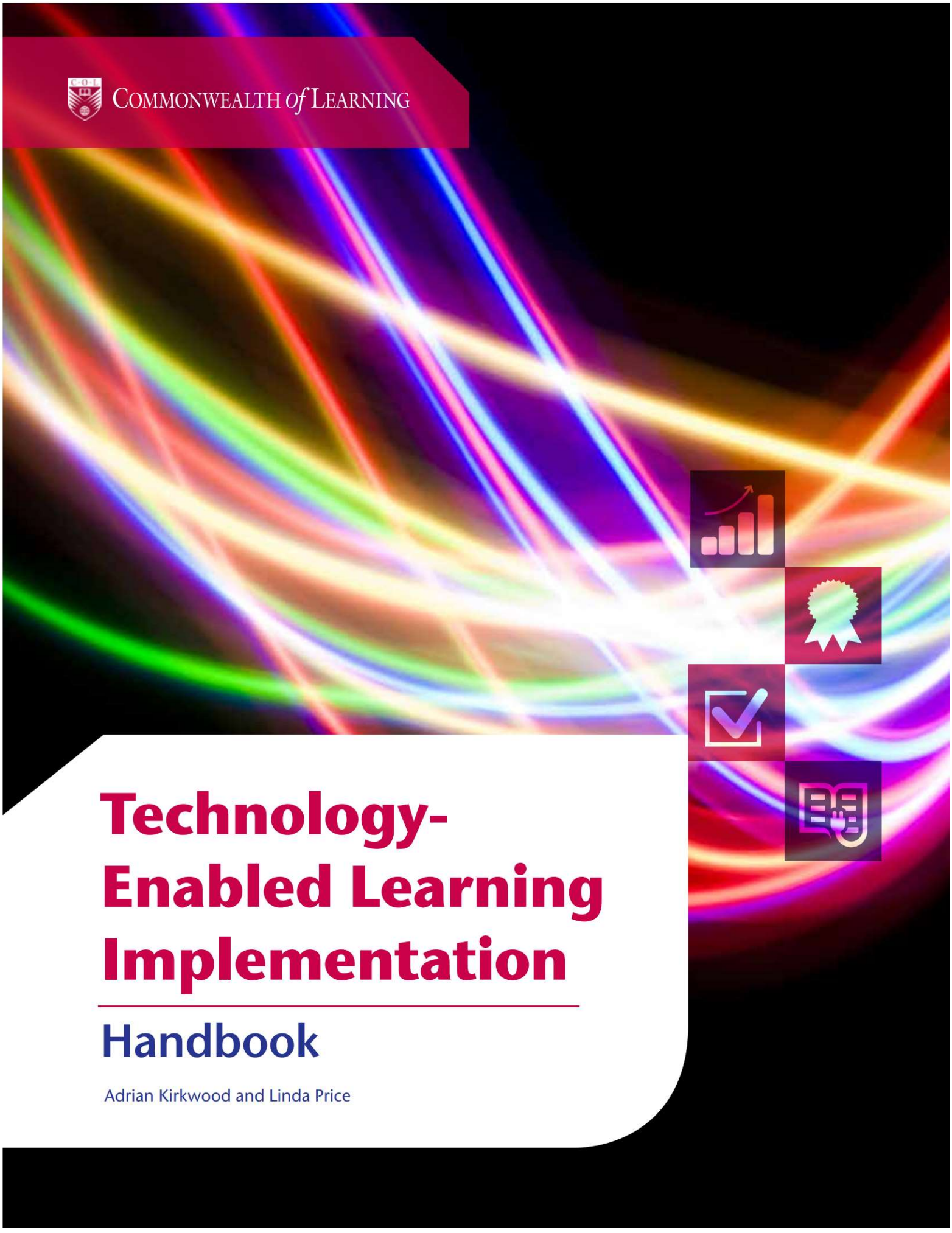

Technology-Enabled Learning Implementation

Handbook

Adrian Kirkwood and Linda Price

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COMMONWEALTH *of* LEARNING

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

Technology-Enabled Learning Implementation Handbook

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Version 1 of the *TEL implementation Handbook* has been developed under the Technology-Enabled Learning Initiative of COL to facilitate the use and integration of TEL in educational institutions in the Commonwealth by adopting appropriate policies and technologies, and strengthening capacity building of teachers and learners to optimise available technologies for the sharing of knowledge resources and to improve learning.

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FOREWORD

In its Strategic Plan 2015-2021, "Learning for Sustainable Development," the Commonwealth of Learning (COL) introduced a new initiative — Technology-Enabled Learning (TEL). There has been a significant increase in access to technologies, particularly mobile technologies, in developing countries in the past decade, and more educational institutions, teachers and students in the Commonwealth now have access to digital tools and the Internet. However, this increase in access to and use of these technologies is not evenly distributed across all countries, and technologies are not being used to their full potential in some areas. The interventions planned under the TEL initiative will allow more government and educational organisations to "adopt policies and strategies for, and devote resources to, technology-enabled learning for innovation and skills." In order to achieve these outcomes, COL has embarked on several activities with governments and educational institutions to promote policy, technology and capacity building.

The *Technology-Enabled Learning Implementation Handbook* has been developed to assist educational institutions in adopting appropriate policies, strengthening technology infrastructure, building the capacities of teachers, helping learners to take advantage of the available technology and open educational resources (OER) for learning, and undertaking a rigorous approach to the assessment and evaluation of TEL. The objective is to provide both a systematic approach and evidence of improved learning outcomes in a TEL environment. We expect that institutions implementing TEL will use this handbook to gather data for evidence-based decision making. This handbook provides you, our partners, with a strategy to engage in a systematic process of critical thinking, decision making, implementation and reflection not just to promote but also to demonstrate improved student engagement and learning.

I am sure this handbook, along with the questionnaires on technology use by faculty and students and the institutional technology audit, will prove useful in implementing TEL in your institution.

We look forward to your comments and feedback based on your experiences of implementing TEL in your institution. These will go a long way in helping us to revise this handbook to serve the specific needs of different contexts and collaborators.

Professor Asha S. Kanwar
President & CEO
Commonwealth of Learning

SECTION 1: INTRODUCTION TO TECHNOLOGY-ENABLED LEARNING

The difficulty lies not in the new ideas but in escaping from the old ones.

John Maynard Keynes

Introduction

The intended audience of this handbook is teachers and administrators in post-secondary institutions who are in a position to take steps to implement Technology-Enabled Learning (TEL). The aim of the handbook is to provide an introduction to implementing TEL in post-secondary education. We hope that it will spark — or reinforce — an interest in TEL and help you to actively engage in TEL implementation in your organisation.

What is *Technology-Enabled Learning*?

One would think that a good way to start in a handbook of this kind would be with an explanation of what is meant by *Technology-Enabled Learning* so that readers have a clear appreciation and understanding of what is being discussed from the outset. However, this would also be quite unusual: far too often in the field of educational technology so much is assumed or taken for granted that basic educational questions are left unanswered.

For the purposes of this handbook, Technology-Enabled Learning is taken to refer to the application of some form of digital technology to teaching and/or learning in an educational context. It is not necessary to get into discussions about whether the learning context can be thought of as formal, non-formal or informal. At this stage, it is sufficient to consider that there is an intention for learning to result from the human-technology interaction. However, it is worth remembering that people have been employing various (non-book) technologies for educational purposes over many decades. Accordingly, we think that it would be helpful to briefly explore the role of digital technologies in education in recent times.

Following the development of the Internet in the 1980s and the inception of the World Wide Web in 1995, there has been considerable growth in the adoption of technology within educational institutions, for both distance and on-campus teaching and learning. In western universities (and a great many primary and secondary schools), institutional "digital learning environments" are now almost ubiquitous, and their use by teachers and students can no longer be considered a novelty or the domain of enthusiasts alone. While this growth was initially much more prevalent in western countries, the adoption of technologies has now spread, to a greater or lesser extent, to almost all parts of the world.

A range of terms, which each emphasise particular characteristics of the phenomenon, exists to describe it — for example, *computer-assisted learning*, *networked learning, eLearning* and, more recently, *technology-enhanced learning*. The latter term is being used increasingly in various parts of the world (see, for example, Balacheff, Ludvigsen, Jong, Lazonder & Barnes, 2009; Goodman, 2001; Keppell, Suddaby & Hard, 2011; Tay & Lim, 2013; Walker et al., 2014). It suggests that technology can enhance learning in some way, but it is unusual to find explicit statements about what this "enhancement" actually involves and how learners benefit (Kirkwood & Price, 2014).

In this handbook we use the term Technology-Enabled Learning (TEL) to describe the use of technology to support students' learning. Using this term makes it possible to avoid potential ambiguities and differing interpretations of the process. The word *enabled* refers to facilitation: learning is made possible by the use of technology. It does not imply the value judgment that the word *enhanced* necessitates. Technology-Enabled Learning is just about making learning possible, whether that means different ways of serving existing learners or, potentially, providing opportunities for learners who were previously regarded as being "out of reach" — that is, those learners who typically have little to no access to educational opportunities because of a variety of circumstances.

What are the potential benefits of adopting TEL?

So, what are the potential benefits that TEL can offer to institutions, teachers and learners? To a certain extent it is impossible to provide a generalised answer to that question, because much depends upon the nature and context of an institution and of the learners it aims to serve. However, here are a few possibilities. You can decide on the relative importance of each one in your own institution: please place a tick (√) in the column you think is most appropriate.

	Very important	Important	Not very important	Does not apply
Increasing technology use by students in preparation for their working lives (developing familiarity, skills, etc.)				
Achieving financial benefits for the institution (e.g. increasing student numbers, reaching new target audiences, etc.)				
Increasing accessibility for students who would not be able to attend conventional classroom sessions (due to location, disability, or work/domestic commitments, etc.)				
Changing the environment in which educational activities can be undertaken to increase flexibility for students in terms of where, when and how they study				

	Very important	Important	Not very important	Does not apply
Providing students with additional opportunities to communicate with teachers, support staff and fellow students				
Providing opportunities for students to access books, journal articles and other resources (texts, sound recordings, still and moving pictures) in digital format from a variety of sources and locations				
Enabling students to become self-directed learners				
Ensuring greater consistency in the quality of teaching and availability of resources				
Enabling feedback on learning activities and assignments to be provided more rapidly to students				
Increasing flexibility for teachers in terms of where and when they undertake their teaching and assessment activities				
Improving the teaching practices of academic staff (e.g. increasing learner engagement through active, student-centred learning)				
Quantitative improvement in student learning outcomes (i.e. higher marks or grades achieved)				
Qualitative improvement in student learning outcomes (i.e. deeper understanding, conceptual development, better application of knowledge to real-world situations)				

Senior managers and decision makers in many institutions are likely to be interested in efficiency benefits that contribute to the reduction or containment of costs, increasing student numbers, competitive advantage, or meeting student expectations. However, those more directly involved in teaching and supporting students are likely to be interested in potential transformational benefits relating to educational outcomes.

It is important that individual teachers articulate a clear rationale for using TEL in respect of their students and the contextual circumstances. For example, teachers whose students are likely to seek employment in business, design, science or technology might argue that using TEL would help prepare their learners for their subsequent careers. Other teachers might be more concerned with maximising the teaching and learning opportunities for their geographically dispersed students. Confusion and misunderstandings can be avoided if teachers develop and share their pedagogical aims when implementing TEL.

The need for clear institutional aims or goals

Just as it is important for individual teachers to have a clear rationale for using TEL, it is also important for institutions to specify a coherent set of aims or goals that they hope to achieve by using TEL. It is not sufficient to proclaim that TEL will "improve the student experience" or "enhance student learning." What do imprecise and ambiguous statements such as these actually mean in practice? What do institutions wish to achieve through the use of TEL? For example, an institution might be particularly interested in:

- increasing its international reach by offering courses that can be taken by learners anywhere in the world (e.g. many large universities have introduced massive open online courses — MOOCs — with this aim in mind);
- improving accessibility and flexibility for students in order to attract groups of learners who are difficult to reach (e.g. those residing in remote and hilly areas);
- responding to the needs of potential employers and the perceived needs of current and future learners;
- offering courses in association with other institutions, on a collaborative teaching or franchise-type basis;
- reducing the costs associated with processing student enquiries, enrolments and registrations, and assessment and examinations procedures; or
- improving or maintaining the quality of its teaching and learning in challenging times (e.g. rapid expansion of student numbers, financial restraints, etc.).

Whatever reasons an institution has for implementing TEL, it needs to make explicit statements about the benefits it expects to be derived for learners and teachers. It is quite possible that some aims might be incompatible with others when applied in practice. For example, attempting to attract difficult to reach groups might involve an increase in the cost per student for the institution. Requirements for students to use high-specification computers might conflict with attempts to overcome the digital divide between different social groups.

In addition, the introduction of TEL might affect multiple institutional policies and areas of activity. For instance, assessment policies might need to be reviewed and amended if one aim of implementing TEL is to increase co-operative or collaborative student project work. Measures might need to be introduced to counteract plagiarism (intended or unintended) in students' work or assignments. This might involve not only developing students' academic practices and digital literacy skills, but also modifying and redesigning assessment tasks so that they rely less on the reproduction of course materials and resources and focus instead on learners demonstrating personal involvement with a topic or its application to novel circumstances (see Carroll, 2007).

Learning from the experience of others

A surprisingly small proportion of published accounts of projects involving the use of technology for teaching and learning provide a clear indication of the educational rationale and anticipated outcomes for both the teacher(s) and students involved and the institution. A lack of clarity on these matters makes it extremely difficult for those concerned — and any other educators who might be interested — to learn any useful lessons from the experiences of others. It seems reasonable to ask questions about the outcomes achieved following the investment of large amounts of time and money. Unfortunately, attention appears to focus too often on the technology or tools involved in a project, rather than the teaching or learning processes and practices.

> Many teachers seem to ask "What can I use this technology or tool for?" rather than "How can I enable my students to achieve the desired or necessary learning outcomes?" or "What forms of participation or practice are enabled for learning?" (Kirkwood, 2014, p. 215)

The use of technology in itself is very unlikely to result in improved educational outcomes and ways of working among teachers and students. Various contextual factors exert far greater influence on the processes of teaching and learning — factors that will be explored later in this handbook. However, educators (and senior educational managers) frequently appear to be taken in by the extravagant claims made about various technologies and the promised advantages and benefits they can bestow. As each new technology or tool is developed and adopted in educational settings, a collective amnesia about lessons learned from research into and evaluations of previous "innovations" also appears to develop. Enthusiasts tend to assume that each new tool or technology is so novel that there is nothing to be learned from the knowledge and experience derived from using older media and technologies (Kirkwood & Price, 2005).

In reality, technologies and tools are far more transient and short-lived than the educational issues that they claim to address. In all sectors of education, various technologies have been used for teaching and learning purposes over many decades. Instead of assuming that "new" equates with "different" or "better," educators need to improve their understanding of the implications of what is already known about TEL, not just in terms of technical issues, but — more importantly — also in terms of the epistemological and pedagogical ramifications.

Avoiding disappointment in the adoption of TEL

Although the word *transform* is frequently used in descriptions and discussions of TEL projects, there is little evidence of "transformations" actually taking place in the large majority of cases. More often than not, teachers express disappointment that real changes in teaching and learning have not been achieved. Despite the immense growth in the use of TEL in both developed and developing countries, concerns continue to be expressed by researchers and educational practitioners about just how effectively technology is being used to improve the learning experience of students (Kirkwood, 2009).

In practice, the technologies and tools most frequently employed in institutional learning environments are commonly used to replicate, reinforce or supplement traditional teacher-led, didactic practices with little or no significant benefit being achieved in terms of student learning (Blin & Munro, 2008; Eynon, 2008; Kirkwood & Price, 2014; Roberts, 2003).

Too frequently, educators focus on the technology available to them and imagine that making use of a particular application or tool in their teaching will change their students' learning outcomes and experience. However, what really matters is not the technology, but how the teachers design transactions, tasks and activities to engage students and promote learning.

It seems self-evident to teachers that a book could be used in many different ways for a variety of educational purposes (e.g. providing direct instruction, references, background information, resource material for analysis, etc.), but when it comes to TEL, many educators take a narrower and far less flexible approach. In reality, technologies and tools such as blogs, forums, podcasts and wikis are not limited to just a single "ideal" role, but can function in a variety of ways for many different educational purposes and can reflect differing epistemologies. The specific way in which an individual teacher or academic team chooses to utilise a tool or technology (the type of learning task, expected outcomes, etc.) will be based on the particular contextual circumstances. The manner in which students use the technology in one particular context will differ from how the same tool is used in other contexts. For example, one teacher might encourage students to use a blog tool to create an individual (private) study diary in which they reflect upon their weekly activities and how their understanding of their study topic is developing. Another teacher might encourage all members of a student group to contribute to a shared blog, with everybody being free to submit anything that they think might be helpful for a particular group task or activity.

Teacher as agent: The crucial role of the teacher in TEL

One critical factor for the successful implementation of TEL is the ability of teachers to know *why*, *when* and *how* to best use technology for teaching and learning. However, getting teachers to use TEL effectively is far from simple, as it involves taking into account a complex variety of intrinsic and extrinsic influences. While there is much published research on teachers' use of technology, it is much more difficult to find reports that relate those uses of TEL to how the teachers involved think about the processes of teaching and learning — their *beliefs* — and how they enact those beliefs in their teaching activities — their *practices*. Where TEL interventions have had disappointingly little impact on students' learning outcomes, it is most likely that the fundamentals of what constitutes *teaching* and *learning* have been taken for granted and/or not considered necessary.

Only by changing the conceptions and beliefs of teachers regarding teaching and learning (with or without technology) can any significant changes be effected in their teaching practices. For the successful adoption of TEL, it is vital to support teachers in the task of reviewing, reassessing and modifying their conceptions of teaching and learning. That is far more critical

than developing their technical skills and competence. For example, one review of competency-based approaches to professional development for online teaching found three important dimensions that were being overlooked and in need of further exploration: "empowering teachers," "promoting critical reflection" and "integrating technology into pedagogical inquiry" (Baran, Correia & Thompson, 2011).

