Students make a plan: ICT access and social and academic uses in higher education

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Abstract

This paper reports on the findings of ICT access issues and social and academic uses in higher education, undertaken as part of a study in 2007 in three dissimilar South African higher education contexts. This diversity provided insight into a highly differentiated student body, varied contexts, different infrastructures and historically distinct backgrounds, thus providing a rich data set. The study focused on forms of "thick" access including both computers and cell phones. Access to the Internet via cell phones proved unexpectedly high, and was undifferentiated across socio-economic background. Findings challenge a staged model to ICT access and use suggesting that take up and use are complex, with students proving enterprising in meeting their educational needs, satisfying their curiosity and finding ways to participate in the "information age" even in difficult environments.

Keywords

Social use, academic use, students' cell phone use, off-campus access, Internet connection types

Introduction

Most studies on ICT use for learning in universities focus on formal course-related contexts. This focus may close off relevant forms of social, informal learning, and create artificial distinctions between different kinds of ICT-mediated learning activities all of which support learning. We therefore decided to interrogate social uses as well as uses in support of formal learning processes. Our view is that if students can engage in ICT-mediated social activities, it is likely that these ICT social skills are transferable to academic situations with more formal academic purposes.

Also, not all social uses are recreational. Many social activities are academic in nature, or support academic activities in indirect ways. In addition, uses which may be categorised as social are likely to include those affective elements of learning (such as support, encouragement etc) which may not be captured by investigations of formal, cognition-linked ICT-mediated learning activities.

The investigation took place at a time of the rise of social software globally. Mindful that limited bandwidth in South African contexts meant that such a rise could not be similarly assumed in the local context, we were nevertheless interested to explore what might be related or precursor type activities occurring in environments with more challenging conditions of access.

We are mindful that students can be enterprising and determined in finding ways of accessing and using ICTs despite the challenges they face both for social and formal study-related purposes. We therefore set out to find out whether and how such students were able to address the challenges they face. We knew that for many students access is a serious challenge (Czerniewicz at al 2006), and wished to clarify the nature of the challenges and the ways that students managed to negotiate their uses in complex settings.

The questions addressed in this paper are therefore: What are the conditions of access in which the diverse students operate? What kinds of use – especially social - are students engaging in? What can be noted about social uses in relation to academic uses? How do use activities relate to access conditions and student demographics? Are there student activities or groups which contradict the trends or expectations?

The study

The research instrument was a questionnaire filled in respectively over a two-month period in 2007 by students from three very different South African universities in three different provinces. The institutions were small (8657 students), medium (17500 students) and large (24061 students). In this paper we report on responses from 2238 students overall.

The questions include both open ended and ranges, providing both qualitative and quantitative data for analysis.

The majority (87%) of respondents were South African, with 51% of respondents reporting their home language to be a South African language of African origin, 34% Afrikaans, and 9% English. The remaining 6% were other African and international students. The sample reflects national proportions regarding African languages (as per HEMIS statistics, Department of Education 2006). While over half (53%) of the respondents were female, this is consistent with the national student profile.

Students were predominantly from Business disciplines (38%) followed by Humanities (34%) and then Sciences (20%). The majority of students were from undergraduate groupings (88%) which is consistent with the national student profile.

Given our interest in diversity, and student background, an index of socio economic group was calculated[1]. This demonstrates that the sample of students was spread evenly across low, average and high socio-economic groups: low socio-economic group - 35,4% of respondents; average socio-economic groups - 31% students; high socio-economic groups - 33,4% of respondents[2].

Findings and discussion

Access

While access on campus is described in generally positive terms and is not differentiated by socio-economic group, off-campus access to computers and the Internet is varied and challenging. Lack of access off campus is a serious constraining factor for a third of the students. However, cell phone ownership is almost ubiquitous, suggesting an opportunity and a more complex set of factors.

Access: computers

Students reported on campus access very favourably (see Figure 1).

