

Learning for Success: Distance Education Students' use of their Learning Materials

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Abstract

This paper reports the results of a research project investigating the use that Distance Education (DE) students at university make of the learning materials that are supplied to them. The research is based on a survey of 998 DE students enrolled in ten undergraduate subjects spread across all five Faculties at Charles Sturt University (CSU) in New South Wales, Australia. CSU is Australia's largest DE provider of higher education. The project addressed the following questions:

- *The extent to which DE undergraduate students use their learning materials.*
- *The extent to which students undertake the learning activities that are often incorporated in learning materials.*
- *The extent to which students obtain learning materials beyond the printed learning materials, especially their use of library facilities and the internet to research topics in their study programs.*
- *The way in which DE undergraduate students approach their study and the study strategies that they adopt.*

The paper reports the major conclusions from the survey. It was found that the majority of students read most or all of the learning materials that were sent to them. They relied heavily upon the prescribed textbooks, did some additional reading as recommended, to a limited extent carried out additional reading beyond that recommended, and worked through the provided learning materials in a methodical manner. They generally completed, in their minds if not always on paper, the study tasks embedded in the learning materials. Those students that read less and paid less attention to study tasks tended to study in a way that was focused on passing assessment tasks. Overall the study provides a strong argument for the retention of printed learning materials as students seem to work well with them, and the more effectively students use them the better they seem to perform.

Introduction

At many Australian universities, including Charles Sturt University (CSU), the site of this study, a large proportion of students study by distance education, but the mainstream higher education teaching and learning literature tends to assume a model of on-campus delivery, although increasingly attention is also paid to on-line learning. Relatively little attention is paid to print-based distance education materials, yet it is likely that print-based materials will remain widely used for the foreseeable future as demand for fully on-line learning remains low and problems of access and technology remain in many areas of the world.

CSU has several campuses in regional New South Wales and is the largest provider of distance learning in Australia. In 2003 a little over 25,000 students from a total of almost 34,000 students were enrolled in DE mode at the university (Charles Sturt University, 2003). Such students generally study two subjects per semester and are required to attend residential schools for some subjects, although subjects with residential schools are in the minority. Over the past fifteen years CSU has moved progressively into on-line support for teaching (for example with the provision of on-line subject outlines and subject electronic forums, which are heavily used), with a small number of courses offered fully on-line. There are continual debates among the University community about the extent to which printed materials can be replaced by on-line materials.

Printed materials sent to students (known as 'mail packages' within the University) consist of:

- a subject outline which contains details of the subject aims and objectives, textbook details and lists of relevant journal, assessment information, and information about contact with lecturers, student support services and other relevant areas of the university; and
- learning materials that may be divided into a 'study guide' containing text written by the lecturer and a book of readings consisting of copies of articles and/or book chapters, or two to three modules each containing a study guide and some readings. Typically each module corresponds to material relevant to each assignment, of which there are usually two to three (sometimes with an examination as well).

The study guides consist of 50 to 75 pages of text written by a lecturer, that generally incorporate study tasks which may require students to summarise material studied, find out extra information, reflect on relevance to the student's workplace and so on. Within the university, educational designers assist with the layout of learning materials, and the University's Learning Materials Centre produces, prints and mails the materials.

Background

There is a dearth of current research studies on printed distance education materials and the use that DE students make of these materials (Phipps and Meristosis, 1999) as most recent studies of distance education have tended to focus on the use of e-learning. However, while the literature on printed distance learning materials is relatively limited there are some studies, generally found in the specialist distance education literature, which provide a useful overview of the area. According to Moore (1993, in Peters, 1998) the key elements of distance education are structure (the materials), dialogue (the direct and indirect interaction between teachers and students) and autonomy (student motivation).

Discussion of structure relates to, as Marland *et al* (1990: 71) put it, 'devices which surround(ed) and infiltrate(d) the discourse, such as objectives, advance organisers, in-text questions, headings and assessment items'. Kin (1994) suggests that most students avoid in-text questions and activities; McDonald (1994) however points out that students will respond to well thought out activities. The move to on-line learning has led to discussion primarily of structure and dialogue (example, Albert & Thomas, 2000) while much other literature deals with motivation among distance education students in a more general sense, often from the perspective of support services that need to be offered (example, Nichols & Gardner, 2002).

