CHAPTER FIVE
Making Appropriate Educational Technology Decisions

INTRODUCTION

In the first four chapters of this report, we have provided a detailed overview of the South African policy environment and the educational system, outlined features and trends in current access to technological infrastructures, and extrapolated lessons on educational technology use. This information provides a rich backdrop for the Departments of Education and Communication, which can effectively be used to inform decisions about harnessing the educational potential of information, telecommunications, and broadcasting technologies. Before providing strategic recommendations in this area, however, it is necessary to establish an appropriate conceptual framework for making effective decisions. To be effective, this framework needs to be strongly influenced by the backdrop we have already provided, as well as by the full range of emerging experiences in using educational technologies in South Africa.

In tackling this task, we have drawn on two documents, each of which contains different approaches to making effective educational technology decisions. Each is applicable to two broadly different scenarios. The first is relevant in environments where the educational intervention is centred on a broadcast, and was originally developed to support the SABC in fulfilling its mandate as a public broadcaster. In this scenario, technologies are selected with a primary intention of supporting a broadcast intervention. This approach was initially developed as part of and provided the conceptual platform for the SABC's School-Based Educational Broadcasting Service. The second broad approach is drawn from the Technology-Enhanced Learning Investigation (TELI), already discussed in chapter one.

EDUCATION AND BROADCASTING IN SOUTH AFRICA: ESTABLISHING THE RELATIONSHIP

As part of the strategic planning for the SABC's school-based educational broadcasting service, SAIDE explored in detail the relationship between education and broadcasting. This examination was undertaken in order to provide answers to certain tensions, which are otherwise hard to resolve. These tensions emerge implicitly in the decision-making approach outlined in the TELI Report.

This policy report stresses the importance of examining teaching and learning environments in depth before choosing which technologies to integrate into those environments (see following section). Further, it suggests that it is necessary to identify strengths and weaknesses of different technological options and to use this to inform decisions that are taken. The report stresses throughout the danger of allowing technology choice to drive educational decisions about how to integrate technology use into teaching and learning environments, and offers the decision-making framework as a strategy to overcome this

problem. The emphasis is on appropriateness of technological choice to context and need as a prerequisite to ensuring that scarce resources are used as effectively as possible.

On the face of it, educational broadcasting planning processes, unless they have been preceded by several other planning exercises, flaunt the most fundamental principle underpinning the above approach. Various technologies to be used are chosen separate from any detailed analysis of educational need and context of implementation and cost effectiveness. Efforts to assert that such analysis does indeed underpin the technological choices are rendered severely problematic by the context of implementation outlined in chapter two. There are simply too many questions to which there are not satisfactory answers.

The School Service report postulated that one could continue at length with processes of posing questions, the answers to which raise more problems than they do solutions. Such a strategy, however, can also create an unhealthy inertia, effectively preventing any action. In addition, another reality is not acknowledged when adopting such a line of questioning, and this relates to the existence of broadcasting companies and corporations in South Africa. These companies and corporations disseminate ever-growing numbers of hours of audio and video media every day, which in turn are likely to be accessed by growing numbers of South African people every day. Increases in the numbers of people who have access to radio and television in South Africa are also likely to continue for the foreseeable future. Furthermore, the public broadcaster, the SABC, accounts for the substantial component of total airtime in South African broadcasting, and is bound by its requirement to operate in the 'public interest'. There is, of course, much debate about what constitutes 'public interest', but there are very few people who would disagree that education is an urgent national priority and, as such, very much in the 'public interest'. Perhaps because of this, the policy environment stresses that the public broadcaster has a responsibility to play a clearly identifiable educational role as part of its operation.