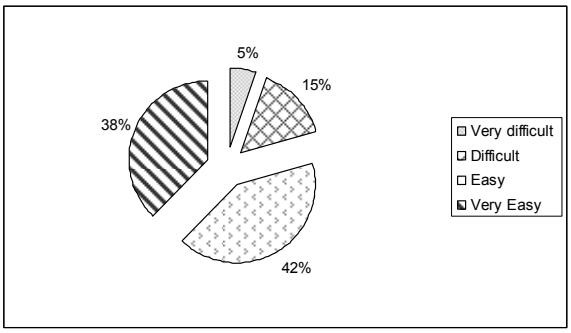

Figure 1: Student on-campus access

[1] This was based on the score from three items: occupation of primary breadwinner, highest education level of primary breadwinner, whether the respondent was the first person in their immediate family to attend university.

[2] These socio-economic group groups were not spread evenly across individual institutions.

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The fact that students describe on campus access so positively emphasises that the ongoing expenditure on infrastructure on campuses is beneficial and valuable in developing country contexts such as these in the study. This contrasts with developed country institutions, where the focus is rather on wireless infrastructure and student laptops[3].

The data in Table 1 also demonstrates that oncampus there is fair and equivalent access for all students regardless of socio-economic background.

Table 1: Ease of access on campus by socio-economic group

	Very difficult	Difficult	Easy	Very Easy	(n)
High	5.35%	13.01%	39.74%	41.91%	692
Average	3.54%	15.27%	39.71%	41.48%	622
Low	5.98%	18.89%	42.93%	32.20%	736

Generally students report some level of access to ICTs off campus with only 16% reporting no access of any kind (see Figure 2 below). Note that the institution with a large proportion of students from low socio-economic groups also has a large proportion of students with no off-campus access to ICTs. However, Figure 2 shows that overall fewer than a third of respondents report a high degree of access.

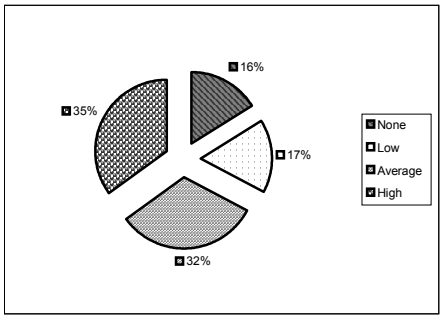

Figure 2: Student off-campus access

Unsurprisingly, but importantly, the relationship between socio-economic group and off-campus access shows that students from low socio-economic groups are more likely to have no or very low access (eg a shared computer outside the home) than students from average or higher socio-economic groups (as shown in Table 2). Just over a fifth of those with no off-campus access are from high socio-economic groups while the converse is the case: just over a fifth of those with high access are from low socio-economic groups.

Table 2: Off campus access by socio economic group

Off campus index	Low socio-economic group	Average socio-economic group	High socio-economic group
None	52.20%	25.08%	22.71%
Low	47.91%	31.19%	20.90%
Average	35.49%	30.68%	33.83%
High	21.93%	34.05%	44.02%

Access: cell phones

In contrast to computer access, cell phone ownership is pervasive (98.5%) and not socially differentiated. Furthermore, 43% of students reported that they access the Internet off campus via their cell phones (see Figure 4 discussed later). An unexpected finding is that despite the cost implications, and the fact that

[3] Campus Technology, 2005, *Making a connection: Wireless and VoIP Campus Trends*. http://www.campustechnolgy.com/article.asp?aid=40321

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students from a high socio-economic group have other kinds of access to the Internet[4], the spread of Internet access via cell phone is remarkably even across socio economic groups (refer to Figure 3).

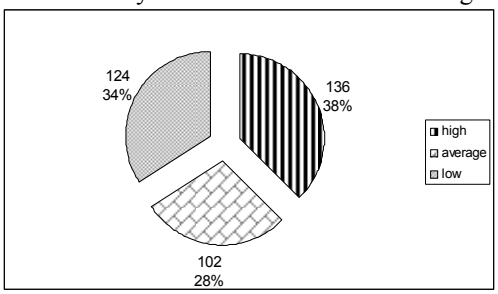

Figure 3: Students who use cell phones to access the Internet off campus by socio-economic group

The fact that cell phones are increasingly being used for Internet access in other sectors is unsurprising (an increase from 58% to 82% was reported from 2006 to 2007 in the South African corporate sector) but it is unexpected in the student sector, especially where so many students are under severe financial pressure.

