

Distance Education Technology in Asia

Edited by
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on behalf of the PANdora network
and its research teams in

Bhutan, Cambodia, China, Hong Kong (China),
India, Indonesia, Laos, Mongolia, Pakistan,
the Philippines, Sri Lanka, Thailand, and Viet Nam

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Accessibility, Acceptance and Effects of Distance Education in South Asia

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The development of distance education in Bhutan, India, Pakistan, and Sri Lanka has been rapid, though has so far proved unable to cater to the dual challenge of increasing demand and the rapidly changing educational content. Current educational policies in the region are encouraging the use of new distance education methods based on information and communication technology, in the hope this they will improve the situation. This chapter reports a major study of the accessibility, acceptance, and effects of current distance education in Bhutan, Pakistan, and Sri Lanka. It is concluded that the modern focus on Internet-based education has failed to take account of its general lack of accessibility and affordability, and that distance education uses of mixed media technologies in the region should be encouraged.

Introduction

The rapid emergence of distance education (DE) in South Asia has been discussed in the previous Chapter. To obtain information about its accessibility, acceptance, and impact in the area, the PANDora network has conducted a series of studies across Asia, focusing in particular on Bhutan, Pakistan and Sri Lanka. The project considered a variety of learning scenarios, and did not examine ICT-based

education solely from the point of view of DE. At OUSL, for example, students have the opportunity to attend face-to-face instruction, and a 100% distance-based mode of education is rare. Indeed, a previous study of DE in Sri Lanka (Senanayake *et al.*, 2006) has shown that a combination of distance-based and face-to-face methods was requested by 86% of students.

A *pilot study* was carried out in late 2005 to explore the views of the BIT external degree students of the University of Colombo. The sample for this survey consisted of the students who registered for the 2005-06 session of the BIT programme. A random sample of 500 students was as selected as participants of the survey. Key issues of interest were access, affordability and acceptance of DE. The results of the pilot showed that 66% of the sample was male and 34% female, reflecting the gender imbalance in the BIT programme. Thirty-two percent of the students had registered for the BIT programme to obtain a second degree; 40% had registered for the BIT programme to enhance their IT knowledge, including included students who were already undergraduates in other disciplines. The results of the pilot study (Attygalle *et al.*, 2006), helped the authors to design the questionnaire for the main PANdora survey.

In addition, a preliminary *online questionnaire* was created by the Software Development Unit (SDU) unit of the University of Colombo School of Computing (UCSC), and was promoted by a poster in and communications with institutes across Sri Lanka. The questionnaire responses were collated in a *MySQL* Database Management System. Its response rate, however, was very low, and the data were not considered worth further analysis. Whereas it was hoped that 500 responses would be received, only 20 responses arrived of which 12 were incomplete. This outcome reflects the fact that web-based surveys are generally unsuccessful in Sri Lanka, owing primarily to the inaccessibility of Internet services.

A *technical study* on the topic, conducted by the whole 13-country PANdora network, has uncovered reasons for the Internet's

inaccessibility in Asia (Baggaley *et al.*, 2007a, b). The study has measured the time taken to access web pages between major Asian cities, and has reported that “In most of the survey conditions, browser loading times were noted up to four times slower than commonly prescribed as acceptable. Failure of pages to load at all was frequent...” Using the widely available ‘traceroute’ routine, the study also analysed the routes taken by web hits (attempts to access material) from web servers at Asian institutions. All web hits go through intermediate web servers before reaching their target, and the more intermediate ‘hops’ involved, the greater the chance that the access attempt will be unsuccessful. Whereas Canadian hits on Canadian web servers users may go through half a dozen hops, web hits by users in Asia commonly go through 20 or more hops, failing to reach their target altogether. For example, the PANdora traceroute study has found that Asian web hits are commonly routed through countries such as the US and Russia, owing to the lack of more direct local routes. Attempts by a Cambodian user in Phnom Penh to access material on a Phnom Penh web server are typically routed through Viet Nam, adding to the time taken and chances that the attempted hit will fail.