To take account of this reality, we argued that the line of questioning shifts when viewed from a broadcasting perspective, and this shift forms the basis of the first approach to making effective decisions about potential roles for broadcasting in supporting education and training. The approach is no longer 'which technologies can most appropriately be used to support educational provision in a given context?' Answering this question presupposes that radio and television are only two possible options amongst a wide spectrum of technological choices. Instead, the line of questioning takes a different point of departure, which might be articulated as 'given the nature and responsibilities of the public broadcaster, what educational roles should broadcasting play and what technologies should be used to support this broadcasting?', the answer to which has educational, political, and broadcasting dimensions. From this, the following questions might flow:

1. What total percentage of expenditure on public broadcasting and overall airtime should be allocated to educational broadcasting to enable the public broadcaster to fulfil its mandate effectively?
2. In which areas of education can broadcasting play the most constructive, supportive roles? Which of these areas are of the highest priority?
3. Within each of the areas identified, what specific focuses are most appropriate?
4. What broadcasting strategies, which will draw on the educational strengths of the respective technologies, should be employed to enable radio and television to play an effective role in support of these focus areas?
5. What partnerships should be established to maximize and expand the impact and usefulness of these educational broadcasting strategies?

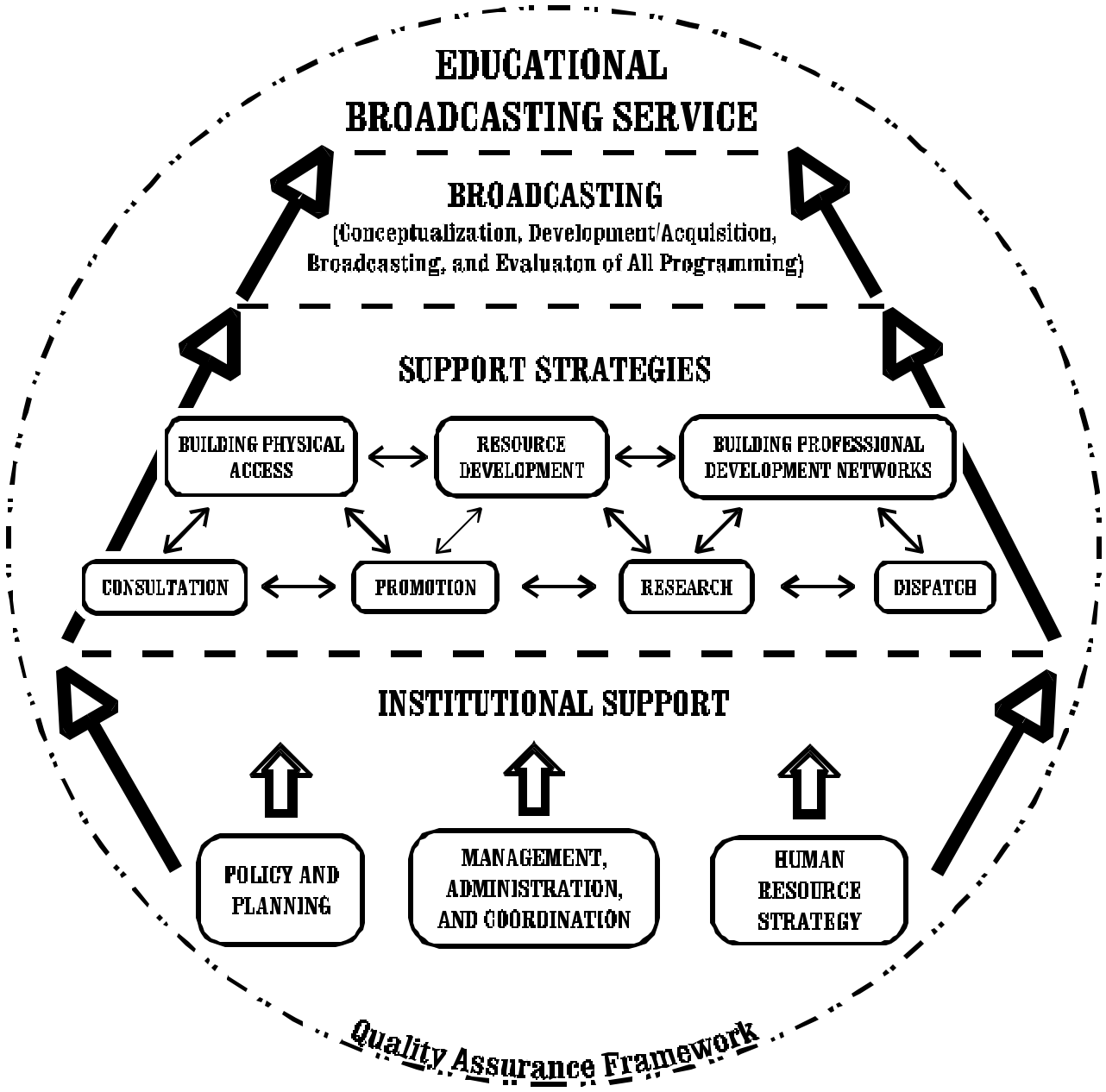
6. Does the percentage of expenditure allocated to educational broadcasting allow for effective implementation of the roles identified in questions two to five? If not, does the allocation need to be reviewed or do the roles need to be altered to match the budget?