Access: the Internet

We asked those students who report some access to the Internet off campus how they connected to the Internet. The largest group of students reported using their cell phones rather than other means, as displayed in Figure 4.

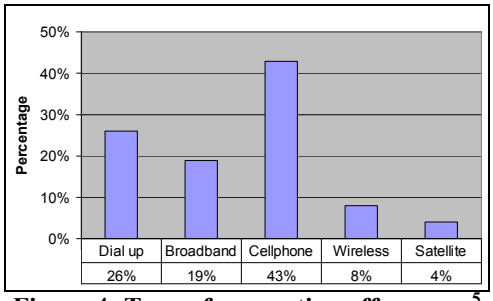

Figure 4: Type of connection off campus[5]

Of particular interest was the fact that the single largest significant group was low socio-economic group students use of their cell phones (see Figure 5).

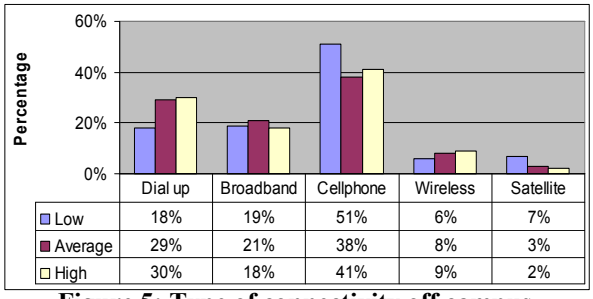

Figure 5: Type of connectivity off campus

Why are students using their cell phones to access the Internet when it is expensive and why are so many students short of finances doing so? It seems that this activity is valuable enough for them to spend their limited budgets on. We need to find out where the value lies. We also assume that despite the expense, this may even be the cheaper or the more convenient alternative, where alternatives are so limited.

Student responses to open ended questions confirm that convenience, distance, ownership and time are important considerations with regards to access to limited facilities off campus, with internet cafés being

[4] High socio-economic group students use a mix of dial up (29%) and Broadband (17%).
[5] Students chose one answer, their most dominant form of connection.

mentioned the most often in this regard. The following quotations are typical "*Lot of people don't have computers & again public internet terminals as well as internet café are always ful*l", and "*Not available in the local area and having to leave the location to go to town just to access the internet via internet café*, and "*I have to go to the internet café to use a computer or the post office & there is a time limit when I'm using them.*"

Interpreting findings about access

While these findings about access are both sobering and illuminating, we know that simple indicators of access are insufficient and that access needs to be considered in relation to use. The kinds of access described here provide indications about availability and therefore potential for use. Such availability does not exist in a vacuum but has to be considered in context. Thus "thicker" contexts of access are needed which unpack kinds of access, perceptions of access, as well as what users bring to that access. Access is not binary in the sense that you have it or you don't. We understand access and use to be inseparable, a kind of never- ending intertwining möbius strip. Thus the data presented so far must be seen as "first line" and read in conjunction with the findings about use explored in the following sections.

Social use

As explained earlier, our interest in social use was predicated partly on the rise of social software as a global phenomenon, as well as the premise that social uses are not necessarily recreational. Thus we asked students about activities which would broadly feed into the kinds of definitions which underpin social software. Social software in its simplest sense refers to "programs [which] allow users to interact and share data with other users" (http://en.wikipedia.org/wiki/Social_software). Because they generally refer to specific tools such as blogs, wikis, bookmarking sites etc which are rare in our contexts, we have avoided the terms social software or Web 2.0. We did not wish to limit the responses to associations with specific tools such as blogging or wikis although these are implied. Rather our interest was to investigate any activities which connote communication and sharing, as well as the possibilities of collaboration.

The table following summarises student responses regarding social uses, with those in bold being of particular interest.

