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Commencing undergraduates' self-efficacy and ability in finding academic resources: Are they improving?

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Abstract

Many studies suggest that young people, including commencing undergraduates are increasingly "Net-savvy" and sophisticated users of information and communication technologies, devices and techniques, including their ability to find information. This paper reports on the self-efficacy and ability of two diverse cohorts of students (one in 1999–2000 and the other in 2004–5) in finding websites and journals for academic purposes, using the same methods. The preliminary results suggest that more recent cohorts (that is, those closer to what has been more recently described as the Net Generation) have greater confidence in their ability to find websites and journals for academic study, and that their confidence is justified. Deeper investigation suggests, however, that these Net Gen undergraduates are more confident than they should be, and that academic and information literacy programmes for commencing students are still necessary to ensure that our more Net-savvy students are also "search-savvy." Because of the differences in the cohorts tested in this research, the findings are limited; nevertheless, this small study does highlight discrepancies in students' self-efficacy and indicators of ability. Having more robust tools to assess students' abilities to find information, particularly for use with commencing undergraduates, would be a useful addition to university curricula.

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Introduction

A decade of research in the first year experience of Australian undergraduates recently found that enhanced efforts to bridge the gap between school and university may account for the increasingly positive views of the role of the secondary school in preparing students for university study. Despite the increased proportion of students feeling positive in this regard, however, just under one-third of students still feel ill-prepared to choose a university course on leaving school (Krause, Hartley, James, & McInnis, 2005). The literature in teaching and learning in higher education suggests that one of the problems associated with transition is a change in incoming university students' academic abilities over the last two decades (Biggs, 2003; Ramsden, 1992). Several studies have found that Australian academics are increasingly dissatisfied with the academic abilities of first year students (Latham & Green, 1997; McInnis & James, 1995; McInnis, James, &

Hartley, 2000; Pargetter et al., 1998), including their independent learning, writing and research skills (Beder, 1998; Latham & Green; McInnis & James; Pargetter et al.). There are, perhaps, limitations in relying solely on the views of academics who themselves are likely still to be adjusting to the massification of higher education. In addition, incoming students who have just been successful in achieving university entrance may not be as aware of their lack of ability in these key skills at university level. More recent studies, many cited in Evan's literature review on transition issues, identify "academic preparedness, and, more particularly, learning strategies and locus of control" as important factors in transition (Evans, 2000). Pargetter reports that students can have an unhappy first year or semester for several reasons, including not having a level of performance comparable to their level of performance at school (70-80%) (Pargetter, 2000). It appears, however, that little has been done in recent years to explore beginning undergraduates' sense of self-efficacy and ability in key skills for university performance, including generic skills such as finding and evaluating information for academic purposes (even though these generic skills are often listed by Australian universities as the intended outcomes of students learning, also called graduate attributes and employability skills) (Barrie, 2004; Business Industry and Higher Education Collaboration Council, 2007).

In their assessment of the needs of beginning undergraduates, McInnis et al. found that "students want their sense of competence and *self-efficacy* enhanced by their initial experience of university" (McInnis & James, 1995, p. 111). According to Bandura's social cognitive theory, among the mechanisms of personal agency, none is more central or pervasive than people's beliefs about their capabilities to exercise control over their own level of functioning and over events that affect their lives (Bandura, 1991); unless people believe they can produce desired effects by their actions, they have little incentive to act. Perceived self-efficacy is concerned with the judgements one makes about what one can do with whatever skills one possesses (Bandura, 1986, p. 391); in fact, a person's level of motivation, affective states, and actions are based more on what they believe than on what is objectively true (Bandura, 1997, p. 2). Self-efficacy has a significant relationship to academic performance, even when ability is controlled as a factor (Wood & Locke, 1987, p. 1021) and it is a reliable predictor of future performance: "an assessment of self-efficacy reflects more than just an ability assessment … capability, although based heavily on ability, also reflects a forward-looking prediction of how hard one will work and an integration of both these factors" (Mitchell, Hopper, Daniels, Jane, & James, 1994, p. 506). Bandura claims that competent functioning requires both skills and self-beliefs of efficacy to use them effectively (Bandura, 1986, p. 391). Successes raise efficacy appraisals; repeated failures lower them, especially if the failures occur early in the course of events and do not reflect lack of effort or adverse external circumstances (Bandura, 1986, p. 399). Bandura believes that self-efficacy has a direct bearing on the performance of university level students: efficacy beliefs contribute significantly to scholastic performance (Bandura, 1997, p. 239).