Significant influences on teachers and how they use technology

Many factors can determine how teachers in higher education employ technology to change their teaching practices and/or the learning practices of their students. Evidence from studies into how technology can enhance or transform educational processes is only one influence on teachers. Some others, often more pervasive, include the following:

- Individual differences in teachers' attitudes to the adoption of innovations (Rogers, 1995).
- Individual differences in teachers' conceptions of and approaches to teaching (Kember & Kwan, 2000; Samuelowicz & Bain, 1992, 2001; Trigwell & Prosser, 1996).
- The established departmental/faculty/institutional ethos and ways of working (Hockings, 2005; Knight & Trowler, 2000; Lindblom-Ylänne, Trigwell, Nevgi & Ashwin, 2006; Norton, Richardson, Hartley, Newstead & Mayes, 2005; Pickering, 2006).
- Competing demands of discipline-based research and administration.

The complex relationships between influencing factors are considered further in Section 2.

How prepared for TEL is your institution?

We trust that the guidance provided in this handbook will help you assess how well-prepared your institution is for the adoption or expansion of TEL. The following activity will help you begin this assessment: please place a tick (√) in the column you think is most appropriate.

	Less than 25%	25-50%	51-75%	More than 75%
What proportion of the teaching staff already have some experience of using technology for teaching and learning?				
What proportion of the teaching staff have expressed some interest in using TEL?				
What proportion of the teaching staff have expressed some reservations about using TEL?				
What proportion of the students already have some access to computing equipment?				

	Less than 25%	25-50%	51-75%	More than 75%
What proportion of the students already have some experience of using technology for learning?				
What proportion of the students have expressed some interest in using TEL?				
What proportion of the library and academic support staff already have some experience of using TEL?				
What proportion of the library and academic support staff have expressed some interest in engaging with the adoption of TEL?				
What proportion of the senior academic managers have engaged in discussions about the implications of implementing or expanding the use of TEL?				
What proportion of teaching spaces in the institution are equipped for TEL activities?				
What proportion of teaching spaces in the institution are suitable for TEL and associated activities?				

Your answers to the questions above will only provide a very rough approximation of the extent to which TEL is currently established within your institution. You will need much more information — qualitative as well as quantitative — to accurately determine how well teachers and learners in your institution are prepared for TEL. Section 2 of this handbook describes other means of collecting relevant information, including questionnaires that can be used to conduct surveys among academic staff and students.

Much information that could be very helpful for planning is difficult to quantify. For example:

- How do teaching staff, academic support staff, academic managers and students understand the term Technology-Enabled Learning? Even if they have encountered some examples of TEL, what awareness do they have of the multiple forms that it could take?
- How do individuals within those groups understand the terms teaching and learning?
- Are they conscious of the key role that assessment requirements play in determining what and how students study (and how these requirements affect students' use of TEL)?
- To what extent are technical and support staff prepared for new ways of working to provide effective support to both teachers and learners?
- How prepared are policy makers and administrators for reviewing and revising policies and procedures so that TEL can be implemented effectively?

- The effective preparation of TEL materials and resources is likely to require input from a number of technical and design specialists. How willing are academic staff and others to work in teams for TEL implementation? What experience of this do they have?

Overall, an institution must be prepared for a wide range of potential consequences to arise from greater use of technology. Greater use of TEL is likely to have an impact on more than just teaching and learning practices. However, the expectations — positive or negative — of various groups within the institution will need to be managed to avoid serious misconceptions about the outcomes of the process.

What next?

The next section explores the complex influences that act upon both the processes and the outcomes of teaching and learning with technology. It also discusses some instruments and procedures that will help you gather more detailed information about the extent to which your institution is prepared for TEL.

SECTION 2: REVIEWING INSTITUTIONAL POLICIES AND INFRASTRUCTURE

> *That men do not learn very much from the lessons of history is the most important of all the lessons that history has to teach.*
>
> Aldous Huxley

The complexity of teaching and learning in large institutions

Enthusiastic individuals and small groups were responsible for most of the early uses of digital technology for teaching and learning. These early adopters usually oversaw all aspects of the process, from developing or adapting tools and resources to utilising them with their own students. They also evaluated the outcomes. More recently, the increased use of a virtual learning environment (VLE) or learning management system (LMS) has brought about technology adoption at a departmental, faculty or institutional level. However, there are wide variations in how "enterprise-wide" systems have been adopted and implemented by educational institutions for teaching and learning (see, for example, Walker et al., 2014).

It has been considerably more difficult to achieve effective adoption of learning technologies in education than policy makers anticipated at the outset. This has been the case at both the micro (course) and macro (institution) levels. Often there has been a substantial lack of clarity about both the means and the ends regarding technology implementation (Kirkwood & Price, 2014). Furthermore, stakeholders have had diverse perspectives on the nature of the problem and what needed to be done (and by whom) to realise better outcomes (Marshall, 2010; Price & Oliver, 2007).

Key to the whole process is not the technology, but teachers. The context within which academic teachers work significantly influences how they use technology to support their teaching (Fanghanel, 2007). We have identified four main sets of factors that influence university teachers' beliefs about teaching — or at least, how they choose to practise their beliefs. These include the following (see Price, Kirkwood & Richardson, 2014, for a more detailed description):

- the teacher's academic context,
- the student's academic context,
- the departmental context, and
- the institutional context.

Figure 2.1 shows components of each cluster of factors and the relationships between them.

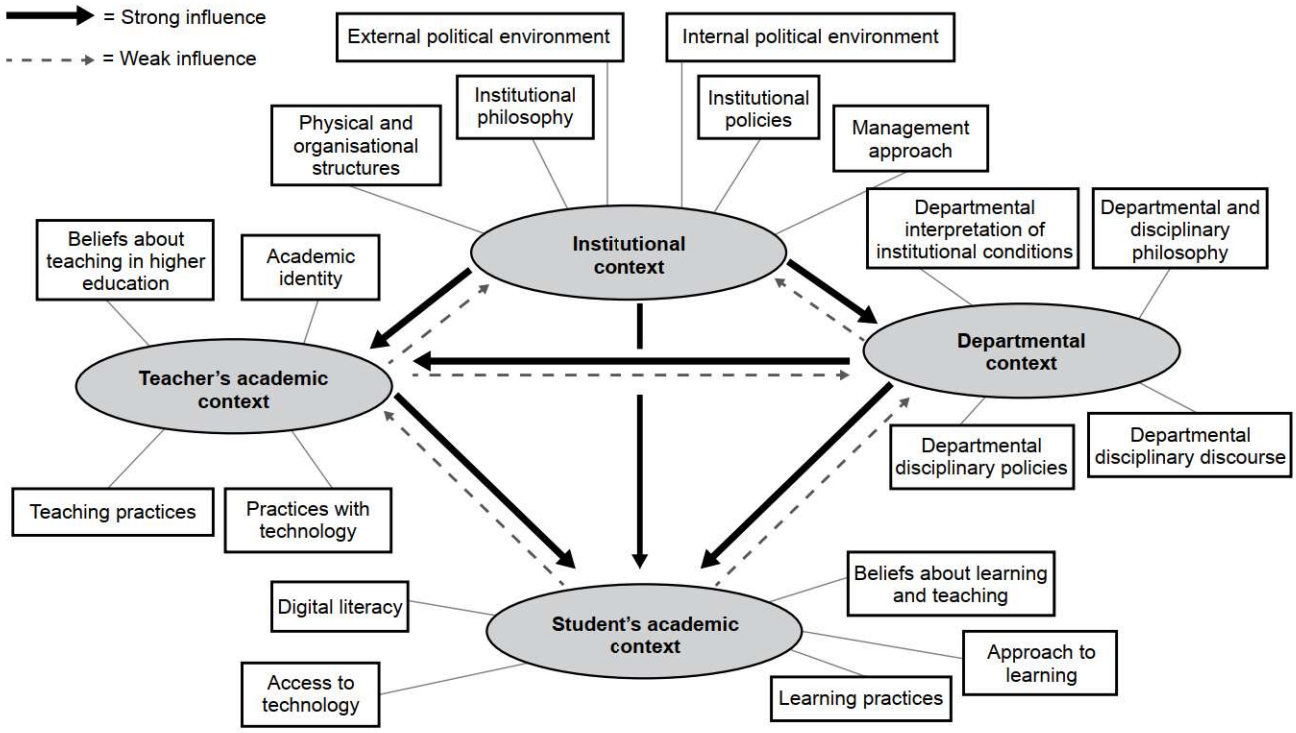

Figure 2.1. Factors influencing teaching and learning with technology in higher education: A framework

The interrelationship between the components

To understand the complexity of what actually happens in terms of teaching and learning, we must consider not only the full range of influences, but also the relationships between them. The four main contextual components we have identified in Figure 2.1 are not only all interrelated but also subject to a number of influences that affect individual university teachers and learners in different ways. In this diagrammatic representation, the stronger influences are indicated with a bold arrow, which also indicates the predominant direction of the influences. There is frequently a reciprocating influence to these, but the strength of that effect is usually weaker. These are represented here by lighter, broken lines. Again, the main direction of flow is indicated.

So, there are many influences — sometimes conflicting — that act upon the processes of teaching and learning. That is why these apparently simple terms should not be taken for granted and why it should not be assumed that everybody has the same understanding of what is involved. It is much more productive to have open and explicit discussions about what people would like to see happen (the outcomes, or what students are expected to learn) and what could be done to help realise the desired outcomes (the learning activities that students undertake).

The impact on TEL of differing beliefs and practices

What does this mean in practice? It is important to recognise that technologies and digital tools can be used in a range of different ways for a variety of purposes. There is little point in simply talking about "using a wiki," "making a podcast" or "creating a self-assessment test." For other people to understand what is being proposed, the purpose of and design for learning need to be made clear.

In strategic terms, an individual teacher whose conception is teaching-focussed (or who works in a department or faculty that has a teaching-focussed ethos) is more likely to use technology in ways that support existing — usually transmissive — teaching strategies. He or she will tend to favour presentational forms — such as PowerPoint presentations, podcasts and webcasts — which support teaching-centred practices.

Practitioners who have a learning-focussed conception of teaching (and are supported in this by their departmental colleagues) are, in contrast, more likely to exploit technologies and tools that facilitate and support the development of their students' learning. Such teachers design learning activities that use learning technologies as *enablers*, making it possible for students to do things such as critically examining sources of information or data, undertaking group tasks, or reflecting upon and demonstrating developments in their understanding and practices through the use of tools such as wikis, blogs, discussion forums and portfolios.

As far as student learning is concerned, the most pervasive influence is assessment — how students are assessed or how they anticipate that they will be assessed. Many educators have referred to assessment as the *de facto* curriculum — what students actually focus on when studying. There is a considerable body of supporting evidence for this (Boud, 1995; Brown, 1997; Brown & Knight, 1994; Ramsden, 1992; Rowntree, 1987). So, any open and explicit discussion of teaching and learning — which would be the ideal type of discussion — also needs to extend to the role of assessment. For example, do teachers and students think of assessment primarily in quantitative terms (where the goal is the accumulation of more information to get higher marks or grades)? Or do they consider it more in terms of achieving qualitative improvements in students' knowledge and understanding (thinking about the subject in deeper, more complex ways)?

You may need to scrutinise the extent to which the assessment tasks and examinations actually set for students match the stated aims and expected learning outcomes for your modules or courses. Is there too much emphasis on the recall of factual information? If your students are expected to demonstrate, for example, critical thinking, problem-solving skills or the application of ideas to novel situations, how are these abilities assessed? What role can TEL play in facilitating (or impeding) the development and demonstration of desired outcomes such as these?

Preparing an institutional review for TEL

We suggest that a thorough review, or reality check, be undertaken before you proceed with the introduction — or expansion — of TEL in your institution. This will involve examining the existing environment and how prepared your institution is for the implementation of TEL. Teaching and learning with TEL is more than a simple transaction between a teacher and students in a closed room, so many associated aspects will need to be taken into account. The appropriate technical infrastructure must be installed in the institution and subsequently maintained. Academic staff will require professional development not only in technical aspects of TEL, but also in how to make best use of technology for their pedagogic purposes. Students will need support to adopt new ways of working digitally for their academic studies. Managers will need to adopt new ways of thinking about resource allocation and monitoring due to the new ways of developing digital materials for teaching and learning. That development of digital resources is likely to require input from specialists with pedagogic, design and media expertise. The review should therefore not just focus on teachers and learners; it should also involve technical/support staff and senior managers/policy makers.

Some tools to help you undertake an institutional review

The questionnaires in Appendixes 1, 2 and 3 can be used to survey teaching staff, students and the officer or senior manager responsible for your institution's technical and educational environment. The areas covered in these questionnaires are briefly outlined below.

The questionnaire aimed at students (see Appendix 1) contains sets of questions under the following headings:

- Access to and Use of Information and Communication Technologies (ICTs) — these questions elicit information about individuals' access to and use of ICTs, equipment, applications, social media and their TEL environment.
- Perceptions of Use of Technology-Enabled Learning — these questions explore attitudes to and expectations about the use of TEL.

In addition to those sets of questions, the questionnaire for academic teachers (Appendix 2) also has the following headings:

- Using ICTs for Teaching and Learning — these questions focus on staff's use of digital resources, open educational resources (OER) and other technologies, as well as training, staff development and policy issues.
- Using ICTs for Research and Scholarship — these questions are about the use of online library resources and institutional digital research resources, services and spaces.

The questionnaire about the educational institution as a whole (Appendix 3) includes items that focus on:

- TEL Environment in the University/Institution — the physical and digital infrastructure, applications and tools, use of social media, digital course creation and OER as well as training and policy issues.
- Institutional Preparedness for TEL — the extent to which the organisation and its structures/processes and human resources are prepared for TEL.

You will need to determine exactly when and how these questionnaires should be used in order to harvest the greatest amount of useful information. Each questionnaire contains a large number of questions, so you will need to ensure meticulous data entry and processing of the responses received. Similarly, the reporting of the findings should accurately and adequately reflect the responses received, and attention should be drawn to any potential biases (positive or negative) arising from the response rates and over- or under-representation of identifiable sub-groups of respondents (e.g. gender, age, location, socio-economic status, etc.). Guidance on interpreting the data collected for the institutional preparedness for TEL is provided in Appendix 4.

You might find it helpful to relate the survey results from your own institution to findings from similar institutions (where these are available) and other reliable sources (e.g. national data).

Reviewing institutional policies and strategies

It is important to relate your survey findings to what is already known by other means. For example, the survey of the existing environment within an institution (Appendix 3) explores the existence of policies, strategies, etc., that might relate to the implementation of TEL. In addition, however, there is a need to review all existing policies and strategies (including those relating to access, diversity, assessment, plagiarism, etc.) in terms of their adequacy and potential consequences. For example, what impact might the increased use of TEL have on institutional aspirations relating to access and diversity among the student body? What changes to assessment policies might be necessary in the light of increased use of TEL?

Exercise

To what extent is the introduction or expansion of TEL likely to have an impact on each of the relevant policies and strategies in your institution?

- Ones that might be affected by the introduction of TEL could relate to teaching and learning, assessment, plagiarism, access and accessibility, use of technology and infrastructure (by both staff and students), library and academic support, academic professional development, academic promotions and rewards, or accommodation, for example.
- (If the Survey of TEL in Educational Institutions questionnaire in Appendix 3 has been conducted, the responses should contribute to your answer to this question.)

What are the main changes (if any) that need to be made to each relevant policy or strategy document?

What procedures or mechanisms need to be used to ensure that the necessary changes are made to each relevant policy or strategy document?

Does it seem likely that the introduction or expansion of TEL will mean additional policies or strategies might need to be developed for your institution? (For example, do you already have a Computing Code of Conduct for staff and students?)

Auditing existing resources and infrastructure

The survey of the existing environment within an institution (Appendix 3) also elicits information about the current provision of hardware and software and the digital infrastructure that is available to be used for teaching and learning. However, before it can be used, this information needs to be audited to verify the actual availability of resources and infrastructure in order to answer questions such as:

- How much equipment is in full working order with an up-to-date operating system and software?
- How evenly is the equipment distributed throughout the institution? Are there any areas with very little equipment and infrastructure?
- How adequate is the internal network (or networks) and can the anticipated usage be accommodated in a sustainable manner?
- What level of simultaneous access and use can be sustained by the institutional intranet? (If there is currently no institution-wide intranet, what level of simultaneous access is anticipated?)
- What software licence agreements are in place? Are they sufficient for the anticipated levels of use throughout the institution?

- Are there adequate arrangements and sufficient digital storage for backing up all systems and documents?
- How adequate are the online security measures in relation to non-authorised users, the potential for plagiarism, etc.?
- Are the existing learning spaces within the institution suitable for TEL? How well-equipped are they?

In parallel with the audit, you will need to discuss the extent to which the institution will take responsibility for the provision and maintenance of suitable equipment and software for use by students (in computer labs, libraries, etc.). Will students be expected to provide and use their own equipment and software?

Anticipating what additional requirements will be necessary

When you have a better picture of the actual provision of resources and infrastructure within your organisation (from the survey and any additional audit) you will be in a better position to determine your additional needs — physical spaces as well as technology and technical infrastructure. You will need to consider long-term as well as immediate needs. For example, think not only about any adaptations to existing learning spaces that might be necessary (e.g. modifying lecture rooms, offices, residential accommodation), but also about the adequacy and appropriateness of those spaces for different forms of teaching and learning that might arise with greater use of TEL. If some presentational teaching will involve a form of TEL that gives students some freedom in terms of where and when they learn, there might be less demand for lecture rooms and a greater requirement for spaces in which smaller groups can meet to discuss issues; work collaboratively on activities, problems or projects; or practise newly acquired skills, for example.

Creating a Policy Review & Infrastructure Audit (PRIA) Report

The preparedness of teaching staff, students, managers and technical/support staff for TEL implementation can largely be determined from the findings from the questionnaires (see Appendixes 1, 2 and 3). However, a PRIA report should be created from the analysed responses from those questionnaires together with the findings from the audits of the existing resources and infrastructure. The combination of different information sources should provide an excellent overview of how well your institution — and its staff and students — is prepared for TEL. It should also provide some very useful insights into what changes or additional measures are likely to be necessary for the effective implementation of TEL.

What next?

In Section 3 we look at the steps you will need to follow to develop institutional stakeholders, both in preparation for and during the implementation of TEL. You will need strategies and structures for engaging teaching staff, academic managers and students in the implementation process. Mechanisms can be established for promoting, rewarding and sharing scholarly approaches to the development of TEL innovations.