The differentiation may seem insignificant on the face of it, but it is substantive. This is because it closes off unnecessary debate about whether or not there is any educational role for television or radio. This changes the focus of planning processes such as the one reflected in the School-Based Educational Service report significantly, preventing wastage of time and energy on debates the outcome of which will not alter the fact that the public broadcaster has an educational mandate that it *must* fulfil. This planning process is, in many important ways, driven by broadcasting prerogatives and not by educational debates (although it quite obviously must be informed by the latter when one seeks to find answers to questions four and five particularly). While this study is not driven by such prerogatives, it is nevertheless necessary for it to grapple with the question of what role broadcasting should play in supporting education and training, which means it also needs to approach the broadcasting industry with similar lines of questioning.

Furthermore, the differentiation clearly locates responsibility for resource allocation on educational broadcasting to the broadcasting sector and not the educational sector. This is because it indicates that responsibility for investing in educational broadcasting lies unequivocally with broadcasters (as is reflected in licence agreements that set conditions to the right to broadcast over public airwaves). This does not mean, though, that the education sector does not have a vital role to play in shaping educational broadcasting interventions. Educational input remains a crucial requirement for success of such a service. Furthermore, it does not preclude educational institutions or departments from making additional investments in educational broadcasting should their own planning processes demonstrate a potential value in such investments.

Within such a scenario, the task at hand is to plan the best possible educational broadcasting service and not to debate whether or not broadcasting is the most appropriate educational intervention. This, in turn, suggests a need to focus on different questions from those provided in the TELI decision-making framework (described below). It should, however, be stressed that the questions posed in this framework remain a crucial reference point for educational broadcasting planning processes. They help to locate educational broadcasting with broader teaching and learning environments and to identify where the gaps and potential weaknesses of any educational broadcasting service lie. This information can then be used to try to fill these gaps and remedy weaknesses through the establishment of appropriate partnerships with educational providers, government departments, educational resource developers, and other key agencies.

As we outlined in the School Service report, most educational broadcasting service are unlikely to succeed unless they supported by a range of non-broadcast strategies. These can be represented graphically as follows:



The above diagram illustrates clearly that this range of strategies needs to function in direct support of the primary activity, which is of course the broadcasting. Both the broadcasting and support strategies, in turn, will influence decisions about the nature of institutional support required, another level at which technological decisions are likely to be required. All of these choices will need to be influenced by a clear understanding of the context of the broadcasting intervention and its intended goals. In developing this understanding, the series of questions provided in the TELI decision-making framework is a valuable tool. Consequently, we now turn our attention to that framework.

THE TELI DECISION-MAKING FRAMEWORK

Although this study began as an attempt to explore possible roles for a dedicated educational broadcasting service, it quickly became clear – as we have noted in the introduction to this report – that trends in the convergence of telecommunications and broadcasting technologies render such a narrow study irrelevant. This is seen, for example, in the fact that internationally even broadcasters' approach to education is increasingly to develop two policies, one in which various technologies are used primarily to support broadcast interventions and a second in which various technologies are used as to support educational interventions in their own right. It is important to stress that the latter approach has, in many ways, much more to do with an effort on the part of broadcasters to stay in touch with trends in convergence of information, communication, and broadcasting technologies than it does to do with educational appropriateness. While this is understandable, it raises many potential problems, particularly if this approach – which is most prevalent in developed countries – is imported wholesale to South Africa, where the physical realities are very different.