It is not clear from the literature whether distance students have particular approaches to study as compared with on-campus students. Richardson (2000) suggests that approaches to learning do not vary significantly between on-campus and distance education students. He finds variations attributable to factors such as age, experience and discipline area. Naidhu (2001:297), in a review of Richardson's book, suggests that there is a need to 'focus attention on the specific uses of the delivery technology rather than the technology itself'. Using Moore's (1993, in Peters, 1998) model, this approach focuses on the link between autonomy (student motivation) and structure (the nature of the materials) and forms the basis for the study reported in this paper.

An earlier study carried out at CSU (Relf & Geddes, 1992) administered the Biggs Study Process Questionnaire (SPQ) (Biggs, 1987, in Relf & Geddes, 1992: 2) and a questionnaire about distance students' use of learning materials to 119 students, in a range of courses, who were attending residential schools. The Study found some indications that 'deep learners' (as identified by their responses to the Biggs SPQ) used more elements of the study guide and read more widely and had more strategies for making sense of their learning materials, than did 'surface' learners'. In another study carried out at a CSU predecessor institution, Roberts (1986) examined the study patterns of distance students, findings that most students spent less than the recommended time on studying and that 49% of students spent most of their study time on assignment-related activities. Two studies carried out at the Indira Gandhi National Open University in India found that students were largely satisfied with the quality of their learning materials (Mishra *et al*, 2001) and that they made extensive use of the self-assessment tasks embedded in the learning materials (Mishra and Gaba, 2001).

The closest recent parallel to the current study appears to be a study by Carnwell (2000) in which twenty learners in a community nursing course in the UK were asked about their learning strategies and what they did with the learning materials. Carnwell proposes a typology of three types of DE students: 'systematic wader, speedy-focuser and global dipper' (2000: 137) and attempts to link these types of learners to a range of learning theories. While useful, this study is limited and is based on an assumption that distance students are women returners-to-learning. A more comprehensive but now dated study by Clyde *et al* (1983) also examined the ways in which students worked with the materials, focusing on habits such as skim-reading, attention paid to assessment tasks and back-tracking.

Research Method

The methodology employed for this project involved both quantitative and qualitative elements. An initial review of the literature on the use of learning materials by distance education students informed the development of a mailed survey. The survey was supplemented by a series of focus groups with distance education students held in a number of different locations. However, this paper is concerned with reporting and analysing the results from the survey only.

The sample frame for the survey was limited to undergraduate distance education students at CSU, including both new and more experienced students. In order to achieve a mix of new and experienced students we constructed the final sample frame from students studying first level (first year) subjects and students studying third level subjects in the Autumn semester of 2004. In general this sample frame allowed us to survey students who were brand new to their studies with CSU in the first level subjects and students who had been studying with CSU for more than 3 years. One first level and one third level subject were chosen from each of the five Faculties' offerings in Autumn semester of 2004. In total 998 students were identified in the sample, and surveys mailed out to them in August 2004, after the results from their studies in the autumn semester were known. A response rate of over 35 per cent was achieved with 351 useable returned questionnaires. The research team were satisfied with this relatively high rate of response to a single mailed survey (Linsky, 1975). The survey results were entered in an Excel™ spreadsheet which allowed basic cross-tabulations of the results to be undertaken.

Discussion

The ages of the respondents reflected the predominantly adult profile of distance education students. Sixty-four per cent of the respondents were aged between 31 and 50 years. A further 26 per cent were aged between 21 and 30 years and 8.3 per cent were aged over 50. The response was heavily biased towards female students. Females constitute 55 per cent (CSU, 2003) of the DE student body at CSU but made up over 82 per cent of the respondents. This heavy bias towards female respondents needs to be borne in mind when interpreting the results from the survey. Over 85 per cent of the respondents were employed, underlining the fact that the majority of DE students combine work with study.

