Instructional technologies in social science instruction in South Africa

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Abstract
This study describes the results of a survey and a description of instructional technologies in place in the social sciences in South African Universities. Lecturers in the social sciences reported a well-established practice of information and communication technologies (ICTs) use for general purposes (although frequent use tended to be for email and searching the Internet). They had a high self-efficacy in terms of using ICTs both generally and for teaching and learning, and a high enthusiasm for the use of ICTs for teaching and learning. Half the lecturers had started using ICTs recently with the introduction of learning management systems (LMSs) whereas the other half had established practices that preceded the mainstreaming of LMSs across universities. Only about a quarter of the respondents felt able to develop and update ICTs themselves which indicates that support is a necessary part of teaching with technology.
In terms of different types of use the focus was on putting content on the web and course administration. Use of ICTs for teaching of skills (whether information literacy, problem solving or critical thinking) was infrequent. There were different types of ICT use across the different sub-disciplines. Lecturers reported factors which constrained their use of ICTs for teaching and learning, such as inadequate technology, pedagogical issues (e.g. plagiarism), and students opting out of lectures when materials were available online. It is argued that user studies in are relevant to the future delivery of educational material, in terms of removing barriers to use and targeting training and supportive activities.

Keywords: Applications in subject areas; Country-specific developments ; Teaching/learning strategies ; Post-secondary education

1. Introduction

Global reviews of experiences in the use of technology in education (e.g. UNESCO, 2003) paint a generally positive picture, indicating that information and communication technologies (ICTs) are fast becoming an integrative part of national higher education policies and plans all over the world. According to Beebe (2004), these international trends are echoed in most African Universities, as more and more of them are arguing the benefits of ‘‘adding e- to learning”.

Factors motivating these shifts are many and varied. Administrators of educational institutions for example perceive ICTs as cost-effective ways of providing quality education by subject experts to more students for less (Engelbrecht, 2003). ICTs seem to offer unprecedented opportunities for corporate and academic institutions to deliver flexible education and training to diverse groups of students (Harley, 2002). And not to forget, ICTs tend to be used simply because they are there (Czerniewicz, 2004).

Brown and Czerniewicz have noted that in developed countries, ICT use in higher education has become an assumption, and questions are asked about how often rather than if they are used (2008). For example, recent studies in the USA and UK no longer enquire whether ICTs are used in courses, but rather what students’ preference for the balance of technology in their courses was (Salaway & Borreson, 2007), or whether the amount of ICT use was what students expected (Joint Information Systems Committee, 2008).

In a developing country context, however, numerous institutional and infrastructural barriers to the use of ICTs mean that use for instruction in South African higher education institutions cannot be assumed. Numerous constraining factors have been highlighted. Van der Merwe (2004), for example, identified lack of commitment to change by academics as one of the main obstacles preventing the use of ICTs in teaching and learning in South African higher education institutions. This is more than likely due to factors such as the time investment required and a lack of incentives and rewards for teaching and learning in general.

Other constraining factors are inadequate training and support, technical as well as pedagogical (Brown, 2002; Buckley 2002); disputes over the ownership of electronic resources, and especially online teaching and learning materials as a source of revenue in most institutions

(Van der Merwe, 2004); and inadequate access to hardware and software for lecturers, as well as inadequate access for students to computers and software (Engelbrecht, 2003).

In the light of the overwhelmingly positive rhetoric surrounding the use of ICTs in higher education, accompanied by the apparent paradox of less than-expected take up of such technologies by academics, it became clear that we know too little about how these resources are actually being used by lecturing staff at universities. There are obvious reasons for addressing these issues, chief amongst them to avoid investing in technologies that will not be used. If something is not being used, it would be helpful to identify the barriers to use, and perhaps address these. Similar topics have been addressed elsewhere, for example by Harley et al. (2004) at the University of California (Berkeley), who studied the use of digital resources in the humanities.

There appears to be a remarkably small international and local literature on the use of ICTs in disciplines such as history, sociology, anthropology, psychology, and even linguistics and literary studies, as well as the range of ''interdisciplinary" studies that arise from them. Harley et al. (2004) suggest that, within the academy, there is a great deal by way of online learning materials for science courses such as Chemistry, Physics and Biology, and also for technical courses such as Engineering and Computer science. However, in undergraduate teaching in the humanities and social sciences, the integration of online learning has been ''elusive and less robustly funded" (p. 6). Harley and her colleagues conclude that, ''at this time there appears to be a paucity of literature that has systematically examined this problem" (p. 6).

Consequently our focus in this study has been on the use of ICTs in teaching the social sciences at South African Universities. South African studies include those of Czerniewicz and Brown (2006), who investigated the access that students and staff had in using ICTs in the Western Cape and how they used them for teaching and learning, and Van der Merwe (2004). One text is explicitly about the teaching of the ''social sciences" in South Africa using ICTs (Tomaselli & Shepperson, 2003), and suggests that the integration of technology into the arts and humanities teaching programmes of local universities has been characterised up to now by a range of impediments, including administrative non-understanding, budgetary constraints, a complicated relationship with equipment, and structural problems in humanities degrees, which have led to little progress in the area. We could find no references to the situation with regard to the social sciences specifically in African Universities, but useful references to the general e-learning situation can be found in Assié-Lumumba (2004), Gunga and Ricketts (2007), and Partnership for Higher Education in Africa (2007).

2. Method

To capture as much of the diversity of use and of user behaviour, Universities in South Africa were stratified along the dimensions of urban/rural and historically white/historically black. A stratified purposive sample of eight universities was selected. The target population of the survey was academics in the social sciences at these institutions. Key informants or gatekeepers were identified at each institution, to act as sources of information, but also as drivers of the data collection.