Within this context, the policy approach developed by the Department of Education concerning educational technologies becomes increasingly relevant. It is relevant to this study less because it is a policy position than because it is a useful resource, which can effectively inform educational practice in a range of ways, particularly as the Departments of Communication and Education start to explore the educational potential of new technologies. It focuses on establishing a policy framework for three types of technology use (these are described in more detail in chapter three):

1. Technologies to support the provision of course materials to learners;
2. Technologies to support other teaching and learning processes; and
3. Technologies to support management and administration.

The TELI policy process establishes clear commitment to a particular approach to making decisions about using technologies in education and training. This decision-making approach depends strongly on developing a clear understanding of the teaching and learning environment and capabilities of different available technologies before examining the likely impact and cost of integrating selected technologies into the teaching and learning environment. The intention of this approach is to guard against technologically driven educational projects, which, as the document itself points out, invariably do not provide effective or sustainable educational solutions. The decision-making framework contained in the TELI Discussion Document poses interesting challenges for an implementation planning process for any technology-enhanced learning strategy, and provides an essential starting point for any investigation of the possibility of using different technologies to support education and training.

Bates suggests that 'decision making should be based on an analysis of questions that each institution needs to ask'.[1] He groups these questions under the following criteria:

- Access: how accessible is a particular technology for learners? How flexible is it for a particular target group?
- Costs: what is the cost structure of each technology? What is the unit cost per learner?

[1] Bates, A. 1995, *Technology, Open Learning and Distance Education*, London, Routledge, p. 1.

- Teaching and learning: what kinds of learning are needed? What instructional approaches will best meet these needs? What are the best technologies for supporting this teaching and learning?
- Interactivity and user-friendliness: what kind of interaction does this technology enable? How easy is it to use?
- Organisational issues: what are the organisational requirements, and the barriers to be removed, before this technology can be used successfully? What changes in organisation need to be made?
- Novelty: how new is this technology?
- Speed: how quickly can courses be mounted with this technology? How quickly can materials be changed? [2]

The TELI Report contains a detailed decision-making framework designed to assist processes of deciding which technologies to use, and how best to use them. The need to answer the types of questions posed by Bates has been used as a starting point for developing this decision-making framework, although the framework itself uses a very different set of organizing principles. It consists of four components or steps, each of which has been designed as a self-contained unit. This has been done to allow different starting points for people, depending on their needs. Each step is discussed briefly.

DEVELOPING AN UNDERSTANDING OF THE TEACHING AND LEARNING ENVIRONMENT[3]

The primary aim of this step in the process is to enable decision-makers to develop a picture of the teaching and learning environment in their planned or existing educational course or programme (including structured and informal educational strategies). To facilitate this, the teaching and learning environment has been broken up into various components (represented graphically in figure one), although it must be stressed that this is a highly artificial separation. Education and training are complex social processes, in which the various components are intertwined in many ways, often creating difficult tensions. Nevertheless, it is necessary to consider each component part in attempting to paint a picture of the whole environment.

[2] *ibid*, pp. 1-2.
[3] This overview of decision-making approaches is based on: Ministerial Committee for Development Work on the Role of Technology that will Support and Enhance Learning, 1996, *Technology-Enhanced Learning Investigation in South Africa*, Pretoria, Department of Education. SAIDE has developed a full decision-making framework for the Department of Education.

