The authors of this article report on an investigation of factors which differentiate between university lecturers in relation to publication output. The study drew on data from lecturers working full-time at two large Australian universities. Measures of research publication output were used to select two groups of lecturers (N1=119; N2=119), that is, those without or with very few publications and those with impressive publication records. Because of the differing metrics of the selected factors, both logistic regression and discriminant analysis were employed to test the discriminative capacity of the various factors and models incorporating some of the factors. A range of factors, including qualifications held, proportion of work time devoted to research tasks, and the confidence assigned by lecturers to the execution of certain research tasks, were found to differentiate between the two groups. A logistic regression model incorporating these factors showed good fit of the data as indicated by the omnibus test result (p<0.001) and a Cox and Snell R2 value of 0.57. The implications of these results are examined from the perspectives of both university managers, who may wish to create an environment that fosters greater research and publication, and those who engage in these activities.

DOI: http://dx.doi.org/10.1080/13600800903575520
URL: http://researchoutput.csu.edu.au/R/-?func=dbin-jump-full&object_id=24412&local_base=GEN01-CSU01
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CRO Number: 24412
University lecturer publication output: Qualifications, time, and confidence count

Brian Hemmings and Russell Kay
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Abstract

The authors of this article report on an investigation of factors which differentiate between university lecturers in relation to publication output. The study drew on data from lecturers working full-time at two large Australian universities. Measures of research publication output were used to select two groups of lecturers (N₁=119; N₂=119), that is, those without or with very few publications and those with impressive publication records. Because of the differing metrics of the selected factors, both logistic regression and discriminant analysis were employed to test the discriminative capacity of the various factors and models incorporating some of the factors. A range of factors, including qualifications held, proportion of work time devoted to research tasks, and the confidence assigned by lecturers to the execution of certain research tasks, were found to differentiate between the two groups. A logistic regression model incorporating these factors showed good fit of the data as indicated by the omnibus test result (p<0.001) and a Cox and Snell $R^2$ value of 0.57. The implications of these results are examined from the perspectives of both university managers, who may wish to create an environment that fosters greater research and publication, and those who engage in these activities.
Background

Most universities receive substantial public funding and strive to demonstrate their value to society through excellence in teaching, service, and research. The publication of scholarly works, such as refereed journal articles and books, is the basic form of currency in academe (see, for example, Hourcade & Anderson, 1998; Star, 2004). Published works are used to measure individual, team, and institutional performance in a range of differing contexts (Grant, 2006; Kamler, 2008). These performances are often highlighted within the institution on published lists and through award ceremonies, and without the institution in the form of publicly-available reports (Hemmings, Rushbrook, & Smith, 2007). The reputations and identities of individuals and their aligned institutions are partly forged through such an exercise (Creamer, 1998; Kim, 2003; Sikes, 2006).

There has been considerable criticism of the use of publication counts in academe, including the claim that too much effort is expended by academics to research and write. As a consequence, other academic tasks are ignored or given insufficient attention (Skolnik, 2000). Any criticism, however, appears to be lost in the current climate which is driven by corporate managerial practices and associated accountability requirements and efficiencies. This climate is evident in many settings, including Britain (Sikes, 2006), North America (Gappa, Austin, & Trice, 2007), and Australasia (Grant, 2006; Hardy & Smith, 2006; Watty, Bellamy, & Morley, 2008).

Karmel, as early as 2003, identified a growing pressure on, and shifting landscape for, Australian academics and this has been vindicated more recently by Coates, Goedegebuure, van der Lee, and Meek (2008) whose results from a national survey of academics indicate a perception of managerialism within the sector, a decline in working conditions, and strong pressure to perform. What is also striking about the contemporary Australian landscape is the predicted loss of large numbers of experienced academics from the profession due to demographic reasons. This loss will mean that a new generation of academics will need to be recruited. In fact, Hugo (2005) has argued that the expected loss will create significant employment shortfalls and that senior managers of institutions will need to consider other strategies such as offering incentives to retain staff members or entice the return of retirees with creditable performance backgrounds. Such a solution would help to ensure that research and related publication output would continue and thus support the activities of recruited staff members new to the academy who, in general, require mentoring and time to develop the skills and confidence to carry out their workplace tasks (Bazeley, 2003; Hemmings & Hill, 2009; Major & Dolly, 2003).