Table 3: Students' ICT social use

Use of ICTs socially	Hardly ever	Sometimes	Often	n
Communicate with other students by email	20.92%	46.03%	33.04%	2194
Participate in email discussion lists	47.53%	36.97%	15.49%	2188
Participate in computer Chat (eg IM)	48.41%	30.90%	20.69%	2165
Communicate with other students by sms	10.33%	29.71%	**59.96%**	2178
Participate in computer Chat (eg Mxit)	**47.05%**	20.81%	32.14%	2153
Use VoIP (e.g. Skype)	**78.76%**	14.81%	6.43%	2147
To use shared resources	26.21%	44.32%	29.47%	2175
Upload resources onto the web	42.51%	36.15%	21.35%	2169
To publish your own content	**71.76%**	19.70%	8.54%	2178

From these results (in Table 3), we found that the only social use a significant number of students reported as undertaking often was communication between students using cell phones, specifically by sms. This was just under two thirds of the respondents. Of interest is that women communicate more often with other students by sms compared to men (68% women to 52% men).

Just under half of the respondents reported sometimes communicating with other students by email and sharing resources. Such activities would be considered the most basic community building activities, and cannot be considered prevalent.

Even more notable is the fact that the other social uses – uploading resources, participating in email discussion lists, online chat (both on computers and on phones) were hardly ever used by between most and half of the students. The fact that the communicative aspects of ICTs are hardly being exploited are emphasised in the findings about ICT uses for learning where only 21% of respondents report communicating with lecturers and tutor by email, 16% participating in online discussion with peers in

their own time, and 15% participating in online discussion with peers at a specific time.

And finally the finding that over two thirds of students report that they hardly ever publish their own content (Table 3) suggests that one of the basic tenets of social software or elearning 2.0- the "write" of the "read and write" net generation is not applicable in these contexts.

Overall ICT social use in general is not high. The general lack of engagement with social software is reflected in another indicator, the data on Facebook users from the three institutions being studied. At the end of 2007, the Facebook users were 3%, 1% and 4% of the total students for the three studied universities respectively[6].

Social use by computer and cell phone

Having noted that cell phone access is much more extensive than computer access, especially off campus, we were interested to consider whether computers and cell phones were used differently for social activities. The table below reveals interesting overlaps.

Table 4: Cell phone use according to computer use

	No cell phone use	< 40 cell phone use	40-80% cell phone use	> 80% cell phone use
Computer use				
none	19.23%	28.85%	26.92%	25.00%
<40%	4.26%	27.86%	45.62%	22.26%
By 40-80%	2.76%	10.71%	45.82%	40.71%
> 80 %	4.71%	1.18%	26.47%	67.65%

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Note : Row percentages given
Number of observations 2024
Pearson chi2(9) = 258.4283   Pr = 0.000
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From the above table, almost 68% of students who use computers for personal purposes more than 80% of their overall computer time, also use cell phones more than 80% of their overall cell phone time on personal activities.

Table 5: From cell phone use to computer use

	No computer use	< 40 computer use	40-80% computer use	> 80% computer use
Cell phone use				
none	12.50%	43.75%	33.75%	10.00%
<40%	4.27%	65.24%	29.91%	0.57%
By 40-80%	1.59%	42.47%	50.85%	5.10%
> 80 %	1.83%	25.77%	56.20%	16.20%

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Note : Row percentages given
Number of observations 2024
Pearson chi2(9) = 258.4283   Pr = 0.000
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On the other hand, of the students who use their cell phones for personal purposes more than 80% of their overall cell phone time, only 16% also use computers more than 80% of their overall computer time on personal activities (Table 5).

Of particular interest are the overlaps between students with both no cell phone and no computer use, and those with very high cell phone and very high computer use. Interestingly there are only 1.83% students with very high use of cell phones who never use a computer for personal purposes.

What does this suggest? The first issue to consider would be access. However while we know that access to computers is varied or limited, we know that cell phone access is ubiquitous. This suggests that cost is a determining factor. Students may own cell phones but may not use them as they cannot afford to use

[6] Data was obtained from institutional networks on Facebook.

them. Given that so many of the students are from low socio-economic groups, this is a likely explanation.