A vital clue in problems associated with transition might be to ascertain incoming undergraduates' levels of self-efficacy and ability in key skills such as finding and evaluation information for academic study. Some might assume that more recent cohorts of "Net Generation" undergraduates, equipped with all sorts of mobile search-enabled devices, might have a heightened sense of self-efficacy and ability in these fields (Caruso & Kvavik, 2005; Oblinger & Oblinger, 2005). The research reported here focuses on ascertaining commencing undergraduates' initial self-efficacy and ability in searching for useful information in two common sources for

university research: websites and academic journals. The analysis which follows focuses attempts to answer the following research questions:

1. What is the level of self-efficacy and ability of incoming undergraduates in finding websites and journals for academic study?
2. Is there any apparent discrepancy between what students believe they can do (self-efficacy) and their actual ability in these tasks?
3. Are there signs of improvements in recent students' levels of in self-efficacy and ability, and if so, what are the implications for university curricula?

Method

Incoming undergraduates in four different cohorts (in 1999 and 2000, and then more recently in 2004 and 2005) were asked to report their levels of self-efficacy in finding websites and journals for academic study. They were also asked to say how they would go about undertaking such tasks. The data for this study were gathered at two Australian universities: at a small urban university in 1999–2000 and at a large urban university in 2004–2005. The four cohorts were quite different (in size, gender and disciplines studied) and so comparisons are limited but yield interesting results and pointers for further investigation.

Participants in each cohort were asked to complete instruments which contained four items measuring their self-efficacy and ability to find websites and journals for university study. The items, which were part of a larger validated instrument (Oliver, 2001) appear in the Appendix. The two items measuring self-efficacy were developed according to Bandura's theory of self-efficacy (Bandura, 1997): students were asked to indicate whether they could perform a task, and, if yes, to indicate their level of confidence on a ten point continuum (where 1 signified *Not confident at all* and 10 signified *Totally confident*). Measuring ability in a given task is far more challenging. This research included a simple indicator which is unlikely to be a definitive measure of a student's entire ability in a task in all contexts. In this research, students were asked to indicate the five steps they would take to perform two information-seeking tasks. Each response was assigned a mark out of ten according to a prescribed marking guide (see Appendix). Students' scores on all four items were entered into a data file in SSPS. In all cases, the instruments were administered under supervision in the first week of the students' first semester. It was explained to students that the data were for research purposes and had no bearing on their assessment for the course, but would give the lecturer a profile of the students' existing knowledge at the commencement of the course, and so it would be helpful if they completed the tasks to the best of their ability.

Results

This study involved data gathering from a total of 904 commencing undergraduates: 241 in the earlier cohort (1999—2000) in Arts, Business and Counselling at a small urban Australian university, and 663 more recently (2004—2005) in Business and Engineering at a large urban Australian university. Table 1 shows the demographic similarities and differences between the cohorts; there were similar proportions of school leavers and mature age students in the two cohorts, but the more recent group (2004-5) included more males, and more students for whom English was a second language ($p < .05$).

Table 1: Demographic similarities and differences between the cohorts of commencing undergraduates

		Cohort	N	% of cohort	
Sex	Male	1999/2000	57	23.7%	p<.05
		2004/ 2005	442	66.8%	
	Female	1999/2000	184	76.3%	
		2004/ 2005	220	33.2%	
Age	School leaver	1999/2000	182	75.5%	p> .05
		2004/ 2005	482	72.7%	
	Mature age	1999/2000	59	24.5%	
		2004/ 2005	181	27.3%	
First Language	English	1999/2000	224	92.9%	p<.05
		2004/ 2005	400	60.3%	
	Other	1999/2000	17	7.1%	
		2004/ 2005	263	39.7%	

The students' self-efficacy and ability in finding websites and journals is reported by the earlier and more recent cohort groupings in Table 2. The table shows that there were significant differences in all means—that is, students in 2004—5 were more confident than the 1999—2000 students that they could find both websites and journals (p<.05), and their performance in the ability tasks suggested that they were in fact more able to find websites and journals than their earlier peers (p<.05).