There is no indication that the pressure to perform in research and other scholarly endeavours in Australia will lessen in the short term, particularly with the advent of the federal government’s Excellence in Research in Australia (ERA) initiative (Australian Government, 2008) and calls to remain internationally competitive with respect to research and innovation (Australian Academy of Science, 2008). Consequently, both experienced and neophyte academics will be expected to produce quality output and those considering entering the academy will also need to be aware of these expectations.

As expressed by Kamler (2008, p. 293), “questions of writing and publication are linked to questions of identity and capacity building”. Aligned with these questions are issues dealing with job satisfaction, workplace morale, job description, and staff retention and loss. Therefore, any
investigation of writing and publication output will shed further light for senior managers of universities and their faculty members on what might influence a number of significant workplace issues. The results of these investigations might then be used by university managers to create a more favourable environment for writing and publishing.

**Literature Review**

According to Maltby, Gage, and Berliner (1995, p. 338), “[l]ow efficacy leads to low motivation and insufficient effort, leading to poor performance, which reinforces the original efficacy perception”. Strong evidence for this claim can be found in the research literature dealing with self-efficacy and publication output. An examination of this literature reveals a consistent pattern between research self-efficacy and scholarly publication. To elaborate, numerous studies (see, for example, Gething & Leelarthaepin, 2000; Seyyed, Al-Haji Umar, & Al-Hajji, 2004; Taylor, Locke, Lee, & Gist, 1984; Vasil, 1992) have shown that academics with low levels of self-efficacy for research, or confidence to perform research tasks, tend to produce low research output, as measured by refereed publications. The converse also appears to be true in that those with high levels of research self-efficacy are more likely to be the most research productive in the academy (Bailey, 1999; Schoen & Winocur, 1988). More recently, Hemmings and Kay (2007) demonstrated, through structural equation modelling techniques, that a measure of writing self-confidence explained most of the variance in publication output and that the standardised direct effect between writing confidence and publication output, for a multiple-group estimation model, varied between 0.51 and 0.61. In other words, the influence of self-confidence on output was positive and very strong.

As documented by Winocur, Schoen, and Sirowatka (1989), self-efficacy beliefs are formed from four main sources, namely, earlier accomplishments, vicarious experiences, persuasion from others, and evaluation of one’s emotions. All or most of these sources have been incorporated into, or at least addressed in, programs designed to promote research self-efficacy with a subsidiary aim of raising publication output. These programs have been conducted within a low threat environment and normally take the form of research workshops, training sessions, and coursework (Major & Dolly, 2003). An additional feature of these programs is an emphasis on supporting academics in various ways. LaRocco and Bruns (2006), for example, argued that emotional, informational, and instrumental supports are critical in preparing academics for research tasks and developing lifelong scholarly habits.

Some writers such as Bazeley (2003) and Hemmings and Hill (2009) have even suggested that completing a doctorate fosters the requisite research skills, builds self-assurance, and spawns publications. Earlier studies have shown some support for such a proposition. For instance, Landino and Owen (1988) noted in their study that holding a PhD contributed to higher self-efficacy for research. Likewise, Bailey (1999) found that holders of doctorates, compared to those with masters’ qualifications, were more prone to have higher levels of research self-efficacy.