The main survey

The main survey was conducted in 2006-07, using the sampling scheme shown in [Table 1](#), with different questionnaires administered to students and educators. These were administered by trained enumerators in 6 districts in Sri Lanka, 5 provinces in Pakistan, and 4 regions of Bhutan. Each participant responded to two sets of questions: one on accessibility and acceptance of DE techniques and the other on learning styles. Modifications were made to the questionnaires to take account of differences in local language, education level, religion, currency, etc., as appropriate. In view of security problems in some areas, the geographical areas covered by the survey were not completely representative of the countries.

To maximise proportional representation and convenience of data collection, sampling was based on a distribution of institutions in the four separate geographical regions of the country, each of which covers four to six districts. To administer the survey, enumerators were identified in each geographical area with the help of teacher education departments. These resource persons were provided with consistent training, and selected the secondary schools, universities and colleges, and vocational institutes that they would visit, with the goal of preserving a good sampling mix of urban and rural institutions, and male and female participants. The universities were generally in urban areas. The survey responses ultimately collected conformed well to the sampling plan initially conceived ([Table 1](#)).

[Table 1](#). Survey samples (students and educators).

	Pakistan (N = 1879)			Sri Lanka (N = 1271)			Bhutan (N = 625)		
	S	U	T	S	U	T	S	U	T
Student	160	910	456	117	611	284	150	300	50
Educator	35	212	106	31	165	63	38	75	12
TOTAL	195	1122	562	148	776	347	188	375	62

S School U University T Other tertiary

1. [Survey demographics by country](#)

- *Bhutan*

Responses were received from 501 students (male, 62%; female, 38%). Their occupations were in government (86%) and private institutions (14%). Thirty-one percent were studying in higher secondary schools, 59% in university institutions and 10% in training institution. They were Buddhist (88%), and Hindu (11%). Only 5% of the participants were married. Previous educational qualifications ranged from bachelor's degree or higher (24%) to grade 10 or lower (16%). Sharchokp was the mother tongue for

42% of them, Dzongkha for 23%, and other dialects for 36%. Most respondents reported the language of their studies as English (60%), however, compared with the national language, Dzongkha (8%), and other languages (32%). Only 70% provided information about their average family income per month; of these, 97% earned Nu.20,000 (approx. USD 500) or less. The cost of their current studies was reported by 79% of them; of these, 97% incurred up to Nu.20,000 a month, and the others (from higher secondary schools) between Nu.20,001 to Nu.40,000.

Thirty-six percent of the sample was pursuing studies at degree level, and the others at class XI (10%), class XII (27%), and certificate or diploma levels (25%). Their subjects were science (30%), arts (17%), commerce (12%), technical/ vocational (17%) and others (23%). Males tended to be enrolled in science and technical/ vocational subjects, and females in arts, commerce and other subjects. Traditional face-to-face study methods were used by 76% of them. The use of traditional DE methods was reported by 6% of the university-level respondents, and online DE methods by 3%.

- *Pakistan*

The survey was administered in English, Urdu and Sindhi. The 1,527 respondents were Muslim (98%), and all were students. Sixty-eight percent were male and 30% female; 28 did not state their gender. This distribution was consistent with the 70:30 division of male and female students in their institutions. Their mother tongues were Urdu (36%), Punjabi (26%), Sindhi (9%) and English (1%). Their languages of study, however, were English (62%) and Urdu (37%). They were studying in government institutions (32%), semi-government institutions (12%), private institutions (28%) and other (28%). Most were unemployed and in full-time studies. Ninety-seven percent were spending an average of Rs. 5,500 (approx. USD 85) per month on their studies. Of the employed students, 71% earn Rs. 10, 000 monthly. On

average, only two members of the average 7-person household unit are earning - thus the amount spent on education is quite high.

Thirty-one percent of the students were enrolled in postgraduate programmes; 28% were studying for their first degree; 26% at higher diploma/certificate levels; grade 10 (5%) and Grade 12 (9%). Their disciplines were sciences (33%), technical/vocational training (28%), commerce (15%); and arts (13%).