The eight universities selected, the number of participants invited to do the survey, and the number of respondents, appear in Table 1. The majority of the respondents were male (58%, n = 85), and worked in a position of lecturer (41%, n = 59) or senior lecturer (19%, n = 28). Fifteen percent of them were professors, and 5% junior lecturers. The majority of respondents had a doctorate degree (54%, n = 80) or Master's degree (41%, n = 60), with 5% having only an Honours (4-year) degree. Respondents had been in their current position for an average of 10 years (M = 10.33, SD = 8.5), with the majority (64%, n = 93) less than 10 years. Data collection was completed by April 2006.

South Africa's Universities have been substantially restructured since 1994, with a number of them involved in institutional mergers (Department of Education, 2001). The institutions represented in this study represent the full range within the South African University sector. Four have recently merged (one with a technikon and three are now the result of a merger between historically advantaged and historically disadvantaged institutions). Four were historically advantaged, and one was historically disadvantaged. Five were traditionally Afrikaans-language institutions. The sample included both the oldest and most established institution in South Africa (established in 1829), as well as the youngest (established in 1982).

Construction and accessibility of the survey was accomplished using global online survey software. Multiple choice, rating scales, simple answer and open-ended questions were all utilized in the surveys. All potential respondents were directed to the web-site via email, and/or efforts by the local key informants. Ethical clearance was obtained from the offices of the vice-chancellors or his/her representative of all eight institutions.

The questionnaire comprised 48 questions. Categories of information canvassed included demographics (eight questions including, departmental affiliation academic position, gender, highest degree); background information (11 questions including general use and teaching use of ICTs, length of time of using ICTs in teaching and learning, extent of use, how they got started, self-efficacy, and interest);

Table 1
Institutional representation of survey respondents.

Name of institution	Historical background[a]	Invited	Number of respondents
University of Cape Town	HAU, English	140	25
Stellenbosch University	HAU, Afrikaans	76	15
University of the Free State	HAU, Afrikaans	79	33
University of KwaZulu-Natal	Merged HAU and HDU, English	139	13
North-West University	Merged HAU and HDU, Afrikaans	49	16
University of Limpopo	Merged HDU, English	39	27
University of Johannesburg	Merged HAU and HDU, Afrikaans	84	6
University of Pretoria	HAU, Afrikaans	169	14
Total		775	149

Note: HAU = historically advantaged university and HDU = historically disadvantaged university.
[a]Source: Cooper and Subotzky (2001).

purposes for which ICTs are used (one question also explored degree of success); and contributing factors to unsuccessful use (eight questions including support needs, satisfaction with support received, and factors motivating use).

Defining ‘‘the social sciences” was not a straightforward matter, but it was decided to make Development Studies, Economics, Political Studies, Psychology, Geography, and Sociology the focus areas of this study. This is virtually the same classification Murray and Renaud (1995) used in their study of disciplinary differences in teaching behaviours.

Despite the simplification, different combinations and organization of departments that fell under the social sciences umbrella within the universities necessitated some restructuring. For example, departments were structured as Archaeology, Archaeology and Anthropology, Anthropology and Development Studies, or Social Anthropology. This made it impossible to group respondents as either Archaeology or Anthropology. In addition there was a single respondent from African Gender Studies and one respondent from Culture, Communication and Media Studies. So a generic group which has been called ‘‘Cultural Studies” was created to include all of the above-mentioned departments.

The respondents represented 45 departments across the eight universities. In terms of the seven broad subject area groupings described above, the majority of the respondents came from Economics (27%, n = 38), followed by Psychology (22%, n = 32), Development Studies (11%, n = 16), Geography, Cultural Studies, Sociology (10% each, n = 15), and Political Studies (9%, n = 13).

3. Results

3.1. How are ICTs being used for teaching and learning in the social sciences?

Overall most respondents (86%, n = 125) do use ICTs for teaching and learning. In the group who did not use ICT’s (n = 21), some indicated that they were interested in starting to use ICTs for this purpose, or did not currently use ICTs for teaching because of their context (i.e. lack of facilities or no present teaching requirement). The majority of the group who did use ICTs for teaching/learning was relatively inexperienced: 47% (n = 69) had been doing so for less than 4 years.

The types of general use which were most dominant were email (used extensively by 90%, n = 133), followed by Microsoft Office (83%, n = 122) and the Internet (74%, n = 108). Half the respondents also use electronic journals extensively (50%, n = 74) as well as online library catalogues (47%, n = 69). Applications relating to teaching and learning, compared to general and research applications, were used less often, with 27% (n = 39) responding that they never used a course web page and 43% (n = 60) responding that they never used a university LMS.

Fig. 1 shows the most common purposes for using ICTs in teaching/learning were for course administration purposes (used by 118 of the 133 respondents), posting online course material such as schedules and PowerPoint lecture notes (used by 116 of the 131 respondents), and promoting the ability to learn independently (used by 100 of the 130 respondents). The least common teaching purposes for which respondents used ICTs were peer assessment by students (used by 25 of the 125 respondents), and teaching numerical and IT skills (used by 56 of the 127 respondents).

3.2. How frequently do departments within the social sciences use ICTs?

Fig. 2 shows that use of email and Microsoft Office is extensive in all departments surveyed. There is some variation in how often the Internet is used in teaching. More respondents from Economics report using the Internet extensively (89%, n = 34) compared to respondents from Geography (53%, n = 8).