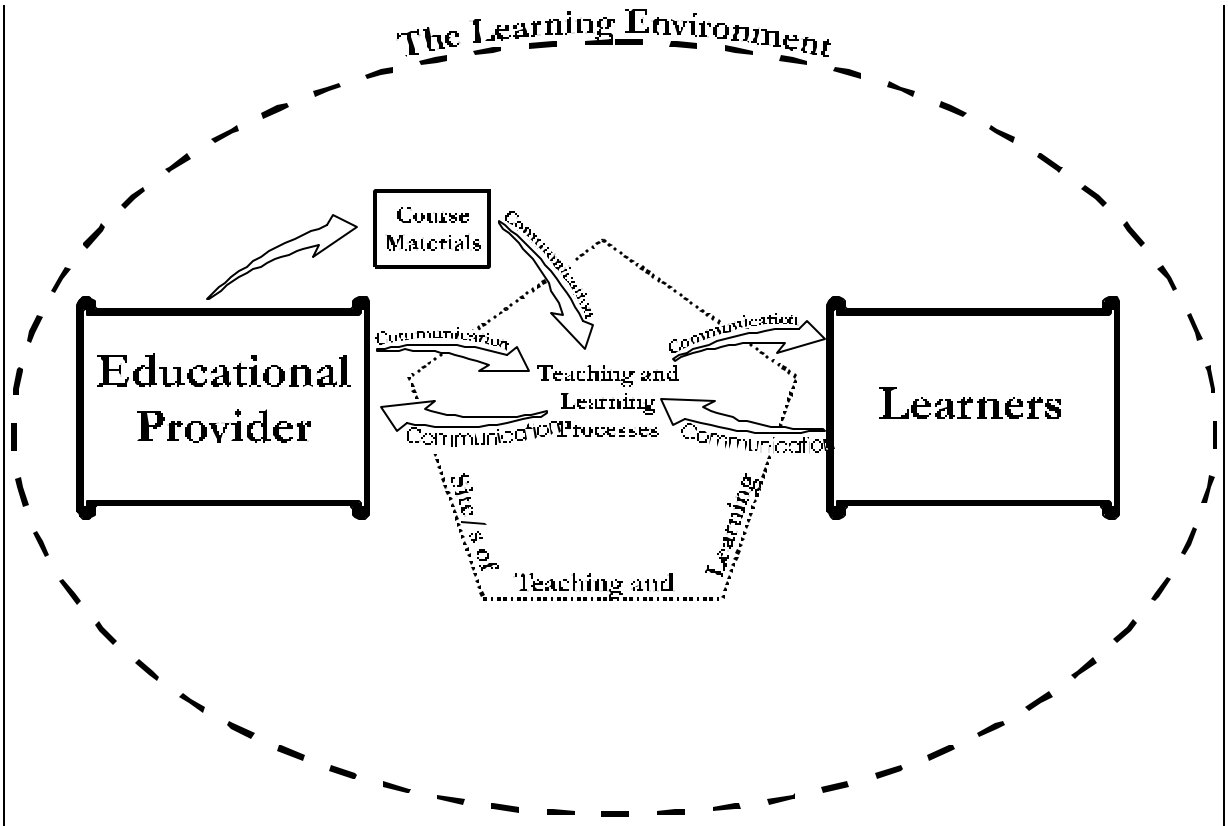


Figure One: The Teaching and Learning Environment

Figure one is a graphical representation of the teaching and learning environment; it can be applied to any teaching and learning context using any methods of educational provision. Each element is described in detail.

1. *Learners*
   As the broad principle of learner-centredness starts to gain credence in South African education and training, it becomes ever more important to be aware of the features of the group or groups of learners for which a planned or existing educational intervention is intended. Developing an understanding of the target group/s of learners in the teaching and learning process and their circumstances is essential in the planning or updating/amending of any educational intervention. As part of this, it is vital to focus on the learning objectives of education and training programmes, developing an understanding of curriculum. These issues are included here because the development of curricula should focus on the needs of learners. It is also important to look broadly at the needs of a range of organizations relevant to the learners, for example employers and community organizations. This also ultimately affects the developing picture of learners' needs in important ways.

2. *Teaching and Learning Processes*
   The design of any course will involve a combination of teaching and learning processes, whether they be structured or not. These will be based on different educational approaches (for example, content mastery, skills mastery, drill and practice, problem

solving, exploratory project work, or applied knowledge-based) and methodologies (for example, learner-centred, teacher-centred, peer group and team work, or constructivist). Most, but not all, teaching and learning processes will be planned by the educational provider during course design and development (whether the educational provider be an institution or the training arm of a large organization). These processes involve an interface or engagement between learners and the educational provider, using a range of activities, strategies, mechanisms, and techniques. The focus of teaching and learning processes is to achieve the stated objectives of a particular course, regardless of what those objectives are. A few examples of teaching and learning processes would be tutorial sessions, lectures, practical work, peer group discussions, watching videos, working through study guides, assignments, and examinations. It is essential to develop an understanding of the teaching and learning processes planned in educational courses in order to choose technologies to support them.