Another factor associated with qualifications and frequently linked to research output is academic level or rank. Researchers have generally reported a positive correlation between academic rank and publication output (see, for example, Blackburn & Lawrence, 1995; Green, 1998; Smey & Try, 2005). That is, as rank increases so does output. The main reasons given for
such a relationship include: (a) junior staff members, compared with their more senior colleagues, tend to have limited knowledge of academic tasks, practices, and cultures (Debowski, 2006; LaRocco & Bruns, 2006); (b) junior ranks tend to lack research skills and are mostly dependent on others for assistance (Laudel & Gläser, 2008); (c) academics at lower ranks are more likely to expend more of their energy on teaching responsibilities, particularly the preparation of instructional materials (Lucas & Turner, 2007; Talib, 2002); and, (d) senior academics, especially professors, have an advantage over their junior counterparts in that they have greater access to networks and resources such as doctoral students (Dundar & Lewis, 1998). Nevertheless, several authors point to a different relationship from that highlighted above. To illustrate, Tien (2000), researching in a Taiwanese context, showed that faculty members who published journal articles tended to be younger and probably were driven by the need to secure tenure and/or promotion.

A recurring theme within the literature pertaining to academic output is the need for time to plan and conduct research. To exemplify, Smey and Try (2005) noted that time is an important input factor and Creamer (1998) contended that time devoted to research is one of the best predictors of career research productivity. Empirical support for these points can be found in the work of Bellas and Toutkoushian (1999) and Hassan, Tymms, and Ismail (2008). Both research teams showed that academics devoting more of their time to teaching and service activities produced less output. Interestingly, Knowles, Cole, and Sumsion (2000) warned their colleagues in teacher education faculties that spending time on teaching and practicum-related activities needed to be balanced with research and writing tasks otherwise opportunities for publication would be squandered. This form of warning has been sounded across the wider sector on a number of occasions. For example, Norrell and Ingoldsby (1991) and Poole and Bornholt (1998) have stressed that time management assistance is needed for many academics if a balance is to be found among the various duties of an academic.

Gender is frequently mentioned in the literature as a major issue related to publication output. The findings of the majority of studies suggest that the most productive faculty members tend to be male (see, for example, Creamer, 1998; Research Corporation, 2001; Sax, Hagedorn, Arredondo, & Dicrisi, 2002). Stack (2004) argues that this gender differential may be the result of females, compared to their male counterparts, giving more attention to partner and other family responsibilities, being afforded fewer opportunities for co-authorship, and facing difficulties in a male-dominated work environment. Support for this latter point can be found in the work of Becher and Trowler (2001) through their synthesis of British and North American research. They have described gender inequities in relation to promotion being less common for females and publication peer-review processes favouring males.

Generally speaking, the literature reviewed above points out that research self-efficacy, qualifications held, academic level/rank, time devoted to research, and gender all appear to have some influence on publication output. Given the current emphases of increased competitiveness and calls to increase research output in the Australian higher education context, it is timely to consider what factors impinge on the output of those presently working in the sector. This information would be vital for those both managing universities and setting policies for higher education employees. Specific information about those who struggle to produce output, compared to those who publish often, would also provide important feedback at a time when
university managers are seeking strategies to attract, retain, and train staff members in an effort to expand their respective research profiles.

**Method**

*Participants*

The participants in this study were drawn from the full-time 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 situated in a state capital city. The lecturers were associated with a range of research fields, including the sciences, education, business, and the arts.

*Instrumentation*

The development of the questionnaire was informed by a literature review and feedback from experts. The questionnaire was divided into three parts. Part 1 was designed to seek information of a background nature, including gender, academic level, and qualifications. The second part 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 part of the questionnaire was mainly based on an instrument developed by Schoen and Winocur (1988). The tasks were grouped according to three areas, namely, research, teaching, and service activities. Only the research tasks were relevant to this paper and are listed in Appendix 1. The focus of Part 3 was on the level of importance given to, and satisfaction derived from, research, teaching, and service activities, as well as the number of refereed publications produced during the participant’s academic career.