There is also diversity in the length of time respondents had used ICTs (Fig. 3). In Economics, 37% used it for more than 8 years (n = 14), followed by Geography and Psychology (40% and 45%, respectively, have used it for 5 years or more; n = 6 and n = 14). Cultural Studies (67%, n = 10), Development Studies (56%, n = 9), and Sociology (57%, n = 8) have used ICTs for between 1 and 4 years. In Political Studies 31% (n = 4) do not use ICTs at all for teaching purposes.

When looking in more detail at the extent of use of the two common teaching and learning applications across subject areas (Fig. 4), we note that respondents from Development Studies use LMSs more extensively (19%, n = 3) compared to respondents from other subject area

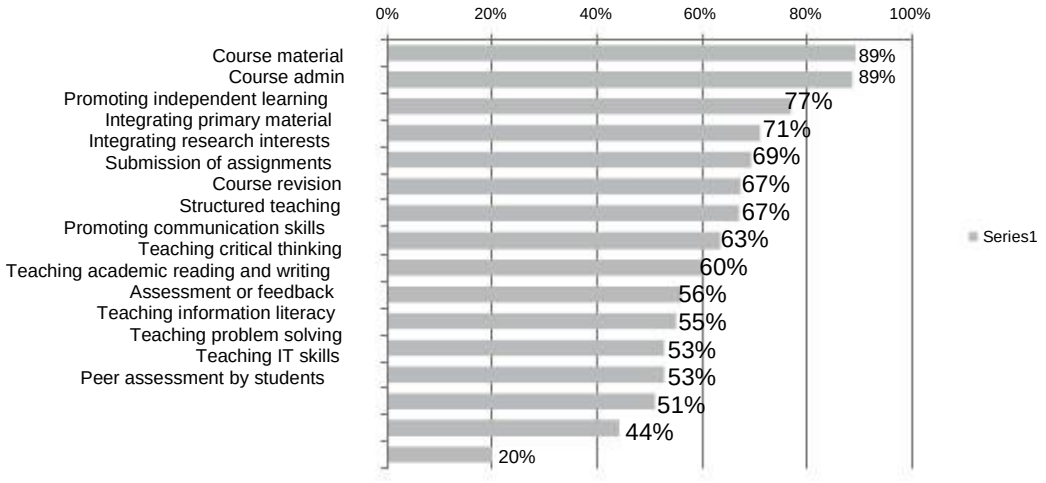


Fig. 1. ICT use for specific teaching purposes.

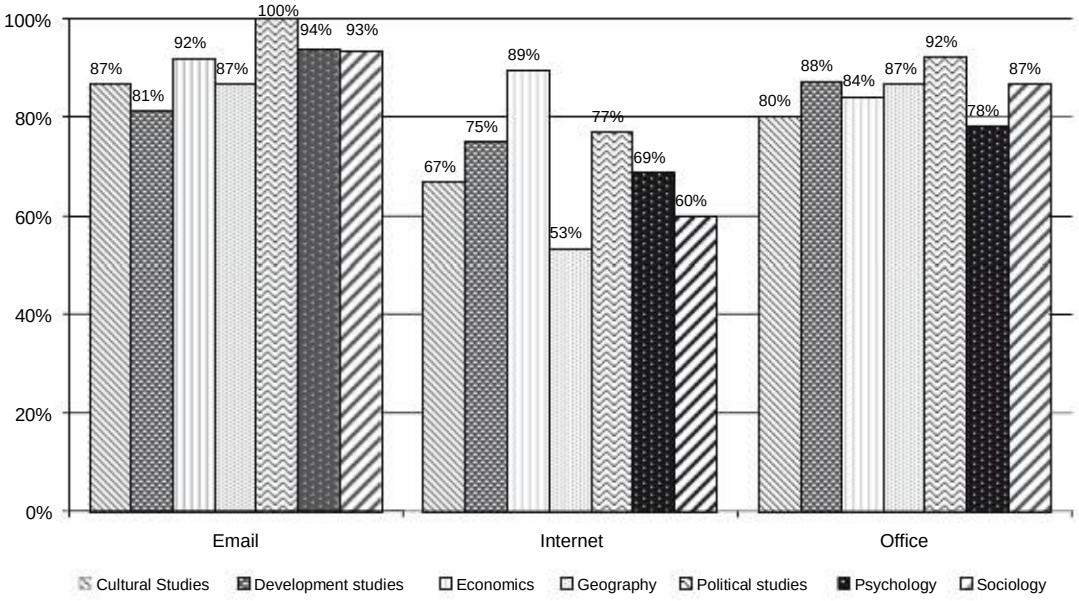


Fig. 2. Comparison of extensive use of general applications by different subject areas.

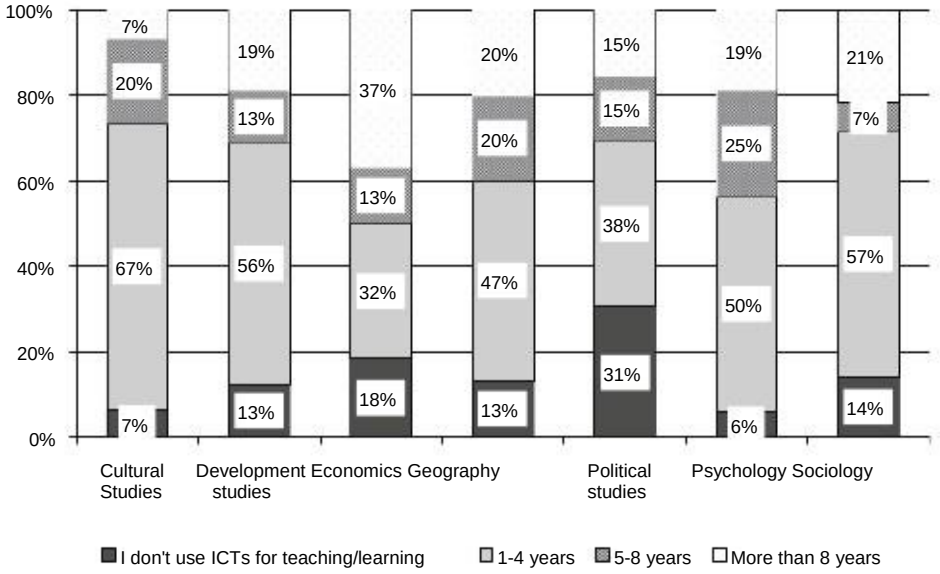


Fig. 3. Breakdown of length of time using ICTs by subject area groupings.

