

Lecturer self-efficacy, research skills, and publication output

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Abstract

In this study, a sample of Australian academics, from two institutions, was used to investigate factors which relate to lecturer self-efficacy. A questionnaire was utilised to obtain responses in three separate areas, namely, research, teaching, and service (i.e., administration/professional engagement). Subsequent factor analysis resulted in the identification of four research factors, two teaching factors, and two service factors. Additionally, measures of research publication output were used to select two groups of lecturers, that is, those without publications and those with limited lecturing experience but with publications. Multivariate analyses were employed to contrast these two groups on the four research factors as a means of identifying specific tasks where these groups differed with respect to self-efficacy. Significant differences were found between the two groups of lecturers on all items for the first two factors and most items on the remaining two factors. An examination of these differences revealed particular difficulties faced by one group of lecturers that were related to designing and analysing research, and writing for publication. These results are discussed in terms of their relevance for intervention programs aimed to improve self-efficacy with respect to research.

Background

It is common practice across the higher education sector to conceptualise the work of faculty members within three broad areas, namely, research, teaching, and service. However, faculty members, according to Seyed, Al-Haji Umar, and Al-Hajji (2004, p. 1110) “face perplexing choices in balancing their workload among teaching, research, and service activities”. Such a choice can be the result of: mixed signals as how best to expend energies across the three workload areas (Austin & Gamson, 1983); workload strain and a lack of time to complete the multitude of tasks academics can set themselves (Bellas & Toutkoushian, 1999); and, pressure from competing groups, including students, colleagues, outside agencies, and managers (Baron, 2000). Because research tends to be valued over teaching and service in many higher education settings e.g., Australia (Bazeley, 2003; Star, 2004), England (Armstrong & Goodyear, 2005; Sykes, 2006), and New Zealand (Middleton, 2005), faculty members commonly feel the pressure to research and to disseminate the findings of their research. Despite gaining some intrinsic and extrinsic rewards by engaging in teaching and service activities, the greatest rewards (such as tenure, promotion, and professional standing) flow to those faculty members who publish scholarly work (Diamond, 1993; Watty, Bellamy, & Morley, 2008). Increasingly, studies are emerging that investigate factors that assist or hinder those who publish and those who do not in an attempt to shed further light on the ‘publish or perish’ or ‘publish or prosper’ issue and to inform managers on ways to improve the publishing performance of their employees (see, for example, Hemmings & Kay, 2007; Hemmings, Rushbrook, & Smith, 2007). This is particularly relevant for managers of faculty members who are new to academe.

A body of literature is growing that discusses the place, contribution, and concerns of ‘early career academics’. Some of these writers draw on a deficit model (see, for example, Debowski, 2006) and report that early career academics can be characterised as lacking research networks, having low credibility, as well as being poorly informed about university structure and culture. Others couch their work within a developmental framework. For example, LaRocco and Bruns (2006) highlight the challenges of moving from one profession to another and one career phase to the next. And, Laudel & Gläser (2008, p. 391) emphasise the “passage from apprentice to colleague and the corresponding transition from dependent to independent”. These same co-workers also described early carer academics as “the most vulnerable group in the science system” (p. 388). This claim is supported by both anecdotal and research evidence that point to early career academics encountering high teaching loads (Lucas & Turner, 2007a), heavy scrutiny from their seniors (Baron, 2006), role overload (Debowski, 2006; Lucas & Turner, 2007b), probation, performance, and job security issues (Star, 2004), poor or limited access to resources (Bazeley, 2003), and even academic isolation (Norrell & Ingoldsby, 1991). Conceivably, pressures such as these can reduce the confidence of early career academics and mean that their productivity in a number of areas (e.g., research and service) could be affected to such an extent that some do not produce publishable works following their initial appointment as a faculty member. By logical extension, it could be argued that some academics remain confined to an early career ‘space’ and cannot, or find it very difficult to, make the transition from apprentice to colleague or dependent to independent academic.