*Procedure*

Participation in the study was voluntary and participants responded anonymously to the questionnaire mailed to all full-time lecturing staff (N=985). A reminder to complete the questionnaire was then placed on the electronic daily 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) argue that a response rate of this size is relatively high in postal surveys and should be considered as more than satisfactory.

The research items in Part 2 of the questionnaire were examined using a principal components analysis with an oblique rotation (using SPSS, Version 16.0). The analysis 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. The small number of items which did not coalesce in the four-factor structure linked with specific information communications technology tasks.

Next, four subscales were produced from a grouping of the items as defined by the major factors. The raw scores of each item loading on a factor were added and then divided by the number of items in the subscale. The subscales had kurtosis and skewness values within or very close to the range -1 to +1 and, as a result, were judged to be appropriately normally distributed and suitable for analysis using multivariate procedures (see, e.g., Hair, Black, Babin, Anderson, & Tatham, 2006). The reliability coefficients of the subscales ranged from 0.80 to 0.96 and thus were deemed to be at an acceptable level (Wiersma, 1986).
A measure, referred to as *research time*, was calculated from answers to a question which asked participants to indicate the percentage of work time they gave, on average, to research cf., teaching and service activities. The distributional properties of this measure also meant that it was appropriate for use in specific multivariate analyses.

One other measure, termed *publication category*, was developed from publication output. When completing the questionnaire, participants were asked to indicate the number of peer-reviewed publications they had published across their career. In accord with recent 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. Publication output was then split into three approximately equal categories. Those participants with no publications or a very low publication output formed the first category (N=119) and those, in general, who had impressive publication rates made up the third category (N=119). For the purposes of this paper, those lecturers in the middle third (i.e., the second category) were omitted from the subsequent analyses. It is worth noting that the Category 1 lecturers averaged 0.27 publication points per year; whereas, their Category 3 counterparts accrued, on average, 6.22 points annually.

A summary of the description of each measure used in the analyses appears in Table 1. These measures are defined as either discontinuous or continuous. Table 2 contains additional information on the continuous measures. It can be seen that there are differences between the means on the continuous measures, indicating that the lecturers in Publication Category 3, as opposed to those in Publication Category 1, tend to report higher research self-efficacy as well as allocate more of their work time to research endeavours. In fact, they report that they devote about a third of their working week to research; whereas, those lecturers in Publication Category 1 report giving, on average, about half of this time.

**Table 1. Description of measures.**

<table>
<thead>
<tr>
<th>Variable Name</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gender</td>
<td>1=Male and 2=Female</td>
</tr>
<tr>
<td>Academic Level*</td>
<td>Level A=1, Level B=2, Level C=3, Level D=4, and Level E=5</td>
</tr>
<tr>
<td>Highest Qualification</td>
<td>Other=1, Masters=2, and Doctoral=3</td>
</tr>
<tr>
<td>Research Subscale 1</td>
<td>Reporting and Supervising Research; 11 items, range 0-9</td>
</tr>
<tr>
<td>Research Subscale 2</td>
<td>Designing and Conducting Research; 10 items, range 0-9</td>
</tr>
<tr>
<td>Research Subscale 3</td>
<td>Writing and Reviewing Substantial Works; 6 items, range 0-9</td>
</tr>
<tr>
<td>Research Subscale 4</td>
<td>Having a Broad View of a Research Area; 3 items, range 0-9</td>
</tr>
<tr>
<td>Research Time</td>
<td>Percentage of time given to research cf., teaching and service</td>
</tr>
</tbody>
</table>

*Associate Lecturer (A), Lecturer (B), Senior Lecturer (C), Associate Professor (D), and Professor (E).*

Besides the difference in terms of publication rates, the two categories of lecturer also varied with respect to academic qualifications gained. Those in Publication Category 3 were much more likely to have completed doctoral programs (87.6%) compared with their colleagues in Category 1 (21.8%). In addition, 20.2% of the latter category of lecturer had not completed qualifications at the Masters level. The Category 1 lecturers were also more frequently female (60.5% cf., 43.0%) and held Level A/B (junior) academic positions (78.2% cf., 45.5%).
Table 2. Means and standard deviations of the four research subscales and research time.