groupings, while respondents from Economics and Geography use course web pages more extensively (26%, n = 10 and 27%, n = 4, respectively).

Whilst these numbers are small it is interesting to note that although respondents from Psychology, Development Studies and Sociology have been using ICTs for teaching/learning for some time now, their use of LMSs and course web pages is not extensive. This may suggest that length of use and extent of use are not always related, or that those disciplines are using ICTs other than LMSs or course web pages.

3.3. What successes are academics having in terms of ICT use?

Respondents were asked about the level of success they have had using ICTs for various teaching and learning purposes. If we examine successful use (by constructing indices across all the ICT activities) and compare those subject areas that have low success and those that have high success, Geography (80%) and Sociology, Cultural Studies, Development Studies (75% for all) have the highest reported success, whereas Economics (58%), Political Studies (50%) and Psychology (33%), reported the least success (Fig. 5).

Academics were also asked to indicate which ICT-related teaching and learning activities they used successfully, unsuccessfully and with mixed results. No prior definition or description of success was given.

In Fig. 6, we examine the responses for those respondents who indicated that they did use ICTs for a particular teaching/learning purpose. The bars indicate (from left to right) successful use, use with mixed results, and use with poor results.

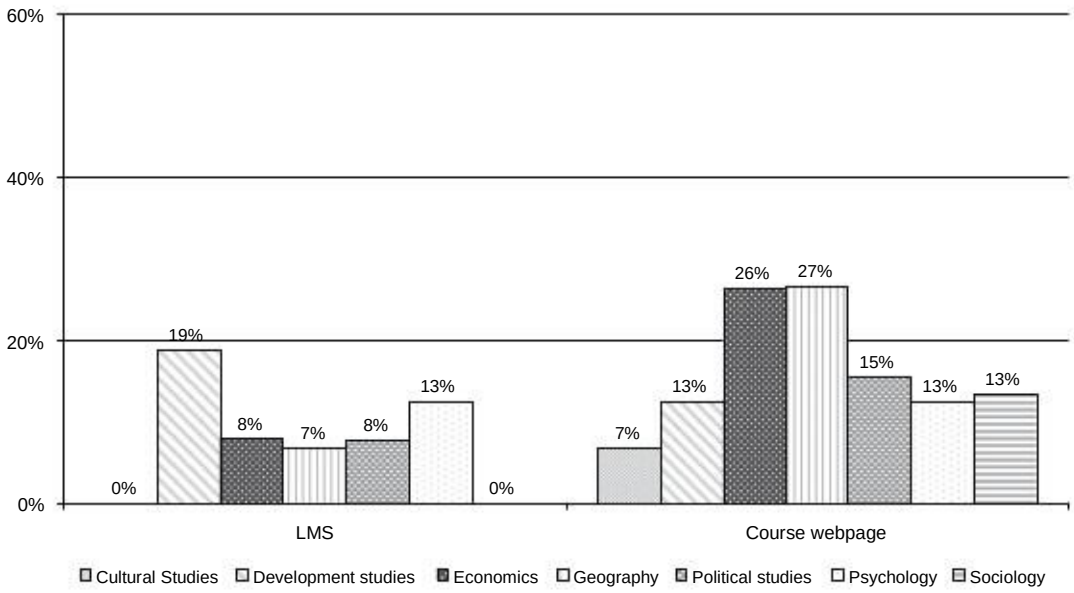


Fig. 4. Comparison of extensive use of teaching and learning applications by different subject areas.

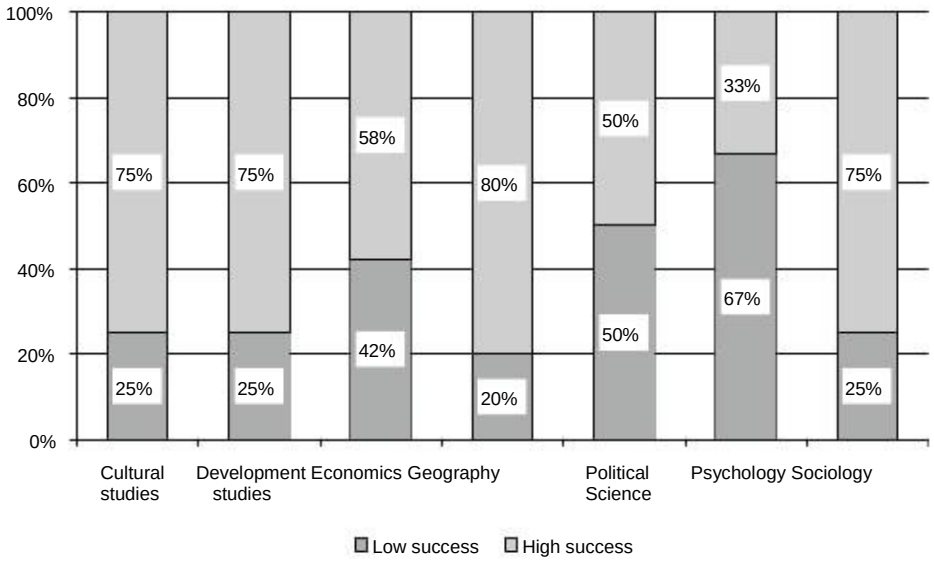


Fig. 5. Overall success compared by subject area grouping.