Social cognitive theory highlights the interactions among personal factors, environmental conditions, and behaviours (Bandura, 2001). A key construct grounded in this theory is self-efficacy. Self-efficacy is the belief that individuals can organise and implement actions to reach a certain level of performance. Bandura (1997) contends that self-efficacy beliefs are influenced by a number of different sources, with previous performance (particularly mastery experiences) being the main source of influence. Researching within a higher education context, Major and Dolly (2003, p. 91) noted that self-efficacy "...encapsulates the way that faculty members see themselves as teachers, researchers, and academic citizens as well as their beliefs about whether they can successfully complete tasks in each of these areas". Other researchers, including Bailey (1999), Blackburn and Lawrence (1995), Schoen and Winocur (1988), and Vasil (1992) have also drawn on the self-efficacy construct when investigating the work of faculty members. Although their chief focus has been research self-efficacy and its relationship with research productivity, there has been some consideration given to both teaching self-efficacy and service self-efficacy. Teaching self-efficacy has been typically described in terms of preparation, delivery, and assessment; whereas, service self-efficacy has been defined in a number of ways. To exemplify, Bailey (1999) defined service self-efficacy, through factor analytic means, in terms of administration and consulting, while Blackburn, Lawrence, Bieber, and Trautvetter (1991, p. 406) viewed service more generally by drawing on three elements: "public (dealing with the nonacademic outside world), professional (working with associations, for example) and campus (committees, etc.)".

In Australia, the last reported study of self-efficacy in the context of faculty work was conducted by Bailey (1999). Given the differing context and the rapid change in the higher education sector in Australia since the 1990s (see, for example, Coates, Goedegebuure, van der Lee, & Meek, 2008; Karmel, 2003), it is timely to explore how the work tasks, using a self-efficacy framework, are currently viewed and conceptualised by faculty members. Moreover, because of the challenge to recruit and retain faculty members in the forthcoming decade (Hugo, 2005), this exploration should especially focus on those faculty members who are new, in relative terms, to the academy. No doubt, developing an understanding as to how faculty members assess their skills and abilities in performing work-related tasks will be of utmost interest to managers and planners employed in the sector.

In summary, this study was designed to serve two purposes: first, to examine the nature and scope of self-efficacy beliefs of lecturers; and second, to identify the relationship of these self-efficacy beliefs to the publishing outputs of beginning lecturers.

Method

Participants

The participants in this study were drawn from lecturing staff at two Australian universities that confer degrees from bachelor to doctoral level. One institution was a large regional university and the other was based in a state capital city. The staff members were affiliated with eight Department of Education, Science and Training (DEST)-categorised research fields: (i) sciences, (ii) information and computing, (iii) engineering and technology, (iv) agricultural/veterinary/environmental sciences, (v) medical and health science, (vi) education, (vii) economics/commerce/political science/tourism, and (viii) arts/humanities/social sciences/policing.

Instrumentation

The development of the questionnaire was informed by a literature review, expert panel input, and piloting. This developmental process was in accord with suggestions made by methodologists such as Creswell (2002) and de Vaus (2002). The questionnaire was divided into three sections. Section 1 was designed to seek information of a background nature, including gender, academic level, and discipline area. The second section was constructed to ask participants to indicate how confident they were in performing work-related tasks using a 10-point scale ranging from *not confident at all* to *completely confident*. This section of the questionnaire was partly based on an instrument developed by Schoen and Winocur (1988). The tasks were grouped according to three areas, namely, research, teaching, and service activities and are listed in the Appendix. The focus of Section 3 was on the level of importance and satisfaction that participants gave to these tasks, as well as the number of refereed publications produced during the participant's academic career. Additional information about the questionnaire can be requested from the authors of this paper.

Procedure

Participation in the study was voluntary and participants responded anonymously to the questionnaire mailed to all full-time lecturing staff (N=985). An E-mail reminder to complete the questionnaire was then placed on the electronic notice-boards of the two universities, resulting in 357 useable returns being received. This represented a response rate of approximately 36 percent. Alreck and Settle (1985) contend that a response rate of this magnitude is relatively high in mail surveys and should be viewed as more than acceptable. It needs to be noted that 26 cases with missing data were eliminated from some of the planned analyses.