SECTION 3: DEVELOPING THE INSTITUTIONAL STAKEHOLDERS

> *The principal goal of education is to create men and women who are capable of doing new things, not simply repeating what other generations have done.*
>
> Jean Piaget

Different institutions are likely to have many contextual differences and hence be at different stages of developing institutional stakeholders (including teaching staff, academic support staff, academic managers and students). Some institutions might be in the initial stages of this, engaging stakeholders at an individual level; others might be doing things at a departmental or institutional level. Some TEL implementations may encompass more comprehensive, institution-wide TEL systems approaches. Whatever the context, however, it is vital to make all stakeholders aware of — and hopefully engaged with — the forthcoming changes. This needs to be done without anyone feeling that significant changes are being imposed upon them. Accordingly, it is crucial to provide staff and students with opportunities to contribute to the process.

Engaging academic staff

A number of strategies need to be adopted in order to engage staff. These range from gathering generic feedback from staff to establishing more formalised structures that enable direct reporting lines to institutional management. In the early stages of implementation, all academic staff should have the opportunity to engage in discussions about TEL at a departmental or faculty level. Such discussions should not be confined to technical and organisational issues (e.g. technical requirements, potential changes to ways of working), but should also cover pedagogical matters and the many ways in which technology could be used for teaching and learning. Although technical familiarity will need to be developed among teaching staff, this should never be done in isolation from a wide-ranging consideration of potential innovations in teaching and learning practices. "Why?" should be discussed as much as "How?"

Exercise

It might be helpful for academic staff to undertake, at a departmental or faculty level, a SWOT (**S**trengths, **W**eaknesses, **O**pportunities & **T**hreats) analysis of the implementation or expansion of TEL.

What are (or could be) the strengths of using TEL in the department or faculty?

For example, making use of audiovisual and other non-text resources for topics or disciplines in which these can make an important contribution to teaching and learning.

What are (or could be) the weaknesses of using TEL in the department or faculty?

For example, potentially reduced opportunities for students living on campus to work together on problems or projects.

What opportunities does TEL offer?

For example, attracting more widely dispersed students; making it possible to teach topics otherwise impossible (or very difficult) to include in the curriculum.

What are the threats associated with using TEL?

For example, restrictions on hardware and software use imposed by the companies that make them (e.g. licensing restrictions or limitations); changes in requirements for teaching spaces.

Exercise

Another useful exercise would involve getting teaching staff and academic managers to develop a Vision of the Future: working together to create a shared view of what the department or faculty might be like in five to ten years' time with regard to teaching and learning. This would need to take account of:

- changing characteristics of the potential student body,
- students' changing expectations about what and how they study,
- potential employers' changing expectations,
- institutional funders' (including government's) changing expectations, and
- developments in the technologies and tools available for TEL.

Demonstrations and hands-on experience

One way of raising awareness among teaching staff and actively engaging them with the potential of TEL is to arrange for a number of academics from within your institution (and/

or from other institutions, if appropriate) to provide demonstrations of TEL innovations with which they have been involved. These demonstrations should preferably illustrate a variety of different tools and pedagogical approaches and should also provide some insights into the development process and evidence of the impact that they have had on students' learning. Wherever possible, sessions should also be organised — perhaps over a prolonged period — to give teaching staff hands-on experience of using TEL materials and resources so that they become aware of its potential advantages and limitations in practice. Such sessions should not be focussed solely on developing technical familiarity and skills; they should also involve explicit consideration of the related pedagogical issues.

If possible, it might be advantageous to establish a TEL Resource Centre in an appropriate location (e.g. your library) where academic and support staff can see demonstrations of and/or get hands-on experience in using TEL materials and resources and also be introduced to the full range of tools and applications available in your institution.

Working in teams to develop TEL materials and resources

The implementation or expansion of TEL might necessitate the introduction of different ways of developing courses and modules, with increased teamwork to maximise the effectiveness of the processes. Each team might include several teachers as subject experts who develop materials and resources in collaboration with specialists in media, Web and pedagogical design.

Reconciling differences between departments

Exercises like the ones outlined earlier in this section are likely to reveal that departments or faculties in your institution have different ideas about the role that they imagine TEL will play. And not only will some be more enthusiastic than others about TEL, but also the precise ways in which they use various tools and features will probably vary. For example, some departments might welcome new presentational facilities; others might favour increased opportunities for student communicative activities and formative assessment. While it is appropriate to have such hopes and expectations for sound educational reasons (relating to the characteristics of the subject and the students), there is a need to ensure that they do not conflict with institutional aims and goals.

Senior academic managers must determine what level of uniformity or variation can be sustained. Operational and economic factors will, most likely, favour minimal variations between different academic areas (with one common set of features for all). However, differences between subject areas (e.g. theoretical or applied, laboratory-based or people-based, etc.) will need to be recognised and accommodated.

The importance of good communication flow

Throughout the implementation process, academic staff should be encouraged to provide

feedback, as this will help the institution to develop appropriate uses of TEL. However, it is equally important to have mechanisms that enable the feedback that has been provided to be acted upon. This feedback needs to be discussed at senior levels, as it may not always be possible to act on suggestions and proposed courses of action due to competing activities or pressures within (and external to) the institution. If suggestions are not being acted on, staff need to know why. Otherwise, the development of institutional TEL capacity building will not only be limited but also might lead to staff disillusionment and dissent.

Reporting structure

A reporting structure should be embedded in the existing governance structure of the institution, with reporting to existing committees. This will enable a seamless bi-directional flow of information and views between management and end-users (teachers and learners). See Figure 3.1 for an example of how this might be constructed.

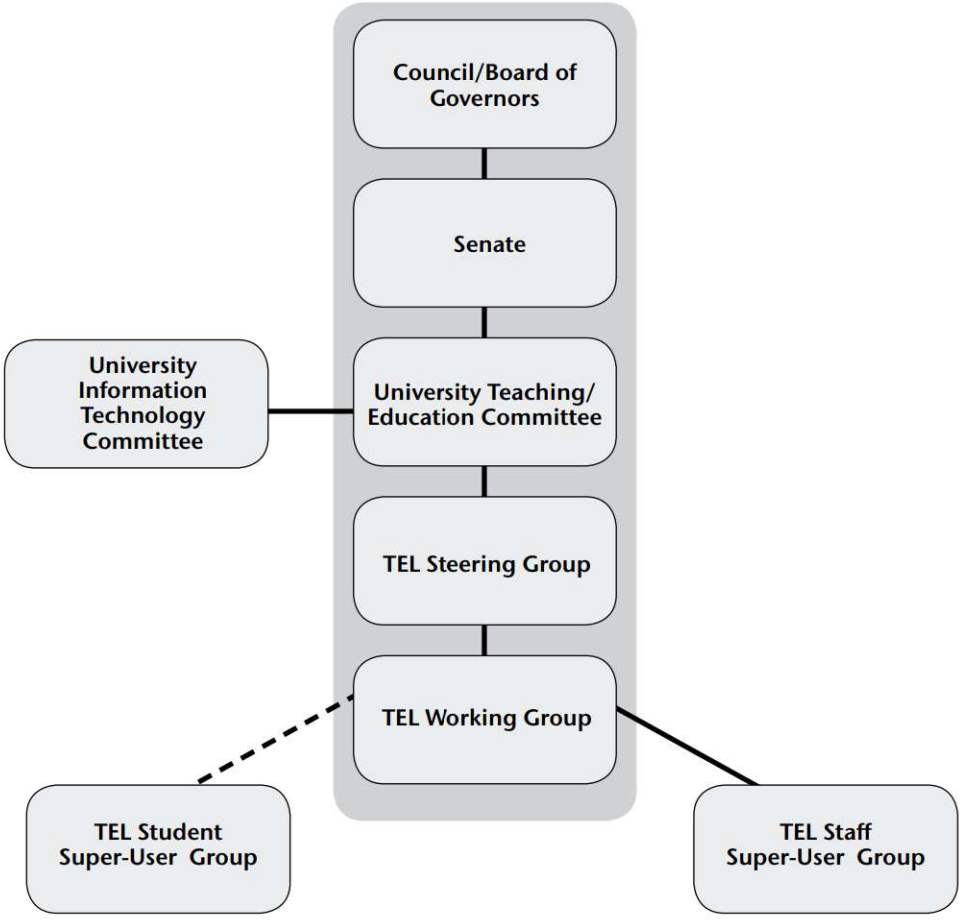

Figure 3.1 Example of a governance structure that enables TEL information flows, decision making and actions

However, the information should not flow in only one way: information flow in both directions is important, and this needs to be factored into the construction of the groups and their reporting lines. So, clear mechanisms need to be put in place for reporting back to the staff who are working closely with TEL.

User-group scrutiny of TEL initiatives

The best way to scrutinise TEL policies for their adequacy and fitness for purpose is through having staff implement them in practice. Such an approach provides a helpful means of testing the viability of any particular initiative. This can be orchestrated through a TEL "super-users group," comprising those who are most closely and regularly engaged with TEL activities. Alternatively, it could be extended to a wider audience, depending upon the initiatives in your institution.

Students can also be drafted onto a user panel or super-users group that can be employed as a sounding board for new initiatives or interventions. Like staff, students need to experience the impact of particular TEL initiatives or be provided with information regarding the likely impact.

Exercise

What are the relevant existing groups and reporting lines in your institution?

What are the existing mechanisms for reporting up to senior management as well as down to user groups?

How well does this work in terms of information flows that contribute to the development of TEL capacity in your institution?

What changes, if any, do you think would be necessary to these existing structures to improve or strengthen their effectiveness?

Developing a scholarly approach to Technology-Enabled Learning

Teaching with technology should not be viewed as distinct from other forms of teaching. Like all teaching, it should be undertaken in a scholarly manner. However, while technology brings fantastic opportunities to support and develop education, it also brings considerable responsibility (Kirkwood & Price, 2014). That is, it raises questions about how we can deploy our resources and investments wisely in order to make the best possible uses of technology to provide good student learning experiences.

We also need to consider what basis we use for making judgments about what qualifies as "good" for teaching and learning (Kirkwood & Price, 2013b, 2015). For example, why is technology-supported learning successful in actively engaging students in some cases but not in others? What is informing the design of successful learning experiences with technologies that is missing from those that are less successful (Kirkwood & Price, 2012; Price & Kirkwood, 2014)?

To address this, it is crucial to provide a culture in which it is imperative for staff to adopt scholarly approaches to teaching with technology.

What do we mean by a "scholarly approach"?

- Posing a problem about a TEL issue
- Studying that problem through appropriate methods for the disciplinary epistemologies
- Applying the results in practice
- Communicating the results to others, including the public
- Reflecting on the findings and their implications
- Subjecting the findings to peer review

University teachers' views of technology fundamentally influence how they use it and what they consider to be a successful use of it (Kirkwood & Price, 2005). As higher education institutions strive to embrace technology, it is important to recognise how teachers' beliefs about teaching influence how they actually practise their profession. Hence, we refrain from simply referring to this as "staff development," as what is required is the holistic development of a culture that encompasses many components. All those components need to be aligned to fundamentally address how institutional cultures consider and value good quality teaching and learning with technology.

Historically, prominence has been given to technology — and in some cases this has led to pedagogical neglect (Becker & Jokivirta, 2007; Beetham & Sharpe, 2007; Conole et al., 2008; Katz, 2010; Kirkwood & Price, 2005). The shift to developing scholarly approaches requires initiatives that seek to educate and develop teachers in a way that enables them to reflect on their innermost beliefs about teaching, as those beliefs influence much of what they do in practice. It is also important to develop a space where they can learn the craft of being scholarly. That is:

- how they go about investigating and reflecting on their practices in an educationally informed manner, and
- how they can use those insights, together with the research and developments of others, in an appropriate and purposeful way in order to improve their own teaching.

Part of this armoury requires teachers to also understand how to make value judgments about relative successes or failures and what evidence is appropriate to use in either situation to help them make those judgments.

Exercise

If there are existing applications of TEL in your institution, to what extent have scholarly principles been applied to their design and implementation?

To what extent have scholarly principles been applied in evaluating those TEL applications?

Valuing scholarly approaches to Technology-Enabled Learning

Some institutional policies contribute significantly to the successful scholarly implementation of TEL. These include policies relating to career development, work planning and promotion. Such policies indicate what is actually valued within an institution and how it is valued, as they are essentially the structures within which academics have to work. They act as agencies that both enable and constrain how academics operate, and influence how academic teachers engage with and approach using TEL.

An important aspect of embedding a scholarly approach to TEL is to first value such an approach. Academics tend to recognise the value of a scholarly approach through rewards and promotions processes. Promotion policy, and its enactment, is highly influential in determining what an institution actually values in relation to TEL as opposed to what it states that it values. For example, what key components are stated in the criteria for rewards and promotions that would recognise and reward scholarly TEL activities? And what evidence would staff need to present in order to demonstrate that this had been successful?

Exercise

How does your institution recognise scholarship activities relating to TEL in its rewards and promotions criteria?

How well are these applied and acted upon?

How are scholarship activities relating to TEL supported?

What kind of advocacy is provided for TEL projects: e.g. what arrangements are made for study leave or reduced teaching duties to provide time to undertake these activities?

What kind of academic professional development activities are provided to engender scholarship relating to TEL?

What kind of professional recognition or pedagogical qualifications are in place for academic staff and how well do they align with TEL activities?

What are the mechanisms and support structures for sharing scholarship activities within the institution?

How well do all of the above activities align and support one another in your institution?

Evidencing scholarly approaches to Technology-Enabled Learning

A fundamental component of a scholarly approach to TEL is that it should be informed by enquiry and evidence. This often requires cultural change within a department, faculty or institution. One way of engendering this change involves providing a repository that enables staff to illustrate how TEL has been applied in a scholarly manner and what effects have been achieved in terms of student learning. It is highly likely that a TEL innovation in one academic area could be adapted for use in another, even if there is no obvious relationship between them.

A scholarly approach to TEL enables staff to discuss innovations and interventions that have had an impact on teaching and learning, as opposed to focusing on the relative merits of the technology per se. Transforming teaching and learning with technology is complex. It requires sophisticated thinking about:

- the educational goals and purposes of any technology use,
- how the learning should be designed, and
- how value should be determined.

Hence, it is important to gather and showcase robust evidence in order to facilitate knowledge exchange among teaching staff and the institution as a whole. Such evidence provides a firm basis upon which to design uses of technology that will improve the student learning experience as effectively as possible. Here are some things to consider in relation to evidencing TEL for academics and policy makers:

For academics: Generating evidence of an intervention

Just as you can learn from the reported experiences of others, so too can the academic community benefit from examining any evidence generated from interventions with which you are involved. Whatever means are used to share evidence with others (report, case study, etc.), the benefits will be easier to comprehend for those not involved with the intervention if sufficient contextual details are provided. We suggest that the following questions be answered for that purpose:

- What was the teaching and learning concern or issue being addressed by the intervention?
- Why did you need to engage with it? How was the pre-existing situation to be improved?
- What was the topic/discipline and at what level?
- What technology/tool was used and why?
- What evidence was used to drive or support the design of the intervention?
- What was the design of the intervention?
- What was the context within which it was used?
- How did the intervention relate to assessed activities (formative or summative)?
- How many students were involved?
- What was the nature of the evaluation undertaken and/or the evidence gathered?
- What was the impact of the intervention (on students' learning/on teaching practice/on others' activities)?
- How successful was the intervention at addressing the issue identified at the outset?

For policy makers: A guide to TEL policy development

The professional development programmes that educational institutions adopt in respect of technologies for learning and teaching focus primarily on teaching individuals *how* to use particular technologies and less frequently on *why* their use is important. A more effective approach involves engaging teachers in an examination of their beliefs about teaching and the approaches they adopt to determine how they relate to the institution's learning and teaching strategy.

Departmental and institutional factors can be just as important as the knowledge and skills of individual academics, so professional development activities should also focus on relevant middle and senior managers — those who need to make informed decisions if institutional policies and strategies are to be implemented effectively.

Policy makers need to be clear about the aims of and purposes for using technologies in support of learning and teaching. Achieving effective interventions has implications for many different aspects of an institution's culture.

In Section 4 we suggest a number of policy areas to review (and revise, if necessary) in order to develop a positive and progressive culture for embedding effective TEL initiatives.

Having developed supportive TEL policies that enable the gathering of robust and scholarly TEL evidence, how is that process going to be managed? A TEL repository, through which TEL knowledge and experiences can be shared, reflects the value that an institution places on such activities and the extent to which it is prepared to invest in them. So, how does your institution manage its TEL repository?

Exercise

What mechanisms are in place in your institution for recording and evidencing TEL activities and interventions in a scholarly manner?

How do you share your TEL scholarship activities within your institution?

What mechanisms or procedures are in place to promote the creation and sharing of OER within your institution?

Engaging students

A fundamental component of any successful embedding of scholarly and progressive TEL activities is having a good stream of data and feedback from students on their experiences. This encompasses a number of activities:

- Regular student focus groups and/or interviews
- Student experience surveys
- TEL usage statistics (learning analytics)

This mixed method approach to gathering data enables an understanding of the range of and variation in student opinions and experience and representativeness of data collected. In particular, the learning analytics data can help to identify students at risk through low engagement with TEL.

Setting up regular focus groups gives students a voice to express their experiences of using technology — particularly with new technological interventions or initiatives. This can provide an early warning about interventions that are not going well and that may need swift and remedial action.

After the TEL intervention has been embedded, surveys provide management with information about how students reacted to and evaluated particular TEL experiences.

At a more individual student-oriented level, learning analytics data provide live dynamic data about students' current progress. This can enable course or module leaders and teachers to understand how much students are using particular TEL initiatives. This is particularly true of learning analytics that can be gleaned from VLEs. Most contemporary VLEs have built-in mechanisms that automatically provide data about student engagement with their module. This can enable early identification of "at-risk" students. Lack of activity in a VLE typically reflects lack of engagement, which in turn tends to lead to dropout or failure (Papamitsiou & Economides, 2014). Hence, identifying at-risk students early can allow remedial strategies to be put in place to help prevent students from dropping out.

Reporting findings such as these, along with suggested actions, in reports and committee papers that go through the governance structure is imperative if TEL is to be acted upon in an evidence-based manner. Otherwise, management decisions will be based on opinion and experience — which may not reflect the reality of a situation. Having a clear structure and line

of report enables better management information and more institution-wide decision making. This leads to more consistency in student learning experiences. However, decisions made regarding TEL improvements, and the resulting changes, need to be systematically reported back to students so that their buy-in and assistance are more likely when gathering information about TEL and its use in an institution.

Exercise

What processes are in place in your institution for gathering information from students about their experiences with TEL?

What systems might need to be introduced or expanded?

What is the nature of the information that is gathered about students' experiences of TEL?

