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Running head: TRACKING FACULTY RESEARCH PRODUCTIVITY

Tracking Faculty Research Productivity: Analysis of a Survey Instrument

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Abstract

Research and publication is an inherent value at all institutions of higher education. Regardless of the motivation, faculty research fulfils a vital need for new knowledge generation. The purpose of the current study is to pilot test a survey instrument to evaluate factors that have an affect on faculty research at one public comprehensive four-year institution. The Business School in cooperation with the Office of Institutional Research created an instrument to track changes in faculty motivation and research involvement over time, with an emphasis on submissions and publications as effective outcomes. The survey instrument consists of scales measuring research integration (incorporating research into the teaching of students), networking with colleagues, and a detailed list of faculty research development activities. This report is a preliminary analysis of the first-year results.

Tracking Faculty Research Productivity: Analysis of a Survey Instrument

Research and publication is an inherent value at all institutions of higher education. Faculty publish books and journals at research institutions, comprehensive colleges, liberal arts colleges, and community colleges; however the emphasis on research varies by type of institution (Dev. Milem, & Berger, 1997; Fairweather, 2002; Perry, Clifton, Menec, Struthers, Ward, & Menges, 2000; Toutkoushian, Porter, Danielson, & Hollis, 2003). Where required, faculty research and publication productivity can range from one to two articles every three years at liberal arts and comprehensive colleges respectively to about six articles every two years at major research universities (Fairweather, 2002). Publication rates vary by discipline, with the medical and hard sciences having the highest rates to fine arts with the lowest rates. Citing a 2001 U.S. Department of Education Report, Toutkoushian and Associates (2003) report that faculty in general spend "25% of their work time" on research and publication (p. 122).

It is important to make a distinction between research activities and scholarship. Scholarship is a broader concept that includes teaching, service, academic citizenship as well as research and graduate training (Paulsen & Feldman, 1995). This study focuses more narrowly on research and publication.

Faculty espouse various reasons for conducting research. In a survey of faculty, Noser, Manakyan, and Tanner (1996) found that "75% of the respondents indicate their reason for conducting research is that they enjoy the challenge of producing quality research" (p. 311). Others have a curiosity for learning or place an importance on mastering the subject by writing a book on the topic (Tien, 2000). However, faculty also cite the need to achieve tenure (Noser et al., 1996), and the drop in publication rates for faculty after tenure at some institutions support the latter incentive (Dundar & Lewis, 1998; Sax, Hagedorn, Arredondo, & Dicrisi, 2002; Tien,

2000). Respect and recognition within the profession are other motivations (Sax et al., 2002). The desire to publish can be attributed to a faculty member's training as a graduate student where the individual learns to value the scientific method and looks forward to contributing to the profession (Buchmueller, Dominitz, & Hansen, 1999). Regardless of the motivation, faculty research fulfils a vital need for new knowledge generation in the higher education system.

The debate has been somewhat heated regarding whether research and teaching conflict, are complimentary, or do not have an effect on each other (Noser et al., 1996). Braxton (1996) reviewed twenty-nine different studies and found that the large majority find no detrimental effect of research on teaching but rather fit within the "null perspective," and a few studies demonstrate a positive effect on teaching (p. 10). Faculty with high research productivity have been shown to be very accessible to students (Bray, Braxton, & Smart, 1996), regularly teaching undergraduates (Olsen & Simmons, 1996), and supportive of teaching (Sullivan, 1996).

Several factors relating to research productivity have been examined in prior research studies. The Higher Education Research Institution Faculty Survey (HERI Faculty Survey) has been used to study various factors demonstrating the effect of rank, salary, department, interest in research and time engaged in research on research productivity (Sax et al., 2002). Tien (2000) found that "age, gender, highest degree earned... [and] discipline affect research productivity (p. 727). According to Sax and associates (2002), the gender gap in publication (females publishing less) still exists, but it is disappearing over time. Other researchers found no effect by gender (Perry et al., 2002). Dundar and Lewis (1998) report that the size of a department or doctoral program is positively related to faculty research productivity, but the effect diminishes with increasing size. Blackburn and Bently (1993) studied measures of self-competence and

demonstrated a positive effect of high self-competence on publications and interest in research reducing the stress associated with the pressure to publish.