The top three purposes for which ICTs were used with successful results were:

- Posting online course material (68%, n = 79).
- Course administration (50%, n = 59).
- Integrating research interests (49%, n = 43).

The top purposes (three are tied at 56%) for which ICTs were used with mixed results were:

- Teaching logical skills and problem solving (69%, n = 46).
- Teaching information literacy and knowledge navigation (60%, n = 40).
- Teaching critical thinking skills (56%, n = 41).
- Structured teaching around online content (56%, n = 45).
- Peer assessment by students (56%, n = 14).

Whilst the majority of respondents did not indicate many cases where ICTs were used with poor results, peer assessment by students stood out as being least successful (36%, n = 9, indicated poor results). Peer assessment however was used by only 20% of respondents (see Fig. 1).

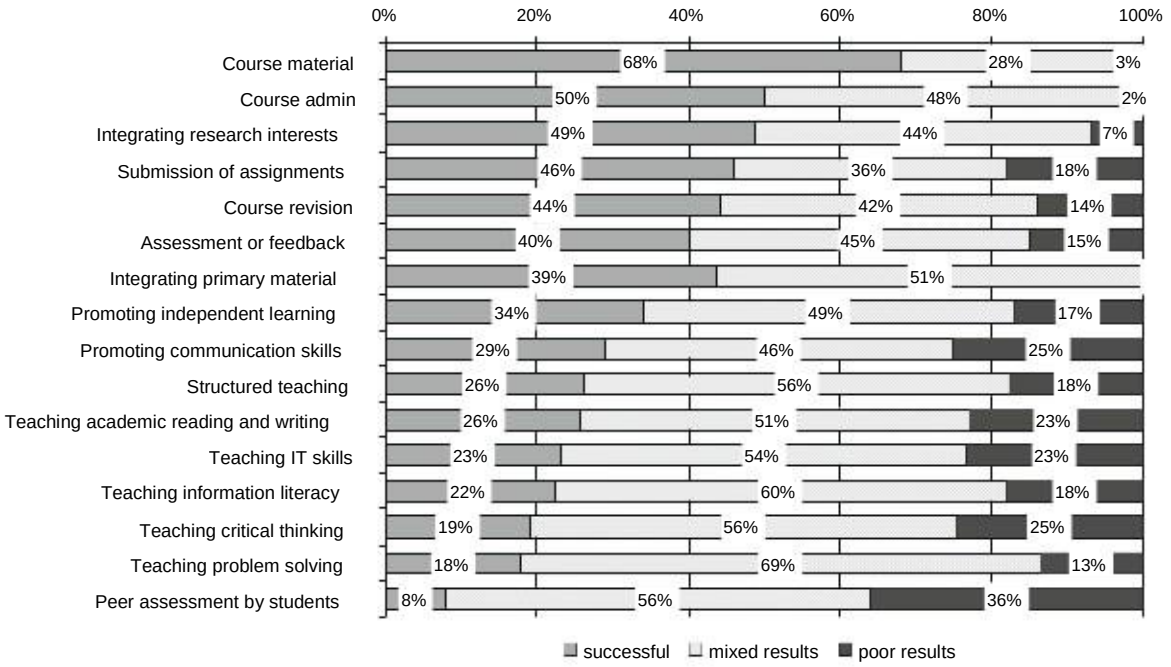


Fig. 6. Degree of success in use of ICT for teaching/learning purposes.

3.4. What are the factors that enable use?

3.4.1. Personal motivation for and interest in ICTs

Respondents generally had an average to high enthusiasm for using ICTs for teaching and learning purposes. Only 13% indicated a below average enthusiasm, with 71% indicating an average or above enthusiasm, and 17% a high enthusiasm. (The mean of the seven-point scale was 4.9, with a SD of 1.4). When asked how they got started using ICTs for teaching and learning, the majority said they taught themselves (59%, n = 89), followed by help from the central IT unit (27%, n = 40), and colleagues (20%, n = 29). A small number of respondents indicated that this was their professional or research area (e.g. IT lecturer or undertaking a post-graduate degree in Computer Science).

3.4.2. Skills

Ninety-six percent of respondents (n = 142) rated their general computer skills as intermediate or above. The majority of this group (65%, n = 95) rated their ability above intermediate but less than expert. Respondents were less confident about their skills in using ICTs for teaching/learning, with 27% (n = 39) rating their skills as less than intermediate and 28% rating them as intermediate (n = 40). Seventeen percent considered themselves as beginners, or very close to it (n = 13). More academics felt they were able to update or adapt ICTs for their courses themselves (60%, n = 87), than develop ICTs for their courses themselves (53%, n = 78).

3.4.3. Supportive environments

Although not everyone availed themselves of training to use ICTs, the majority of respondents (58%, n = 85) had attended at least one workshop on using ICTs for teaching/learning, and the remainder none.

Workshop attendance appears to have a positive effect on skill level. Respondents who indicated they had attended several workshops on using ICTs for teaching/learning had a higher perception of their skills in this regard (Fig. 7).