This data is however for social use, which suggests that students may in fact be using their limited resources more for study related purposes. Given that students report accessing the Internet via their cell phones, this suggests that their use is quite purposeful, and in support of their studies. This supposition is supported by responses from a question specifically about cell phone use where a significant group said they often used cell phones for something to do with their studies (40%) and only a fifth said they hardly ever did (Table 6 below).

Table 6: Academic use of cell phones

	Hardly ever	Sometimes	Often	(n)
receive information from my university via my cell phone	41.76%	42.89%	15.35%	2117
use my cell phone for something related to my studies	21.79%	38.54%	39.6%	2120

These finding suggest strategic use of available resources. We considered related data to track the relationship between access and types of use.

Social use and academic use

An analysis of ICTs for academic and social use, however, shows that there is a stronger relationship between the level of access and social use than access and academic use. Students with above average access off campus have a far higher frequency of use for social purposes than students with below average access (see Table 7 below).

Table 7: Access and social use

	Social use	
Access Code	**below average**	**above average**
Below average	51.60%	48.40%
Above average	31.94%	68.06%

This same pattern is not mirrored in terms of academic use, as displayed in Table 8.

Table 8: Access and academic use

	Academic use	
Access Code	**above average**	**below average**
Below average	49.88%	50.12%
Above average	51.29%	48.71%

How does one make sense of this? One must note that access in these findings refers to all access and is most likely understood as computer and Internet access, rather than cell phone access. One might have assumed that where there was more computer/Internet access there would be more use for academic purposes.

The first possibility is that academic requirements remain the same despite changing levels of access ie more formal ICT-related required activities are designed for equivalent access on campus, and do not differentiate on the basis of different levels of access off campus. It is demanding to design for different levels and kinds of off-campus access. Also, some formal activities such as searching electronic academic databases may not be available from off campus sites. Staff quotes from the questionnaire emphasise the problem of off-campus access eg "*Access off campus limits full implementation*" [of ICTs]; "*We need more access to computers on campus so that we don't marginalise the already disadvantaged who can't have access*."; "*Student access to computers is often difficult and use of computer facilities creates problems of discrimination amongst students eg online submission of assignments/tutorials/discussion groups etc, especially with large numbers*."

Another possibility is that when students have more access, their preference is to use it for more social activities rather than for more formal course related activities. It is important to remember that such

activities may not be purely recreational and may be supporting learning and academic work. The quote below reflects though students use computers mainly for social purposes, they find it easy to use for academic purposes when needed. This is probably due to the increased computer literacy and skills gained from use of computers, even for social activities, which can be transferred to academic uses of computers. A quote supports this: "*Most of the time I use ICTs for personal use and sometimes when I do use them for educational purposes I have no problem doing what I want because my computer skills are good*." Another quote confirms the affective role that ICTs can play, assisting academic performance by support and encouragement: " *I use them to keep in contact with friends for motivation.*"

Given that cell phone use is so high and that 40% of students report using them for something to do with their studies (Table 6), we were interested in a closer look at cell phone use in general and in terms of socio economic group.