<table>
<thead>
<tr>
<th>Publication Category</th>
<th>Factor</th>
<th>Mean</th>
<th>Standard Deviation</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Research Subscale 1</td>
<td>5.383</td>
<td>1.951</td>
</tr>
<tr>
<td></td>
<td>Research Subscale 2</td>
<td>4.975</td>
<td>1.866</td>
</tr>
<tr>
<td></td>
<td>Research Subscale 3</td>
<td>4.331</td>
<td>1.887</td>
</tr>
<tr>
<td></td>
<td>Research Subscale 4</td>
<td>5.542</td>
<td>1.796</td>
</tr>
<tr>
<td></td>
<td>Research Time</td>
<td>17.390</td>
<td>12.739</td>
</tr>
<tr>
<td>3</td>
<td>Research Subscale 1</td>
<td>7.599</td>
<td>1.047</td>
</tr>
<tr>
<td></td>
<td>Research Subscale 2</td>
<td>7.124</td>
<td>1.126</td>
</tr>
<tr>
<td></td>
<td>Research Subscale 3</td>
<td>6.405</td>
<td>1.686</td>
</tr>
<tr>
<td></td>
<td>Research Subscale 4</td>
<td>7.023</td>
<td>1.336</td>
</tr>
<tr>
<td></td>
<td>Research Time</td>
<td>33.718</td>
<td>18.569</td>
</tr>
</tbody>
</table>

Results

Because both continuous and discontinuous measures were involved, it was decided to focus attention on the two types of measure in two phases. During the first phase, only the five continuous measures were considered, thus allowing a determination of the best linear combination of measures to distinguish between the Category 1 and 3 lecturers. This determination was based on the results of a discriminant analysis using the SPSS (Version 16.0) Classify program. According to Sharma (1996), a discriminant analysis should be used when the multivariate normality assumption is not violated. In this phase of the study, only five measures met this assumption and thus were used in the analysis. The discriminant function was highly significant (Wilks’ lambda=0.598, χ²=118.892, df=3, p<0.001), and three of the measures, namely, Research Subscale 1, Research Subscale 2, and Research Time, met the criterion for inclusion in the function. Furthermore, the unstandardised canonical discriminant functions evaluated at group means were -0.812 (Category 1) and 0.819 (Category 3) and the canonical correlation between the criterion and the set of measures (or predictors) was 0.634. This figure indicated that over 40% of the variance was shared by the linear combination of the three predictors.

The results of the classification analysis are presented in Table 3 and show that 84.9% of those categorised with high publication output (i.e., Category 3) were correctly classified; whereas, 26.1% of those classified as non-producers or poor producers of output (i.e., Category 1) were misclassified. The percentage of grouped cases that were correctly classified was 79.4%.

Table 3. Classification matrix for discriminant analysis for Category 1 and Category 3 lecturers.

<table>
<thead>
<tr>
<th>Actual Group</th>
<th>Number of Cases</th>
<th>Predicted</th>
<th>Category 1</th>
<th>Category 3</th>
</tr>
</thead>
<tbody>
<tr>
<td>Category 1</td>
<td>119</td>
<td>88</td>
<td>31</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>(73.9%)</td>
<td>(26.1%)</td>
<td></td>
</tr>
<tr>
<td>Category 3</td>
<td>119</td>
<td>18</td>
<td>101</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>(15.1%)</td>
<td>(84.9%)</td>
<td></td>
</tr>
</tbody>
</table>