Communication

The increasing availability of on-line services and the use of on-line learning in distance education are predicated on optimistic forecasts of the availability of good internet connections to students.

Table 1 shows the type and place of internet access available to the respondents.

Type and location of internet access	Number	% of all responses
At home (quick connection e.g. broadband)	94	17.6
At home slow connection	226	42.4
At work	189	35.5
Other	22	4.1
No access	2	0.4

Table 1: Type and Location of Student Access to the Internet.

Note: Respondents could nominate more than one

This table shows that the majority of students had access to the internet at home, but nearly 40 per cent did not have home access. About a third had access through work, although some of these also enjoy access at home. Only a very small number had no internet access. Nearly 18 per cent of students had a quick connection (example, broadband access) at home, a figure that is comparable with media reports of the uptake of broadband services in Australia and the difficulties of provision of broadband outside the metropolitan areas.

Contact and communication with academic staff are often cited as major factors in retaining students and lowering rates of attrition. Table 2 shows that the means of communication between distance education students and their lecturers has changed with the introduction of new technology.

Frequency of communication	Telephone (%)	Email (%)	Electronic forum (%)
Very often	0.3	0.6	35.4
Often	2.6	4.6	33.7
Occasionally	13.1	27.5	16.6
Seldom	18.3	27.2	5.4
Never	65.7	40.1	8.9

Table 2: Frequency of Student Communication with Academics via Email, Telephone and Electronic Forum

Note: The electronic forum refers to a web based discussion group mechanism that is attached to every DE subject run by CSU and to which students have automatic access via the CSU website.

The results in Table 2 show that use of the telephone, once the main means of communication between academics and DE students, is now infrequent, with fewer than 3 per cent of students reporting that they used this means of communication very often or often. Interestingly, email communication was also quite low with only just over 5 per cent of students reporting that they use this form of communicating with academic staff very often or often. Students are clearly using the electronic forum as the major means of communication with academics with nearly 70 per cent of students reporting that they accessed their forums often or very often. Taken together with the results on access to the internet, the figures in Table 2 suggested that students were actively choosing the internet as their main means of communication with the University and with academics regarding their study. Thus the web has already become a major tool for DE students and is likely to become even more important in the future as increasing numbers of students are able to access broadband services at home. However, accessing the electronic forums did not mean that all students actively participate by posting messages. When asked about how they contributed to the forum once accessed, students divided fairly evenly between those who contributed occasionally (42 per cent) and those who looked but did not contribute (40 per cent).

These results show that DE students regarded the internet as a major means of communication with the University. The study did not test the extent of the use of electronic forums for teaching and assessment; however at the time of the survey most academics at CSU were using the electronic forums for communication rather than for teaching. Nevertheless, these results suggested that the use of the internet for teaching and learning could be acceptable to students, although the limited access to broadband would be a significant constraint on the types of teaching and assessment activities that could be effectively implemented. Greater use of the internet for teaching delivery, involving the downloading of large quantities of material, would still appear to be beyond the reach of most students who enjoy only slow speed, dial-up internet access.

Approach to Study

In general, the students seemed to have developed quite disciplined study habits. The majority of subject outlines included a suggested schedule for study which usually specified the topics included in the subject, the order in which they should be studied and the number of weeks that students should devote to each topic. As Table 3 shows, most of the students adhered to the schedule at least some of the time, with over 46 per cent following the study schedule all or most of the time.

	Number	%
Yes, all the time	37	10.9
Yes, most of the time	120	35.2
Yes, some of the time	119	34.9
Not at all	65	19.1
Total	341	100.0

Table 3: Whether Students Adhered to the Study Schedule

In response to a further question, students also reported that they studied their materials regularly with an overwhelming majority (83.5 per cent) reporting that they studied on a regular basis throughout the semester. In most cases study patterns were continuous rather than sporadic. Nearly 65 per cent of respondents replied that they studied over a number of days in the week, with only 20 per cent saying that they studied only at weekends and even fewer (9.5 per cent) saying that they studied mostly on one weekday. The students seemed to work hard. Most students (61.5 per cent) said that they allowed between 3 and 9 hours of study time per subject per week with over 27 per cent of the respondents saying that they devoted more than 9 hours per week to each subject. Typical quotations from students on this issue underlined the variety of study patterns used and the lengths students went to in order to study:

- Anytime possible i.e. at work/home/relatives houses/doctors/ anywhere I would have to wait.
- (I studied) whenever I could. If I did a morning shift I studied at night until tired and if a night or afternoon shift, I studied in the morning or on a work break.
- (I studied) on the train one and a half hours each way to and from work, as well as at night and weekends around assignments.