- *Sri Lanka*

The Sri Lanka sample included 1,012 students from schools, universities and other educational institutions, in the six districts with the most institutions in these three categories. It included equal proportion of male and female students, and representation from all of the country's religions and ethnicities. Most of the respondents (94%) spoke Sinhala, and the others Tamil and English. Their language of study was mainly English (72%), and their subjects of study were predominantly in the sciences (49%), with 55% of the male students in this area. Female students (63%) tended to study arts subjects. Their study methods were usually traditional (76%), with only 12% of the students reporting learning via online distance-based methods.

The sample also included 259 educators, equally divided between male and female, in schools, universities and institutes. Ninety-two percent were full-time educators, and around 8% were part-time. Most worked in state or government institutions (64%), and 30% were at private institutions; 4% were in the semi-government sector. Sixty percent were in science disciplines, and 25% in technical and vocational areas. Most (80%) earned less than SLR 30,000 (approx. USD 320) monthly. Their method of teaching was primarily traditional, face-to-face (88%).

2. ICT access and usage.

- *Bhutan*

ICT methods were used by 77% of the sample in their studies. Computers without Internet connection were reported as the most commonly used (65%), followed by TV (53%), projectors (49%), audio-visual cassettes (45%), Internet and radio (42% each), e-mail (40%), computer-aided learning methods (32%), Internet chat (24%), and web-based training (19%). The use of CAL and WBT is relatively higher in vocational training institutions (53% and 29% respectively, compared to 32% and 24% in the universities, and only 20% and 5% in the schools. Of those who had studied using computers without Internet, 46% had used it at their institutions, 39% in Internet cafés, and only 6% at home. Forty-six had used the Internet in cafés, and 39% at their institutions. TV and radio were reported to be more available at home (46% and 49% respectively, compared to 31% and 16% in the educational institutions), although only 10% and 7% of the sample reported having using these media in their studies. No gender differences were observed in uses of ICT for study. When asked about the factors that would encourage educational uses of the Internet, 44% mentioned easier access at school, 36% free and cheap access, 34% easier access at home, and 17% free/ cheaper lessons. Female respondents (42%) tend to view free or cheap access as a facilitating factor, compared with males (33%).

- *Pakistan*

Eighty percent of the respondents stated that they use ICT in their current studies, and 10% use ICT techniques only. Most students are taught by traditional face-to-face methods (63%), and only 6% reported using distance-based online learning methods. The use of computers without Internet was reported by 50% of the sample; e-mail (34%); CAL techniques (26%); online chat methods

(23%); and WBT (16.2%). Fourteen percent of them report using Internet at a cyber-café, and 12% at their work place. No differences were observed between men and women in this respect, except that Internet cafes are used more by the men. Educational uses of TV and radio, both commonly available in Pakistani homes, were noted by 29% and 21% respectively.

- *Sri Lanka*

Comparable responses were observed in the Sri Lanka sample. Among the student respondents, 89% stated that they were using ICT resources in study programmes, with most of them (76%) using computers without Internet. Internet and e-mail facilities were used (57% and 54% respectively) by university students, primarily in the workplace, and at lesser levels by students in institutes (36% and 39%), and in schools (12% and 8%). It should be noted that the schools in this sample were from the 6 main districts of Sri Lanka, and that these figures are likely to over-estimate ICT usage in schools across the country as a whole. Low usage levels of online chat (23%) and WBT (26%) were noted. Similar ICT usage patterns were noted in the educators' responses, with 90% reporting that their institutions use ICTs in study programmes.

3. Attitudes to ICT-based Learning

Reactions to ICT-based learning in the three countries were recorded on 5-point Likert attitude scales from "strongly agree" through "don't know" to "strongly disagree" (Table 2). Six positive and six negative statements were created, to avoid response bias.

Table 2. Statements about ICT-based learning.