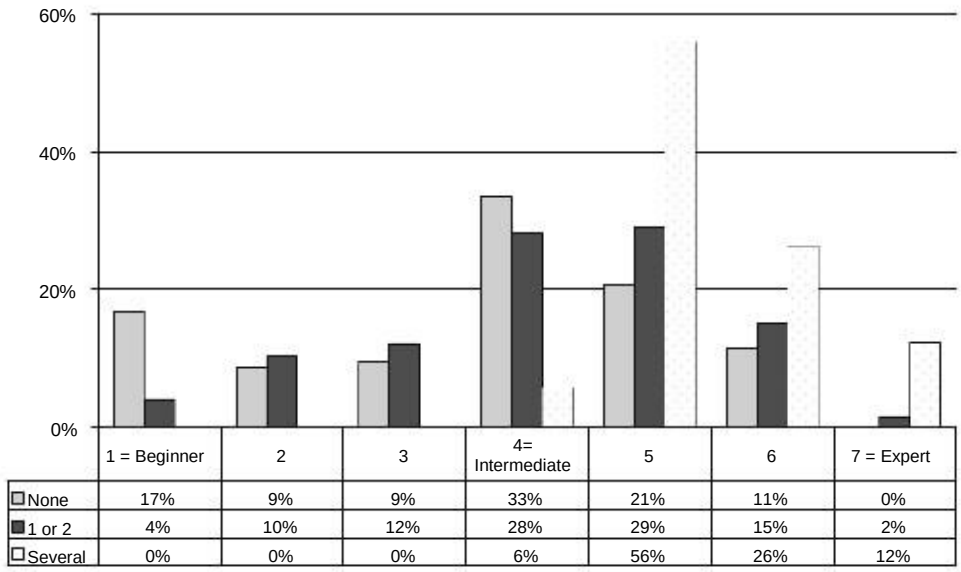
There was also a positive effect in terms of respondents' perceptions of their own ability to develop ICTs for their courses (75% of those who attended several training sessions felt they could do so) (Fig. 8).

Respondents were asked to indicate to what extent 12 institutional factors would motivate them to use ICTs for teaching and learning. The factors included more recognition and possibility of promotion, more training and support, better infrastructure, increased funding, remuneration, and more time. Respondents were overwhelmingly in agreement that incentives were motivating. For example: 98% (n = 141) agreed that demonstrated student benefits and improved learning would motivate them to use ICTs for teaching. Other strong motivating factors in this regard were if it released staff from teaching time, and if it reduced administrative demands on them (in both cases 91% agreed with the statement, n = 131). Whilst the majority of respondents agreed that all of the factors would assist in motivating them to some extent, there was less agreement that possibilities of promotion (only 72%, n = 104) and increased remuneration (69%, n = 99) would motivate them to use ICTs in their teaching.

3.5. What are the factors that constrain use?

3.5.1. Poor infrastructure

Most respondents were in agreement that computers and network access were inadequate for students (63%). Other constraining technological factors were that the network was too slow, especially in classroom situations (59%), unreliable classroom facilities (57%), and insufficient technical support (56%). Fewer respondents noted that computers and network access were inadequate for lecturers (37%, n = 46), that it was difficult to get server space to store/host materials (32%, n = 41) and that staff training was inadequate (53%, n = 67).



	1 = Beginner	2	3	4= Intermediate	5	6	7 = Expert
None	17%	9%	9%	33%	21%	11%	0%
1 or 2	4%	10%	12%	28%	29%	15%	2%
Several	0%	0%	0%	6%	56%	26%	12%

Fig. 7. Comparison of self-perception of ICT skill for teaching/learning AND attendance at workshops.

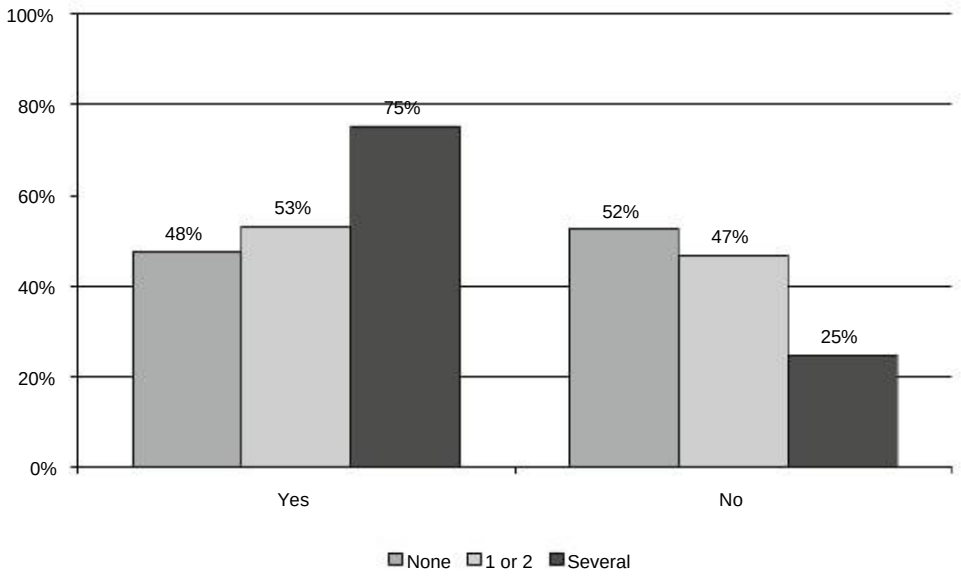


Fig. 8. Comparison of respondents' perception of their ability to develop course based ICTs and attendance at workshops.