But the students enjoyed studying despite the long hours devoted to the activity. Nearly 80 per cent of the respondents said they enjoyed the activity of studying with only 20 percent saying they did not.

It appears that the process of studying increased the level of students' interest in their subjects. As Table 4 shows, the number of students claiming that they were very interested in the subject for which they were answering rose after study whilst the numbers claiming only moderate interest fell.

Level of interest	% before study	% after study
Very interested	21.7	33.3
Interested	39.9	38.7
Moderately interested	25.9	16.0
Not very interested	9.7	7.7
Not interested at all	2.8	4.3
Total	100.0	100.0

Table 4: Level of Students' Interest in the Subject Before and After Study

Generally most students experienced some difficulty in studying with 42.3 per cent of students reporting that they found the subject difficult or very difficult, and 52.3 per cent experienced average difficulty. Less than 1 per cent of students reported that they found the subject very easy.

Use of Learning Materials

A number of questions sought to identify exactly what students did with their learning materials. On first receipt of the materials, 91.7 per cent said they immediately opened up the materials, while 8.3 per cent said they put them aside until the semester started. On opening up the study materials, 41.3 per cent reported that they quickly skimmed through all the materials, 21.1 per cent looked at the assessment tasks first and 19.4 per cent started to read the subject outline. The study guide (the text provided by the lecturer) was in most cases read systematically and in order (86.3 per cent responded in this way, while 7.3 per cent studied each topic but in a different order). 6.3 per cent of students did not study all of the topics. Of the two latter categories of students, almost half (46.8 per cent) reported tailoring their reading primarily to the assessment tasks.

One of the most important questions related to the physical actions that students took with their materials.

Table 5 shows student responses; they were asked about the action that they most frequently used.

Activity	Number	%
Made their own, separate, notes on the topics	131	37.6
Wrote notes on the learning materials	54	15.5
Highlighted some sections of importance	118	33.9
Physically re-arranged the topics	0	0.0
Just read them through as they were	39	11.2
None of the above	1	0.3
Other	5	1.4
Total	348	99.9

Table 5: Students' Physical Interactions with their Learning Materials

These responses indicate that only just over half of the students made notes about or from the learning materials, either physically upon them or separately. Highlighting was the favoured activity of a third of the students.

Students' use of in-text study activities, or study tasks, was a major focus of the research study. While only 15.8 per cent completed all of the study tasks, Thirty-two cent completed 'most' and 38.7 per cent 'some'. Only 11.2 per cent said they completed none. Of those who completed some, most or all of the tasks, 41.3 per cent wrote formal answers to them, 22.8 per cent said they thought deeply about the tasks but without writing responses, and 35.4 per cent paused for thought. Only 3 per cent (n= 9) discussed the tasks with other students. In qualitative responses, some students said that they responded differently to different activities.

Some typical qualitative answers relating to use or non-use of the tasks were as follows:

Reasons for completing study tasks	Reasons for not completing study tasks
<ul style="list-style-type: none">• <i>I found making myself write an answer, although difficult, was a way to commit it to memory.</i>• <i>Critically reflect - include own life experiences.</i>• <i>It was the first time I had studied at University level and thought it might be relevant for the assessment tasks.</i>• <i>Anything to deepen my knowledge and understanding is helpful.</i>	<ul style="list-style-type: none">• <i>Lack of time. Felt the activity was not necessary to increase understanding.</i>• <i>Not compulsory.</i>• <i>Because I didn't enjoy the subject and wasn't motivated.</i>• <i>Couldn't relate them to my work.</i>