How is this relayed into management decision making and policy development?

How is information about decisions and changes relayed back to students?

What next?

In Section 4 we consider the development of institutional policies and strategies for TEL. Before these can be developed and introduced in a meaningful way, however, it is necessary to examine differences in teachers' and learners' assumptions about and expectations of educational processes — with or without TEL. Many fundamental terms that are often taken for granted can actually be interpreted in a variety of ways, so they need to be discussed explicitly in order to minimise misunderstandings and to facilitate agreed-upon courses of action being shared within an institution. The next section also considers benefits that can potentially be derived from the use (and creation) of OER within an institution.

SECTION 4: DEVELOPING INSTITUTIONAL POLICIES AND STRATEGIES FOR TEL

Most human beings have an almost infinite capacity for taking things for granted.
Aldous Huxley

Introduction

Before considering the drafting (or redrafting) of policies and strategies for TEL that are appropriate for your institution, we recommend that you spend some time examining some of the factors that are rarely discussed because they are taken for granted. Many fundamental elements of the educational process are contentious; they are open to variations in interpretation, which — if ignored — can result in misunderstanding, frustration and unrealised goals.

Teachers' assumptions about teaching and learning

These two terms — *teaching* and *learning* — are in constant use in educational institutions, but most of the time their actual meaning is taken for granted. When talking among themselves, teachers usually assume that others share their understanding of what the teaching process involves and how it is best conducted. Students tend to do the same in terms of learning. Also, when teachers assign learning activities or tasks for their students, they assume that the learners share their understanding of what purpose is to be served. Unfortunately, there is little supporting evidence that these assumptions are correct. For example, teachers might think of teaching in terms of:

- imparting knowledge and skills to learners,
- making learning possible, and
- developing students' conceptions and understandings of a topic.

Teachers with those varying conceptions of teaching will similarly view learning in different ways (Samuelowicz & Bain, 2001; Trigwell, Prosser & Waterhouse, 1999).

Learners, however, are likely to think of teaching as:

- conveying and explaining the topics of a syllabus, and
- telling them what they need to know and understand for assessment purposes.

They are likely to think of learning as:

- acquiring new knowledge and skills,
- memorising information in order to pass the course (and possibly use in their working life), and
- changing the ways in which they think about and understand aspects of their subject and real-world issues and problems.

Of course, these are only a few of the many ways in which teaching and learning are understood by those directly involved in those processes. Many of them are incompatible with one another. In particular, learning might be considered as being:

Either	Or
About quantitative change	About qualitative change
About acquisition	About participation
A solitary activity	A social activity

Much educational benefit can be gained from NOT taking these terms for granted: in any educational context, it will be possible to improve clarity and to develop a shared understanding by explicitly examining the conceptions of all those involved in these processes. This is essential when it comes to using TEL, because:

- a number of different specialists might be involved in creating materials, resources, etc., and they all need to be sure that they have a shared understanding of the precise educational intention and purpose of their task; and
- students might make use of the TEL materials, resources and activities without a teacher present to explain precisely what learners are expected to do and why, so the educational rationale needs to be conveyed as part of the teaching/learning activity itself.

When they consider how digital technologies could be used to support teaching and learning in higher education, some teachers think primarily about content or materials. They see TEL in terms of the capacity to store and deliver teaching materials (text, pictures or diagrams, sounds, moving images) digitally, or its potential role in finding and retrieving resources (e.g. from specialist repositories or through open searching of the Web). Other teachers think of TEL primarily in terms of the communication that it can facilitate (teacher-student or student-student) and the dialogue that can be enabled — either synchronously or asynchronously.

These two positions can be related to general conceptions of teaching in which the teaching process is seen as being principally concerned with either "the transmission of knowledge" (teacher-centred) or "the facilitation of learning" (learner-centred) (Kember & Kwan, 2000).

So, how teachers employ technology reflects how they conceive their teaching role. Learning, particularly in higher education, is usually expected to involve more than simply the acquisition of new information, procedures or processes. Therefore, teaching should entail developing students' capacity to think about their subject in qualitatively different ways, so transmissive teaching will often be inadequate for developing the intellectual skills required of graduates.

Exercise

One way of getting teachers — in departmental or faculty groups — to express their views about the nature of teaching and learning is to invite them to list what they consider to be the advantages and disadvantages of TEL for both their teaching practices and their students' learning. Their responses will indicate the focus of their attention, and differences within the group could stimulate discussions about their different concerns.

Advantages of TEL for teaching	Disadvantages of TEL for teaching
e.g. • Can engage students in a variety of ways (using text, sound, visuals, etc.) in their learning • Supports students' interactions with their peers and enables them to engage in collaborative work • Better prepares students for their careers/ personal lives • Enables better provision of feedback on assignments and tasks • Can involve students in different locations, possibly different countries, and enable them to work together • Ensures more consistency in the quality of teaching • Enables the teaching of topics that were previously impossible or difficult to teach in current circumstances	e.g. • Students will not attend face-to-face sessions (lectures, etc.) • More difficult to control what resources students access and make use of
Advantages of TEL for learning	**Disadvantages of TEL for learning**
e.g. • Offers greater flexibility for learners in terms of where and when they study • Supports students with specific learning difficulties who may find aspects of the curriculum difficult to access • Helps to develop students' abilities to link theoretical and practical aspects of a topic • Makes more active learning possible	e.g. • Requires access to high-specification computer and the Internet — potential problems with access and reliability • Requires institution/teachers to develop appropriate digital literacy skills in learners for them to make effective use of TEL • Increases potential for plagiarism by students

Students' expectations about teaching and learning

In a similar manner, students' expectations about and conceptions of what teaching and learning involve will be influenced by their prior experience. Students who have little or no experience of formal learning other than in primary and/or secondary schools will imagine that learning at higher levels will be much the same. In very many cases, their experience would have involved didactic teaching and the passive acquisition of knowledge for the purpose of successfully passing assessment and examination tasks. These students will feel comfortable with didactic teaching in higher education, but might encounter dissonance between their expectations and those of their teachers if they encounter less familiar approaches. Many educators have come across students who express concerns about "drawing their own conclusions" in essays or who make statements such as "Why don't you tell us what we are expected to learn instead of getting us to discuss the topic among ourselves?" Kember (2001) found that students entering university frequently held a set of beliefs about teaching and learning that could be labelled "didactic/reproductive." His research confirmed that "students who commence higher education with didactic/reproductive beliefs can find the process difficult and even traumatic. They are uncomfortable with teaching approaches that do not correspond with their model of teachers presenting information to be passively absorbed by students" (Kember, 2001, p. 217).

The issue here is that many students may fail to understand the underlying purpose of some educational activities designed by their teachers, particularly in relation to technology use. While many young people make frequent use of the Web, when it comes to educational tasks it is very often regarded simply as a source of information. Even in technology-rich societies, new students often have very restricted expectations about how technology might contribute to their learning at university. Teachers in higher education cannot assume that their students already possess the necessary intellectual skills for effective use of technology in their studies. It is a mistake to confuse young people being *good with technology* with appropriate uses of technology for intellectual development (Jones, Ramanau, Cross & Healing, 2010).

Hence, an important task for teachers is to engender in students a conception of teaching and learning that provides an educational rationale for learning activities, and particularly those that involve TEL. Furthermore, teachers need to ensure that their students develop the necessary and appropriate intellectual skills for active participation in the learning process, rather than assuming that these already exist. Responsibility for these important aspects of learner development should not be left to individual teachers: appropriate policies should be introduced and implemented at departmental, faculty and/or institutional levels.

Institutional assumptions about teaching and learning with technology

Senior managers are often keen to promote the wider adoption of TEL as a catalyst for changing the nature of teaching and learning within their institution. They hope to change not only the means through which teaching takes place, but also the nature of the teaching and

learning processes. However, unless there is a reason — and appropriate opportunities — for teachers to question and reassess their beliefs about the nature of teaching and learning, they are most likely to use TEL in ways that simply reinforce their current practices. Technology in itself is very unlikely to bring about significant changes in how teachers teach and expect their students to learn. The same is true for students: they need to understand *why* they are expected to undertake learning tasks, and not just *how* to execute them.

Often, teachers and academic managers think that if any particular digital tool or technology is introduced to support teaching and learning, the desired outcomes will automatically follow. So, for example, an online forum, a wiki or a shared blog might be made available as a course component to support discussion and collaboration among students. However, the actual ways in which those tools might be used, by both teachers and students, will owe more to the users' views about what constitutes teaching and learning (and their expectations of these based upon previous experience) than to the technology or tool itself. Students are unlikely to start collaborating with their peers — no matter what tool is introduced — if the course assessment scheme discourages (or punishes) students who co-operate or collaborate on assignments. Only where it is made clear that constructive group work will be rewarded by the assessment scheme is such an innovation likely to have some success.

For example, an attempt in one institution to employ wikis to promote collaborative student learning groups had limited success because the use of that tool was not sufficient to counteract some students' preference for working alone rather than as part of a team (Elgort, Smith & Toland, 2008). Similarly, Downing, Lam, Kwong, Downing and Chan reported that their students' technology-enabled interaction and collaborative activity "was tempered by the need to get a good individual grade in their final assignment" (2007, p. 211).

In fact, many writers have emphasised the fundamental link between assessment and student learning behaviours and demonstrated that the study behaviour of most students is informed — or driven — by assessment requirements (Kirkwood & Price, 2008). The actual, or expected, assessment format of a course will determine not only what parts of the teaching students will attend to (topics, activities and components), but also the manner in which they will attend to it (memorisation of facts or developing a deeper understanding). Gibbs advised us that "assessment is the most powerful lever teachers have to influence the way students respond to courses and behave as learners" (1999, p. 41).

Adding TEL to existing courses

In recent years, many institutions that primarily offer distance education have attempted to get students online in order to support and enhance their teaching, learning and administration processes. One particular facet of educational interaction that technology can facilitate is greater student-student and student-teacher communications, something that is often lacking for those

who study independently. Sometimes referred to as "the Achilles heel of distance education" (Guri-Rosenblit, 2005, p. 475), it can be overcome by a variety of online means.

Increased opportunities for communication can not only help overcome feelings of isolation, but also add important new dimensions to the educational experience of distance learners studying largely by themselves. However, achieving such benefits requires more than a simple technical fix. When courses have been designed for presentation to several cohorts of distance learners over time and use a transmissive approach (i.e. written and/or recorded materials that aim to impart to learners all that they require to pass the course), it is particularly difficult to introduce significant changes to the model of teaching and learning. When digital tools and resources are added to a pre-existing course, their use by learners is likely to be very limited, and even then only in keeping with the teaching and learning practices originally conceived for the course.

In contrast, when technology is pedagogically integrated within course design, it can enable and support more active forms of learning. For example, if students are required to work in small groups on a collaborative task, using the Internet to find information resources and online tools to communicate with their peers and create a joint project that is assessed appropriately, then the use of TEL has a clear pedagogic role. Initiatives of this kind, however, are less common than the more superficial uses of ICT that tend to be bolted on to existing course designs.

"Doing things better" or "Doing better things"?

In Section 1 we stressed that innovations with TEL need to have a clearly articulated rationale if everyone involved is to understand its goals or aims (i.e. what the innovation is supposed to achieve and why that is important). The goals or aims might be *administrative* or *managerial* (e.g. improved administration of enrolment, notification of assessment requirements and the assignment schedule, etc.) — such goals are often linked to efficiency and/or reducing costs — or they might be *educational* (e.g. improved access to digital resources, enhanced communication or the use of digital tools for students to co-operate or collaborate on projects, etc.) — in which case, there might be a need for even greater clarity about the intended aims and outcomes. Let's look at online library resources as an example.

Providing students with access to online library resources is an innovation that might be undertaken for a variety of reasons. If students are home-based or located in many dispersed locations, they might otherwise have no access to good library resources. In this case, TEL offers learners an additional educational source for their studies. If the students are primarily campus-based, providing access to online library resources might simply increase the ease with which they can use those resources. Such a move might increase costs without changing the fundamental nature of the educational opportunities offered, though; it might simply result in fewer visits to the library building.

So, some TEL innovations might be concerned with "doing things better." They mirror or supplement existing educational practices while improving the consistency of provision, the accessibility of resources or the convenience for learners to study where and when they choose. They do not, however, change the nature of the learning that they support. Many institutions have launched MOOCs as a form of TEL provision for dispersed learners. More often than not, such courses make lectures available to students as streamed videos; however, note that not only does the teaching remain a lecture as per traditional methods, but what students are expected to learn from those lectures is not changed in any substantial way. MOOCs have therefore been criticised for perpetuating transmissive didactic teaching practices (Bates, 2012; Dolan, 2014).

In contrast, "doing better things" involves using TEL to provide learning opportunities that were not available previously. Usually, this would involve more than replicating existing teaching practices, focusing instead on developing qualitative changes in students' learning. In the context of higher education, these might include, for example, designing learning activities involving technology aimed at enabling students to:

- Develop and deepen knowledge and understanding, not simply in terms of knowing more (facts, principles, procedures, etc.), but also of knowing differently (more elaborate conceptions, theoretical understanding, etc.).
- Develop the capacity to participate in academic discourse and a community of practice related to their discipline or profession.
- "Learn how to learn" to develop greater self-direction and the capacity — and aspiration — to continue learning throughout life.
- Develop an understanding that knowledge can be contested (legitimate differing perspectives) rather than absolute.
- Develop a range of "generic" or "life" skills. For example, critical thinking and discernment, and the ability to cope with uncertainty, communicate appropriately with different audiences, work effectively with other people and reflect on practices, etc.

Developing shared understandings and use of terminology

Institutional activities aimed at raising awareness of TEL and its potential effects on teaching and learning need to go beyond technology-led familiarisation sessions and training on "how to use" particular technologies and tools. Opportunities must be created for the potential benefits and pitfalls of using technology for teaching and learning to be discussed explicitly. Adopting a pedagogically-led approach is likely to have a less threatening and a longer-lasting influence than adopting a technology-led one. At the very least, this should help avoid considerable time and effort being wasted by teachers in developing learning activities and resources that will be underused by their students.

It is not just a matter of providing professional development or training sessions on the use of TEL. The issues can be better addressed during the process of curriculum and course design within departments or faculties. In addition to considering *what content* should be presented, those involved should consider at the same time *how* the content is to be taught and assessed. Everyone involved in developing TEL materials and resources needs to have a *shared understanding* of the teaching and learning processes that are proposed, and this should be brought about through explicit discussion. What particular form will any proposed teaching activity take and what will students be expected to do? Teaching might involve one or more of the following:

Presentation	Students are expected to assimilate information through reading, listening, watching, observing, etc.
Interactive/adaptive tuition	Learners actively engage with simulations, exercises, etc.
Finding and handling information	Students develop skills to effectively engage with, evaluate and select information to use in appropriate ways.
Experiential problems or tasks	Relating academic knowledge, models and theories to students' own experiences in personal, domestic or work contexts.
Communicative activity	Students engage in dialogue with teachers, tutors, fellow students or people outside the course.
Productive activity	Students record, create, assemble, store and retrieve items relating to their learning (including for assessment purposes).

Ideally, any course or module would contain a mix of different types of teaching activity (and associated learning activities), rather than just one or two from the list above. The exact combination and proportion of each will, of course, depend upon a wide range of factors, and teachers can develop the design that best meets their particular pedagogical needs and context.

Exercise

You could invite teachers in your institution to review the modules or courses for which they are currently responsible in terms of the teaching and learning activities involved (see the box above).

What proportion of study time do they expect students to spend on each of the categories?

Are the proportions in line with what the teacher expected? If not, why?

Are the proportions about right to enable students to achieve the desired learning outcomes (e.g. practising and demonstrating the necessary knowledge and skills)? If not, what changes would need to be made to achieve a better balance of types of teaching and learning activities?

If several teachers are responsible for teaching a particular course or module, how do they ensure that an appropriate balance is achieved in the types of teaching and learning activities across the whole course or module?

Where there is known to be variability in the meanings ascribed to educational processes and how they are enacted (e.g. teaching, learning, assessment), these processes and terms must be examined and discussed rather than all stakeholders assuming that they are unambiguous and understood in the same way by all involved. Ultimately, students must share the understandings of their teachers. They need to know what is expected of them, and teachers should not assume that their students understand the educational processes in the same way as the teachers do.

Unintended consequences of technology-led professional development activities

We pointed out earlier that a teacher's conceptions of teaching and learning influence how that teacher actually teaches. Research has also shown that those conceptions influence a teacher's expectations of — and engagement with — professional development activities. In a study of new university lecturers, Nicholls reported that:

> Those who associated teaching with the transmission of knowledge, where students had to acquire a well-defined body of knowledge, were most anxious to develop more sophisticated skills to facilitate the transmission. Those who associated teaching with facilitating learning were anxious to understand and conceptualize the learning process, to help their students. (Nicholls, 2005, p. 621)

This is often evident when institutions adopt professional development programmes that focus primarily on teaching "how to" approaches with digital technologies and tools. A more effective approach involves engaging teachers in activities that support them in reflecting upon and reconsidering their deeply held beliefs about teaching, while offering realistic alternatives for them to consider. We return to this in Section 5.

Using external resources for teaching and learning

The institutional adoption of TEL does not mean that the institution must assume total responsibility for the creation of digital materials and resources to support teaching and learning. There are a variety of external sources of trustworthy digital assets that can add great value to teaching and learning activities.

Numerous specialist digital repositories, databases and collections are maintained by bodies such as learned societies, professional bodies, museums and galleries, universities, research institutes, and governmental and non-governmental agencies. These resources are usually from credible and reputable sources. However, access to them is often restricted and protected, although educational institutions can usually make arrangements for their staff and students to have the right to use them for educational purposes. Within educational institutions, the library staff will normally have responsibility for arranging access to external digital resources, as well as to e-book

collections and online journals. Library staff would also be responsible for promoting the use of these resources both by academic staff in their teaching and by students in their learning.

Exploring the use of OER within the institution

A very wide range of resources and materials, created by educators around the world, already exists and might be suitable for use by the teachers and students in your institution. When redesigning your courses or modules to make optimum use of TEL, it is worth considering the potential for making use of OER. You might also consider creating some OER that could be shared within your own institution and/or by other educators in your country or throughout the world.