Statement	Country/ Gender		Responses (%)					N
			SA	Agr	DK	Dis	SD	
1. It is easy to learn when you use CD, CAL materials.	Bhutan	M	16	59	16	9	0	297
		F	17	54	20	9	0	186
	Pakistan	M	28	51	13	5	3	926
		F	29	51	8	9	3	404
	Sri Lanka	M	40	54	4	2	0	498
		F	35	57	6	2	0	449
2. Can learn more from books than from a computer or other technologies.	Bhutan	M	17	36	8	33	6	302
		F	16	37	10	32	5	187
	Pakistan	M	25	38	10	22	4	865
		F	34	38	6	20	2	352
	Sri Lanka	M	17	51	6	23	3	494
		F	19	48	4	26	3	454
3. A computer can help you to learn.	Bhutan	M	64	33	1	1	1	294
		F	63	35	1	0	1	186
	Pakistan	M	40	46	7	3	3	922
		F	43	48	3	3	2	412
	Sri Lanka	M	47	49	2	2	0	500
		F	42	55	2	1	0	460
4. Computers are necessary tools in educational and work settings.	Bhutan	M	78	19	1	1	1	303
		F	82	15	1	0	2	189
	Pakistan	M	45	38	9	5	4	924
		F	54	36	3	5	2	403
	Sri Lanka	M	43	48	3	6	0	495
		F	49	44	3	4	0	452
5. You have to be a 'brain' to work with computers.	Bhutan	M	26	53	4	15	2	302
		F	40	37	6	16	1	187
	Pakistan	M	31	44	8	12	4	924
		F	29	50	6	13	2	409
	Sri Lanka	M	23	43	4	24	6	489
		F	22	46	5	22	5	445
6. ICT-enabled learning is interactive and interesting.	Bhutan	M	38	54	5	2	1	299
		F	47	45	5	2	1	185
	Pakistan	M	26	49	15	9	1	900
		F	30	53	9	7	1	389
	Sri Lanka	M	31	54	7	7	1	489
		F	25	63	5	6	1	433

7. E-mail is an effective means of communication between the teacher and students.	Bhutan	M	29	45	11	13	2	302
		F	30	42	10	15	3	188
	Pakistan	M	26	41	12	16	5	919
		F	29	48	5	15	3	401
	Sri Lanka	M	22	51	9	15	3	491
		F	21	52	10	14	3	447
8. It is difficult to use the computer/ Internet for studying.	Bhutan	M	5	23	5	49	18	304
		F	4	22	7	52	15	188
	Pakistan	M	12	24	10	35	19	926
		F	14	25	4	42	15	400
	Sri Lanka	M	5	14	4	48	29	494
		F	3	12	6	54	25	446
9. ICTs increase motivation to study.	Bhutan	M	45	50	4	0	1	307
		F	37	52	8	2	1	190
	Pakistan	M	28	56	9	7	0	933
		F	28	64	5	3	1	417
	Sri Lanka	M	39	55	4	2	0	505
		F	33	61	3	3	0	461
10. ICT makes my lessons more interesting.	Bhutan	M	45	49	3	2	1	307
		F	37	54	5	2	2	192
	Pakistan	M	25	54	10	10	1	934
		F	27	58	6	9	1	412
	Sri Lanka	M	34	59	4	3	0	506
		F	30	62	4	3	1	459
11. ICT helps to increase my efficiency.	Bhutan	M	41	52	3	3	1	305
		F	33	58	5	3	1	189
	Pakistan	M	25	49	12	12	3	881
		F	25	60	6	8	1	366
	Sri Lanka	M	38	50	5	7	0	506
		F	29	63	4	3	1	459
12. ICT is affordable for my studies.	Bhutan	M	16	52	7	21	4	306
		F	18	55	7	14	6	189
	Pakistan	M	18	47	13	10	12	920
		F	17	57	8	16	2	401
	Sri Lanka	M	19	63	6	10	2	499
		F	18	65	7	8	2	444

Most respondents in each country agreed that computers “can help you to learn” (Q3) and “are necessary tools in educational and work settings (Q4), and that “it is easy to learn when you use CD, CAL materials” (Q1) . The most positive consensus on the last of these statements was in the Sri Lanka sample, and the highest undecided rate in Bhutan. The items regarding the use of ICTs to increase motivation to studies (Q9), making lessons more interesting (Q10) and increasing efficiency (Q11) received overwhelmingly positive responses in each country similarly. The students in all three countries were divided, however, on whether they “can learn more from books than from a computer or other technologies” (Q2), with relatively large proportions both agreeing and disagreeing with the statement. In Bhutan and Pakistan, nearly 4:5 respondents were of the opinion that “you have to be a ‘brain’ to work with computers” (Q5), with 2:3 of the Sri Lanka sample agreeing with this view.