3.5.2. Lack of time

In terms of ICT-related factors the majority of respondents were in agreement that it was too time consuming to develop or adapt ICT materials (63%, n = 72). This illustrates the additional time investment required of lecturers who choose to use ICTs in their teaching. Other ICT issues such as tools being unreliable, CMSs being inadequate, ICTs not being user-friendly, or inflexible/limited in function were less significant.

3.5.3. Student factors

One of the biggest problems highlighted were that students copy/plagiarise from the web (89% of respondents, n = 111, were in agreement with this factor), that they do not have information literacy skills to assess credibility of online sources (74%, n = 91), and that they opt out of attending lectures when material is available online (73%, n = 89). Lack of computer literacy (61%, n = 75) and reinforcing of current inequalities through use of ICTs (61%, n = 74), were the other factors staff were in agreement with. The factor which few respondents thought was a problem was that students found ICTs too difficult to use (45%).

3.5.4. Integrating technology into courses

Respondents also agreed that in terms of teaching factors, integrating technology was problematic in courses that emphasised verbal and written interaction between students and lecturers (63%, n = 74), and in courses that used primary source material extensively (48%, n = 57). It would appear that the key to successful use of ICTs was that there had to be a particular reason and benefit for using the technology, both for students and lecturers. Fewer respondents indicated that ICTs were not culturally sensitive and did not recognise

local needs (41%, n = 50), that they were not available in the language needed (19%), that they were unsuited to the learning outcomes of the course (24%, n = 28), and that they got in the way of good teaching practice (26%, n = 31).

4. Discussion

The findings of this study are not surprising. Four results stand out:

- The use of computers for teaching and learning is pervasive – 86% of the respondents reported some use, although for the majority this was quite recent (in the last 4 years). This mirrors Czerniewicz and Brown's (2006) finding that 97% of academics in five higher education institutions in the Western Cape region reported some use.
- The use however is narrow, focusing mainly on putting content on the web and course administration. Use of ICTs for teaching of skills such as information literacy, problem solving and critical thinking was infrequent (as were student driven purposes such as peer assessment).
- There is consensus about the value of computers. People are overwhelmingly positive about the benefits of computers, both generally and particularly, for teaching and learning. These positive dispositions toward ICTs are important enabling factors for use.
- Lecturers reported factors which constrained their use of ICTs for teaching and learning. The major ones were inadequate technology (e.g. slow network connections), pedagogical issues (e.g. plagiarism, information literacy among students, and students opting out of lectures when materials were available online), lack of time to develop or adapt ICT materials, and integrating technology into courses. In her study of concerns about use at one Western Cape University, Van der Merwe (2004) identified insufficient time to implement e-learning activities as the major barrier, with students' access to computers on- and off-campus as a distant second concern.

Differences between groupings within the social sciences were evident in the use of ICTs for teaching and learning. There is evidence that the extent to which ICTs are being taken up differs across disciplines, and in addition, they are being used differently. For example: differences in the frequency of use of ICTs by different disciplines in the UK have been noted by Williams, Coles, Wilson, Richardson, and Tuson (2000), who reported on the high use of ICTs in business and management subjects. Differences have also been noted by Hammond and Bennett (2002), who reported that the dominant use of computers to support communication occurs in humanities faculties. Thus it would seem as if the variation in content, practices, theories, and methods in the social sciences makes a difference to how they take up ICTs.

It would seem, also from the present study, that those social science subject areas that fall towards the harder end of the disciplines (Psychology, Economics and Geography) definitely used ICTs more successfully and in more varied ways. There is also indication that subjects using ICTs more recently (i.e. since the introduction of LMSs) such as Development Studies and Cultural Studies, report greater success. Paradoxically, it is from the 'softer' disciplines, like Communication, that most of the advocacy for ICTs is heard. Two implications of our findings here are that ICT use is more likely to be driven by intellectual and data requirements than in response to general advocacy; and that LMSs (which integrate a range of tools) enable successful use of ICTs for a wider variety of purposes.

Some interesting suggestions have been made in terms of disciplinary adoption of ICTs by Fry (2004, 2006). She suggests that fields with tightly controlled research cultures such as the hard pure disciplines will develop a coherent field-based strategy for the uptake and use of ICTs (Fry, 2004). On the other hand, she argues that domains which are less hierarchical and intellectually pluralistic, specifically the soft disciplines, are more likely to continue to rely on face-to-face communication and will appropriate ICTs in an ad-hoc, localised manner (Fry, 2006). This may be one explanation as to why differences in ICT use exist within the social sciences.

We have noted earlier that there is surprisingly little local research into access and use of ICTs in higher education in South Africa, and in the social sciences in particular. Existing studies either focus on a region (Czerniewicz & Brown, 2006) or one institution (Van der Merwe, 2004), across disciplines. Our decision was to study the use of ICTs in one country in one set of disciplines in a diverse set of higher education institutions, as a first assessment of user behaviour in the social sciences, in a country like South Africa. Our study thus joins the landscape of user studies, as exemplified for example by Harley et al. (2004) in the USA, as a start to filling the void in local and international literature.

The potential usefulness of user studies however extends beyond this. Ideally understanding how ICTs are being used in teaching ought to work for us, to assist us to leverage better use of existing resources. For a start, knowing what the barriers are to employing specific ICTs, in general, but in our case in the social sciences in South Africa, allows institutions to address them. This is typically done via support and training activities to staff. If we understand patterns of use better, these supporting activities could be more narrowly targeted to address specific concerns or constraining factors. It might also mean that such institutional support is more likely to be utilized by academics.