Use of the recommended textbook was high; four-fifths of students used the textbook all the time and 14.8 per cent used it occasionally. Most students used the textbook as recommended by the study guide (77.4 per cent) while 16.3 per cent read it from cover to cover. Only a small minority (5.1 per cent) read only parts that related directly to assessment tasks. A concern of lecturers is that students do not read the Readings that are provided with the study materials. However the study provided some reassuring findings, with 65.5 per cent of students claiming they read all of the Readings and 24.5 per cent saying they read most. Only 6.8 per cent said they read only a few or none at all. Of those who did not read all, the following reasons for given for selection of those that they did read (in descending order of popularity);

- Read only those that seemed to relate directly to the assessment tasks (57 per cent)
- Read only those that were mentioned in those parts of the study guide that the student read (20.7 per cent)
- Read only those that were printed, not on the web (Note that subjects allow the lecturers to add extra materials (the CSU term for this is 'flexible publishing') (10.7 per cent)
- Read only those the student was most interested in; and only those that seemed easy to understand (5.8 per cent each)

Nearly all of the students (83.4 per cent) read the Readings in the order suggested by the Study Guide.

Over two-thirds of students undertook some additional reading. 53.4 per cent read some of the suggested further reading and 8.0 per cent read most of them. Thirty-eight per cent did none of the suggested extra reading. Additional reading that the students had found for themselves was also carried out. Students were given a choice of possible sources, and allowed to tick more than one. 760 responses were received (ie more than 2 responses per student on average) with TV and radio programs, books and web sites most often ticked. Students cited the following as most often used (they were asked to select one for this question):

- Books 38.0 per cent
- Relevant TV/radio programs 33.7 per cent
- Website 26.3 per cent

Only 8.2 per cent (n=62) read any additional journal articles, with only 3 students saying that was the type of additional material that they used the most.

In general students were satisfied with the learning materials they received, although less than half were 'very satisfied' (Table 6):

Level of satisfaction	Number	%
Very satisfied	145	41.8
Satisfied	185	53.3
Not satisfied	17	4.9
Total	347	100

Table 6: General Satisfaction of Students with Learning Materials for the Subject

Some typical suggestions for improving materials included:

- It was a very big topic. Reducing the content might make it more easy for students to assimilate some of it.
- More up to date Readings – many were over 10 years old.
- Selecting materials that are easier to read and understand. Too much academic mumbo-jumbo.
- Give relevant websites.
- Would have liked the study guide and textbook to be better integrated.

Differences Among Students

The study also looked at the different ability levels of students and the impact that these differences had upon their study habits and patterns. Students were asked to assess their own academic abilities compared to other university students. In addition, the students were also asked to give their final grade for the subject for which they were answering.

Table 7 summarises the results.

Perception of academic ability	Number	%
Above average	67	19.1
Average	251	71.7
Below average	32	9.1
Total	350	99.9
Final Grade		
Higher Distinction	14	4.0
Distinction	77	22.1
Credit	139	39.8
Pass	114	32.7
Fail	5	1.4
Total	349	100.00

Table 7: Students' Perceptions of Their Academic Ability and Grade Achievement

Differences among the students in both final grade achieved and their own perceptions of their academic ability yielded some interesting contrasts in answers – particularly in issues concerning their approaches to study. In general, those with a higher perception of their own academic ability (HAA) tended to have more regular study habits than those who felt their ability was lower than average (BAA). Those with higher perceptions of their academic ability tended to answer that they followed the prescribed study pattern in their learning materials all the time (22.7%). None of those with a lower perception answered that they stuck to the study schedule all the time. HAA respondents were more likely to make their own notes separately on the learning materials (52.3%) as opposed to BAA students (18.8%). BAA students were more likely to simply highlight sections of the materials for importance (46.9%). HAA students were more systematic in their use of study tasks contained in the learning materials. They were more likely to complete all the study tasks (28.4% compared to 15.6% of BAAs) and more likely to write formal answers to the tasks (53.2% compared to 29.6% of BAAs). HAA students were also slightly more likely than BAA students to use the prescribed textbook all the time. However, although HAA students appeared to take a more systematic approach to their study than BAA students, the results suggested that some BAAs might compensate for their lack of structure in study by studying longer. BAA students were more likely to report that they devoted 9 hours per week or more to the study of a subject (43.8%) than HAA students (31.3%) who seemed to devote relatively fewer hours to study than their lower self-rated peers. The inference is that HAA were more skilled at studying effectively than BAA students. Nearly a quarter of HAA students (22.4%) reported a high level of enjoyment from studying compared with only one in ten (9.7%) BAA students.