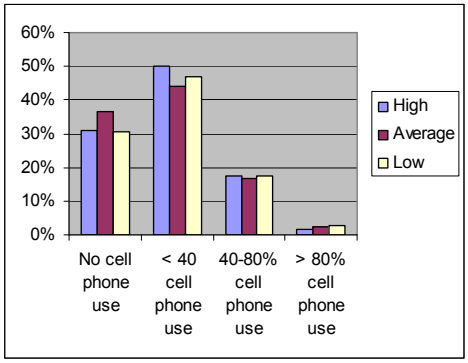

Figure 6: Academic use of cell phones by socio-economic group

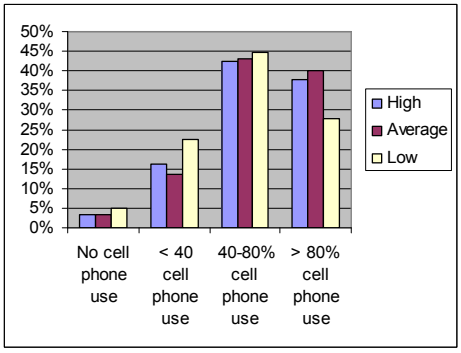

Figure 7: Personal use of cell phones by socio-economic group

The assumption is generally that cell phones exist for social purposes, and this is borne out by these findings (as in Figure 6 and 7). Yet the fact that there is a group of students undistinguished by socio economic background who use cell phones for academic purposes is of great interest and worthy of investigation (Figure 6). Almost a fifth of those reporting on academic use of cell phones say that they this is 40-80% of their cell phone use, a sizable group who are making interesting choices.

Social use and other related indicators

A closer examination of the data showed more social use amongst those with better off-campus access and amongst those from high socio-economic groups. In addition, when in equivalent situations students from high socio-economic group use email more than low socio-economic group. And generally, students from low socio-economic group communicate by sms less than students from high socio-economic groups.

Lack of off-campus access to ICTs definitely impacts on the frequency of student social use of ICTs. If students have no access they report spending less of their computer time on personal activities (54% spend 40% or less of their time on personal activities) compared to students with excellent off-campus access (40% spend 40% or less of their time on personal activities).

Other links between social use and off-campus access are evident in terms of lack of use. That is students with no access hardly engage with any ICT-based social uses. In many cases the discrepancies between no access off campus and excellent access on campus in terms of use are not large, but there are some aspects of social use where differences are marked (Table 9).

Table 9: Comparison of students with no and excellent off-campus access who hardly ever **engage in a particular social use of ICTs**

	No access	Excellent access	
Chat on computer (eg IM)	57%	50%	Chi2= 32 p 0.00
Chat on cell phone (eg Mixit)	68%	34%	Chi2= 143 p 0.00

VoIP (eg Skype)	89%	75%	Chi2= 48 p 0.00
Shared resources	42%	23%	Chi2= 87 p 0.00
Uploading resources	61%	39%	Chi2= 32 p 0.00
Email discussion lists	56%	50%	Chi2= 32 p 0.00

The discrepancies between the use of shared resources and the uploading of personal resources seem to be clearly related to access issues, given that content is more bandwidth-demanding. The relative similarity of the VoIP findings suggests that this is not an activity which has taken root amongst these students, although this may also be related to ease of access.

Similarly, participation in discussion lists does not seem to be linked to access, suggesting that participation in discussion lists is not a valued, fashionable or required activity. Those with more off-campus access participate in email discussion lists less often. We note that 58% of those with bad off-campus access participate in email discussion lists while only 49% of those with excellent-off-campus access participate in email discussion lists.

The most surprising finding is the limited use of Chat on cell phones given what an exceptionally cheap option this is, it being free for one to one communication[7]. This may be due to the tricky demands of setting up web-enabled chat on cell phones, and the lack of local support. In addition, while students almost all own cell phones, not all those cell phones may be sophisticated enough for web-linked activities.

Socio economic grouping

The differences in terms of students' social use across different socio-economic groups are not as marked as that for students' social use and off-campus access. In some instances students from a higher socio-economic groups report an increased frequency of often use that is about 10% more than students from a low socio-economic group (Table 10 below).

Table 10: Specific social uses by socio-economic group

	Low socio-economic group	High socio-economic group	
Email	27%	38%	Chi2= 21 p 0.00
Sms	53%	65%	Chi2= 23 p 0.00
MXit	25%	37%	Chi2= 32 p 0.00
Shared resources	23%	34%	Chi2= 28 p 0.00
Uploading resources	16%	26%	Chi2= 27 p 0.00

Some differences in preferences of social use of ICTs amongst students from different socio-economic groups are noted in Table 11. For example in conditions of excellent off-campus access students from high socio-economic group use email as a way of communicating with other students more often than students from low socio-economic group's (40% compared to 25%).

