

Harnessing technology for tertiary education in small island developing states (SIDS)

Overview

While the use of information and communication technologies (ICTs) in education at all levels has experienced exponential growth throughout the world, this expansion has not been uniform. Many developing countries and small island developing states lag behind in their educational technology development, although some have been making rapid progress. For the small island states of the Pacific, Caribbean, and the Indian Ocean – many facing problems of smallness, isolation, and scattered populations – effective leveraging of ICTs is an urgent development requirement. In some ways, these small island states have proven to be good laboratories for innovative uses of ICTs. This Policy Brief looks at how ICTs have been utilized in the small island developing states, with emphasis on the Pacific and Caribbean Islands, and what the future policy options may be for both national institutions and governments.

Why are ICTs so important to small island developing states?

To the degree that ICTs are now so central to the global economy and society, they are of great importance to all states. But their importance is even greater for small island states, because of their smallness and isolation from the major centres of production and consumption.

Too many SIDS lag behind in their tertiary education development. And conventional tertiary teaching methods will simply take too long to raise these states' levels of tertiary education participation. Table 1 (on p. 2) provides some estimations on the latest available gross enrolment ratios (GER) for tertiary education. In many countries, these are well below the levels needed to compete and prosper in a highly globalized knowledge society.

Distance and flexible learning now offers a much quicker route to widen access to tertiary education. In addition, it may reduce gender inequality. Research on distance learners in the Pacific Islands has shown that women are more likely to get tertiary education if they can access distance learning, which allows them to stay with their families and often in their own countries.

Figure 1: The Pacific Islands – small, isolated, and widely scattered



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Table 1. Gross enrolment ratios in selected Caribbean, South Pacific, and Indian Ocean countries

Country	GER 2007
Caribbean	
Belize	3 (2005)
Guyana	12
Jamaica	24 (2008)
Saint Lucia	9
Trinidad & Tobago	11
East Asia and Pacific	
Brunei	15
Fiji	15
Marshall Island	17
Samoa	7 (2001)
Tonga	6 (2004)
Vanuatu	6 (2004)
Indian Ocean	
Mauritius	14

Source: UNESCO Institute for Statistics (UIS), *Global Education Digest*, 2007, 2008, 2009.

1. Bermuda being the latest to join UWI on 25 August 2010.
2. While bandwidth availability and pricing has improved in the Pacific Islands, it is still limited and very expensive compared with availability and prices in other countries.

Examples of successful use of ICTs in tertiary education in SIDS

The most widespread and successful use of technology in tertiary education in SIDS in the Pacific and the Caribbean has been in distance and flexible learning. Both the University of the West Indies (UWI), owned and operated by 16 states or territories¹ and the University of the South Pacific (USP), owned and operated by 12 states, have been providing distance education to their respective regions since the 1970s.

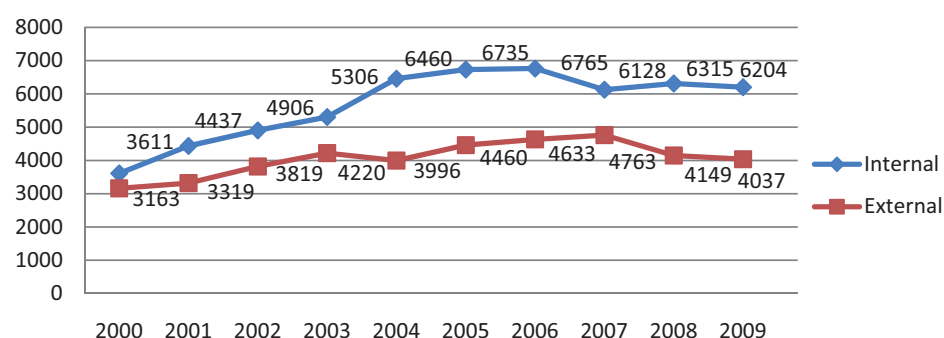
Distance and flexible learning courses now account for a large proportion of students at the USP. *Figure 2* compares the number of face to face and distance students over the last decade. Currently, approximately 40 percent of Equivalent Full Time Students (EFTs) are external students, meaning that they study by distance.