Certainly the culture (norms, values, beliefs) across institutions and within departments will affect the importance placed on research (Austin, 1996). Faculty work in different environments providing varied levels of support for travel to conferences, research seminars, graduate assistants, or other research initiatives. These differences among institutions and departments will also affect faculty pursuit of research and publication.

Purpose

The purpose of the current study is to pilot test a survey instrument to evaluate factors that have an affect on faculty research at one public comprehensive four-year institution (see Appendix A). The Business School in cooperation with the Office of Institutional Research (OIR) created an instrument to track changes in faculty motivation and research involvement over time, with an emphasis on submissions and publications as effective outcomes. The survey instrument consists of scales not on the HERI Faculty Survey measuring research integration (incorporating research into the teaching of students), networking with colleagues, and a detailed list of faculty research development activities. Other scales measure more in depth faculty motivation to conduct research and personal attitudes. This report is a preliminary analysis of the first-year results.

Research productivity is conceptualized as a function of an instructor's educational background, support received from the department, motivation, and research involvement (see Figure 1). Academic background variables include education level, rank, and years of teaching experience. Departmental support is measured in terms of fair compensation, faculty research development activities, provision of sabbaticals, and teaching load. Other factors considered in the model are personal motivation, supportive attitudes, the formation of research networks, and research involvement. Although not part of the current survey, other demographic variables such as gender will be added to the instrument.

[Figure 1 about here]

Methods

The instrument was developed by two members of the Faculty Scholarship Committee in the School of Business who are experienced in conducting research. Changes to the instrument were made with feedback from several faculty who initially completed the survey. The instrument was then administered by the OIR to 55 contract faculty in the School of Business during spring 2002. Forty-three surveys were returned. This pilot study is being expanded to increase faculty participation from several schools on campus in part to achieve sample sizes large enough to conduct a factor analysis in the future.

Business faculty responding to the survey varied in their education level, years teaching, and academic rank. About 54% had an earned doctorate, 7% had a doctorate in progress, with the remaining 39% having a masters or other level of education. Another 44% had taught in higher education for fifteen or more years, 37% had experience teaching eight to fourteen years, with the remaining faculty having less experience (19%); thus, those instructors responding to the survey generally had extensive teaching experience in higher education. The large majority had taught at the college for a duration of four or more years (86%).

Statistical methods included Cronbach's Alpha, a correlation matrix to examine the relationship among the variables, use of logistic regression analysis, and descriptive statistics using SPSS. Given the small sample size, the study has the power to identify statistically significant relationships among variables that have moderate to high correlations (Borg & Gall,

Faculty Research Productivity 7

1989), but other variables (with important contributions) will not achieve significance. Although Spector (1992) recommends at least a sample size of 100 for item analysis, the initial analysis was conducted on a smaller sample of faculty (n=43) for a first look at the data and reliability; however, this does represent nearly 70% of full-time business faculty on campus.

Several categorical variables were recoded into dummy variables (i.e. academic rank, education level, teaching experience, submissions, and publications). Other variables are an average of several questions on a scale ranging from 1 to 7, strongly disagree to strongly agree. The research productivity measures in this study have been commonly used in other research (Toutkoushian et al., 2003). See Table 1 and the survey instrument in the appendix for further detail and explanations.

[Table 1 about here]

Findings

Reliability Analysis

The subscales developed for the instrument all resulted in high intercorrelations among the questions, which support the judgment that each set represents a "common underlying construct" (Spector, 1992, p. 30). Coefficient alpha demonstrated internal consistency with all values exceeding .7 as recommended by Spector (1992) (see Table 2). Alpha could not be substantially increased by eliminating items from the scales. Additional items should be added to the subscales for faculty perceptions of compensation and the effect of faculty workload; or, alternative measures of actual teaching load or salary levels could be incorporated into future analyses.

[Table 2 about here]

Relationships Among Variables

Relationships hypothesized during the construction of the instrument were supported by the results of correlations (see Table 3). The correlations establish a level of criterion-related validity for the model and the scales.

[Table 3 about here]

The correlations show that professors with current submissions are more likely to participate in faculty research development activities, are more motivated, have research networks with colleagues, positive attitudes, and routinely engage in research activities. The same variables have similar relationships with current publications, with the exception of faculty research networks, and total publications. The variable, current submissions, is highly correlated with current publications. Education level, motivation, networking, positive attitudes towards research, and current submission are also positively associated with total career publications.