The three groupings of items in Section 2 of the questionnaire were interrogated separately using a principal components analysis with an oblique rotation (using SPSS, Version 14.0). The analysis of the **research** items identified four factors and these accounted for approximately 69 percent of the variance in the variable set. Thirty of the 32 items were used to delineate the components. An analysis of the 22 **teaching** items revealed two factors and these accounted for approximately 64 percent of the variance. Twenty-one of the 22 items were used to delineate the components. Finally, the majority of the **service** items, numbering 13, were aligned with two major factors accounting for approximately 59 percent of the variance. The small number of items which did not coalesce in the factor structure tended to be linked with specific information communications technology tasks.

Next, eight subscales were derived from a grouping of the items as defined by the major factors. This derivation resulted by adding the raw scores of each item loading on a factor and then dividing by the number of items in the subscale. It needs to be noted that the **research** and **service** subscales had kurtosis and skewness values within or reasonably close to the range -1 to +1 and thus deemed to be appropriately normally distributed and suitable for analysis using bivariate and multivariate techniques (see, e.g., Hair, Anderson, Tatham, & Black, 1998). However, the **teaching** subscales had moderate negative skewness and relatively high kurtosis which, in both cases, seemed to be due to ceiling effects. All of these measures, as well as the reliability coefficients of the subscales, are presented in Table 1 below.

Table 1
Means, standard deviations, skewness and kurtosis values, and alpha coefficients of the subscales

Measures	Subscales							
	Research Subscale 1	Research Subscale 2	Research Subscale 3	Research Subscale 4	Teaching Subscale 1	Teaching Subscale 2	Service Subscale 1	Service Subscale 2
Mean	6.73	6.27	5.65	6.46	7.57	7.68	6.37	6.56
Standard Deviation	1.77	1.74	1.99	1.66	1.14	1.05	1.60	1.64
Skewness	-1.26	-1.04	-.68	-.89	-1.74	-1.49	-.74	-.76
Kurtosis	1.67	.91	.04	.59	6.29	4.32	.49	.23
Cronbach's alpha	.96	.94	.90	.80	.95	.92	.90	.85

One other measure, integral to this paper, was developed from publication output. In this study, participants were asked to indicate the number of peer-reviewed publications they had published across their career. In line with current Australian governmental guidelines, each publication received a point with peer-reviewed books being allocated a weighting of five (i.e., one book = 5 journal articles/conference papers/book chapters). Participants' points were then tallied and divided by the number of years they had served as an academic. From these calculations a five-point scale was constructed to typify low to high publication output. For the purposes of this paper, two categories of publisher were identified. The first category was made up of 47 lecturers who had no publications in their first six years as an academic; whereas, the second category comprised 78 lecturers who had been active publishers in the same time-frame. It needs to be acknowledged, however, that a small number of lecturers fitting this category were excluded because their output was substantial and almost certainly meant that they were not neophyte researchers but had professional research positions before accepting a lecturing position.

Apart from the stark difference in terms of publishable work, the two categories of publisher also varied with respect to academic qualifications held and the proportion of time they allotted to their respective work areas. The active publishers were much more likely to have completed doctoral programs (60.3 percent) compared with their non-publishing counterparts (4.3 percent). Furthermore, 34 percent of the latter category of academics had not completed qualifications at the Masters level. In relation to time allocated to the areas of research, teaching, and service, the two categories of publisher were characterised by certain differences. For example, the active publishers, on average, devoted more than a quarter of their work time to research tasks and approximately 50 percent of their work time to teaching-related activities. On the other hand, the non-publishers spent, on average, more than two-thirds of their work time engaged in teaching activities and gave less than 15 percent of their time to research-related endeavours. Interestingly, the active publishers, compared with the non-publishers, allocated slightly more of their work time to service activities (21 percent cf., 18 percent).

Results

A correlation matrix (N=331) is presented below in Table 2. An inspection of the correlation coefficients revealed that all the subscales were positively and significantly related ($p < .01$). The inspection also showed that the coefficients of the

subscales forming the three groupings were high, whilst the coefficients of the subscales across the groupings tended to be more moderate in magnitude. To illustrate, the coefficient for the Teaching Subscales 1 and 2 was .81, whereas the coefficients between the two teaching subscales and the four research subscales varied from .216 to .357.