The three country samples shared the predominant view that ICT-enabled learning is “interactive and interesting” (Q6), though there seemed to be more uncertainty on this among Pakistani males than in the other subgroups. Nearly 70% of each country sample was positive about the use of e-mail as “an effective means of communication between the teacher and students” (Q7). Responses on the question of whether “it is difficult to use the computer/ Internet for studying” (Q8) were mixed, though the majority disagreed. Relatively high proportions in all three countries disagreed that “ICT is affordable for my studies” (Q12).

4. Study habits

Study activities of the sample were recorded on a 5-point scale from “I do this rarely/ never” through “don’t know” to “I do this almost always” (Table 3). Eight student-related items were created and 2 teacher-related ones (Q7 and 8).

Table 3: Statements about study activities.

1	I do this rarely or I never do this
2	I do this sometimes
3	Neutral/DK
4	I do this often
5	I do this almost always

Statement	Country/ Gender		Responses (%)					N
			1	2	3	4	5	
1. I work through learning material point by point and study each section separately.	Bhutan	M	9	42	8	31	10	292
		F	6	49	5	26	14	185
	Pakistan	M	2	11	11	46	30	837
		F	1	7	6	51	34	359
	Sri Lanka	M	9	38	8	30	15	489
		F	9	36	6	31	18	444
2. I repeat the most important parts of the material until I know them by heart.	Bhutan	M	10	15	7	34	34	293
		F	7	15	5	31	42	186
	Pakistan	M	2	13	8	44	33	817
		F	3	9	3	54	31	355
	Sri Lanka	M	9	29	12	32	18	486
		F	8	25	9	29	29	442
3. I try to combine everything dealt with separately in a course to form a whole.	Bhutan	M	12	31	20	29	8	292
		F	13	32	24	25	6	182
	Pakistan	M	4	21	12	47	16	793
		F	3	17	14	46	19	334
	Sri Lanka	M	11	30	19	29	11	477
		F	11	28	22	23	16	429
4. I link the specific facts with the general arguments in a unit/ module.	Bhutan	M	12	36	22	23	7	289
		F	16	41	15	19	9	177
	Pakistan	M	4	19	14	46	16	802
		F	4	14	12	55	15	339
	Sri Lanka	M	7	33	20	28	12	483
		F	9	29	21	25	16	437
5. To test my progress, I put the main points in course units into	Bhutan	M	9	25	8	34	24	293
		F	3	30	4	37	26	183
	Pakistan	M	4	13	10	42	31	811
		F	4	10	11	46	30	341

	Sri Lanka	M	11	28	14	30	17	481
		F	9	25	14	29	23	441
6. I do more activities and assignments than is asked of me in a course.	Bhutan	M	17	31	15	24	13	290
		F	21	31	13	23	12	185
	Pakistan	M	8	25	10	39	18	808
		F	8	24	7	42	20	348
	Sri Lanka	M	20	31	11	26	12	479
		F	18	33	12	23	14	439
7. I follow the instructions given in the materials and by the tutor/ teacher/ counselor.	Bhutan	M	4	13	5	29	49	290
		F	2	13	3	31	51	184
	Pakistan	M	2	10	7	49	32	801
		F	2	9	4	49	36	344
	Sri Lanka	M	7	25	12	37	19	480
		F	7	22	13	34	24	437
9. I need the teacher to give advice when I have difficulties while studying.	Bhutan	M	4	16	8	34	38	291
		F	4	18	3	34	41	185
	Pakistan	M	2	7	7	45	38	809
		F	1	6	5	48	40	345
	Sri Lanka	M	11	27	14	31	17	484
		F	8	31	11	30	20	442
9. I always base conclusions on the information in the materials and group interactions.	Bhutan	M	8	25	15	36	16	293
		F	7	33	9	37	14	186
	Pakistan	M	4	18	11	46	21	801
		F	4	14	9	45	28	348
	Sri Lanka	M	8	32	14	32	14	484
		F	6	36	15	29	14	434
10. Using the theory in a course, I form solutions to practical problems.	Bhutan	M	6	28	16	34	16	290
		F	6	34	11	34	15	186
	Pakistan	M	4	12	12	49	24	805
		F	4	12	10	50	24	343
	Sri Lanka	M	7	27	16	35	15	484
		F	5	34	16	30	15	436