The use of educational technologies in tertiary education has gone through a clear development path. Initially, in the 1970s to the late 1980s, the main use of the satellite technology was to augment written materials with tele-tutorials. At this time, distance education was still conducted mainly through correspondence. While technology did not influence

pedagogy too much, it enabled widely separated campuses to be linked together, allowing a large number of students to access tertiary education who would otherwise not have had any access. The small amount of audio contact between lecturers and students was important in ensuring better student retention and outcomes, but this interaction was severely limited because of both the rudimentary technologies involved and the high costs.

With improvements in technology and the recent availability of greater bandwidth,² technology is now used much more intensively. Video-conferencing has enabled the teaching of postgraduate courses combining short, intensive face-to-face (f2f) teaching with remote completion of assignments and further electronic interaction. Broadcast of lectures has also been possible, although this option not been favoured by lecturers at USP in the past because of bandwidth issues. Increasingly, media-rich content is being made available to students who cannot or do not wish to attend f2f classes. The widespread use of computerized learning management systems (such as Moodle) has enabled fully online courses to be made

Figure 2: Equivalent full-time students (EFTS) by course delivery mode, 2000–2009



Source: University of the South Pacific, University Planning Office, unpublished data.

available to students, not only in the immediate catchment areas of universities, but to international students as well. This ability to reach international markets is a tantalizing possibility for small island states and one that they should exploit fully.

Apart from enabling students to access tertiary education in places where f2f teaching is not available, distance learning also allows governments to test the capabilities of students in their own countries, by requiring them to pass a certain number of courses by distance, before giving them scholarships to study abroad. Many countries in the Pacific have adopted this approach, which ensures higher success rates than would otherwise be the case.

While technology has been leveraged to make education more accessible and varied, it has not been fully integrated into the total learning system in many SIDS. This is a major challenge for educational institutions. They need to go beyond using technologies only to increase access, and more fully exploit them to enrich the range of educational experience of students; to develop better pedagogies; and to fundamentally alter both the economics of learning and the nature of pedagogy. This is the



Computer labs are now a common and important element of tertiary education

most challenging and perhaps the most rewarding component of harnessing technologies for tertiary education – and one that requires the deep commitment of managements and senior academics, and considerable and sustained staff development.

Technology has been used for distance education in a similar way in the Caribbean region, where the University of the West Indies has played a major role in the development of a regional network of sites, all linked to the mother organization.

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Box 1. USPNet

The main ICT infrastructure that enables educational technologies to be effectively used for education at the University of the South Pacific is called USPNet. It is a private satellite telecommunications umbrella over all the 12 countries owning USP (Cook Islands, Fiji, Kiribati, Marshall Islands, Nauru, Niue, Samoa, Solomon Islands, Tonga, Tuvalu, Tokelau, and Vanuatu). It uses a VSAT system with current capacity of 11 MHz to provide video and audio conferencing to all the sites, full internet service to all students, and telephone and fax services. The earliest version of USPNet was established in the early 1970s, meaning that it has been functional for nearly four decades. It is going through an upgrade which will enable it to have both c-band and ku-band capabilities, thus enabling the connection of remote schools and other sites. There are plans to create national academic broadbands and school nets using USPNet as the main infrastructure while enabling the provision of full online and mixed mode courses.

Box 2. Distance education at the University of the West Indies

The University of the West Indies has been a pioneer in distance and flexible learning. It began offering distance education courses in 1983 using an audio tele-conferencing system that was known as the UWI Distance Teaching Experiment (later, Enterprise) UWIDITE, which further evolved into the University Distance Teaching Centre (UWIDEC) in 1996. Print materials and tele-conferencing were both used. In 2008, the university established UWI Open Campus, combining the Office of the Board for Non-Campus Countries and Distance Education, the School of Continuing Studies, UWIDEC, and the Tertiary Level Institutions Unit. It has 42 sites and 4,000 distance education students. The Caribbean region is actively involved in deepening the use of ICTs through various initiatives, including the development of the Caribbean Knowledge Learning Network (CKLN) which envisages high speed regional connectivity for tertiary institutions as well as being a portal for OERs (Gaible, 2008: 8–9).