Table 2: Mean self-efficacy and ability in finding websites and journals in the two cohorts

		Cohort	N	Mean	Std. Error Mean	
Finding websites	Self-efficacy	1999/2000	241	4.96	.188	p<.05
		2004/ 2005	660	7.47	.064	
	Ability	1999/2000	241	3.16	.189	p<.05
		2004/ 2005	664	4.55	.096	
Finding journals	Self-efficacy	1999/2000	240	2.02	.170	p<.05
		2004/ 2005	589	5.76	.088	
	Ability	1999/2000	240	.28	.081	p<.05
		2004/ 2005	660	1.90	.095	

A quick scan of the means reported in Table 2 indicates that in the instruments and scales reported here (that is, a self-efficacy rating out of 10 and an ability test out of 10), students' mean self-efficacy consistently exceeded their ability. In fact, when students' self-efficacy is deducted from their ability some interesting results appear. The mean for each cohort is a negative number, meaning that self-efficacy exceeds ability. In other words, using the instruments designed for this research, students' confidence exceeds their ability. If the students' self-efficacy scores are deducted from their ability scores, the result shows how much confidence exceeds ability; the more negative the result, the more the students' confidence to perform the task exceeds their ability. Table 3 shows that there are significant differences in the discrepancy between ability and confidence: in both tasks (finding websites and

journals) the more recent cohort's mean self-efficacy exceeded mean ability more than did the earlier cohort's ($p<.05$).

Table 3: Discrepancy between cohorts' mean ability and self-efficacy

Ability minus self-efficacy	Cohort	N	Mean discrepancy	Std. Error Mean	
Finding websites	1999/2000	241	-1.80	.183	p<.05
	2004/2005	660	-2.92	.108	
Finding journals	1999/2000	239	-1.74	.168	p<.05
	2004/2005	585	-3.73	.119	

Further interrogation reveals that there is a more specific factor behind this discrepancy. Table 4 shows that in 2004-05, males' self-efficacy exceeded ability more than did females ($p < .05$) This was not the case in 1999-2000 ($p < .05$).

Table 4: Discrepancy between male and female mean ability and self-efficacy in the two cohorts

Ability minus self-efficacy	Cohort	Sex	N	Mean discrepancy	Std. Error Mean	
Finding websites	1999/2000	male	57	-2.33	.390	p>.05
		female	184	-1.64	.207	
	2004/2005	male	440	-3.14	.133	p<.05
		female	218	-2.49	.186	
Finding journals	1999/2000	male	56	-2.30	.435	p>.05
		female	183	-1.57	.173	
	2004/2005	male	393	-4.06	.141	p<.05
		female	190	-3.02	.211	

Discussion

There are clear limitations to the results of this research. The cohorts were demographically different, including the disciplines undertaken by the students (which may be a factor in ability). Nevertheless, the results do suggest some interesting directions for further testing: it would appear that more recent cohorts of commencing undergraduates (who have had longer exposure to the Internet and search tools) are more confident and more able to find websites and journals when they begin their university studies. However, it must also be stated that it is very likely that with the passage of time between 1999 and 2005, search tools for websites and journals (and particularly academic library databases) have become more sophisticated. The resources available in these two repositories are also vastly different, with exponentially more information available to the more recent cohort. It also appears that, according to the two instruments in use here, students are consistently more confident than they should be. However, the ability test in use here cannot be an absolute measure of ability to find websites and journals because it is limited to students saying what they would do (rather than actually doing it) in five steps. The marking guide for the test allocates more marks for students who say they would judge the results of what they found, then refine their search terms

and perform the search again. It is unknown whether the students who failed to say they would do this would actually do so if they were performing the actual task. Nevertheless it is interesting that, with the passage of time, students' self-efficacy is even more likely to exceed their ability, and that males are more likely than females to do this. This increased confidence may be due to males being heavier users of the Internet and web-enabled devices as suggested in several studies (Caruso, 2004; Caruso & Kvavik, 2005; Oblinger & Oblinger, 2005; Oliver & Goerke, 2007). A 2007 survey of the research literature and commentary by Williams and Rowland attempted to establish "whether there has been a change in the way that teenagers (and young undergraduates) approach information, libraries and research, occasioned by advances in and, as importantly, the *availability* of ICT (information and communications technology) applications" (Williams & Rowlands, 2007). They point out that research into search expertise well and truly predates the Internet, and that several recent studies have found that young people lack expertise in query formulation—how to formulate a search phrase (p. 10). The advent of Internet-enabled natural language search tools, such as Ask Jeeves in the mid 1990s, meant that the skill of formulating a search term, possibly using Boolean logic, seemed no longer necessary. Williams and Rowland conclude that "it may be that the general lack of increase in expertise in information retrieval may be due—ironically—to the perceived ease with which digital systems (as exemplified by the Web) can be searched" (p. 10).