If you are not sure what OER encompasses, these definitions (with examples) should provide clarification:

> Digitised materials offered freely and openly for educators, students and self-learners to use and re-use for teaching, learning and research. (OECD, 2007, p. 10)

> Open Educational Resources (OER) are teaching and learning materials that are freely available online for everyone to use, whether you are an instructor, student or self-learner. Examples of OER include: full courses, course modules, syllabi, lectures, homework assignments, quizzes, lab and classroom activities, pedagogical materials, games, simulations, and many more resources contained in digital media collections from around the world. (OER Commons, n.d.)

If you need further information about the potential benefits and disadvantages of using OER, you could look at the following sources:

UNESCO and the Commonwealth of Learning (2011), *A Basic Guide to Open Educational Resources (OER)*.[1]
OECD (2015), *Open Educational Resources: A Catalyst for Innovation*.[2]
COL has developed a short course called Understanding Open Educational Resources (requiring about two hours of study time) that can be accessed at COL's Technology-Enabled Learning Lounge.[3] The course is open and does not require any user ID or password. Users can print a certificate of completion for the course.

With many thousands of OER available from institutions across the world, it might seem difficult to know where to look for suitable resources. Fortunately, a number of specialist search engines have been developed to assist in this process. Here are some of them:

[1] http://hdl.handle.net/11599/36
[2] http://www.oecd-ilibrary.org/education/open-educational-resources_9789264247543-en;jsessionid=61bdilpi0l6oc.x-oecd-live-02
[3] http://tell.colvee.org

Jorum[4] – "Free learning and teaching resources, created and contributed by teaching staff from UK Further and Higher Education Institutions."
OER Commons[5] – "Find Free-to-Use Teaching and Learning Content from around the World. Organize K-12 Lessons, College Courses, and more."
DOER – Directory of Open Educational Resources[6] – Open Educational Resources from Commonwealth universities and educational institutions.
Temoa[7] – "A knowledge hub that eases a public and multilingual catalog of Open Educational Resources (OER) which aims to support the education community to find those resources and materials that meet their needs for teaching and learning through a specialized and collaborative search system and social tools."
OpenLearn[8] – "Aims to break the barriers to education by reaching millions of learners around the world, providing free educational resources and inviting all to sample courses that registered [Open University] students take."

Of course, in the spirit of the "open" movement, OER are not just things that you find, adapt and use for your own teaching. They are also things that you create and make available for other people to find, adapt and use. Institutions need to develop appropriate policies and strategies not only to encourage their teachers to make use of OER, but also to develop their own OER that can be shared with educators and learners around the world.

Exercise

To what extent do teachers in your institution already make use of OER?
(If you have already conducted a survey of teachers using the Questionnaire on Faculty Use of Technology for Teaching and Learning in Appendix 2, the responses should enable you to answer this question.)

Would your institution like to see more teachers making use of OER? Why is it considered useful to do so?

What guidance and support does your institution currently provide to teachers relating to (a) finding, adapting and using OER, and (b) developing OER?

Are there plans to extend (or provide) such guidance and support in your institution?

A draft institutional OER Policy Template[9] that can be used by institutions is available on the

[4] http://www.jorum.ac.uk
[5] https://www.oercommons.org
[6] http://doer.col.org
[7] http://www.temoa.info
[8] http://www.open.edu/openlearn
[9] http://cemca.org.in/ckfinder/userfiles/files/DRAFT%20OER%20POLICY%20template_revised.odt

website of COL's regional office in New Delhi — the Commonwealth Educational Media Centre for Asia (CEMCA). You can use it as the basis for discussion about the potential benefits of OER in your institution, or, if your institution would like to adopt a stand-alone OER policy document, you can adapt it to meet your institution's particular context and requirements. A better option, though, would be to incorporate an appropriate set of OER guidelines within an integrated TEL policy for your institution. In Section 5 we will be looking in more detail at implementing policies and strategies, so you might wish to look at the template in Appendix 5 now and note the main points for an OER policy for your institution. These can then be revisited when you move on to considering an integrated TEL policy.

Enabling students to work effectively with external resources

Students in schools, colleges and universities already use digital technologies to support and enhance their studies, even if this is not officially encouraged by the institution or required by the curriculum. More often than not, an Internet search engine such as Google is the preferred starting point for many learners when they are looking for information, and online resources such as Wikipedia are referred to frequently. However, few students possess the evaluative skills necessary to select the most trustworthy and appropriate sources for their particular educational purpose. In fact, new students often have very restricted expectations about how technology might contribute to their learning at university: "We cannot assume that being a member of the 'Net Generation' is synonymous with knowing how to employ technology based tools strategically to optimise learning experiences in university settings" (Kennedy, Judd, Churchward, Gray & Krause, 2008, pp. 117–18).

Institutions must therefore ensure that teachers (and others providing student support) take responsibility for making certain that learners acquire the digital literacy skills necessary for learning effectively. All academic programmes within an institution should help students to develop approaches to using TEL that are appropriate and necessary for the level of study. The process should involve explicit reference to the educational purposes of less familiar learning activities and an exploration of how technologies and tools could contribute effectively to achieving the desired outcomes.

Exercise

To what extent do learners in your institution already make use of TEL?
(If you have already conducted a survey of learners using the Questionnaire on Learner Use of Technology for Teaching and Learning in Appendix 1, the responses should enable you to answer this question.)

Would your institution like to see learners making use of TEL to a greater extent? Why do senior managers and teachers in your institution consider it advantageous for them to do so?

What guidance and support does your institution currently provide to learners relating to (a) the technical skills required for effective use of TEL, and (b) the intellectual skills and digital literacy necessary for effective use of TEL?

Are there plans to extend (or provide) such guidance and support?

Drafting institutional policies and strategies for TEL

Throughout the world of education there are many teachers and senior managers who view digital technologies as being primarily a means of delivery — that is, they see the adoption of TEL mainly in terms of changing how teaching practice is organised for the students. The majority of TEL projects undertaken to date have involved replicating existing teaching practices. Teachers using it have assumed that the adequacy and appropriateness of existing teaching practices are beyond question. However, in higher education there is considerable evidence that casts doubt upon such complacency (Biggs, 2003; Blin & Munro, 2008; Kember & Kwan, 2000; Laurillard, 2002; Price & Richardson, 2004; Trigwell & Prosser, 1996).

Where underlying assumptions about educational processes have been questioned and re-examined, a need for improvement in teaching and learning practices has often been identified. Digital technologies are viewed not simply as providing a delivery mechanism, but as supporting changes in how university teaching and learning are undertaken to better prepare learners for the modern world (Kirkwood & Price, 2012).

For this reason, it is not enough for TEL policies and strategies to focus primarily on technical issues; all aspects of teaching and learning — and the many complex factors that influence them — need to be taken into account.

University policy makers, managers and teachers need to take a very broad view when considering the consequences of adopting TEL at departmental, faculty and institutional levels. This involves identifying and specifying the aims and purposes of using TEL to support teaching and learning, bearing in mind that terms such as these are open to a variety of interpretations by those involved. Further, changes in any one organisational area are likely to cause changes in

a number of others. Therefore, achieving effective innovation with technology has implications for many aspects of institutional culture, including:

- **Policies for infrastructure and technical support** — ensuring that staff responsible for teaching, administering and supporting student learning are experienced, proficient and up to date in the use of technologies.
- **Policies and strategies relating to student assessment** — tasks that are assigned to assess students (a) should require students to demonstrate personal understanding rather than primarily repeating or reproducing facts or information, and (b) should not be exclusively competitive/individualistic, but should align with the nature of the activities undertaken (increasingly social, interactive and collaborative).
- **Policies and strategies for developing students' digital literacy** — ensuring that students acquire and practise the intellectual skills as well as the operational abilities necessary for using technologies and the associated tools in pursuit of educational goals and purposes.
- **Policies and strategies for the professional development of academic staff** — enabling practitioners to understand differing conceptions of and approaches to teaching, learning and assessment and to reflect on and appraise the adequacy and appropriateness of their existing beliefs and practices.
- **Policies aimed at advancing and rewarding scholarly activities relating to TEL** — encouraging and rewarding teachers who undertake scholarly investigations of their pedagogical practices (and their students' learning) with the aim of improving their educational processes and practices. This should include scholarly (rather than technologically deterministic) activities relating to learning and teaching with technology.
- **Policies and infrastructure for sharing TEL scholarship activities** — promoting and enabling the sharing of TEL activities designed using scholarly principles to improve teaching and learning practices and the scholarly evaluation of their effectiveness. This would involve the establishment of a digital repository for retaining "successful" TEL activities and the associated documentation together with search facilities to enable their retrieval by other interested teachers.

Drafting an integrated TEL policy and associated strategies requires all these aspects to be examined and discussed. Ultimately, all stakeholders in the institution should debate them. It is likely that some existing institutional policies will need to be amended to enable some potential benefits of TEL — for students, teachers and the institution as a whole — to be realised. (This is why it is essential that institutional goals and aims be discussed and agreed on early in the implementation process.)

A TEL policy template is presented in outline form in Appendix 5. It lists a number of key sections and sub-sections that should be included: only headings and examples are provided

in Appendix 5, as variations in the circumstances of institutions will necessitate considerable differences in the detail. If you have undertaken the various exercises throughout this handbook, you should already have considered many of the issues and be in a position to complete most of the sections.

The most appropriate means of discussing and refining the draft TEL (and related) policies and strategies will vary between institutions. Consequently, the manner in which agreement is reached and approval is achieved within an institution will also vary.

Exercise

Within your institution, what is the most appropriate means of discussing and refining draft TEL (and related) policies and strategies? Should an institution-wide representative group be established for the purpose of doing this, or would existing groups or committees be better placed to undertake the task?

What would be the most appropriate mechanism for ensuring that all stakeholders have an opportunity to consider and respond to the draft proposals?

What institutional body would have ultimate responsibility for approving the proposals? What other boards or committees would need to be involved in the approval procedure?

What mechanisms (if any) would need to be established to (a) review the implementation process and (b) update and reconsider the various policies and strategies relating to TEL within a reasonable time (one or two years?) after the implementation has been embedded?

What next?

In the final section — Section 5 — we consider mechanisms and procedures that can help with the implementation of institutional policies and strategies. We look at some issues relating to the technology infrastructure and the technical training necessary for all categories of staff involved. More importantly, we reflect upon the necessity for educational and pedagogical capacity building and professional development to enable academic teachers and their students to make effective use of TEL. Finally, we look at monitoring and evaluation procedures that can help you determine how successfully TEL is being used in your institution, and also identify where materials, processes or practices would benefit from being modified.

SECTION 5: IMPLEMENTING POLICIES AND STRATEGIES

> *Progress is impossible without change, and those who cannot change their minds cannot change anything.*
>
> George Bernard Shaw

Implementing the technical infrastructure for TEL

The PRIA report — and in particular, the audit of existing resources and infrastructure — should provide an indication of the extent to which your organisation needs to install new technical infrastructure and/or upgrade existing facilities to meet your projected needs. You will need to consider:

- equipment (hardware) to be used by individual teachers and/or in teaching spaces,
- equipment (hardware) to be used by students (their own or equipment provided by the institution in teaching spaces or elsewhere),
- networking equipment to provide adequate capacity and coverage throughout the institution,
- servers for digital storage of materials, resources, online tools, etc.,
- servers for student services (communications, project work, sharing facilities, etc.), and
- servers for student and course administration.

In addition to the physical infrastructure, the institution will need to provide technical assistance and support mechanisms — both initial and ongoing — to academic and administrative staff and for dealing with breakdowns and difficulties. Students will also need technical support and assistance. The more an institution embraces TEL, the more likely it is that students will expect to have access to the academic systems at any time of the day. The implications of this will vary from institution to institution, and much will depend upon the nature of the students. For example, students in remote locations might be in different time zones, while those in employment will most probably study when they are not at work.

Technical training for academic staff

If you have conducted the Questionnaire on Faculty Use of Technology for Teaching and Learning (see Appendix 2), you will know how much experience the academic staff already have. However, even if teachers have considerable familiarity with using technology for certain tasks, they might have no previous knowledge of the system your institution has chosen to

use for TEL. If a commercial VLE or LMS has been adopted, it is unlikely that many of your teaching staff will have much previous experience of working with that particular system or with the range of the tools and facilities that it offers.

Accordingly, it will be necessary to implement appropriate means of delivering technical training (initial and ongoing) for teachers and other staff who support teaching and learning. Initial training will be required to enable them to start preparing materials and resources, using basic tools to support the teaching and learning processes and for conducting course or module administration. As additional tools and facilities are added, or as existing ones are updated or replaced, further ongoing training will be necessary. Both initial and ongoing training can be provided on an institution-wide basis, for individual departments or faculty, or for specific modules or courses.

Exercise

In your institution, what advantages and disadvantages do you think will be associated with institution-wide technical training (e.g. convenience, costs, timeliness, coverage, etc.)? (The responses to the questionnaire for academic staff might provide some insights for this exercise.)

What advantages and disadvantages are likely to be associated with technical training undertaken at a departmental or faculty level?

What advantages and disadvantages are likely to be associated with technical training arranged for specific modules or courses?

The importance of capacity building and professional development

Various groups of staff throughout the institution will need capacity building and/or professional development to accompany the introduction of the infrastructure (equipment and systems) for TEL. Almost certainly, the following will be necessary:

- Academic teachers will need to know how best to use TEL for their pedagogical purposes.
- Middle managers will need to understand the implications for the curriculum and resources at a departmental or faculty level.
- Senior managers will need to appreciate the implications of TEL policies and strategies for students, staff and resources.
- Academic support staff will need to consider how best to help and advise teachers and learners in order to maximise the potential benefits of TEL.

- Technical support staff will need to extend their understanding of the development process for courses and modules and how they can best contribute their expertise.

The nature of the professional development activities will be different for different stakeholder groups, but they should all be planned in a manner that draws together common threads and shared concerns in order to advance the institution's goals for implementing TEL. Table 5.1 presents a framework for developing an integrated strategy for the continuing professional development (CPD) of different academic groups.

Table 5.1. A framework for continuing professional development (CPD) for teaching and learning with technology

Target group	Focus of CPD	Purpose of CPD	Aim of CPD
Senior managers	University policy and decision making regarding the use of TEL	To develop a fuller understanding of the effects of university TEL and related policies and strategies on students, staff and resources	To promote strategic decision making that embeds the necessary structures and resources to support policy decisions relating to TEL
Middle managers	Faculty- and department-level policy making on the use of TEL in the overall curriculum	To understand the implications of faculty- and department-level TEL and related policies and strategies for students, staff and resources	To promote strategic decision making that supports the coherent application of faculty- and department-level TEL and related policies in course programmes and modules by providing appropriate structures and policies for staff and students
Individual teaching staff	Curriculum and course development using technology	To develop an understanding of the pedagogical rationale of using TEL in their courses and modules and the implications of their choices for students, staff and resources	To promote contextualised reflective practice and tactical choices for pedagogically driven technology use, aimed at improving the quality of the student experience

Academic professional development

In most educational institutions, a considerable amount of time is spent on the professional development of academics, particularly in relation to using technology for teaching and learning. However, some academic professional development models have been criticised for their reliance on deficit models that seek to "up-skill" deficient teachers. Such an approach oversimplifies the complexity of teaching and learning processes and, without any justification, takes for granted a shared understanding of the underlying concepts and theoretical principles. Pedagogical issues and variations in models of teaching and learning are rarely addressed

explicitly in courses and sessions that have a technology focus, and their usefulness has been questioned (Benson & Brack, 2009; Oliver & Conole, 2003).

If the existing academic beliefs and practices of teachers remain unchallenged, teachers are much more likely to use technology in ways that replicate and support their current teaching methods. Too often, teachers view technology as simply a means of delivering information. Convincing teachers to consider moving beyond merely replicating traditional classroom practices requires much more than "how to" guidance. It requires development activities that provide encouragement and opportunities to engage in pedagogical problem solving and discovery about teaching with technology — activities that are informed by a deeper understanding of the learning and teaching processes (Kreber & Kanuka, 2006).

Further, academic professional development activities need to look beyond the individual teacher. They also need to address the predominant culture within an organisation (Knight & Trowler, 2000). Bringing about changes in teaching practices through the use of technology (often cited as an institutional aim or goal) is not solely the responsibility of individual academic teachers. Organisational structures and the context and environment within which academics have to practise exert considerable influence on how teachers undertake their teaching (Price & Kirkwood, 2008). For example, a lack of congruence has been found between teachers' beliefs — what they think teaching should be about — and their actual teaching practices (Norton et al., 2005). Such differences seem to result from contextual factors that require an individual teacher's practices to conform to the dominant teaching culture within a department or institution. Transforming how teachers teach in order to improve the quality of the student learning experience is the responsibility of the whole institution (Knight, Tait & Yorke, 2006). This is particularly the case when it comes to teaching with technology.

Development of students' digital literacy skills

In Section 4 we mentioned that students' expectations and conceptions of teaching and learning in higher education might not be aligned with their teachers' beliefs about those processes. Furthermore, studies undertaken in a number of technology-rich western countries (see, for example, Bennett, Maton & Kervin, 2008; Helsper & Eynon, 2009; Jelfs & Richardson, 2013; Jones, Ramanau, Cross & Healing, 2010; Kennedy et al., 2008) fail to support claims that "digital natives" or the "Net generation" are already well prepared for learning with technology. The findings indicate that those claims fail to take account of the considerable differences between *technical skills and competency* (which many young people are found to have) and the *intellectual skills* necessary for effective use of technology for educational purposes (which most do not have).

For example, young people entering higher education regularly use a search engine like Google or a source like Wikipedia to find information about or resources for a topic of interest, but they often lack the evaluative skills to select the most trustworthy and appropriate sources for their particular academic purpose.

Academic programmes must ensure that opportunities exist for students to develop their digital literacy skills. Such skills are not simply about knowing how to use technology, but also about knowing how to use it effectively for learning.

Exercise

What do you know about the experience of your institution's students (and potential students) with using technology *for educational purposes*. (The responses to the questionnaire for students might provide some insights for this exercise.)

What do you think could be provided to develop students' digital literacy at an institutional level, e.g. by a library or similar unit?

What could be provided to develop students' digital literacy within academic programmes, courses or modules?

Monitoring and evaluating TEL developments

There are many reasons why it is important to monitor and evaluate TEL developments in terms of their use by both students and staff.

For example, monitoring can determine whether students have used the technology as expected by those designing learning sequences and activities. If they have used the technology, have the anticipated learning processes and/or outcomes been achieved? If they have not used the technology as expected, what changes or remedial measures can be put in place to rectify the situation for current or future students?