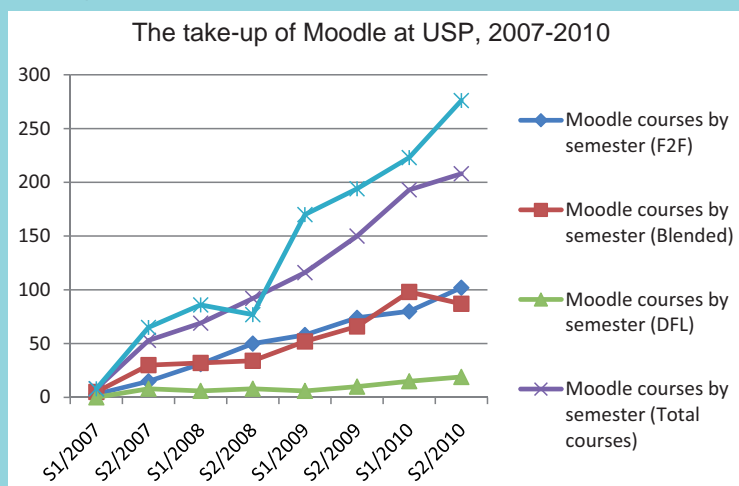
Tertiary education providers are also using more recent and youth-oriented social networking tools like Facebook, wikis, blogs, and twitter to fully leverage youth interests and social trends for learning and teaching.

The most effective use (and the most rapid expansion) of ICTs in tertiary education involves sophisticated learning and course management systems. There are many such platforms, such as WebCT, Blackboard, and Moodle, to name a few. At USP, the main learning management system that enables students' access to much technology-enhanced education is Moodle – an open source software now very widely used internationally (see Box 3).

Moodle allows courses to be put on the web or online; it enables open-learning materials and open educational resources (OER) to be incorporated easily, as well as various media and enhanced educational tools. Students can interact among themselves; lecturers can have computerized monitoring and management of student interactions; and all aspects of course management become computerized and can be integrated into larger MIS systems.

Box 3. The use of e-learning platforms for distance education at USP

The previous learning management system at the University of the South Pacific having become too costly for the university to manage, Moodle was introduced in 2007. It had a very rapid take-up, as shown in the figure below.



Due to bandwidth constraints, one of the main challenges with Moodle at USP has been that it was not properly exploited to make use of its many and rich features. This has been overcome through further training of key staff, participation in international conferences and the subsequent creation of a strong international network and enhancement of USPNet.

An interesting new development for flexible learning is the use of mobile phone technology. Mobile telephony has advanced extremely rapidly in SIDs, where there is now far greater mobile connectivity than either land-line or PC-based connectivity. Many tertiary institutions are now experimenting with the use of mobile phones for students, to assist with class announcements and student interaction. A pilot project is currently underway in two USP courses, in which SMS (short message service) 'text messages' are sent to students with assignment reminders, updates on quizzes, and test dates. As mobile telephony has expanded rapidly even in small and poor countries, it offers interesting new possibilities for education, such as delivering content or giving quizzes via mobile phones.

Factors limiting the use of technology for tertiary education in small states

The main factors inhibiting the harnessing of technology in tertiary education are summarized below:

- Lack of top-level leadership: There is lack of awareness among prime ministers and presidents, ministers, and top public servants and, in the case of tertiary education institutions, of vice-chancellors, presidents and senior academic leaders of the benefits of ICTs, the costs of not making adequate investments, and of maintaining monopolies.
- Lack of adequate connectivity and its high price: This has been the result of strong monopolies in the telecommunications sectors until recently from which the Caribbean and the Pacific Islands have suffered badly. This is perhaps the single most important impediment to effectively harnessing technology for tertiary education in SIDS.
- Inadequate financing: In many SIDS, government did not budget for ICT development. In some cases, available aid was able to be used, although governments and institutions were not able to meet the recurrent costs related to technology.
- Lack of national up-take from 'pockets of excellence': Although there are many pockets of excellence in educational technologies, especially at UWI and USP (both pioneers in utilizing educational technologies), regional organizations and governments and other

institutions have not taken sufficient advantage of them, partially because they often were compelled to collaborate with institutions located in donor countries.