Information literacy and critical thinking, in their many guises, appear in one way or another on Australian universities' lists of graduate attributes and employability skills, and increasingly universities are exploring how to embed and assess those skills in their curricula (research into this area is at the heart of the Australian Learning and Teaching Council projects such as *Integration and Assessment of Graduate Attributes in Curriculum*). Attempts have been made to assess graduates' abilities in generic skills (for example, in the Graduate Skills Assessment Test), but uptake of such tests is low (Australian Council for Educational Research, 2005). Sector-wide reports suggest that urgent action is required to ensure that university graduates receive adequate coverage of generic and employability skills in the curriculum (Business Industry and Higher Education Collaboration Council, 2007), and critical thinking and information literacy are core to those skills Therefore it would seem crucial that an adequate instrument be developed and disseminated, particularly one for use with first year students. Mismatch of skills in the first semester is likely to add to retention issues—and this mismatch can be in either over- or underestimating incoming students' skills.

It would seem then from the research reported here, which deserves further interrogation, that commencing undergraduates who are becoming increasingly competent and confident in their use of web-enabled devices may overestimate their abilities to find key resources for university learning (such as websites and academic journals). Research into the first year experience in Australian universities has been ongoing over many years (Krause, Hartley, James, & McInnis, 2005; McInnis & James, 1995; McInnis, James, & Hartley, 2000), and key gaps in students' abilities were identified in independent learning, time management and learning how to learn (Beder, 1998; Pargetter et al., 1998); research skills (Latham & Green, 1997); and academic reading and writing (Krause et al., 2005). Pargetter et al. (1998) reported that school leavers said they should be provided with a "transition stage" in which the skills of more independent inquiry, research, writing and analysis could be learned. Universities in Australia have responded by offering a range of solutions. Some offer compulsory credit-bearing units in which research and information literacy skills are embedded; others offer self-access short courses by student or library services. The findings from this

research suggest that we well might assume that commencing undergraduates have sophisticated information technology skills through high use and ownership of web-enabled devices, but being able to use devices, and search tools such as Google, does not necessarily translate into sophisticated searching techniques in the academic setting. Students, and their teachers, may be tempted to overestimate their students' abilities in these skills, and, even worse, overestimate their abilities to judge the worth of what they find—an ability not investigated here, but one certainly worthy of further research.

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Appendix: The instrument used in this research

Self-efficacy in finding websites and journals

The following questions ask you about your confidence in performing certain tasks related to your studies. Circle the number that best indicates your confidence level for each task.

1. Can you find research material using the Internet? No/Yes (Circle one).
   If yes, how confident are you in performing this task? Circle ***one number*** on this scale.

Not confident at all				Reasonably confident					Totally confident
1	2	3	4	5	6	7	8	9	10

2. Can you find academic journal articles in a university library? No/Yes
   If yes, how confident are you in performing this task? Circle ***one number*** on this scale.

Not confident at all				Reasonably confident					Totally confident
1	2	3	4	5	6	7	8	9	10

Ability in finding websites and journals

1. If you had to find—without help from others—websites on a specific subject for university study, what steps would you take to find these sites after you were seated at a computer connected to the Internet? List up to five steps.

Scoring criteria: Students' scores were recorded as a whole number between 0 (no attempt) and 10. Marks were awarded according to evidence of the following concepts (2 marks for each concept):

- That a search engine is needed
- That keywords are used in it
- That searches may need to be refined using particular symbols or using Boolean logic
- That sites need to be evaluated
- That thorough searching is often a cyclical process

2. If you had to find—without help from others—academic journal articles on a specific subject for university study, what steps would you take to do so? List up to five steps.

Scoring criteria: Students' scores were recorded as a whole number between 0 (no attempt) and 10. Marks were awarded according to evidence of the following concepts (2 marks for each concept):

- That a database or index of journals is needed
- That keywords are used in it
- That searches may need to be refined and that full text or citation details of the articles may be found
- That articles need to be evaluated
- That the search may need to be repeated