Percentage of grouped cases correctly classified: 79.4%
The second phase was designed to build on the results of the discriminant analysis by describing and testing the relationships between the three significant continuous measures (viz., Research Subscale 1, Research Subscale 2, and Research Time) and the three discontinuous measures (viz., Gender, Academic Level, and Highest Qualification) on the same outcome variable, that is, low/high publication output. Logistic regression was considered the most appropriate procedure to use when examining relationships involving a dichotomous outcome variable and a mix of continuous and discontinuous measures, which means the multivariate normality assumption is obviously violated (Sharma, 1996). The logistic regression was performed using the Regression program in SPSS (Version 16.0) with the measures being entered in two separate blocks. The three continuous measures were entered in Block 1 and, predictably, the results revealed a significant relationship between these measures and the outcome variable. The omnibus test indicated an overall significant model ($\chi^2[3]=129.030, p<0.001$) and the Cox and Snell $R^2$ and the Nagelkerke $R^2$ values were 0.418 and 0.558 respectively. These two pseudo-$R^2$ measures can be regarded as “somewhat analogous to $R^2$ in linear regression” (McCoach & Siegle, 2003, p. 149) and are congruent with the canonical correlation reported earlier. The Block 2 results, with all six measures included, are displayed in Table 4.

Table 4. Results of the logistic regression.

<table>
<thead>
<tr>
<th>Measure</th>
<th>B</th>
<th>SE</th>
<th>Wald’s $\chi^2$</th>
<th>Df</th>
<th>$p$</th>
<th>Exp (B)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Research Subscale 1</td>
<td>0.382</td>
<td>0.237</td>
<td>2.602</td>
<td>1</td>
<td>0.107</td>
<td>1.465</td>
</tr>
<tr>
<td>Research Subscale 2</td>
<td>0.524</td>
<td>0.221</td>
<td>5.617</td>
<td>1</td>
<td>0.018</td>
<td>1.689</td>
</tr>
<tr>
<td>Research Time</td>
<td>0.036</td>
<td>0.014</td>
<td>6.882</td>
<td>1</td>
<td>0.009</td>
<td>1.037</td>
</tr>
<tr>
<td>Gender</td>
<td>-0.169</td>
<td>0.413</td>
<td>0.166</td>
<td>1</td>
<td>0.683</td>
<td>0.845</td>
</tr>
<tr>
<td>Academic Level</td>
<td>-0.002</td>
<td>0.248</td>
<td>0.000</td>
<td>1</td>
<td>0.993</td>
<td>0.998</td>
</tr>
<tr>
<td>Highest Qualification</td>
<td>2.117</td>
<td>0.402</td>
<td>27.771</td>
<td>1</td>
<td>0.000</td>
<td>0.120</td>
</tr>
<tr>
<td>Constant</td>
<td>-3.398</td>
<td>1.660</td>
<td>4.189</td>
<td>1</td>
<td>0.041</td>
<td>0.033</td>
</tr>
</tbody>
</table>

Once again, the results showed a significant relationship between the set of predictor variables and the outcome variable in the model, with an omnibus test result of $\chi^2[6]=169.787, p<0.001$. The Cox and Snell $R^2$ and the Nagelkerke $R^2$ values were 0.570 and 0.680 respectively. This increase in the variance accounted for was due to the influence of the Highest Qualification variable (see Table 4); but, the other discontinuous variables, namely, Gender and Academic Level, were not significant. It is interesting to note that, because of the relationships between qualifications and the variable Research Subscale 1, this latter variable was no longer a significant factor in the model. Furthermore, the analysis revealed that three measures, namely, Research Subscale 2, Research Time, and Highest Qualification, were significantly related at the 5% level to the outcome variable.

Logistic regression parallels discriminant analysis in that it is used to predict (and classify) group membership from a set of predictor variables (Hair et al., 2006). The results of the classification analysis are evident in Table 5 and point out that that 89.1% of those lecturers falling in Category 3 (i.e., high output producers) were correctly classified; whereas, 16.8% of those belonging to Category 1 (i.e., non-producers or poor producers of output) were misclassified. The percentage of grouped cases that were correctly classified was 86.1%. It is apparent when comparing these classification results with those yielded earlier from the discriminant analysis that the inclusion
of Highest Qualification, a discontinuous measure, improved the prediction/classification result, especially for Category 1.