Table 11: Comparison of students' social email use for communication in conditions of excellent off-campus access

	Low socio-economic group	Average socio-economic group	High socio-economic group
1. hardly ever	24%	21%	21%
2. sometimes	50%	45%	38%
3. often	25%	33%	40%

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Pearson chi2(4) =   9.8309   Pr = 0.043
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[7] In South Africa, there are 5.87 million MXit users currently.

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Interestingly, the percentage of students who use cell phones to access the Internet is similar across socio-economic group; one might have expected it to be more by high socio-economic group.

Social use and gender

Little overall difference in the social use of ICTs between gender can be observed except in the use of sms to communicate with other students and in the frequency of computer gaming, as shown Table 12.

Table 12: Main gender differences of social use

	Female	Male
Sms	67% (often)	52% (often)
Computer games	12% (often) 53% hardly ever	24% (often) 35% hardly ever
Web games	7% (often) 75% hardly ever	11% (often) 56% hardly ever

There are, however, notable differences when gender use of cell phones is considered. In this one area a higher female frequency of use is noted. Looking at those who spend 80-100% of their cell phone time on personal activities, 40% of female students are found in this range whilst only 29% of male students spend the same proportion of their cell phone time on personal activities.

In all other areas higher male use is observed, with 57% men sometimes or often participating in email discussion lists compared to 48% of women. There are also more men using IM chat (56% men to 48% women), using VoIP (26% men to 16% women), playing web based games (44% men to 25% women), playing computer based games (64% men to 47% women), uploading resources onto web (63% men to 53% women) and publishing their own content (34% men to 23% women).

Socio-economic status is a however complicating factor. In conditions of excellent off-campus access, the higher the socio-economic group, the more often women email other students (low 22%, average 29%, high 45%), participate in email discussion lists (low/average 9%, high 16%), use shared resources (low 14%, average 34%, high 38%) and upload resources onto web (low 12%, average 28%, high 33%).

In conditions of bad access, the higher the socio-economic group the more often women chat with MXit (low 8%, average/high at least 22%).

Conclusion

The study confirms that discussions about access to ICTs in higher educational settings need to be multi-faceted and acknowledge the complex interplays between student background, institutional context and the impact of broader social ICT related trends. In addition, access must be considered in relation to use, including factors such as the demands on users, user interests and purpose of use.

This study suggests that a broader access to technology or ICTs is emerging: computers, web services, cell phones now form a spectrum of access across the board in higher education. Furthermore, cell phones, labs and Internet Cafés offer possibilities across the socio economic spectrum and are certainly being used in interesting ways. That said, not all forms of ICTs are equal or equivalent, and considerations of cost, functionality and ease of use remain a crucial part of the access mix.

Significantly for medium-term planning is that on-campus provision of facilities remains a crucial equaliser and an important mechanism for ensuring fair and equivalent access for all students, even as other forms of access develop and become available beyond the institution. Offering lower cost or more cost effective cell phone and Internet Café access has yet to be offered as a central service.

The study finds that the use of technology for social purposes is not high, but that better-off students with good off-campus access use technology more for social purposes. Given that the social uses of technology require a "connected culture" one can assume that as more "connectedness" is enabled by both more advanced cell phones with better functionality, and increased and cheaper off-campus access, social uses will rise. The argument and the findings implied in this paper are that such uses are beneficial to academic

use both by improving student ICT literacies in general, and because social uses feed into, support and overlap with academic uses. The rise of social use provides a useful indicator of the growth of relevant skills for students in an increasingly technology-mediated world.

At the same time, the findings suggest that the academic requirements of the students are an important determinant of their behaviour even in the most challenging of circumstances. Students meet their educational obligations as best they can. They engage with technology in enterprising ways, making thoughtful decisions based on the options at their disposal both within and outside of the educational institutional context. This in turn challenges the laggard or catch-up models of technology ICT given that students from poorer backgrounds within especially challenging situations find strategic solutions to their educational needs. A staged developmental model does not neatly apply in rapidly changing developing country higher education contexts. Our findings show that students make a plan, now academic and policy makers –as a strategic response to changing conditions- need also to make an intelligent plan.

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