A similar picture emerges when comparing the responses of students with actual high and low grades in the subjects. Comparing students who reported achieving a higher distinction (HD) with those that achieved a pass grade (PS), it appeared that HD students are more likely to take a structured and systematic approach to their study than PS students. HD students were more likely to study over a number of days in the week (92%) compared to PS students (60%) who were more likely to study on only one day of the week or at weekends only. HD students were more likely to put longer hours into studying with 57 per cent of this group studying between 6-9 hours per week per subject. Only 32 per cent of PS students responded that they studied between 6-9 hours per week. PS students were more likely to be studying between 1 and 6 hours per week per subject. Interestingly however, more or less the same proportion of HD students (29%) and PS students (25%) reported that they put in more than 9 hours of study per week per subject. It appears that very long hours of study did not necessarily guarantee the achievement of high grades in a subject. HD students were also more likely to take a highly systematic approach to their study with 100 per cent of HD students reporting that they studied each of the topics in a subject systematically and in order, compared to 83 per cent of PS students who were more likely to report that they studied the topics out of sequence (5%) or only studied some of the topics in a subject (11%). HD students were far more likely to make written notes on topics in the learning materials (79%) than PS students (37%). HD students were more likely to complete all the study tasks in the learning materials (36%) than PS students (12%); and HD students tended to write formal answers to study tasks (62%) compared with PS students (37%). Finally HD students were more likely to read all the readings in the learning materials (86%) as opposed to PS students (62%). Thus, HD students seemed to be more engaged with and enjoyed their studies than PS students. Fifty-eight per cent of HD students reported that they contributed frequently or occasionally to the electronic forum in the subject compared to 41 per cent of PS students. HD students were more likely to enjoy the activity of studying for a subject (50%) compared to PS students (24%) and were more likely to be very satisfied with the learning materials (43%) than PS students (29%).

Conclusion

The discussion needs to be prefaced by a statement that the findings of the study are clearly affected by the preponderance of female respondents. It is normal to receive a higher response rate from women than men to surveys, but this study is particularly hampered by the over-representation of females, since the activities of completing and returning a survey are quite similar in their nature to distance study. The low response rate of male students in the survey made it difficult to draw reliable conclusions about gender differences from the data, but examination of the data did not indicate major differences between the genders in responses to the key questions.

A number of points emerge from the findings that are relevant to universities that offer distance education. Students seem to be satisfied with the printed materials that are sent to them, confirming the results for other studies of distance education students where a high level of satisfaction with learning materials is evident (Mishra *et al*, 2001). Books are more often consulted as additional reading than web sites, indicating that for this cohort of students printed materials are still the preferred medium. On the other hand, the students in this research expressed their strong preference for web-based communication (email and particularly e-forums) in their interactions with lecturing staff and other students.

Students appear to be more focused and more disciplined in their approaches to study than might be expected. On the whole they seem to adopt regular study patterns rather than studying only at times when assignments are due. Most of the students use the embedded study tasks, confirming Mishra and Gaba's (2001) earlier findings that DE students make extensive use of self-assessment activities in their learning materials. Over a quarter of the responding students spent more time than that recommended by the University (which is eight hours per week per subject) on their studies. Most students work quite methodically through their study materials and are not particularly driven by assessment tasks in their reading, although those that read less are primarily driven in their selection by assessment tasks. While the study does not negate earlier studies by Carnwell (2000) and Clyde *et al* (1983) that found that students used different approaches to their study materials, it suggests that the majority fall into the methodical or 'systematic wader' category proposed by Carnwell (2000) rather than being distributed more equally among the categories. However, the finding that only one-half of students make notes from their learning materials, suggests that half are not using strategies that will aid retention of the material. Relf & Geddes (1992) found that 'surface learners' (according to the Biggs typology of deep and surface learners) avoid making notes, preferring to highlight relevant sections.