Three of the study activities listed in Table 3 (Q3, Q5 and Q10) may be regarded as logical styles of learning. A large proportion of students in Pakistan appear to be using these approaches more than students in Bhutan and Sri Lanka. Items relating to solitary learning approaches (Q2 & Q6) also suggest that Pakistani students, compared

to those in Bhutan and Sri Lanka, use a greater mixture of learning activities. The items about teacher-focussed learning styles (Q7 & Q8) indicate that students in Pakistan and Bhutan tend to use a more teacher-centred approach than those in Sri Lanka.

4. Motivation for studying.

Reactions about motivation for studying in the three countries were recorded on 5-point Likert attitude scales from “strongly agree” through “don’t know” to “strongly disagree” (Table 4).

Table 4. Statements about motivation for studying.

Statement	Country/ Gender		Responses (%)					N
			SA	Agr	DK	Dis	SD	
1. I like to take courses which seem useful to me in my present or future career.	Bhutan	M	63	29	4	1	3	299
		F	70	21	4	3	2	190
	Pakistan	M	55	32	8	5	1	837
		F	58	33	4	4	1	366
	Sri Lanka	M	42	36	11	6	5	492
		F	43	40	10	2	5	442
2. I am in this programme out of the interest for the subjects that are being dealt with.	Bhutan	M	34	27	16	10	13	296
		F	31	26	8	15	20	189
	Pakistan	M	20	33	11	25	10	819
		F	18	39	5	30	8	357
	Sri Lanka	M	11	22	20	22	25	490
		F	12	16	22	26	24	437
3. I chose this study because the work I can do with it after graduating interests me.	Bhutan	M	45	37	11	4	3	296
		F	45	33	15	6	1	188
	Pakistan	M	23	48	12	13	4	816
		F	29	42	7	17	5	349
	Sri Lanka	M	35	39	15	8	3	487
		F	36	36	19	6	3	441
4. My most important goal in following this programme is to	Bhutan	M	10	19	16	21	34	297
		F	21	20	9	22	28	189
	Pakistan	M	25	28	9	27	11	824
		F	25	37	5	21	12	359

	Sri Lanka	M	21	30	15	21	13	488
		F	22	30	20	17	11	442
5. I only study to improve myself personally and to enrich my life.	Bhutan	M	32	28	14	12	14	299
		F	34	30	11	14	11	190
	Pakistan	M	30	38	10	17	5	820
		F	37	39	8	14	2	361
	Sri Lanka	M	30	33	16	14	7	488
		F	28	34	17	11	10	439
6. I want to be able to apply what I learn in solving practical problems.	Bhutan	M	44	40	10	3	3	300
		F	47	29	16	6	2	190
	Pakistan	M	42	42	10	5	1	832
		F	48	41	6	4	1	363
	Sri Lanka	M	37	40	13	6	4	484
		F	35	44	14	4	3	443
7. The teacher should encourage me to think about how material is linked to reality.	Bhutan	M	42	38	10	7	3	299
		F	43	37	13	7	0	190
	Pakistan	M	39	45	8	6	2	826
		F	46	46	4	4	1	364
	Sri Lanka	M	23	50	14	9	4	483
		F	25	51	16	5	3	443
8. I prefer being encouraged to study the materials at a certain pace.	Bhutan	M	25	45	19	7	4	298
		F	33	42	14	7	4	187
	Pakistan	M	29	47	11	11	3	824
		F	27	53	6	11	2	366
	Sri Lanka	M	24	47	17	10	2	484
		F	24	46	21	6	3	440
9. I prefer to work on assignments and projects with other students.	Bhutan	M	27	48	15	6	4	297
		F	39	35	11	11	4	190
	Pakistan	M	32	44	9	11	4	839
		F	37	40	6	12	5	368
	Sri Lanka	M	34	42	12	10	2	483
		F	36	45	10	6	3	444
10. I prefer courses in which practical applications of theoretical content are given.	Bhutan	M	35	45	10	5	5	297
		F	42	30	14	7	7	190
	Pakistan	M	38	39	14	6	2	820
		F	44	40	9	5	3	361
	Sri Lanka	M	39	40	12	6	3	484
		F	35	44	15	4	2	442