The classification result and the pseudo-$R^2$ measures indicate that the tested model, using the six predictors, was fit to the data well. Further support for this claim can be gained by inspecting the findings of the Hosmer-Lemeshow (H-L) inferential goodness-of-fit test which yielded $\chi^2[8] = 4.922$, $p < 0.766$. As noted by Peng, Lee, and Ingersoll (2002), an insignificant H-L result is additional evidence of overall model fit.

<table>
<thead>
<tr>
<th>Actual Group</th>
<th>Number of Cases</th>
<th>Predicted Category 1</th>
<th>Predicted Category 3</th>
</tr>
</thead>
<tbody>
<tr>
<td>Category 1</td>
<td>119</td>
<td>99</td>
<td>20</td>
</tr>
<tr>
<td></td>
<td></td>
<td>(83.2%)</td>
<td>(16.8%)</td>
</tr>
<tr>
<td>Category 3</td>
<td>119</td>
<td>13</td>
<td>106</td>
</tr>
<tr>
<td></td>
<td></td>
<td>(10.9%)</td>
<td>(89.1%)</td>
</tr>
</tbody>
</table>

Percentage of grouped cases correctly classified: 86.1%

**Discussion**

Knowles et al. (2000, p. 8) argued that time, “assuming the presence of intellectual and physical energies,...is the fundamental component which makes possible the development of conceptually sound and professionally meaningful scholarly inquiries”. The present study is supportive of this argument because the findings indicate that those academics with high qualifications and who apportion greater work time to execute research tasks are much more inclined to produce scholarly products. Additionally, research self-efficacy, particularly relating to the designing and conducting of research, when coupled with qualifications and time, was shown to differentiate between those who battle to produce publications and those who are active researchers and writers. This finding is aligned in some respects to the results reported by Bailey (1999) and Vasil (1992) who found that efficacy for research activities was linked to publication output.

The notion of research self-efficacy was central to this study and extends considerably the work reported by Hemmings and Kay (2007). They used a single item measure labelled as *writing self-confidence*, and demonstrated that it was the strongest predictor of publication output in a sample of academics from one Australian university. The current study has attempted to examine the ‘self-confidence’ construct more extensively by drawing on factor analytic procedures to produce a fuller conceptualisation of research self-efficacy. This conceptualisation is formed by four discrete subscales, namely, *reporting and supervising research, designing and conducting research, writing and reviewing substantial works*, and *having a broad view of a research area*. Such a conceptualisation builds on the work begun by Schoen and Winocur (1988) which was also conducted in Australia. Their instrument contained fewer and some dated items when compared to the present era. These items, over two decades ago, when subjected to a factor analysis revealed a single underpinning factor.

Although gender and rank were not significant contributors in the results of the respective multivariate analyses, it was shown using descriptive measures, however, that the poor performing academics, compared to their more productive counterparts, tended to be female and
of junior rank. Support for this result can be found in the work of researchers such as Dundar and Lewis (1998), Green (1998), Sax et al. (2002), and Smeby and Try (2005).

The results offer directions to university managers and policy makers. First, since there were clear differences between the two categories of lecturer in terms of qualifications held, a strong argument emerges that encouragement and incentives need to be offered to those lecturers without higher research degrees. As discussed by Bazeley (2003), Hekelman, Zyzanski, and Flocke (1995), and Major and Dolly (2003), doctoral experience and completion combine to grow self-assurance and provide the foundation for a record of publication. Instrumental support during candidature in the form of fee waivers, meeting associated travel expenses (e.g., costs related to data collection), and buy-out for some work duties would obviously assist the candidate. Perhaps managers need to consider whether recruiting staff members without a higher research degree in certain fields is a sustainable course of action. No doubt, in some selected professional areas, a research-oriented qualification may not be so vigorously sought, especially if teaching and service duties are pivotal to the advertised position. However, in the current ERA context, these positions arguably will not be as readily available.