One interesting finding from this study is the heavy reliance that students place upon the prescribed textbook, with students generally reading all parts of the textbook that are suggested in their study guides, and in some cases (16.3%) reading every word of the book. This finding suggests that the choice of textbook is one of the most important teaching tasks that can be undertaken by lecturers, as suggested by Dominowski (2002). In their use of additional materials that were self-located, books featured heavily, as did television and radio programs, with web sites less popular and journal articles rarely used. These findings have important implications for libraries in universities that have large numbers of distance students. Some further research questions are suggested by the results, such as how students chose which of the recommended further reading they should undertake, whether lecturers would be better advised to recommend books rather than journal articles, or whether students need additional assistance to be able to use journal databases.

There are clear differences between higher and lower achieving students, measured both by their own assessment of their academic abilities, and by the grade they actually achieve in a subject. This is especially true in relation to students' approaches to the act of studying. In general, higher achieving students are more likely to take a more structured and disciplined approach to their study than lower achieving students. Higher achieving students are more likely to:

- Follow the study schedule suggested in the learning materials
- Make written notes on the topics in the learning materials
- Complete all the study tasks in the materials
- Write formal answers to study tasks
- Read all the readings provided with the learning materials
- Study for more hours per week
- Study over a number of days per week.

Thus, higher achieving students work harder and more systematically than their lower achieving counterparts. Higher achieving students take a "deep learning" approach to their study displaying many of the habits of deep learning described by Biggs (1999). Working hard and working systematically are clearly important messages that universities should be reinforcing with all their distance education students to ensure success.

There are some clear lessons for the design of distance education learning materials that emerge from this study. Firstly, a key finding has been the structure and discipline that DE students impose on themselves in DE study. This suggests that students prefer that their learning materials help them to maintain that discipline and structure in their study. A high level of structure in the design of learning materials would appear to be preferable for DE students rather than learning materials that require students to construct their own pathways through the materials. A firm topic-based structure with a clear schedule for study and through which students progressively build their learning over the period of study is important. The findings on the use of in-text study tasks are relevant here. Most of the students in this study completed some or most of the study tasks which helped them to focus on the key messages from the learning materials. While most of the students did not make written notes on their learning materials, the higher achieving students did. Thus, devising study tasks which encourage students to make written notes is likely to boost the learning of DE students.

Allied to the level of structure that should be incorporated into the learning materials is the requirement for a textbook. The students in this study relied heavily on the textbook. Although they may have located extra learning materials elsewhere, these materials could not act as a substitute for a textbook. It is not unusual for DE learning materials to lack a recommended textbook. The reasons for this practice vary from the newness of the subject matter (i.e. there is no text that covers the subject adequately) to a belief that students should be able to undertake their own research to find learning materials, rather than relying on a text. It is clear from this study that a traditional textbook is very important to student learning and that lecturers need to be aware of this if considering doing without a set textbook.

Finally, the changing nature of communications between students and academics is a key finding from this study. The reliance of the students in this study on the web-based, electronic forums that accompanied the subjects in which they were enrolled has major implications for the role of the academic in communications. Just because many of the students did not participate in forum-based discussions, did not mean that most of the non-participating students were not using the forum to learn about the subject. This study did not investigate the use of the web for teaching and learning activities but DE students have clearly come to rely on the internet as the major method of communication with academics. Academic staff need to ensure that they use the web-based forums regularly to communicate with students, despite sometimes encountering an apparently low level of student interaction and feedback. The low level of telephone and email traffic with students that was reported in the study should allow academics the time to use forums to communicate with students in a more planned and systematic manner than was previously possible.

Acknowledgement

The authors would like to thank Anne McDonald, Educational Designer, for her assistance with the research.

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