Although we have focused in this study on barriers to use, it would be instructive also to focus on factors that enable use. Czerniewicz and Brown (2006) concluded that it is easier to identify constraining rather than enabling factors in ICT use, but this may be all the more reason for doing it. Van der Merwe (2004) has made a start in her study in identifying some of these factors to create an enabling technological environment for e-learning initiatives: invest in specifically web LMSs as user-friendly web environments; standardise one LMS and ensure that this system is integrated into the larger IT system; take note of global standards; and keep abreast of and evaluate open source LMSs. In the present study motivation and interest, skills, and institutional factors such as support and incentives emerged as factors to explore – suggesting that given time and recognition, academics' engagement with ICTs for teaching would increase.

In conclusion, our study found that academics are not reticent to adopt ICTs; in fact they are extremely positive about them, but feel constrained by practical issues such as lack of infrastructure, support, and time. For resource-strapped institutions in South Africa this will not be an easy matter to try and resolve. In addition, student diversity with regard to levels of computer literacy will make integrating ICTs into the curriculum more of a challenge. Solutions to these problems are likely to be highly context dependent, but manageable starts are possible via for example additional recognition and reward by institutions, and streamlining of administrative process which can free up time for academics. This would still leave resource-intensive issues such as infrastructure and ICT support for staff and students unresolved. Given the differences between subject groupings, it is unlikely that one approach will work across all departments.

Acknowledgements

This work was made possible by generous funding from the Andrew W. Mellon Foundation. The Foundation had no involvement in the study design, data collection, and decision to submit for publication.

References

Assié-Lumumba, N. T. (Ed.). (2004). Cyberspace, distance learning, and higher education in developing countries. Boston: Brill.
Beebe, M. A. (2004). Impact of ICT revolution on the African academic landscape. In Paper presented at the CODESRIA conference on electronic publishing and dissemination, 1–2 September, Dakar, Senegal.
Brown, C., & Czerniewicz, L. (2008). Trends in student use of ICTs in higher education in South Africa. In Paper presented at the 10th annual conference on World Wide Web applications, 3–5 September. Cape Town: Cape Peninsula University of Technology.
Brown, I. T. J. (2002). Individual and technological factors affecting perceived ease of use of web-based learning technologies in a developing country. Electronic Journal of Information Systems in Developing Countries, 9(5), 1–15.
Buckley, D. P. (2002). In pursuit of the learning paradigm: Coupling faculty transformation and institutional change. Educause Review, 37(1), 29–38.
Cooper, D., & Subotzky, G. (2001). The skewed revolution. Trends in South African higher education: 1988–1998. Cape Town: Education Policy Unit, University of the Western Cape.
Czerniewicz, L. (2004). Cape of storms or Cape of good hope? Educational technology in a changing environment. British Journal of Educational Technology, 35(2), 145–158.
Czerniewicz, L., & Brown, C. (2006). The virtual Möbius strip. Centre for Educational Technology Research Report Series 1. University of Cape Town. <http://www.cet.uct.ac.za/files/KnowledgeBase/VirtualMobiusCompleteReportWithAppendices.pdf> Retrieved 01.21.09.
Department of Education (2001). The National Plan on higher education. Pretoria: Government Printers.
Engelbrecht, E. (2003). E-learning – From hype to reality. Progressio, 25, 1.
Fry, J. (2004). The cultural shaping of ICTs within academic fields: Corpus based linguistics as a case study. Literary and Linguistic Computing, 19(3), 303–320.
Fry, J. (2006). Scholarly research and information practices: A domain analytical approach. Information Processing and Management, 42(1), 299–316.
Gunga, S. O., & Ricketts, I. W. (2007). Facing the challenges of e-learning initiatives in African universities. British Journal of Educational Technology, 38(5), 896–906.
Hammond, N., & Bennett, C. (2002). Discipline differences in role and use of ICT to support group-based learning. Journal of Computer Assisted Learning, 18, 55–63.
Harley, D. (2002). Investing in educational technologies: The challenge of reconciling institutional strategies, faculty goals, and student expectations. Research & occasional paper series 7.02. Berkeley: Center for Studies in Higher Education, UC Berkeley.
Harley, D., Henke, J., Head, A., Miller, I., Nasatir, D., Xi, S., & Jing, G. (2004). The use of digital resources in humanities and social science undergraduate education. First Year Report, October. Berkeley: Center for Studies in Higher Education, UC Berkeley.
Joint Information Systems Committee (2008). Great expectations of ICT: How higher education institutions are measuring up. London: Ipsos Mori.
Murray, H. G., & Renaud, R. D. (1995). Disciplinary differences in classroom teaching behaviours. New Directions for Teaching and Learning, 64, 31–39.
Partnership for Higher Education in Africa (2007). ICTs and Higher Education in Africa. Cape Town: Centre of Educational Technology, University of Cape Town. <http://www.cet.uct.ac.za/projects#PHEA> Retrieved 01.20.09.
Salaway, G., & Borreson, J. (2007). The ECAR study of undergraduate students and information technology. <http://connect.educause.edu/Library/ECAR/TheECARStudyofUndergradua/41172?time=1233126793)> Retrieved 01.21.09.
Tomaselli, K., & Shepperson, A. (2003). Gearing up the humanities for the digital era. Perspectives in Education, 21, 31–45.
UNESCO (2003). Manual for pilot testing the use of indicators to assess impact of ICT use in education. <http://www.unescobkk.org/education/ict/resource> Retrieved 03.12.07.
Van der Merwe, A. D. (2004). Evaluating the integration of ICTs into teaching and learning activities at a South African higher education institution. Unpublished PhD Thesis. South Africa: University of Stellenbosch.
Williams, D., Coles, L., Wilson, K., Richardson, A., & Tuson, J. (2000). Teachers and ICT: Current and future trends. British Journal of Educational Technology, 31(4), 307–320.