Table 2
Correlation matrix

Measures	1	2	3	4	5	6	7	8
1. Research Subscale 1	1							
2. Research Subscale 2	.823*	1						
3. Research Subscale 3	.818*	.736*	1					
4. Research Subscale 4	.632*	.692*	.542*	1				
5. Teaching Subscale 1	.357*	.225*	.326*	.216*	1			
6. Teaching Subscale 2	.303*	.227*	.256*	.290*	.810*	1		
7. Service Subscale 1	.552*	.517*	.563*	.346*	.518*	.486*	1	
8. Service Subscale 2	.568*	.506*	.525*	.352*	.466*	.397*	.699*	1

* $p < .01$ (2-tailed)

The results reported next consider the two groups of neophyte lecturers and the four research subscales, namely, Research Subscale 1 (reporting and supervising research), Research Subscale 2 (skills related to the conduct and management of research), Research Subscale 3 (writing major works and reviewing articles/books), and Research Subscale 4 (having a broad view of a research area). Multivariate analysis of variance was used to contrast the two groups of lecturers on the four research subscales as a way of identifying specific sources of difference. Significant differences were found on all four subscales (Pillai's Trace = .454, $F[4, 116] = 24.14$, $p < .001$). The explained variance as indicated by the η^2 value was 45.4 percent. Subsequent multivariate analyses of the separate subscales demonstrated significant differences between the two groups of lecturers on all items for the first two subscales and most items on the remaining two subscales. A review of the univariate test results using a conservative criterion ($p < .001$) identified items which differentiated the two groups in terms of research self-efficacy (these are presented in the Appendix). These results, using an eta-square measure, permitted a ranking of the discriminative capacity of the items. In relation to Research Subscale 1, submitting and resubmitting papers for publication, and preparing conference papers, were the research tasks that most clearly differentiated lecturers with publications and those without publications (see Table 3). With respect to Research Subscale 2, those lecturers who published were markedly more efficacious in leading research projects and analysing the results of the research (see Table 4). In terms of Research Subscale 3, examining theses and reviewing books and journal articles clearly discriminated the two groups. Interestingly, writing textbooks and applying for study leave were tasks that did not differentiate the two groups (see Table 5). Finally, when considering Research Subscale 4, reviewing research literature for a research project and generating research ideas were viewed more confidently by those who published compared to

those who did not. However, keeping up to date with the research literature was a task that did not differentiate the two groups (see Table 6).

Discussion

The present study has evidenced the utility of the self-efficacy construct and the items used to measure lecturer self-efficacy. A principal components analysis revealed that lecturer self-efficacy could be delineated by a set of eight subscales: four research subscales; two teaching subscales; and, two service subscales. The research subscales were defined by items that respectively considered *reporting and supervising research, conducting and managing research, writing major works and reviewing articles/books*, and *having a broad view of a research area*. The teaching subscales drew on items that concentrated either on *designing and assessing instruction or delivering tutorials and lectures*. Finally, the items comprising the service subscales linked either to *professional engagement activities* e.g., responding to the media and liaising with outside agencies or *administrative tasks* such as participating in school/faculty committees and chairing academic meetings. All of the subscales had Cronbach's alphas in the highly reliable to very highly reliable range and were thus deemed psychometrically sound (Cohen, Manion, & Morrison, 2007). That is, other researchers can, with assurance, assess lecturer self-efficacy by tapping into its related dimensions. More work, however, is warranted to further validate and, in addition, test the applicability of the subscales in other Australian university settings, as well as the wider higher education context.

Those faculty members new to the academy should find the list of items forming the various subscales, or excluded from the subscales, a useful tool to promote discussion with an assigned mentor and other colleagues about the myriad of possible tasks expected to be performed across an academic career. Even though some faculty members, because of their appointment conditions, would not carry out all of these tasks, most faculty members would be required to execute the majority of the tasks in order to move through probation and gain subsequent promotion or salary increments.