In general, these results indicate that students in all three countries like to choose the study programmes that promise to be useful in their future and career. Their choices of subject differ, however, between countries and gender groups. In Bhutan most students (approx. 2:3) take particular study programme purely out of interest. In Pakistan, this proportion is 1:2, while in Sri Lanka it is 1:4. The item about preferences for courses with theoretical content (Q10) indicates that most students in all three countries believe that the theoretical knowledge that they gain should be capable of practical application.

Discussion

1. Accessibility.

The survey looked at the use of ICT resources by students and educators at their homes, educational institutions and at work where relevant. The results indicated that the sample institutions have not yet fully harnessed computers in education, even though in possession of them, and that both campus- and distance-based education are still being provided mainly through traditional methods. Low Internet availability was noted, in particular at the Bhutanese and Pakistani institutions, and students in all three countries continue to receive their education by the traditional face-to-face method.

2. Affordability.

When asked whether it is affordable to use ICT for their studies, most study in Pakistan and Sri Lanka responded in the affirmative, though only 1:3 in Bhutan. The high costs of Internet access were a major reason for low use, and it is clear that connectivity charges are particularly unaffordable for most students and even educators, given their low incomes.

3. Acceptance.

Despite the low accessibility and affordability of common DE methods, there was a general acceptance that ICT-based learning is useful. Relatively high proportions of the students in all three countries agreed that computers with Internet facilities are or would be useful for their studies. Nonetheless, over half of the samples in each country felt that more can be learned from books than from a computer or other technologies.

4. Effects.

The results showed general agreement that ICT resources can make studies more interesting. Relatively high proportions of the students agreed that they save time for other work when they use computers and CD materials; and over half of them in each country stated that using the Internet increases their understanding of concepts and theories.

5. Gender differences.

The survey has suggested numerous gender differences in the survey responses: higher proportions of male students in science subjects, for example, and female students in the arts. In *Bhutan*, a greater proportion of male students tends to use ICT-based learning methods compared with the female students; and female educators also reported lesser levels of experience with ICTs compared with male educators. Similar results are observed in *Pakistan*, where the size of female population is now reaching that of the male population (2007 ratio: 1.05:1), and gender disparity in educational access has become a major national problem. Traditionally, families favour boys over girls for admission to schools, especially when education is expensive. The Sri Lanka results reveal a possible gender difference with respect to Internet access, in that Internet cafés appear to be more popular with male than female students.

6. Capacity Building.

The need for increased public awareness and capacity building in relation to ICT and DE benefits has been made particularly clear by this study. In its own right, the survey has illustrated ways in which capacity building can occur among Asian educators. For example, research assistants were provided with training in all three countries, and undergraduates received training in enumeration techniques, and were sent to rural areas to conduct face-to-face surveys with students and educators. The survey coordinators gained experience in managing national-level projects, and had the opportunity to work with multidisciplinary teams from the education, computing, and statistics disciplines. In addition, the project provided many researchers with a first-time opportunity to use ICT tools for international communication, and software for the handling and analysis of large data sets. The experiences they received with the Statistical Package for the Social Sciences (SPSS), for example, have since been passed on to students and colleagues. The collaborative nature of the PANdora project also helped researchers to grow personally and professionally, by attending online seminars and making presentations at international conferences. Project planning and reporting workshops were conducted with the participation of IDRC/ PANdora resource persons, and the annual synthesis meetings at which all of the PANdora projects were discussed were major educational experiences. The experience as a whole benefitted not only the individuals involved but also their institutions.