- Lack of adequate secondary infrastructure such as electricity, landlines and fibre-optic networks: Large areas in the Pacific still do not have electricity, without which it is of course impossible to develop ICTs.
- Inadequate ICT technical manpower: such as programmers, education technologists, content creators, and ICT technicians.
- ICT-illiterate teachers: Unless teachers are well trained in utilizing ICTs, it will be difficult to achieve widespread use of technology in education.
- Educational conservatism and scepticism about the quality of education mediated by technology: It is interesting that even poor face-to-face teaching is not questioned, but issues of quality are always brought up in relation to ICT-enabled learning despite the fact that these materials are often subjected to greater scrutiny.

Table 2. Connectivity in Pacific Island countries 2008

Country	Mobile Subscription	Internet users
	per 100 persons	
Cook Islands	33.9	25.4
FSM	30.8	14.5
Fiji	71.1	12.2
Kiribati	1.0	2.1
Marshall Is	1.7	3.6
Nauru	14.9	29.9
Niue	38.5	65.9
Palau	66.6	27.0
PNG	9.1	1.8
Samoa	5.9	2.0
Solomon Is	5.9	2.0
Tonga	48.7	8.1
Tuvalu	20.2	43.0
Vanuatu	19.5	7.3

Note: All country data refers to 2008 except for Palau, which is 2009.

n.a. = not available

Source: Pacific Islands Forum Secretariat, 2010.

'Lack of connectivity is the single most important impediment to effectively harnessing technology.'

Policy options and recommendations

‘One of the most important policy developments in small island states has been the breaking-up of telecommunications monopolies.’

Policies have a strong impact on the successful use of ICTs for the development of tertiary education. Based on research and development experience in ICTs in tertiary education, this section outlines policy options and recommendations.

For national policy-makers

One of the most important policy developments in small island states has been the breaking-up of telecommunications monopolies. The Caribbean island states liberalized their telecommunications market beginning in 2002, ahead of the Pacific, where liberalization in some countries has started only recently. There have been significant new developments that open up major opportunities for enhanced use of technology for tertiary education (as well as for health, business, e-governance, and indeed for development in general). Governments need to ensure that adequate resources are provided for key national infrastructure such as fibre optic cables.

Establishing national ICT plans and implementing them are prerequisites to greater leveraging of technology. UNESCO provides an excellent site and a tool kit for countries to develop ICT policies and to promote ICT in education (see www.ictinedtoolkit.org). The key problem, however, is implementation, since many countries have had good plans for years but have made little progress in ICT development.

States also need to learn from pockets of excellence in ICTs that already exist in different regions, while they also examine systems and assistance from outside the region.

For national education policy-makers

The effective use of ICTs in colleges and tertiary institutions is essential if SIDS are to survive and prosper in the rapidly globalizing knowledge societies. Ministries of education need to ensure that active and effective ICTs in education policies are developed and implemented. This will require adequate resourcing; change in curriculum in education and in teacher training; the development of capabilities in ministries of education in ICT management; the establishment of ‘schoolnets’ to pool resources and improve access; and effective networking regionally and internationally where very significant developments are taking place.

Integrating ICT into the national curriculum should be a priority if small island states are to gain from the benefits of technology. While increased access does not necessarily lead to enhanced learning and teaching, combined efforts in curriculum reform, appropriate learning resources being made available, and having an effective teacher professional development (TPD) can provide excellent benefits.