Second, creating time and space for research activities will be critical. For instance, a tri-session arrangement (two sessions for teaching and one session for research) will be one way of encouraging an intensive focus on research and scholarly writing. Such an arrangement has been in limited use in Australia but increasingly university managers are considering its advantages and disadvantages. However, if structural changes are not created to give more time for research, then the pressure is on the individual academic to make time count or for managers to implement time management programs for those wrestling to find an appropriate balance among research, teaching, and service activities. Both Norrell and Ingoldsby (1991) and Poole and Bornholt (1998) have argued for this form of intervention.

Third, developing research and writing self-confidence will need to be a prominent aspect of professional development programs designed mostly for new academics and those needing some renewal. More specifically, a stronger focus on writing skill will be required. Grant (2006) and McGrail, Rickard, and Jones (2006) both contend that such skill development has been hampered by a lack of encouragement from significant others. Consequently, any attempt to foster skills and generate confidence will require programs based around the support and collaborative efforts of colleagues. As discussed by LaRocco and Bruns (2006), these programs would need to place emotional support at their forefront. The performance review process for the above-mentioned academics needs to be aligned with such initiatives. For example, the development of writing skills and publication targets can be included in the performance objectives framed at a meeting between the academic and his/her supervisor.

Professional development programs for academics would also be well served if they included the following features taken from Zimmerman (2000): (a) modelling of self-regulatory techniques; (b) the setting of short-term goals, as opposed to long-term or distal goals; and, (c) the provision of enactive feedback that is regular and immediate. Although his work concentrates mainly on how to build self-assurance in children and adolescents, it can be argued that academics encountering new challenges would benefit from an approach grounded in his ideas.
The research tasks listed in Appendix 1, particularly those pertaining to the first and second subscales, will also be a critical part of any program designed to improve research self-efficacy beliefs. To have mastery experiences in these tasks is one way of boosting self-confidence. However, a targeted program that focuses initially on the more elementary tasks such as attending conferences, delivering conference papers, adhering to research ethics requirements, and collaborating with colleagues about research is one that would be beneficial. A hallmark of this program, as borrowed from Zimmerman (2000), is the setting of goals that are proximal and realistic. The program would then need to address the other tasks in a systematic fashion so that eventual mastery of all, or most, tasks is achieved.

Despite this study contributing worthwhile information about the factors influencing publication output, there are nevertheless certain limitations inherent in the study. For example, the measure, referred to as *Research Time*, which asked participants to indicate what proportion of their work time they allocated to research, compared with the two broad areas of teaching and service, did not permit further analysis of how much ‘real’ time was spent, on average, across the various work areas. With the benefit of hindsight, it would have been valuable to know the total number of hours per week each participant gave to his/her academic duties, as well as what factors (e.g., child care responsibilities, recreational pursuits, and health matters) either influenced them to work longer weeks or to a minimum schedule. Apart from gleaning this form of information from a questionnaire, follow-up case-study material would be a useful and rich supplement to help produce a clearer impression of the lecturer’s life-world.

Another shortcoming of the research centres on the fact that the publication data were self-reported. Researchers contemplating the use of such a measure might consider an alternative source that could be easily substantiated, especially since publication lists of individuals working within universities may become more readily available.

In a university environment, success is measured usually by publication output. To be successful, academics need to hold qualifications that demonstrate a range of abilities, be confident in these abilities, and find the time to put their abilities to the test. In order to bridge the gap between those academics who are successful and those who are not successful, and thus avoid division and further anxiety within academic circles, it is of paramount importance for university managers to garner those resources necessary to support neophyte academics and academics in need of renewal.
References


Appendix 1

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