Because this study concentrated on research self-efficacy and two groups of early career academics, the following section will highlight the various differences between those faculty members who published and those who did not. First, the two groups of early career academics could be contrasted on the four research subscales. Second, these same two groups differed significantly on nearly all of the items comprising the research subscales. And third, the items in the respective subscales could be ranked in terms of their discriminative capacity, showing, clearly where the two groups varied. Although consistent with Bailey's (1999) findings; that is, faculty members with low or very low research productivity tend to have the lowest levels of research self-efficacy, the item by item rankings add to the literature pertaining to lecturer self-efficacy. This addition is important in that the itemised research tasks can form the basis of researcher development, and more generally, professional development activities. To elaborate, the research tasks that had the least amount of discriminative capacity (e.g., attending conferences, generating research ideas, and preparing research budgets) would be a logical point to begin professional development with those low in research self-efficacy, or for that matter, holding professional qualifications only and lacking graduate research experience. Further, those tasks with greater discriminative capacity could be viewed and practised in a systematic way, leading to the targeting of tasks, with the greatest discriminative capacity (e.g.,

conducting pilot studies, preparing conference papers, and examining theses), that arguably require the most attention and exploration. Such an approach seems appropriate, given that Hekelman, Zyzanski, & Flocke (1995) suggested that newly appointed faculty members need to enrol in programs that focus on research activities and how to garner research resources. And, Major and Dolly (2003) discussed the need to orient new academic staff using research workshops and even course work, as long as this orientation occurred in a 'low threat' setting. More recently, Debowski (2006, p. 84) reported that the "managers of Australian universities can no longer simply hope that researcher development will occur by osmosis", with the implication being that a planned and well-ordered strategy is needed to redress any fundamental deficiencies in research knowledge and skills and ultimately build confidence to research and publish from that work. Put simply, interventions should be derived that begin from the known and move to the unknown. The study reported here nominates a starting point and the various tasks that can fit logically within such a continuum.

A key finding of this study was that only a couple of the non-publishing academics had completed a doctoral program and a substantial number of the academics in this same category of non-publisher did not hold qualifications at the Masters level. Given that a rich and extended graduate student experience is a means of gaining research and writing confidence (see, for example, Major and Dolly, 2003), it could be argued that a lack of such an experience for the vast majority of non-publishing academics in this study was a contributing factor to their low research productivity. Furthermore, this paucity of experience would probably position these faculty members at an apprentice stage and quite dependent on others for support and resourcing (Laudel & Gläser, 2008). As documented by LaRocca and Bruns (2006), this support for early career academics needs to be multifaceted and draw on emotional, informational, and instrumental supports. Debowski (2006) and Norrell and Ingoldsby (1991), for example, would contend that a research mentor is the most effective person to provide these supports or at least give advice on how to secure these supports. However, Clarke (2004) has indicated that formal mentoring relationships with early career academics are challenging to develop because of time constraints and the need to create opportunities for collegial interactions and friendships.

Time was a minor focus of this study but it is worth airing here that the active publishers spent, on average, at least 25 percent of their work time in research activities, whereas the non-publishers devoted less than 15 percent. Although this result does not surprise, it is encouraging that the non-publishing academics were giving some of their time to research endeavours. Conceivably, these academics were studying part-time, preparing reports or manuscripts which may not meet peer-review guidelines, or were refining their research skills. Unfortunately, the study did not set out to question the participants on this matter. Nevertheless, one strong message that could be relayed is that academics need to monitor the time they allocate to both teaching and service tasks, or else not enough time could be left for research and publishing.

It is important to recognise several limitations of the present study. First, the part of the study that concentrates on early career academics is potentially limited by the overall sample size. However, it needs to be pointed out that the participants from the two institutions sampled represent approximately 5 percent of the staff members working in the public and private universities in Australia. Second, the measure of

publication output was based on self-reported data. A future study might profit from using an alternate source, especially one that could be readily verified.

The results of this study complement existing research and fill a void with respect to the Australian higher education context and potentially other settings. Additionally, these results have implications both theoretically and practically. Such an assertion can be made since the research is grounded in self-efficacy theorising and interventions can be derived for neophyte lecturers. For example, university managers could implement structured and developmental interventions that influence research self-efficacy beliefs and lead to positive performance outcomes for early career academics.