Recommendations

1. Establish regional centres for efficient learning support.

Through government/ private/ public/ donor partnerships, regional centres should be established to provide easier and affordable access to learning resources. The centres should be equipped with basic reference materials and tutorial facilities, and with Internet, printing,

and fax facilities. They should be equipped and managed according to a sustainable model, so that tutors and mentors are continually available, and their facilities can be easily maintained and replaced. Degree programme students could be given part-time employment to mentor their juniors at a distance as well as face-to-face. Staff involved in DE delivery need to be trained to design programmes that are sensitive to the needs and conditions of distant learners. Existing models of this type should be expanded to all parts of the region.

2. Strengthen localised online educational resources.

The lack of up-to-date reference materials as well as the accessibility of references is a concern for students as well as teachers. Resources are typically limited to library-based references, and access to them can be difficult from the place of work. The development of shareable digital materials, with an emphasis on localised content, will provide easier access and widespread opportunities for content development and translation. Capacity building in the development of digital materials will be required.

3. Develop blended learning models.

Student preferences in all three countries are moving towards blended learning approaches, by which traditional teaching and learning methods are integrated with technology-based practices. Traditional universities should adopt DE methods so that their services can be extended beyond their physical boundaries. The region's open universities should also move towards more extensive uses of IT in course delivery, and combinations of TV, radio, web and offline material. Among the three countries of this study, online educational methods remain a distant dream, with only a handful of institutions currently taking the necessary steps towards developing them. The integration of ICT into the curriculum should be encouraged at all levels; and Internet access charges should be

reduced as a major way of creating positive public attitudes to ICT-based distance learning.

4. Policy guidelines for Government and donor agencies.
 - a) Governments should allocate more funds for the promotion of ICT infrastructure.
 - b) Donor agencies should identify under-privileged and low-income populations with the help of local NGOs, and provide them with ICT-based educational resources.
 - c) Internet facilities should be made available at every educational institution, at lower costs and higher speed.
 - d) Governments should construct adequate power plants to eradicate the problems of power failure.
 - e) Governments should provide training in ICT usage for DE students and teachers.
 - f) Quality assurance guidelines should be provided for institutions delivering online education, and their implementation strictly monitored.

Conclusions

Bhutan, Pakistan, and Sri Lanka each give a high priority to education and the advantages of a knowledge-based society. Their present and past governments have recognised the value of high-school education for all citizens. Access to tertiary education, however, remains restricted by lack of the resources needed to make it available to all. An obvious strategy for them is to increase the use of effective ICT-based DE methods. As the current study has indicated, students are highly motivated to use ICTs in their work, and major initiatives have emerged in South Asia promoting ICT-based DE, and creating a vast range of new possibilities for teachers and learners. A 'paradigm shift' is beginning to be observed from teacher- to learner-centred methods, giving the student greater flexibility of control in the

learning process. A wide spectrum of ICT-based methods is now envisaged to help DE as well as traditional education to expand.

The modern focus on Internet-based education in South Asia, however, seems to have totally failed to take account of its general lack of accessibility and affordability. While waiting for improved access to modern ICT facilities such as computers and the Internet, there is clear scope for more extensive uses of radio and TV, media that are freely available in all parts of South Asia. Nationwide systems of educational radio and TV are much to be desired. Although the public and private sectors both steer away from such initiatives for financial reasons, a public and private investment in educating future generations by these readily affordable and accessible media would be a significant contribution. With Internet access not yet universally available, uses of mixed media technologies in DE are much needed and to be encouraged. Expanded, equitable educational opportunities are needed for all ethnic, religious and social communities, and for both genders. It is crucial for educational institutions to provide access to ICTs, not just for learning but also as a preparation for life.

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