plan		
2.1	There is a strategic plan for the implementation of TEL	2	2
2.2	The strategic plan for TEL has measurable goals and outcomes	2	1
2.3	The strategic plan for TEL is approved by the senior management of the organisation and is supported by adequate financial provisions	2	2
	Category score	6	5
3	IT Support Department		
3.1	The organisation has an IT department that handles procurement, installation and maintenance of technologies for teaching and learning	4	5
3.2	There is an ICT policy in place, which is implemented by a high-powered committee in the organisation	3	3
3.3	The head of the IT support department reports to senior management and is responsible for the overall functioning of technology in the organisation	4	4
3.4	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	5
	Category score	15	17
4	Technology		
4.1	There is adequate hardware infrastructure for teaching and learning (e.g., access to computers for students and learners)	4	4
4.2	There are adequate applications and software for teaching and learning (e.g., access to appropriate software, intranet, LMS, etc.)	4	5
4.3	There is adequate networking infrastructure in the organisation (e.g., access to adequate bandwidth)	4	4
4.4	There are adequate policies and procedures in place to protect privacy and organisational data	2	2
	Category score	14	15
5	Content		
5.1	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	2

5.2	There are instructional designers in the organisation, or faculty members are trained to organise learning content appropriately	3	2
5.3	Teachers have adequate access to an online system to develop courses for TEL	2	3
	Category score	8	7
6	Documentation		
6.1	There is a variety of help available to support teachers and students in using technology effectively	4	4
6.2	Lessons learned in the implementation of TEL are stored and shared within the organisation for others to access and learn from	2	2
6.3	The workflow processes and responsibilities to implement TEL are well documented in the organisation	2	3
	Category score	8	9
7	Organisational Culture		
7.1	Faculty and staff members are willing to learn about new technology in the organisation	4	5
7.2	Faculty and staff members support each other easily	4	4
7.3	There is a culture of knowledge creation and sharing in the organisation	3	3
	Category score	11	12
8	Leadership		
8.1	Leaders in the organisation are involved in the implementation of TEL	4	5
8.2	Senior management in the organisation regularly review, monitor and evaluate the progress of TEL	4	4
8.3	The top leadership of the organisation is supportive of TEL and provides encouragement and motivation to the faculty and staff to achieve their academic goals	4	3
	Category score	12	12
9	Human Resources and Training		
9.1	Faculty members are qualified and trained to use technology for teaching and learning	4	4
9.2	Faculty and staff members receive regular training to update them in the use of TEL	4	3
9.3	There are adequate staff to support TEL	4	4
9.4	The organisation has a structure in place to create teams for TEL content development and delivery	3	3
9.5	Faculty members trust the help received from instructional designers and technology support staff while developing and delivering courses	3	3
9.6	The IT staff members are highly skilled and trained to provide the needed support	4	3
	Category score	22	20
10	TEL Champions		
10.1	There are early adopters of TEL in the organisation	4	4
10.2	There are TEL champions in the organisation who support and care about pedagogic innovations	3	3
10.3	There are faculty members who can take leadership roles in developing appropriate policies and a TEL strategy for the organisation	4	3
10.4	There are TEL champions to research and disseminate good practices in TEL	4	3
	Category score	15	13
	Overall score	123	122

For both MCE and MIET, the preparedness score falls between 95 and 129, which according to COL's TEL implementation handbook is in the range of "developing preparedness." This means the institutions have put in place some aspects of TEL processes, policies and infrastructures and are on the way to developing a robust system.

Chapter 5: Conclusions

The MIER institutions have been experimenting with a number of methodologies and tools for improving the classroom learning environment, especially at the teacher and technical education level, so that students' interest and curiosity are maintained and their learning is enhanced. When technology was integrated with day-to-day teaching and learning in the classroom, the students were more curious and interested in learning. The teachers also found it convenient to prepare and deliver lessons using multimedia technology, and the classroom environment consequently became livelier and more interactive. These small experiments with technology in light of modern educational trends over the years have motivated us to adopt various educational technologies in our institution, especially when the technology infrastructure in the state of Jammu and Kashmir was less modern than in the rest of the country. By adopting such technologies, we have been able to impact the lives of thousands of students, who are serving as key change agents and nation builders in various parts of India and other countries. Every year, students have been giving positive feedback about the adoption and use of technology in the institute, confirming the institute is a clear leader in the TEL space in Jammu and Kashmir.

The survey has brought to light various positives for the institute and also reveals areas that need further improvement and attention from management. The following are some of the key takeaways from the survey:

- While teachers and students feel there is an institutional TEL policy in place because of MIER's emphasis on using educational technology, an actual policy document is required to cover all aspects of ICT usage in education; in addition, a workflow process is needed for the IT maintenance and services being provided in the institutions.
- The IT infrastructure in both institutions requires improvement so that TEL can be practised on a daily basis in teaching–learning.
- A special effort needs to be made to improve Wi-Fi accessibility and enhance high-speed Internet access.
- Teachers and students have received a lot of training in TEL, but the training now has to focus upon key elements, such as developing MOOCs, using multimedia authoring tools, and learning to implement audio- and video-based digital learning materials in their teaching content and online assessments.
- More students and faculty need to be equipped with laptops or tablets to provide a better online learning experience. They should be able to access their learning resources remotely and through mobile applications.
- More technology-driven, smart classes and online learning platforms need to be developed to give further impetus to TEL in a real sense.
- Faculty competence in using the LMS needs to be enhanced through more training programmes, workshops and/or other resources. Faculty members need to be encouraged to use the LMS as their primary platform so they are exposed to the pedagogical aspects of TEL; this will give a further boost to blended learning in the institute.
- The institute needs to improve faculty and student awareness about OER and promote the use of OER to improve the teaching–learning process. A platform needs to be developed so stakeholders can share their teaching and learning materials as OER.

Key recommendations

1. A robust policy for TEL implementation is needed.
2. LMS use needs to be improved, and a Moodle-based system needs to be developed.
3. An OER repository is needed to share knowledge resources created by faculty.
4. While C-DELTA has already been adopted at MIER institutions to help students develop digital competencies, faculty and student capacities in TEL need to be further enhanced.
5. More courses using blended learning need to be offered at MIER institutions.

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