3. *Communication*

All education and training involves processes of communication between the educational provider and learners, and it is essential to develop an understanding of the modes of communication most appropriate to a particular teaching and learning process. Any teaching and learning process consists of combinations of these kinds of modes of communication, which in turn support the teaching and learning strategies and activities of a particular course. This communication can either be one-way or two-way, depending on need. Communication can take place in various ways:

- face-to-face, for example, in classes, tutorials or practical sessions;
- via correspondence, whether it involves post, courier, fax, or electronic mail;
- using printed media of various kinds, which can either be distributed via correspondence or in face-to-face sessions;
- using audio such as radio, audio cassettes, compact discs, telephone calls, or audio conferencing;
- using video, for example, one-way broadcasting, video, or video-conferencing;
- using computers and computer-based multi-media, whether they be stand-alone or part of a network.

4. *Course Materials*

Often, in processes of making decisions about which communications technologies to use to enhance teaching and learning, there is insufficient consideration of the need to have high quality learning resources. This problem is discussed in greater detail in the following section.

5. *Sites of teaching and learning*

All teaching and learning strategies and activities take place at one or more 'sites'. Conventionally, people have tended to equate sites of teaching and learning with schools and universities, but the development of more flexible approaches to education and training is gradually making it clear that there are multiple sites. These would include schools, universities, colleges, and technikons, but would also include community centres, the home, the workplace, and a range of other physical locations. Any education and training programme could involve teaching and learning strategies and activities at more than one teaching and learning site. It is vital to know the sites at which teaching and learning will take place, because the physical infrastructure available at these sites will influence choices of technologies. For example, there is no point in developing a distance education programme that requires students to work on computers if the

majority of students will not have access to computer facilities at home or at a local learning centre.

6. *Educational Provider*

Internationally, the term 'educational provider' is coming to be understood as the whole structure offering programmes in any sector of education and training. This structure might be an educational institution, a consortium of organizations, a private business (or department within a business), a non-governmental organization, or a government department. The description of the educational provider in any educational programme would, therefore, include the following elements:

- Finances;
- Educators;
- Curriculum design and development;
- Course materials design and development;
- Student counselling (pre- and in-programme);
- Technical support;
- Professional development strategies;
- Administrative systems;
- Quality assurance strategies; and
- Marketing.

The educational provider has been included last in this description because the description of the educational provider will depend very much on the descriptions of the other elements of the teaching and learning environment.

CHOOSING TECHNOLOGIES

The aim of this step is to gather information about the range of technologies available that can enhance education and training. This information covers the range of technologies available, infrastructure required to introduce the technologies, some indications of the costs of the technologies (but not of the associated costs of introducing them into teaching and learning environments, which depends on a range of variables), and discussions about some of their strengths and weaknesses. Using this information, decision-makers would be expected to make some preliminary decisions about which technologies, if any, they would like to use to enhance their planned or existing educational intervention. These technologies could be used in one of two ways; to support teaching and learning strategies and activities or to support the administration and management of the teaching and learning environment.