For all small island states, the issue of whether to provide tertiary education technology networks on a national, regional or shared basis is an important policy issue. In the case of both the Caribbean and the Pacific regions, it was decided as early as the 1970s that a regional approach best served the needs of small island states as it allowed economies of scale. Although recent developments in tertiary education in both the Caribbean and the Pacific pose challenges to this view, increasing regional

integration and regional provision of services is the declared goal of the Pacific Plan for the Pacific Island countries. Indeed, USPNet is now being seen as offering the option of a Pacific Islands information superhighway.

The regional networks and partnerships need to be expanded to international networks and partnerships. There are many very interesting and exciting international developments in leveraging ICTs more effectively, such as the 'one laptop per child movement' – now gathering additional momentum with India's announcement of a US\$35 laptop, and the very rapid expansion of open learning resources.

The Pacific Regional Digital Strategy (Pacific Islands Forum Secretariat, 2010) contains the Pacific Islands' commitment to increasing the level and utilization of ICTs, including for tertiary education. It is based on both national and regional capacity improvement and provision.

For tertiary education institution leaders

It is vital that the vision for modern, independent and empowering learning and teaching guide the utilization of ICTs in tertiary education. ICTs should play a strongly transformative role. Technology should not simply become an add-on to our traditional pedagogy.

A very significant policy question for tertiary education institutions is whether to use commercial software or to opt for open source software. USP chose open source software for learning management after finding that the commercial software is too expensive. As much as possible, open source software should be the preferred option for

tertiary institutions and national governments for reasons of cost-effectiveness, fit for purpose, compatibility with other systems and capacity to expand.

This will require a strong push as many IT section heads and personnel are often strongly wedded to commercial products they have used for some time. Institutions need to formulate strong policy frameworks to ensure that IT departments and other decision-makers give open source software a fair chance and that suppliers do not unduly influence IT personnel.

Whether to use commercial computer and telecommunication networks or to opt for public or proprietary networks is an important policy consideration. The experience in the Pacific small island states has been that a non-commercial network, such as USPNet, was the only viable option, as commercial options would have priced distance education out of the market. If possible, not relying on commercial and monopolistic networks is a good policy option.

Another policy option that represents a major opportunity for SIDS is the use of open educational resources (OERs) in tertiary institutions. While there are strong institutional impediments, it is vital that tertiary institutions take full advantage of available OERs, which can dramatically widen choices, reduce cost and speed the development and implementation of online and mixed mode courses.

It is also vital that educational technologies be chosen after full involvement of lecturers and students. End-users involvement is crucial. Academics need to be empowered and incentivized to experiment with innovative technologies, and an active

'A significant policy question for tertiary education institutions is whether to use commercial software or to opt for open source software.'

programme of technology evaluation and management should be in place to ensure that once a decision is made, the chosen technologies are quickly mainstreamed and that institutions avoid creating incompatible software.

Capacity building is crucial to the success of using technologies in tertiary education. National and regional, as well as organizational competencies in scanning the globe for the best developments, undertaking systematically effective evaluation, and developing effective policy framework for effective implementation are crucial. The IIEP Online Forum³ strongly emphasized the critical importance of 'skillful use of technology' rather than technology for the sake of technology. Funding and developing technology and pedagogy champions, and sustained staff development are keys to rapid and high quality leveraging of technologies for tertiary education.

3. The IIEP Online Forum on 'Policy Options for the Development of Tertiary Education in Small States' was organized from 18 October to 26 November 2010.

Conclusion

Capacity development is crucial to the success of using technologies in tertiary education. National and regional, as well as organizational competencies in scanning the globe for the best developments, undertaking systematically effective evaluation, and developing effective policy framework for effective implementation are crucial. Funding and developing technology and pedagogy champions, and sustained staff development are keys to rapid and high quality leveraging of technologies for tertiary education.

Finally, effective student support is vital. Institutions often do not provide adequate student support for the use of new technologies. Effective induction and orientation are crucial for the successful implementation of educational technologies by both the students and teaching staff.

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