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Appendix

RESEARCH

Keeping up to date with research literature
Generating research ideas
Reviewing literature for a research project
Expressing your ideas in writing
Designing research
Conducting pilot studies
Adhering to research ethics requirements
Collecting data
Using computer software
Analysing research results
Leading research projects
Collaborating with colleagues about research
Working with research assistants
Delivering research findings at staff seminars
Presenting invited research papers in other departments and universities
Preparing conference papers
Attending conferences
Delivering conference papers
Writing for an academic audience
Submitting papers for publication
Resubmitting papers for publication
Writing journal articles
Writing research-based books
Writing textbooks
Reviewing journal articles
Reviewing books
Examining theses
Supervising students' research projects
Supervising postgraduate students
Preparing a research budget
Applying for research grants
Applying for study leave

TEACHING

Using information technologies (ICT)
Delivering lectures
Keeping up to date and revising lecture material
Preparing tutorials
Delivering tutorials
Selecting reading materials
Preparing handouts
Revising teaching strategies
Facilitating student discussion in class
Consulting with students
Designing subject assessment
Setting exams
Preparing assignments
Marking assignments
Assessing students' skills
Providing feedback on assessment items
Assigning grades
Developing subjects
Consulting with colleagues about coursework
Supervising the teaching in a subject
Coordinating subjects

Responding to student feedback

SERVICE ACTIVITIES

Participating in school/faculty committees
Participating in university-wide committees
Chairing academic meetings
Participating in professional associations
Responding to the media
Answering public enquiries
Advising prospective students
Organising conferences/symposia
Entertaining visitors on campus
Consulting professionally
Liaising with external agencies about research
Liaising with external agencies about coursework
Editing a journal
Serving on an editorial board
Reporting on a colleague for tenure or promotion
Participating in courses/programs outside the University

Table 3
Univariate results for Research Subscale 1 in rank order*

Item	<i>F</i>	<i>p</i>	η^2
2.29 Resubmitting papers for publication	95.218	.000	.440
2.28 Submitting papers for publication	67.219	.000	.357
2.16 Preparing conference papers	61.288	.000	.336
2.20 Writing journal articles	54.907	.000	.312
2.19 Writing for an academic audience	48.996	.000	.288
2.14 Delivering research findings at staff seminars	47.209	.000	.281
2.26 Supervising students' research projects	40.957	.000	.253
2.15 Presenting invited research papers in other institutions	38.471	.000	.241
2.27 Supervising postgraduate students	35.771	.000	.228
2.18 Delivering conference papers	27.644	.000	.186
2.17 Attending conferences	16.028	.000	.117

*Pillai's Trace .504, $F(11, 111) = 10.238$, $p < .001$, $\eta^2 = .504$

Table 4
Univariate results for Research Subscale 2 in rank order*

Item	<i>F</i>	<i>p</i>	η^2
2.10 Analysing research results	59.166	.000	.327
2.11 Leading research projects	55.560	.000	.313
2.6 Conducting pilot studies	50.222	.000	.292
2.13 Working with research assistants	48.146	.000	.283
2.5 Designing research	47.863	.000	.282
2.7 Adhering to research ethics requirements	41.771	.000	.255
2.8 Collecting data	32.719	.000	.211
2.30 Applying for research grants	32.547	.000	.210
2.12 Collaborating with colleagues about research	31.856	.000	.207
2.31 Preparing a research budget	24.479	.000	.167

*Pillai's Trace .443, $F(10, 113) = 8.99$, $p < .001$, $\eta^2 = .443$

Table 5
Univariate results for Research Subscale 3 in rank order

Item	<i>F</i>	<i>p</i>	η^2
2.25 Examining theses	35.058	.000	.228
2.23 Reviewing journal articles	22.143	.000	.157
2.24 Reviewing books	18.519	.000	.135
2.21 Writing research-based books	15.875	.000	.118
2.22 Writing textbooks	7.793	ns	
2.32 Applying for study leave	5.190	ns	

*Pillai's Trace .264, $F(6, 114) = 6.805$, $p < .001$, $\eta^2 = .264$

Table 6
Univariate results for Research Subscale 4 in rank order*

Item	<i>F</i>	<i>p</i>	η^2
2.3 Reviewing literature for a research project	22.445	.000	.154
2.2 Generating research ideas	21.710	.000	.150
2.1 Keeping up to date with research literature	4.944	ns	

*Pillai's Trace .203, $F(3, 121) = 10.271$, $p < .001$, $\eta^2 = .203$