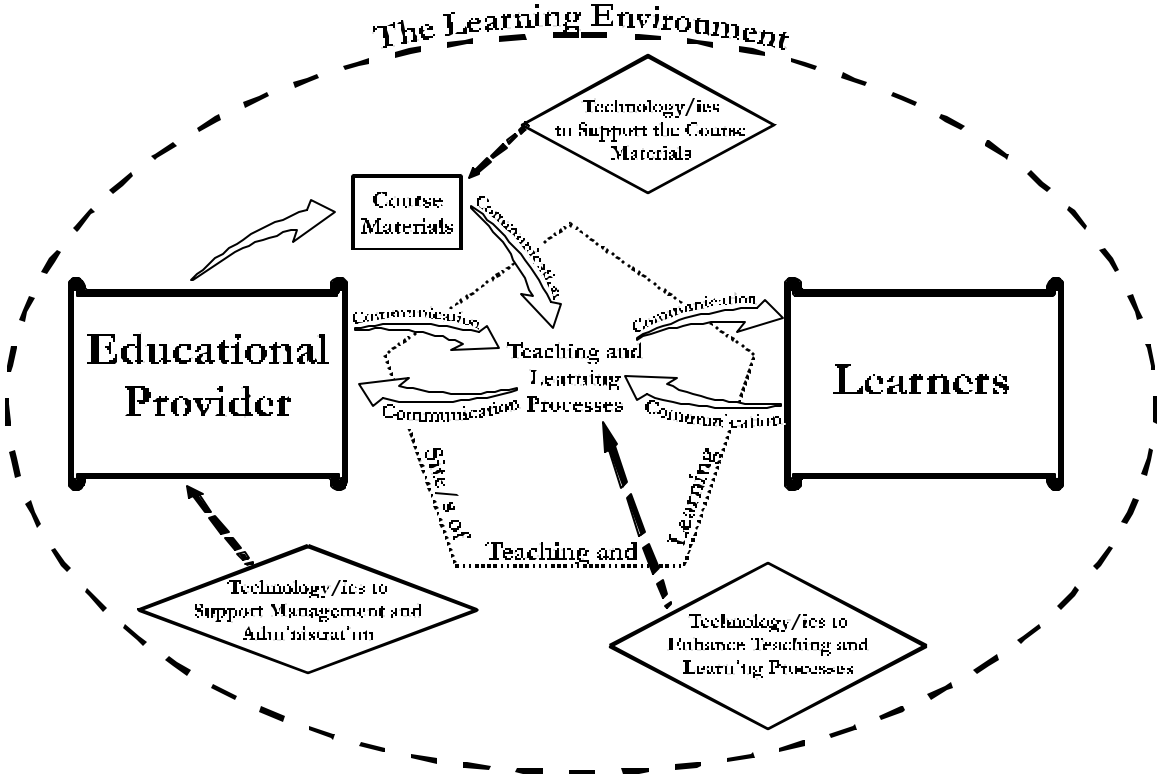


Figure Two: Integrating Technologies into the Teaching and Learning Environment

Figure two indicates where decisions about the use of technologies will need to be taken, by indicating what the place of technologies within the teaching and learning environment is.

INTEGRATING TECHNOLOGIES INTO THE TEACHING AND LEARNING ENVIRONMENT

The purpose of this step in the process is to develop an understanding the implications of introducing certain technologies into the teaching and learning environment (represented graphically in figure two). The ability to develop this understanding will depend in part on accessing information about the technologies themselves (as noted in the previous step). In addition, however, several of the answers will depend very much on the needs and circumstances of the educational provider and of the learners, as well as on the specifics of chosen teaching and learning sites. Consequently, this step also depends very much on developing a clear understanding of the teaching and learning environment in the first step. The picture developed during the first step is then refined when certain technologies are used to enhance it.

COSTING

When deciding which technologies to use to enhance education and training, it is essential to understand the financial implications of introducing a particular technology to a teaching and

learning environment. The most effective way of doing this is to calculate the costs of the teaching and learning environment before or without the introduction of the chosen technologies and then to calculate the costs (or savings) of introducing technologies into that teaching and learning environment. Using the understanding developed of the implications of integrating specific technologies into the teaching and learning environment, it will also be possible to reflect on the educational implications (positive and negative) of introducing these technologies. For maximum benefit, it would be ideal to run comparative costing processes on different combinations of technologies. Together, these processes would make it possible to determine, with a fair degree of insight, the cost benefits of investment in the selected technologies.

CONCLUDING REMARKS

This chapter has outlined two broad approaches to making decisions about using technologies in education and training. These two approaches – which are not mutually exclusive – provide a crucial conceptual platform for this feasibility study, as it examines potential use of a range of information, telecommunication, and broadcasting technologies. They have already been used in strategic planning processes that underpinned the implementation of the school-based educational broadcasting service, as well as many other planning processes in South African education. With this framework in place, the implementation principles outlined in the previous chapter, and a strong understanding of the context of implementation, as well as the technological building blocks available, it is now possible to begin to explore appropriate educational models for the large-scale application of broadcasting, telecommunications, and information technologies in South African education.