Monitoring activities might include:

- determining the extent of use of the TEL infrastructure, tools, resources, etc., by students and staff (on an individual or a course/module basis),
- determining whether students' extent and pattern of use of TEL materials and resources match the teachers' expectations,
- establishing which students (and staff) are making little or no use of TEL materials and resources, and
- ascertaining which TEL materials and resources could benefit from amendment, revision or improvement.

Evaluation activities might include:

- establishing how well TEL materials and resources have enabled students to achieve the learning outcomes of a module or course (and possibly identifying any elements that would benefit from revision),

- identifying teaching or learning activities that worked particularly well for students (and then sharing best practices with other teachers in the same department, faculty or institution), and
- undertaking a scholarly investigation of a particular innovation to share with the wider academic community (through publication, conference attendance, etc.).

Mechanisms and procedures should be established for monitoring TEL developments within a department, faculty or whole institution — but note that the particular circumstances of an institution will facilitate or limit the use of specific techniques for collecting evaluative information.

Many VLEs or LMS can produce data and statistics on the use of the various materials, resources, tools, etc. — simple quantitative data such as the number of site visits, logon duration or pages visited — but turning those data into useful information — data analytics — will require educational judgments to be made by teachers and managers of the systems. The system data can link a unique user (i.e. a student or staff member) with visits to individual Web pages or tools, but the interpretation of the data derived might entail apportioning that raw data into meaningful sub-divisions. For example, what is the minimum length of time that a user needs to be visiting a Web page in order to gain something from it, rather than just clicking through to another page? Does the system differentiate between different elements within the same Web page (e.g. an activity rather than reading matter)?

More importantly, data on visits to TEL Web pages or tools provide no information about what the user actually did during that visit: quantitative data tell us nothing about the types of interactions or activities with which learners (and teachers) are engaging. The data cannot tell us whether a student undertook a specific learning activity unless that activity is associated with a separate Web page or pages. If a student "visits" a discussion forum, the data probably cannot tell us whether the student simply read the postings, responded to postings they read or initiated a new discussion thread. Similarly, data on visits to a wiki or a blog do not indicate the nature of the activity undertaken — you would need to analyse the entries on those tools to understand what students were actually doing. So, while the data might help you to discover what proportion of students had ever (or never) used a resource or tool, they provide no qualitative information about the activity undertaken during visits.

N.B. There are many ethical issues that need to be considered if TEL data enable individual students or teachers to be identified. Concerns are much less likely to be expressed when group data are presented (e.g. a course group as a whole).

To build a better understanding of the effectiveness of TEL developments, evaluation procedures that enable the educational benefits to be scrutinised should be established. Emphasis needs to be given to the types of interactions or activities with which learners and

teachers are engaging and their effectiveness for achieving the pedagogical goals. In Section 3 we suggested that it would be useful to arrange for feedback to be collected regularly through:

- student focus groups and/or interviews,
- student experience surveys, and
- TEL usage statistics (learning analytics).

Usually, relying on a single method of data collection (e.g. a questionnaire or multiple-choice test) to determine whether the expected outcomes had been achieved would be ineffective. Multiple methods, usually involving both quantitative and qualitative data, would be necessary. For example, different methods are required in order to ascertain (a) the extent of TEL use by students, (b) their attitudes to or views on using TEL, (c) any problems or issues that they encountered, (d) the learning that they have derived from using TEL and (e) any changes in their understanding and behaviour that might be attributed to their engagement with TEL learning sequences or activities. For a critique of some of the methods that have been used, see Kirkwood and Price (2013a, 2014).

Exercise

Can you list the types of routine information that could be used for monitoring and evaluation purposes in your institution (e.g. student demographics, assignment submission rates, grades attained by students, usage data from a VLE, etc.)?

What additional sources of information (quantitative and/or qualitative) would be useful for evaluating TEL developments in your institution?

Who would be responsible for collecting and analysing such data and information in your institution (e.g. individual teachers, each department/faculty, an administrative unit with institution-wide responsibility)?

To whom would the analysed information be reported?

What mechanisms would need to be put in place in your institution to ensure (a) adequate monitoring and evaluation of academic programmes, courses or modules, and (b) that the findings of such studies are acted upon to improve TEL projects?

To optimise the sharing of lessons learned from evaluation studies, procedures should be developed for the documentation of findings and the sharing of outcomes within the institution (and possibly more widely).

Conclusion

Throughout this handbook we have attempted to illustrate the complexity of teaching and learning processes, a complexity that increases when technology is involved. Nothing should be taken for granted when considering teaching and learning activities, and it is necessary to recognise the complex factors that can have an impact on TEL innovations when trying to evaluate them. Instead of focusing primarily on the technology concerned, evaluative studies should aim to understand and illuminate all aspects of the educational process, but in particular, the impact on students and their learning.

We hope that following a systematic process of implementation of TEL in your institution would help you achieve a better understanding of the complex processes associated with TEL, particularly as they affect your institution's educational goals, policies and practices. Rather than starting with technological imperatives, we hope that you will be able to place greater emphasis on your institution's aspirations for educational and pedagogic processes and consequently be better placed to attain real benefits from the implementation of TEL.

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APPENDIX 1

COMMONWEALTH of LEARNING

Learning for Sustainable Development

Questionnaire on Learner Use of Technology

The primary aim of this questionnaire is to assess the Technology-Enabled Learning environment and enabling policies, including learners' access to media and technology, and their nature of use and preferences for adopting technologies for learning in an educational institution.

The questionnaire shall be completed by a randomly selected stratified sample of learners in an institution. Use appropriate sample size determination and random number table for the survey.

Protecting the privacy of the respondent is important — all personal information will be kept confidential and used only in aggregate form.

Please respond to all the questions by following the instructions.

A. Background Information

1.1 Name of the university/institution: _____

1.2 Country: _____

1.3 Your email: _____

1.4 Gender: O Female O Male

1.5 Your age group: O Below 20 O 21-25 O 26-30 O 31-35 O 36-40 O 41 and above

1.6 Your level of study: O Undergraduate O Graduate or postgraduate O Research

1.7 Year of study: O Year 1 O Year 2 O Year 3 O Year 4

1.8 Your faculty discipline:

O Humanities
O Social Sciences
O Commerce and Management
O Health and Medical Sciences
O Natural Sciences
O Engineering and Technology
O Agriculture and natural resources
O Fine and Performing Arts

1.9 Do you have a physical or learning disability that requires accessible or adaptive technologies for your coursework?

- O No
- O Yes, I have one or more physical disabilities that require accessible or adaptive technologies
- O Yes, I have one or more learning disabilities that require accessible or adaptive technologies
- O Yes, I have both physical and learning disabilities that require accessible or adaptive technologies
- O Prefer not to answer

1.10 Most of the courses you are currently studying are:

- O Traditional face-to-face
- O Completely online
- O Blended, where some components of the study are done online

B. Access to and Use of Information and Communication Technologies (ICTs)

1. Ownership of and Access to ICTs

1.1 Do you own any of these devices?

Devices	Yes	No, but I plan to buy one in the next 12 months	No, and I do not plan to buy one in the next 12 months
Desktop computer	☐	☐	☐
Laptop	☐	☐	☐
Smartphone	☐	☐	☐
Tablet device (e.g. iPad)	☐	☐	☐

1.2 Do you have access to any of these devices at your university?

Devices	Yes, provided by the university	Yes, I use my personal device in the university	No, my university does not allow me to use these
Desktop computer	☐	☐	☐
Laptop	☐	☐	☐
Smartphone	☐	☐	☐
Tablet device (e.g. iPad)	☐	☐	☐

2. Internet Access

2.1 Where do you access the Internet? (Tick (✓) all that apply.)

☐ Home ☐ Office ☐ Cybercafe ☐ Do not access

2.2 You have access to the Internet through (tick (✓) all that apply):

☐ Dial-up connection ☐ ADSL connection ☐ Leased line ☐ Wireless ☐ Mobile devices

2.3 Which device do you use most frequently to access the Internet?

O Smartphone O Tablet or iPad O Laptop O Desktop computer

2.4 You have broadband Internet connectivity at (tick (✓) all that apply):

☐ Home ☐ Office ☐ Cybercafe ☐ Do not access

2.5 Where do you get access to broadband Internet in your university/institution? (Tick (✓) all that apply.)

☐ Classrooms ☐ Library ☐ Hostels
☐ Faculty rooms ☐ Laboratories ☐ Reception lounge
☐ Seminar halls ☐ Students' common rooms ☐ Open areas

2.6 Do you get Wi-Fi/wireless Internet connectivity on your campus? ☐ Yes ☐ No

2.7 I use the Internet:

O Daily O Alternate days O Once a week O Irregularly O Rarely O Never

2.8 On average, how much time do you spend on Internet-related activities (email, browsing, social media) daily?

O <1 hour O 1-2 hours O 3-5 hours O >5 hours O Do not use daily

3. Use of ICTs

3.1 Please rate your skills in the following computer-related activities.

Computer Skills	I can't use it	I can use it to a small extent	I can use it satisfactorily	I can use it well	I can use it very well
Word processor (e.g. Word)	☐	☐	☐	☐	☐
Spreadsheets (e.g. Excel)	☐	☐	☐	☐	☐
Presentation (e.g. PowerPoint)	☐	☐	☐	☐	☐
Email	☐	☐	☐	☐	☐
Search engines	☐	☐	☐	☐	☐
Databases	☐	☐	☐	☐	☐
Multimedia authoring	☐	☐	☐	☐	☐
Graphic editing	☐	☐	☐	☐	☐

Computer Skills	I can't use it	I can use it to a small extent	I can use it satisfactorily	I can use it well	I can use it very well
Digital audio	☐	☐	☐	☐	☐
Video editing	☐	☐	☐	☐	☐
Web page design	☐	☐	☐	☐	☐
Learning Management System	☐	☐	☐	☐	☐
Web 2.0 tools (wikis, blogs, social networking and sharing tools)	☐	☐	☐	☐	☐

4. Social Media

4.1 Do you have a profile/account on a social media platform or platforms?
O Yes (Go to 4.2) O No (Go to 5)

4.2 Which social media platforms do you use? (Tick (✓) all that apply.)

☐ Facebook
☐ Twitter
☐ Google+
☐ LinkedIn
☐ Blog (using Blogger or Wordpress or within institutional website/CMS)
☐ Slideshare or similar presentation platform
☐ Photo sharing (Instagram/Flickr/ Picasaweb, etc.)
☐ Research sharing sites (Academia.edu, ResearchGate.net, etc.)
☐ Social bookmarking sites (Delicious, ScoopIt, Pinterest, etc.)
☐ Goodreads.com (for connecting with authors and readers) or similar

4.3 How frequently do you update your social media status?
O Several times a day O Once a day O Once a week
O Once a fortnight O Not very frequently O Not at all

4.4. On average, how much time do you spend on social media daily?
O <1 hour O 1-2 hours O 3-5 hours O >5 hours O Do not use daily

5. Mailing Lists and Discussion Forums

5.1 Are you a member of any mailing list or discussion forum? O Yes (Go to 5.2) O No (Go to 6)

5.2 How many email-based discussion forums are you subscribed to? O 1-5 O More than 5

5.3 Do you moderate any discussion forum or mailing list? O Yes O No

5.4 How often do you post to discussion forums/mailing lists?
O Several times a day O Once a day O Once a week
O Once a fortnight O Not very frequently

6. Technology-Enabled Learning Environment

6.1 Please rate your experiences with the following resources/services/spaces provided by your institution.

Resources/Services/Spaces	Poor	Fair	Neutral	Good	Excellent	Not available
eClassroom facilities (e.g. computers, projection systems, lecture capture systems, SMART boards, etc.)	☐	☐	☐	☐	☐	☐
Computer labs (for practical and Internet access)	☐	☐	☐	☐	☐	☐
Email services (institutional)	☐	☐	☐	☐	☐	☐
Learning Management System (e.g. Moodle, etc.)	☐	☐	☐	☐	☐	☐
ePortfolio	☐	☐	☐	☐	☐	☐
Network bandwidth/speed of Internet (download and upload)	☐	☐	☐	☐	☐	☐
Wi-Fi access	☐	☐	☐	☐	☐	☐
Online or virtual technologies (e.g. network or cloud-based file storage system, Web portals, etc.)	☐	☐	☐	☐	☐	☐
Access to software (e.g. MATLAB, GIS applications, statistical software, qualitative data analysis, graphics software, textual or image analysis program, etc.)	☐	☐	☐	☐	☐	☐
Download and use of free and open source software for teaching and learning	☐	☐	☐	☐	☐	☐
Support for maintenance and repair of ICTs	☐	☐	☐	☐	☐	☐
Access to data storage	☐	☐	☐	☐	☐	☐
Data visualisation software	☐	☐	☐	☐	☐	☐
Citation/reference management software	☐	☐	☐	☐	☐	☐
Plagiarism detection software	☐	☐	☐	☐	☐	☐
Institutional repository for sharing of research	☐	☐	☐	☐	☐	☐
e-Journals	☐	☐	☐	☐	☐	☐
e-Books	☐	☐	☐	☐	☐	☐
Citation databases	☐	☐	☐	☐	☐	☐
Bibliographic databases	☐	☐	☐	☐	☐	☐
e-Newspapers	☐	☐	☐	☐	☐	☐

Resources/Services/Spaces	Poor	Fair	Neutral	Good	Excellent	Not available
e-Theses and dissertations	☐	☐	☐	☐	☐	☐
Patent database	☐	☐	☐	☐	☐	☐
e-Proceedings of conferences	☐	☐	☐	☐	☐	☐
Statistical databases	☐	☐	☐	☐	☐	☐

7. Use of Online Courses

7.1 Have you ever taken an online course? O Yes (Go to 7.2) O No (Go to C)

7.2 In the past year, have you taken a MOOC (massive open online course) through any institution/organisation (e.g. Coursera, Udacity, edX, MITx, your college/university, etc.)?

- O No, and I don't know what a MOOC is
- O No, but I do know what a MOOC is
- O Yes, but I didn't complete it
- O Yes, and I completed it

C. Perceptions of Use of Technology-Enabled Learning

1. Please rate the following statements about technology use in your studies.

Statements *I want to use technology in my studies because:*	Strongly agree	Agree	Neither agree nor disagree	Disagree	Strongly agree
It will help me get better results in my subjects.	☐	☐	☐	☐	☐
It will help me understand the subject material more deeply.	☐	☐	☐	☐	☐
It makes completing work in my subjects more convenient.	☐	☐	☐	☐	☐
It motivates me to explore many topics I may not have seen before.	☐	☐	☐	☐	☐
It allows me to collaborate with others easily, both on and outside of the campus.	☐	☐	☐	☐	☐
It will improve my IT/information management skills in general.	☐	☐	☐	☐	☐
It will improve my career or employment prospects in the long term.	☐	☐	☐	☐	☐

2. Please rate how useful each of the following technologies currently is or would be in your studies (regardless of whether or not you have used each technology in the past).

In your studies, how useful do you think it would be to …	Not at all useful	Useful to a limited extent	Neutral	Useful	Very useful	Do not know
Design and build Web pages as part of your course?	☐	☐	☐	☐	☐	☐
Create and present multimedia shows as part of your course requirements (e.g. PowerPoint)?	☐	☐	☐	☐	☐	☐
Create and present audio/video as part of your course requirements?	☐	☐	☐	☐	☐	☐
Download or access online audio/video recordings of lectures you could not attend?	☐	☐	☐	☐	☐	☐
Download or access online audio/ video recordings to revise the content of lectures you have already been to?	☐	☐	☐	☐	☐	☐
Download or access online audio/video recordings of supplementary content material?	☐	☐	☐	☐	☐	☐
Use the Web to access university-based services (e.g. enrolment, paying fees)?	☐	☐	☐	☐	☐	☐
Use your mobile phone to access Web-based university services or information (e.g. enrolment, paying fees)?	☐	☐	☐	☐	☐	☐
Use instant messaging/chat (e.g. Skype, Messenger, Hangout, etc.) on the Web to communicate/collaborate with other students in the course?	☐	☐	☐	☐	☐	☐
Use instant messaging/chat (e.g. Skype, Messenger, Hangout, etc.) on the Web to communicate with teachers and administrative staff from the course?	☐	☐	☐	☐	☐	☐
Use a social networking platform (e.g. Facebook) on the Web to communicate/ collaborate with other students on the course?	☐	☐	☐	☐	☐	☐
Use microblogging (such as Twitter) to share information about class-related activities?	☐	☐	☐	☐	☐	☐
Keep your own blog as part of your course requirements?	☐	☐	☐	☐	☐	☐

In your studies, how useful do you think it would be to …	Not at all useful	Useful to a limited extent	Neutral	Useful	Very useful	Do not know
Contribute to another blog as part of your course requirements?	☐	☐	☐	☐	☐	☐
Use the Web to share digital files related to your course (e.g. sharing photos, audio files, movies, digital documents, websites, etc.)?	☐	☐	☐	☐	☐	☐
Use Web-conferencing or video chat to communicate/collaborate with other students in the course?	☐	☐	☐	☐	☐	☐
Receive alerts about course information (e.g. timetable changes, the release of new learning resources, changes in assessment) via RSS feeds on the Web?	☐	☐	☐	☐	☐	☐
Receive alerts about course information (e.g. timetable changes, the release of new learning resources, changes in assessment) via text message on your mobile phone?	☐	☐	☐	☐	☐	☐
Contribute with other students to the development of a wiki as part of your course requirements?	☐	☐	☐	☐	☐	☐
Receive grades/marks from your lecturer via text message on your mobile phone?	☐	☐	☐	☐	☐	☐
Receive pre-class discussion questions from your lecturer via text message on your mobile phone?	☐	☐	☐	☐	☐	☐
Use a personal dashboard on the university intranet to access all your academic information related to courses, grades, etc.?	☐	☐	☐	☐	☐	☐
Use an ePortfolio system to record your achievements for future use beyond the course of your studies?	☐	☐	☐	☐	☐	☐

3. Please indicate to what extent you agree with the following statements.

Statements	Strongly agree	Agree	Neither agree nor disagree	Disagree	Strongly agree	Do not know
I get more actively involved in courses that use technology.	☐	☐	☐	☐	☐	☐
I am more likely to skip classes when materials from course lectures are available online.	☐	☐	☐	☐	☐	☐
When I entered college, I was adequately prepared to use the technology needed in my courses.	☐	☐	☐	☐	☐	☐
Technology makes me feel connected to what's going on at the college/ university.	☐	☐	☐	☐	☐	☐
Technology makes me feel connected to other students.	☐	☐	☐	☐	☐	☐
Technology makes me feel connected to teachers.	☐	☐	☐	☐	☐	☐
Technology interferes with my ability to concentrate and think deeply about subjects I care about.	☐	☐	☐	☐	☐	☐
I am concerned that technology advances may increasingly invade my privacy.	☐	☐	☐	☐	☐	☐
I am concerned about cyber security (password protection and hacking).	☐	☐	☐	☐	☐	☐
In-class use of mobile devices is distracting to me.	☐	☐	☐	☐	☐	☐
In-class use of mobile devices is distracting to my teacher.	☐	☐	☐	☐	☐	☐
Use of tablets/laptops in class improves my engagement with the content and class.	☐	☐	☐	☐	☐	☐
Multitasking with my technology devices sometimes prevents me from concentrating on or doing the work that is most important.	☐	☐	☐	☐	☐	☐
When it comes to social media (e.g. Facebook, Twitter, LinkedIn), I like to keep my academic life and social life separate.	☐	☐	☐	☐	☐	☐
I wish my teachers in the university would use and integrate more technology in their teaching.	☐	☐	☐	☐	☐	☐

D. Your Comments

There is a need to improve the Technology-Enabled Learning environment in your university.