As evidence of the School of Business shift from a purely environment to a research and teaching environment, there is a negative correlation between extensive years of teaching (15 or more) and total publications.

The variables, motivation, attitudes, and integration of research with teaching are highly correlated. Engagement in research and networking with other faculty are two other variables highly correlated with each other. Factor analysis may result in combining some of these scales; however, conceptually, they appear to measure different constructs.

Descriptive Statistics

Descriptive statistics show substantial research participation by faculty on campus. Only 16% of business faculty had no publications. There were 16% having twenty or more publications, 16% with ten to fifteen publications and the remaining 52% with 16 to 19 publications. The variable, research publications, was defined as including books, book

chapters, journal articles, proceedings, software, and manuals. Book reviews are excluded.

During the last academic year, 51% of faculty submitted an article to a peer-reviewed journal.

About 44% of faculty spent one to four hours on research activities per week with the remaining engaged in research more hours per week (66%).

It is interesting to note, however, that 44% had not published a peer-reviewed journal article since coming to the college, 21% published two articles, 14% three to four articles, and 9% with four journal publications (remaining percentage--no response).

The large majority of faculty currently attend research workshops (95%), professional conferences (74%), and work on research teams around common interests (77%). A substantial number of business faculty present at professional conferences (42%), receive some development from their chair (42%), formally mentor another faculty member (33%), or are mentored by others (28%). Less frequent activities are participation in summer research grants (16%) or other research grant opportunities (21%), receiving support for pursuing a doctoral program (16%), and taking leave or a sabbatical (2%).

Logistic Regression Analysis

The Hosmer and Lemenshow test support the null hypothesis that the regression equations fit the data well. For the equation predicting current journal submissions, 86% of the cases were classified correctly with the same percentage for both those who submitted and did not submit manuscripts. The second equation predicting current publications resulted in 74% of all cases correctly classified--79% of those who failed to publish correctly classified and 68% of faculty with publications correctly classified.

The Wald statistic tested the null hypothesis that $\beta = 0$ for each of the coefficients. The only factor to show significance in the logistic regression analyses is faculty participation in

research development activities during the last academic year; thus, highlighting the positive effects of departmental initiatives and their importance in promoting an active research agenda (see Table 4). This supports the views of (Dill, 1986) about the need to provide this type of support for faculty. It is believed that other variables would achieve significance in the regression equations, demonstrating predictive validity, if sample sizes were larger. Path analysis is another statistical technique that could demonstrate indirect as well as direct effects on scholarly research productivity.

[Table 4 about here]

Study Implications

The pilot study results are promising in terms of demonstrating internal consistency among questions that comprise each of the subscales. When larger samples are achieved, factor analysis will be utilized to further confirm and define the subscales on the instrument. In addition, it will be interesting to note the changes in faculty attitudes and involvement in research over time as the Business School continues to place more emphasis on scholarly research.

Certainly the sample survey and continuous nature of that which is being measured leaves many questions (Weick, 2001). Further longitudinal studies will reveal if these effects persist over time. However, consistent with Dill (1986), the preliminary analysis provides strong support for the efficacy of departmental support of faculty research development activities. Clearly attention to the communal culture is important (Palmer, 1998) in creating social support for faculty inquiry and discovery. The continuous and ongoing and public sense making in scholarly communities is a not only the critical activity for faculty, but is essential to promote social order (Freire, 1970). Faculty mentoring, research workshops, participation in research conferences, leaves and sabbaticals appear to stimulate communities of learning (Hammond &

Madsen, 2004) and positively affect faculty scholarship productivity in terms of submissions and publications.

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Table 1. Variable Definitions