Comment.

Thank you.

APPENDIX 2

COMMONWEALTH of LEARNING
Learning for Sustainable Development

Questionnaire on Faculty Use of Technology for Teaching and Learning

The primary aim of this questionnaire is to assess the Technology-Enabled Learning environment and enabling policies, including understanding teachers' access to media and technology, and their nature of use; teachers' perceptions and beliefs about the use of technology for teaching and learning; and the use of digital resources, including open educational resources, for teaching, learning and research in an educational institution.

The questionnaire should be completed by a randomly selected stratified sample of teachers in an institution. Use appropriate sample size determination and random number table for the survey.

Protecting the privacy of the respondent is important — all personal information will be kept confidential and only be used in aggregate form.

Please respond to all the questions by following the instructions.

A. Background Information

1.1 Name of the university/institution: _____

1.2 Country: _____

1.3 Your email: _____

1.4 Gender: O Female O Male

1.5 Your age group: O Below 26 O 26-30 O 31-35 O 36-40 O 41-45 O 46-50 O 51-55 O 56-60 O 61-65 O 66-70

1.6 Your position: O Professor O Associate Professor O Assistant Professor O Lecturer

1.7 Your highest qualification: O PhD O MPhil or MTech O Master's

1.8 Primarily involved in:
O Undergraduate teaching O Graduate or postgraduate teaching O Doctoral research

1.9 Your years of teaching experience:
O 5 or <5 years O 6-10 years O 11-15 years O 16-20 years O 21-25 years
O 26-30 years O 31-35 years O 36-40 years O 41-45 years

1.10 Your faculty discipline:

- O Humanities
- O Social Sciences
- O Commerce and Management
- O Health and Medical Sciences
- O Natural Sciences
- O Engineering and Technology
- O Agriculture and natural resources
- O Fine and Performing Arts

B. Access to and Use of Information and Communication Technologies (ICTs)

1. Ownership of and Access to ICTs

1.1 Do you own any of these devices?

Devices	Yes	No, but I plan to buy one in the next 12 months	No, and I do not plan to buy one in the next 12 months
Desktop computer	☐	☐	☐
Laptop	☐	☐	☐
Smartphone	☐	☐	☐
Tablet device (e.g. iPad)	☐	☐	☐

1.2 Do you have access to any of these devices at your university?

Devices	Yes, provided by the university	Yes, I use my personal device in the university	No, my university does not allow me to use these
Desktop computer	☐	☐	☐
Laptop	☐	☐	☐
Smartphone	☐	☐	☐
Tablet device (e.g. iPad)	☐	☐	☐

2. Internet Access

2.1 Where do you access the Internet? (Tick (✓) all that apply.)

☐ Home ☐ Office ☐ Cybercafe ☐ Do not access

2.2 You have access to Internet through (tick (✓) all that apply):

☐ Dial-up connection ☐ ADSL connection ☐ Leased line ☐ Wireless ☐ Mobile devices

2.3 Which device do you use most frequently to access the Internet?

O Smartphone O Tablet or iPad O Laptop O Desktop computer

2.4 Do you have broadband Internet connectivity on your campus?

O Yes (Go to 2.5) O No (Go to 3)

2.5 Where do you get access to broadband Internet? (Tick (✓) all that apply.)

☐ Classrooms ☐ Library ☐ Hostels

☐ Faculty rooms ☐ Laboratories ☐ Reception lounge
☐ Seminar halls ☐ Students' common rooms ☐ Open areas

2.6 Do you get Wi-Fi/wireless Internet connectivity on your campus? O Yes O No

2.7 I use the Internet:
O Daily O Alternate days O Once a week O Irregularly O Rarely O Never

3. Use of ICTs

3.1 Please rate your comfort level with the following computer-related activities.

Computer-related skills	Expertise level (Trainer)	User level (Advanced)	User level (Intermediate)	User level (Basic)	Non-user level (N/A)
Word processor (e.g. Word)	☐	☐	☐	☐	☐
Spreadsheets (e.g. Excel)	☐	☐	☐	☐	☐
Presentation (e.g. PowerPoint)	☐	☐	☐	☐	☐
Email	☐	☐	☐	☐	☐
Search engines	☐	☐	☐	☐	☐
Databases	☐	☐	☐	☐	☐
Multimedia authoring	☐	☐	☐	☐	☐
Graphic editing	☐	☐	☐	☐	☐
Digital audio	☐	☐	☐	☐	☐
Video editing	☐	☐	☐	☐	☐
Web page design	☐	☐	☐	☐	☐
Learning Management System	☐	☐	☐	☐	☐
Web 2.0 tools (wikis, blogs, social networking and sharing tools)	☐	☐	☐	☐	☐

4. Social Media

4.1 Do you have a profile/account on a social media platform(s)?
O Yes (Go to 4.2) O No (Go to 5)

4.2 Which social media platforms? (Tick (✓) all that apply.)

☐ Facebook
☐ Twitter
☐ Google+
☐ LinkedIn
☐ Blog (using Blogger or Wordpress or within institutional website/CMS)
☐ Slideshare or similar presentation platform
☐ Photo sharing (Instagram/Flickr/ Picasaweb, etc.)
☐ Research sharing sites (Academia.edu, ResearchGate.net etc.)
☐ Social bookmarking sites (Delicious, ScoopIt, Pinterest, etc.)
☐ Goodreads.com (for connecting with authors and readers) or similar

4.3 How frequently do you update your social media status?

O Several times a day
O Once a day
O Once a week
O Once a fortnight
O Not very frequently
O Not at all

5. Mailing Lists and Discussion Forums

5.1 Are you a member of any mailing list or discussion forum? O Yes (Go to 5.2) O No (Go to 6)

5.2 How many email-based discussion forums do you subscribe to? O 1-5 O More than 5

5.3 Do you moderate any discussion forum or mailing list? O Yes O No

5.4 How often do you post to discussion forums/mailing lists?

O Several times a day
O Once a day
O Once a week
O Once a fortnight
O Not very frequently

6. Technology-Enabled Learning Environment

6.1 Please rate your experiences with the following resources/services/spaces provided by your institution.

Resources/Services/Spaces	Poor	Fair	Neutral	Good	Excellent	Not available
eClassroom facilities (e.g. computers, projection systems, lecture capture systems, SMART boards, etc.)	☐	☐	☐	☐	☐	☐
Computer labs (for practical and Internet access)	☐	☐	☐	☐	☐	☐
Email services (institutional)	☐	☐	☐	☐	☐	☐
Learning Management System (e.g. Moodle, etc.)	☐	☐	☐	☐	☐	☐

Resources/Services/Spaces	Poor	Fair	Neutral	Good	Excellent	Not available
ePortfolio	☐	☐	☐	☐	☐	☐
Network bandwidth/speed of Internet (download and upload)	☐	☐	☐	☐	☐	☐
Wi-Fi access	☐	☐	☐	☐	☐	☐
Online or virtual technologies (e.g. network or cloud-based file storage system, Web portals, etc.)	☐	☐	☐	☐	☐	☐
Access to software (e.g. MATLAB, GIS applications, statistical software, qualitative data analysis, graphics software, textual or image analysis program, etc.)	☐	☐	☐	☐	☐	☐
Download and use of free and open source software for teaching and learning	☐	☐	☐	☐	☐	☐
Support for maintenance and repair of ICTs	☐	☐	☐	☐	☐	☐

C. Using ICTs for Teaching and Learning

1. Use and Creation of Digital Content for Teaching

1.1 Nature of the classes that you teach (tick (✓) all that apply):

- ☐ Traditional face-to-face
- ☐ Completely online
- ☐ Blended, where some components of the study are done online

1.2 Please indicate how often you **use** the following digital resources/platforms in your teaching.

Types of Resources	Always	Often	Sometimes	Rarely	Never
Images (pictures, photographs, including from the Web)	☐	☐	☐	☐	☐
Presentations (e.g. PowerPoint, including from online sources)	☐	☐	☐	☐	☐
Word files (activity sheets/handouts/notes)	☐	☐	☐	☐	☐
Digital films/video (e.g. from YouTube)	☐	☐	☐	☐	☐
Audio recordings	☐	☐	☐	☐	☐
Simulations and 2D/3D animation	☐	☐	☐	☐	☐
Learning Management System	☐	☐	☐	☐	☐
Blogs	☐	☐	☐	☐	☐
Social bookmarking	☐	☐	☐	☐	☐

Types of Resources	Always	Often	Sometimes	Rarely	Never
Microblogging (Twitter, Facebook, etc.)	☐	☐	☐	☐	☐
Open textbooks	☐	☐	☐	☐	☐
Open access research papers	☐	☐	☐	☐	☐

1.3 Have you **created and shared** the following teaching and learning materials?

Types of Resources	Never	Yes, but not shared with others	Yes, and shared through an open licence
Images (pictures, photographs, including from the Web)	☐	☐	☐
Presentations (e.g. PowerPoint, including from online sources)	☐	☐	☐
Word files (activity sheets/handouts/notes)	☐	☐	☐
Digital films/video (e.g. from YouTube)	☐	☐	☐
Audio recordings	☐	☐	☐
Simulations and 2D/3D animation	☐	☐	☐
Blogs	☐	☐	☐
Course packs	☐	☐	☐

1.4 Are you aware of open educational resources (OER) in your discipline? ○ Yes ○ No

1.5 How often do you use the following OER platforms for your teaching and learning?

OER Platforms/Sources	Always	Often	Sometimes	Rarely	Never
OER Commons	☐	☐	☐	☐	☐
Saylor Academy	☐	☐	☐	☐	☐
WikiEducator	☐	☐	☐	☐	☐
OpenStax College	☐	☐	☐	☐	☐
BC Campus Open Textbooks	☐	☐	☐	☐	☐
NPTEL, India	☐	☐	☐	☐	☐
MIT Open Courseware	☐	☐	☐	☐	☐
OpenLearn, UK	☐	☐	☐	☐	☐
CollegeOpenTextbook	☐	☐	☐	☐	☐
Directory of Open Access Journals	☐	☐	☐	☐	☐
Directory of Open Access Books	☐	☐	☐	☐	☐
MERLOT	☐	☐	☐	☐	☐

1.6 Please rate your skills in integrating the following in teaching and learning.

Technologies	I can't use it	I can use it to a small extent	I can use it satisfactorily	I can use it well	I can use it very well
Learning Management System (e.g. Moodle)	☐	☐	☐	☐	☐
Online collaboration tools (e.g. Adobe Connect, Google Docs)	☐	☐	☐	☐	☐
ePortfolio	☐	☐	☐	☐	☐
eBooks/eTextbooks	☐	☐	☐	☐	☐
Online video/audio	☐	☐	☐	☐	☐
Educational games/simulations	☐	☐	☐	☐	☐
Lecture capture tools	☐	☐	☐	☐	☐
Accessible tools (for people with disabilities)	☐	☐	☐	☐	☐
Social media (blogs, wikis, etc.)	☐	☐	☐	☐	☐

2. Training and Staff Development

2.1 Have you received training on the use of ICTs for teaching and learning? O Yes O No

2.2 Does your university/institution provide regular training on the use of new technologies for teaching and learning? O Yes O No

2.3 Have you ever participated in any online training? O Yes (Go to 2.4) O No (Go to 3)

2.4 Have you attended any massive open online courses (MOOCs)? O Yes O No

2.5 Which of the following MOOC platforms are you aware of? (Tick (✓) all that apply.)

☐ Coursera ☐ Udacity ☐ EdX ☐ iVersity ☐ FutureLearn ☐ None

3. Policy Issues for Technology-Enabled Learning

	Yes	No	Do not know
3.1 Is there a policy for ICT use in teaching and learning in your university/institution?	O	O	O
3.2 Is there a strategy for Technology-Enabled Learning in your university/institution?	O	O	O
3.3 Is there an ICT policy in your university/institution (covering what technologies to use and not use for teaching and learning)?	O	O	O
3.4 Is there a privacy and data protection policy in your university/institution?	O	O	O

	Yes	No	Do not know
3.5 Is there a policy on dealing with plagiarism in your university/ institution?	O	O	O
3.6 Is there a policy for the use of open educational resources in your university/institution?	O	O	O
3.7 Is there a system in place for the use of open source software in your university/institution?	O	O	O
3.8 Is there a workflow and escalation procedure for repair and maintenance of ICTs in your university/institution?	O	O	O

D. Using ICTs for Research and Scholarship

1. Access to e-Resources in Library

1.1 Does your library provide access to subscription-based e-resources?

O Yes (Go to 1.2) O No (Go to 2) O Do not know (Go to 2)

1.2 If yes, which kind of library resources do you regularly access for teaching and learning?

Digital library resources	Always	Often	Sometimes	Rarely	Never
e-Journals	☐	☐	☐	☐	☐
e-Books	☐	☐	☐	☐	☐
Citation databases	☐	☐	☐	☐	☐
Bibliographic databases	☐	☐	☐	☐	☐
e-Newspapers	☐	☐	☐	☐	☐
e-Theses and Dissertations	☐	☐	☐	☐	☐
Patent databases	☐	☐	☐	☐	☐
e-Proceedings of conferences	☐	☐	☐	☐	☐
Statistical databases	☐	☐	☐	☐	☐
Any other, please mention _____	☐	☐	☐	☐	☐

2. Availability of Research Support

2.1 Please rate your experiences with the following resources/services/spaces provided by your institution.

Resources/Services/Spaces	Poor	Fair	Neutral	Good	Excellent	Not available
Access to data storage	☐	☐	☐	☐	☐	☐
Data visualisation software	☐	☐	☐	☐	☐	☐
Citation/reference management software	☐	☐	☐	☐	☐	☐
Plagiarism detection software	☐	☐	☐	☐	☐	☐
Institutional repository for sharing of research	☐	☐	☐	☐	☐	☐
Funds to support open access publications	☐	☐	☐	☐	☐	☐

E. Perceptions of Use of Technology-Enabled Learning

1. Please rate the following attitude statements.

Statements	Strongly agree	Agree	Neither agree nor disagree	Disagree	Strongly agree
Technology-Enabled Learning can solve many of our educational problems.	☐	☐	☐	☐	☐
Technology-Enabled Learning will bring new opportunities for organising teaching and learning.	☐	☐	☐	☐	☐
Technology-Enabled Learning saves time and effort for both teachers and students.	☐	☐	☐	☐	☐
Technology-Enabled Learning increases access to education and training.	☐	☐	☐	☐	☐
Technology-Enabled Learning will increase my efficiency in teaching.	☐	☐	☐	☐	☐
Technology-Enabled Learning enables collaborative learning.	☐	☐	☐	☐	☐
Technology-Enabled Learning can engage learners more than other forms of learning.	☐	☐	☐	☐	☐
Technology-Enabled Learning increases the quality of teaching and learning because it integrates all forms of media: print, audio, video and animation.	☐	☐	☐	☐	☐

Statements	Strongly agree	Agree	Neither agree nor disagree	Disagree	Strongly agree
Technology-Enabled Learning increases the flexibility of teaching and learning.	☐	☐	☐	☐	☐
Technology-Enabled Learning improves communication between students and teachers.	☐	☐	☐	☐	☐
Technology-Enabled Learning enhances the pedagogic value of a course.	☐	☐	☐	☐	☐
Universities should adopt more and more Technology-Enabled Learning for the benefit of their students.	☐	☐	☐	☐	☐

2. Please rate the following motivators for you to use Technology-Enabled Learning.

Motivator	Very strong motivator	Strong motivator	Average motivator	Weak motivator	Very weak motivator
Personal interest in using technology	☐	☐	☐	☐	☐
Intellectual challenge	☐	☐	☐	☐	☐
Self-gratification	☐	☐	☐	☐	☐
Training on Technology-Enabled Learning	☐	☐	☐	☐	☐
Better Internet bandwidth at workplace	☐	☐	☐	☐	☐
Credit towards promotion	☐	☐	☐	☐	☐
Professional incentives to use Technology-Enabled Learning	☐	☐	☐	☐	☐
Technical support	☐	☐	☐	☐	☐
Peer recognition, prestige and status	☐	☐	☐	☐	☐
Improved infrastructure (hardware and software) deployment	☐	☐	☐	☐	☐
Release time/Reduction in existing workload	☐	☐	☐	☐	☐
To be a trendsetter by early adoption of technology in education	☐	☐	☐	☐	☐

3. Please rate the following barriers to your use of Technology-Enabled Learning.

Barrier	Very strong barrier	Strong barrier	Average barrier	Weak barrier	Very weak barrier
Concern about faculty workload	☐	☐	☐	☐	☐
Concern about students' access to technology	☐	☐	☐	☐	☐
Lack of training on Technology-Enabled Learning	☐	☐	☐	☐	☐
Lack of technical support in the university	☐	☐	☐	☐	☐
Lack of institutional policy for Technology-Enabled Learning	☐	☐	☐	☐	☐
Lack of professional prestige	☐	☐	☐	☐	☐
Concern about the quality of e-courses	☐	☐	☐	☐	☐
Lack of incentives to use Technology-Enabled Learning	☐	☐	☐	☐	☐
Lack of credit towards promotion	☐	☐	☐	☐	☐
Intimidated by technology	☐	☐	☐	☐	☐
Concern about security issues on the Internet	☐	☐	☐	☐	☐
Inadequate availability of hardware and software	☐	☐	☐	☐	☐
Poor Internet access and networking in the university	☐	☐	☐	☐	☐
Lack of time to develop e-courses	☐	☐	☐	☐	☐
Lack of instructional design support for Technology-Enabled Learning	☐	☐	☐	☐	☐
No role models to follow	☐	☐	☐	☐	☐

F. Your Comments

There is a need to develop a Technology-Enabled Learning policy and strategy in your university.

Comment.

Thank you.

APPENDIX 3

COMMONWEALTH of LEARNI

Learning for Sustainable Development

Questionnaire for Survey of Technology-Enabled Learning in Educational Institutions

The primary aim of this questionnaire is to assess the Technology-Enabled Learning environment and enabling policies in educational institutions.

The questionnaire shall be completed by a responsible officer in a university/institution to provide relevant data.

Please respond to all the questions by following the instructions.

A. About Your University/Institution

1.1 Name of the university/institution: _____

1.2 Website: _____

1.3 Number of students enrolled: _____

1.4 Number of faculty and academic staff employed: _____

1.5 Number of non-teaching and support staff employed: _____

1.6 Level of teaching (tick (✓) all that apply):
☐ Undergraduate ☐ Graduate or postgraduate ☐ Doctoral research

1.7 Status of your institution: O Public O Private not-for-profit O Private for-profit

B. Technology-Enabled Learning Environment in the University/Institution

2.1 Number of desktop computers/tablets/laptops in the university/institute connected to the Internet:

2.1.1 Desktop computers: _____

2.1.2 Tablets: _____

2.1.3 Laptops: _____

2.2 Do you have broadband Internet connectivity at your premises?
O Yes (Go to 2.3) O No (Go to 2.7)

2.3 If yes, for whom is the broadband Internet made available? (Tick (✓) all that apply.)
☐ Officials and staff ☐ Faculty members ☐ Students ☐ Researchers ☐ Visitors

2.4 Where do you provide access to the broadband Internet? (Tick (✓) all that apply.)

☐ Classrooms	☐ Library	☐ Hostels
☐ Faculty rooms	☐ Laboratories	☐ Reception lounge
☐ Seminar halls	☐ Students' common rooms	☐ Open areas

2.5 How do you get broadband Internet connectivity at the university/institution?
O Through a government-supported Internet service provider
O Through a private Internet service provider

2.6 Current level of Internet bandwidth available in the university/institute is:
O <1 Gbps O 1-5 Gbps O 6-10 Gbps O >10 Gbps

2.7 Do you have Wi-Fi/wireless Internet connectivity on your campus? O Yes O No

2.8 Is there any access control in place for restricting any particular kind of online content from being accessed or downloaded (reasons could be related to limitations on Internet speed or security concerns)? O Yes (Go to 2.9) O No (Go to 2.10)

2.9 If yes, what kind of content do you not allow users to access or download? (Tick (✓) all that apply.)

☐ Social media (e.g. Facebook, Twitter, LinkedIn, Instagram, etc.)	☐ Massive downloads of videos, audios, reference books, etc.
☐ Video channels (e.g. YouTube, Vimeo, etc.)	☐ Software download (e.g. Cnet.com, Sourceforge.net, etc.
☐ Chat/messengers (e.g. WhatsApp, Viber, Skype, GTalk, etc.)	☐ Adult content
☐ Audio channels (e.g. iTunes, online MP3 players, etc.)	☐ Emails

2.10 Does your university maintain any official profile/institutional group on social media platforms?
O Yes (Go to 2.11) O No (Go to 2.12)

2.11 If yes, where do you maintain an official profile/group on social media platforms? (Tick (✓) all that apply.)

☐ Facebook	☐ Email-based discussion forums
☐ Twitter	☐ LinkedIn
☐ Google+	☐ Institutional wiki page
☐ YouTube, Vimeo or similar	☐ Flickr, Picasa Web Albums, Instagram or similar for photo sharing
☐ Blog (using Blogger or Wordpress or within institutional website/CMS)	

e-Classrooms

2.12 Do you have any e-classroom facilities in your university/institution, integrating ICT in classrooms? O Yes (Go to 2.13) O No (Go to 2.15)

2.13 If yes, what kinds of hardware are available in e-classrooms? (Tick (✓) all that apply.)

☐ Public address system
☐ LCD projector (fitted with desktop computer/laptops/DVD players)
☐ SMART Board or interactive whiteboard

2.14 Number of e-classrooms you have: _____

Educational e-Content Creation

2.15 Do you have any educational e-content or an audio-visual production unit/studio/centre?
O Yes (Go to 2.16) O No (Go to 2.17)

2.16 Number of e-content materials produced in the last year:

- Course-related textbooks: _____
- Audio lessons: _____
- Video lessons: _____
- Multimedia lessons: _____
- Online courses: _____

2.17 Do you participate in any e-content or audio-visual repository/content-sharing platform for disseminating your produced educational content? O Yes (Go to 2.18) O No (Go to 2.25)

2.18 If yes, what type of external content-sharing platform/repository do you usually use? (Tick (✓) all that apply.)

☐ State-level repository
☐ Regional repository
☐ National repository
☐ International repository

2.19 Provide website addresses of the repositories that your institution participates in/ contributes to:
_____

2.20 Do you have an institutional video channel (e.g. YouTube or similar)?
O Yes (Go to 2.21) O No (Go to 2.22)

2.21 Provide a link to the video channel: _____

Open Educational Resources

2.22 Are the educational e-contents or audio-visual materials produced by your university/institute available with a Creative Common licence? O Yes (Go to 2.23) O No (Go to 2.27)

2.23 If yes, do you have an institutional repository for OER?
O Yes (Go to 2.24) O No (Go to 2.25)

2.24 If yes, provide the website address of the repository: _____

2.25 Is your university/institution a member of any OER consortia or any formal OER network?

O Yes (Go to 2.26) O No (Go to 2.27)

2.26 If yes, please give their names: _____

Online Courses

2.27 Has your university/institution produced or designed any online course?

O Yes (Go to 2.28) O No (Go to 2.29)

2.28 How many online courses (including MOOCs) do you offer in the current year?

Number of eLearning courses: _____

2.29 What is the total number of learners studying online in your university/institute?

Number of learners: _____

2.30 Nature of online courses (tick (✓) all that apply):

☐ Completely online

☐ Blended (face-to-face with some online component)

☐ Online (with limited face-to-face contact)

2.31 Do you have any external partners for collaborative designing and delivery of online courses?

O Yes (Go to 2.32) O No (Go to 2.33)

2.32 If yes, what type of external partner or collaborator do you usually have?

O Public state-level institution

O Public national-level institution

O Private for-profit organisation

O Private not-for-profit organisation

Other Online Facilities

2.33 Please indicate which of the following resources/services/spaces are provided by your institution (tick (✓) all that apply):

Resources/Services/Spaces	Available	Not available	Planned
eClassroom facilities (e.g. computers, projection systems, lecture capture systems, SMART boards, etc.)	☐	☐	☐
Computer labs (for practical and Internet access)	☐	☐	☐
Email services (institutional)	☐	☐	☐
Learning Management System (e.g. Moodle, etc.)	☐	☐	☐
ePortfolio	☐	☐	☐
Network bandwidth/speed of Internet (download and upload)	☐	☐	☐
Wi-Fi access	☐	☐	☐
Online or virtual technologies (e.g. network or cloud-based file storage system, Web portals, etc.)	☐	☐	☐

Resources/Services/Spaces	Available	Not available	Planned
Access to software (e.g. MATLAB, GIS applications, statistical software, qualitative data analysis, graphics software, textual or image analysis program, etc.)	☐	☐	☐
Download and use of free and open source software for teaching and learning	☐	☐	☐
Support for maintenance and repair of ICTs	☐	☐	☐
Access to data storage	☐	☐	☐
Data visualisation software	☐	☐	☐
Citation/reference management software	☐	☐	☐
Plagiarism detection software	☐	☐	☐
Institutional repository for sharing of research	☐	☐	☐
e-Journals	☐	☐	☐
e-Books	☐	☐	☐
Citation databases	☐	☐	☐
Bibliographic databases	☐	☐	☐
e-Newspapers	☐	☐	☐
e-Theses and dissertations	☐	☐	☐
Patent databases	☐	☐	☐
e-Proceedings of conferences	☐	☐	☐
Statistical databases	☐	☐	☐

Training on Technology-Enabled Learning

2.34 Do you organise regular training for faculty and learners to use technology effectively?

O Yes (Go to 2.35) O No (Go to 2.38)

2.35 If yes, how often do you organise training?

O Once a month O Quarterly O Yearly

O Twice a month O Half-yearly O As and when required

2.36 Total hours of training organised in the last year: _____

2.37 Total number of teachers trained in the use of technology for teaching and learning: _____

Policy issues for Technology-Enabled Learning

2.38 Is there a policy for ICT use in teaching and learning in your university/institution?

O Yes O No O In development

2.39 Is there a strategy for Technology-Enabled Learning in your university/institution?

O Yes O No O In development

2.40 Is there an ICT policy in your university/institution covering what technologies to use and not use for teaching and learning? O Yes O No O In development

2.41 Is there a privacy and data protection policy in your university/institution?
O Yes O No O In development

2.42 Is there a policy on dealing with plagiarism in your university/institution?
O Yes O No O In development

2.43 Is there a policy for the use of Open Educational Resources in your university/institution?
O Yes O No O In development

2.44 Is there a system in place for the use of open source software in your university/institution?
O Yes O No O In development

2.45 Is there a workflow and escalation procedure for repair and maintenance of ICTs in your university/institution? O Yes O No O In development

C. Institutional Preparedness for Technology-Enabled Learning

3.1 Please respond to the following statements using the codes below:

Codes: *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.*

Statements	1	2	3	4	5
Policy					
There is a well-documented Technology-Enabled Learning policy.	O	O	O	O	O
The Vision and Mission of the Technology-Enabled Learning policy are aligned with the mission of the organisation.	O	O	O	O	O
The Vision and Mission of the Technology-Enabled Learning are well understood across the organisation.	O	O	O	O	O
There is a commitment on the part of institutional leaders to use technology to achieve strategic academic goals.	O	O	O	O	O
Strategic Plan	O	O	O	O	O
There is a strategic plan for the implementation of Technology-Enabled Learning.	O	O	O	O	O
The strategic plan for Technology-Enabled Learning has measurable goals and outcomes.	O	O	O	O	O
The strategic plan for Technology-Enabled Learning is approved by the senior management of the organisation and is supported by adequate financial provisions.	O	O	O	O	O

Statements	1	2	3	4	5
IT Support Department					
The organisation has an IT department that handles procurement, installation and maintenance of technologies for teaching and learning.	O	O	O	O	O
There is an ICT policy in place, which is implemented by a high-powered committee in the organisation.	O	O	O	O	O
The head of the IT support department reports to senior management and is responsible for overall functioning of the technology in the organisation.	O	O	O	O	O
The head of the IT support department is well qualified and up to date in order to manage the technological requirements of the organisation.	O	O	O	O	O
Technology					
There is adequate hardware infrastructure for teaching and learning (e.g. access to computers for students and learners).	O	O	O	O	O
There are adequate applications and software for teaching and learning (e.g. access to appropriate software, intranet, Learning Management System, etc.).	O	O	O	O	O
There is adequate networking infrastructure in the organisation (e.g. access to adequate bandwidth).	O	O	O	O	O
There are adequate policies and procedures in place to protect privacy and organisational data.	O	O	O	O	O
Content					
There is support available for the creation of digital multimedia content in the organisation (e.g. production of eCourses, audio and video materials, animation, etc.).	O	O	O	O	O
There are instructional designers in the organisation or faculty members are trained to organise learning content appropriately.	O	O	O	O	O
Teachers have adequate access to the online systems to develop courses for Technology-Enabled Learning.	O	O	O	O	O
Documentation					
There is a variety of help available to support teachers and students in using technology effectively.	O	O	O	O	O
Lessons learned in the implementation of the Technology-Enabled Learning are stored and shared within the organisation for others to access and learn from.	O	O	O	O	O
The workflow processes and responsibilities to implement Technology-Enabled Learning are well documented in the organisation.	O	O	O	O	O
Organisational culture					
Faculty and staff members are willing to learn about new technology in the organisation.	O	O	O	O	O
Faculty and staff members support each other easily.	O	O	O	O	O
There is a culture of knowledge creation and sharing in the organisation.	O	O	O	O	O

Statements	1	2	3	4	5
Leadership					
Leaders in the organisation are involved in the implementation of Technology-Enabled Learning.	O	O	O	O	O
Senior management in the organisation regularly review, monitor and evaluate the progress of Technology-Enabled Learning.	O	O	O	O	O
The top leadership of the organisation is supportive of Technology-Enabled Learning and provides encouragement and motivation to the faculty and staff to achieve the academic goals.	O	O	O	O	O
Human Resources and Training					
Faculty members are qualified and trained to use technology for teaching and learning.	O	O	O	O	O
Faculty and staff members receive regular training to update them in the use of Technology-Enabled Learning.	O	O	O	O	O
There are adequate staff to support Technology-Enabled Learning.	O	O	O	O	O
The organisation has a structure in place to create teams for content development and delivery of Technology-Enabled Learning.	O	O	O	O	O
Faculty members trust the support received from instructional designers and technology support staff while developing and delivering the courses.	O	O	O	O	O
The IT staff members are highly skilled and trained to provide the needed support.	O	O	O	O	O
TEL Champions					
There are early adopters of Technology-Enabled Learning in the organisation.	O	O	O	O	O
There are TEL champions in the organisation who support and care about pedagogic innovations.	O	O	O	O	O
There are faculty members who can take leadership roles in developing appropriate policies and a Technology-Enabled Learning strategy for the organisation.	O	O	O	O	O
There are TEL champions to research and disseminate good practices in Technology-Enabled Learning.	O	O	O	O	O

D. Comments

There is a need to develop a Technology-Enabled Learning policy and strategy in the organisation.

Comment.

Thank you.

APPENDIX 4

Interpretation of Preparedness for Technology-Enabled Learning Questionnaire Results

In Appendix 3, section C, we listed a series of statements to assess institutional preparedness for Technology-Enabled Learning. See below for how to interpret the scores.

- Score below 55: Negligible preparedness. There is no comprehensive Technology-Enabled Learning system or infrastructure, and policies are incomplete. The structures in place need immediate attention.
- Score 55–94: Limited preparedness. The institution has addressed some aspects of the Technology-Enabled Learning system, policies and infrastructure, but they need further development.
- Score 95–129: Developing preparedness. The institution has put in place some of the aspects of a Technology-Enabled Learning system, policies and infrastructure, and is in the process of developing a robust system.
- Score 130–164. Established preparedness. The institution has an established Technology-Enabled Learning system as well as policies, infrastructure and practices in place.
- Score 165 and above. Exceptional preparedness. The institution has successfully implemented a Technology-Enabled Learning system and its effect can be easily observed.

APPENDIX 5

TEL Policy Template

Please remember that this template is written in note form and should be used for guidance and inspiration. Use the pointer and questions to deliberate on the policy development based on the data gathered through the surveys, and then articulate sentences for your TEL policy. COL will gather examples of TEL policies developed over the Strategic Plan period (2015-2021) and share these as examples of how to develop appropriate policy in institutions.

1. The Goal(s) or Aims of Technology-Enabled Learning in [institution]

In what ways does the institution expect to benefit from the implementation of TEL? (Some specific examples would be better than ambiguous phrases such as "An enhanced learning experience for students.")

What will be the benefits for learning?

What will be the benefits for teaching?

What will be the benefits for the institution?

Are any other benefits anticipated?

2. Educational Rationale

Why is it important for the institution to adopt TEL? What aspects of the existing arrangements for teaching, learning, learner support, student administration, student diversity, student recruitment and retention, etc., need to be changed or improved?

"Doing things better" or "doing better things"?

To engender a more scholarly approach to the design, development and support of learning, particularly in relation to TEL?

3. Drivers for Change

Changes in the national (and international) educational environment?

The need to increase student engagement and improve student outcomes?

Changing expectations in the workplace in terms of what graduates are capable of doing?

Responding to changes in students' characteristics and their expectations?

The necessity for graduates to have well-developed digital literacy skills?

Demands for improved pedagogical expertise and digital literacy for academic staff?

4. Technology and Infrastructure

[Drawing upon findings from your institution's Policy Review and Infrastructure Audit (PRIA) Report.]

Adequacy (or inadequacy) of existing equipment and infrastructure for enabling the institution's goal(s) for TEL to be achieved?

The need for additional equipment and infrastructure?

Implementation of a single institution-wide system or separate systems for each site, faculty or department?

Responsibility for maintaining technology infrastructure and providing technical support to staff and students?

Organisational responsibility for the design and development of TEL materials and resources, applications, digital tools, etc.?

5. Opportunities for Development

Developing academic teachers' pedagogical knowledge and practices for the purpose of designing teaching and learning activities that improve the quality of face-to-face, blended and online learning?

Developing the understanding and competence of responsible academic managers in relation to approving and funding TEL projects and innovations?

Developing the digital literacy skills of students and their understanding of acceptable academic practices?

Developing an institutional framework for quality enhancement in teaching and learning?

Building capacity and mechanisms for the design, implementation and reporting of monitoring and evaluation activities (including learning analytics) for quality assurance and quality enhancement purposes?

Developing appropriate TEL design principles and standards as an aid to supporting improved consistency and quality?

Creating a mechanism for the sharing of (a) TEL materials and resources and (b) the scholarly experiences associated with their development and evaluation?

6. Embedding and Aligning with Existing Policies

Ensuring alignment with the institution's mission statement and top-level policy relating to teaching and learning?

Ensuring alignment with the policy (policies) relating to student assessment and academic practice?

Ensuring alignment with the policy (policies) for developing students' digital literacy?

Ensuring alignment with the policy (policies) for the professional development of academic staff?

Ensuring alignment with the policy (policies) for the reward and promotion of academic staff?

Ensuring alignment with the policy (policies) for the rewarding scholarly activities relating to TEL?

7. TEL Governance

Developing an appropriate governance structure for TEL that is fully embedded within the institutional governance of the institution?

Ensuring adequate representation of all relevant departments, faculties and sites within the institution?

Ensuring the adequate flow of information to and from users (teachers and students) through appropriate means?

8. Periodic Review of the TEL Policy

Ensuring that a mechanism and/or procedure is established to review the TEL policy after one or two years to ensure that it remains up to date and adequately reflects the changing educational and technical environment?

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