Educational Background					
Academic Rank	Q58 0= Less than full professor				
	1 = Full Professor				
Education Level	Q59 $0 = \text{Less than doctorate/professional degree}$				
	1 = Earned doctorate/professional degree				
Teaching Experience	Q57 $0 = \text{Less than } 15 \text{ years of teaching}$				
	1 = 15 or more years teaching				
Departmental Support					
Compensation	Q8,Q35 Average of scale with Q35 values reversed				
Faculty Development	Q44-50,52-55 Number of activities				
Sabbatical	Q51 $0 = No$ sabbatical or leave				
	1 = Took sabbatical last academic year				
Teaching Load Perceptions	Q33,Q40 Average of scale with Q40 values reversed				
Research Motivation					
Personal Motivation	Q2,Q4,Q9,Q10,Q12,Q17,Q27 Average of scales				
	with Q17 values reversed				
Support Network	Q16,Q20,Q28,Q29,Q32,Q34,Q37,Q38,Q39				
	Average of scales				
Supportive Attitude	Q6,Q13,Q14,Q21,Q31,Q42 Average of scales with				
	Q14, Q31 values reversed				
Research Involvement					
Research Integration	Q3,Q5,Q11,Q15,Q23,Q25,Q41 Average of scales				
	with Q15 values reversed				
Routine Engagement	Q1,Q7,Q18,Q19,Q22,Q24,Q26,Q30,Q36 Average				
	of scales				
Research Productivity					
Current Submissions	Q60 $0 = \text{No submissions}$				
	1=one or more submissions				
Current Publications	Q61 $0 = \text{No publications since current employment}$				
	1 = One or more publications				
Total Publications	Q62 Total number of publications				

Table 2. Reliability Analysis of Subscales

Scale	Alpha	Number of Cases	Number of Items
Personal Motivation	.92	43	7
Support Network	.74	43	9
Supportive Attitude	.93	43	6
Research Integration	.87	43	7
Research Engagement	.89	43	9

Table 3. Correlation Matrix

-	1	2	3	4	5	6	7	8	9	10	11	12	13	14
1. Academic rank		-												
2. Teaching experience	.63**	¢	-											
3. Educational level	.00	02		-										
4. Compensation	.03	17	.17	-	-									
5. Faculty development	20	12	.15	07		-								
6. Sabbatical	.07	.03	02	.21	15	-	-							
7. Teaching load perceptions	s26	.02	01	14	.03	04								
8. Personal motivation	19	24	.43**	.09	.34*	.23	37*		-					
9. Support network	35*	35*	.14	.10	.40**	.05	05	.55**	-					
10. Supportive attitude	26	28	.36*	.04	.33*	.22	40**	.91**	.46**	-	-			
11. Research integration	19	13	.36*	05	.33*	.25	39*	.89**	.46**	.87**	-			
12. Routine engagement	36*	31*	.03	.04	.47**	.17	17	.67**	.72**	.66**	.61**			
13. Current submissions	16	25	.21	.01	.58**	01	13	.36*	.49**	.34*	.23	.42**		
14. Current publications	06	13	02	01	.38*	.25	04	.33*	.28	.30*	.26	.39**	.59**	
15. Total publications	.13	31*	.43**	04	.16	.17	02	.38*	.33*	.33*	.31*	.19	.31*	.21

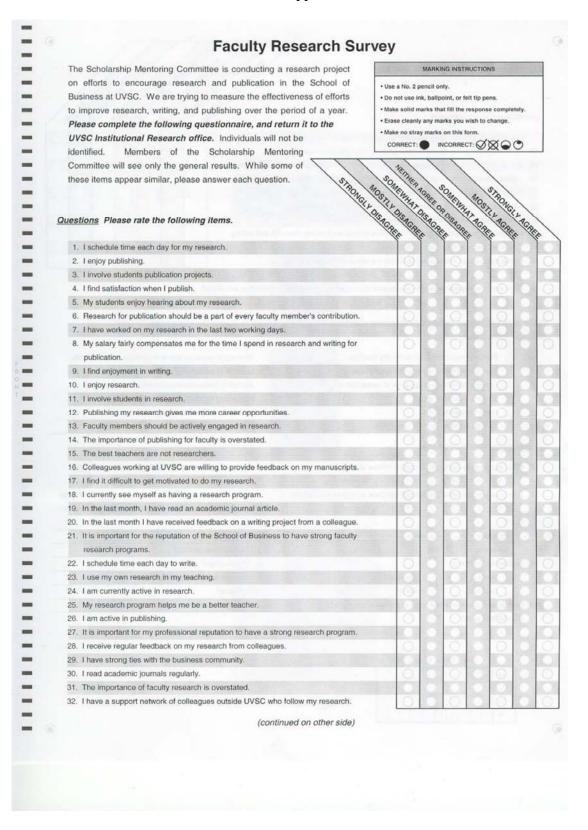
^{*} p <.01, **p<.05, n = 43 in all cases except for Total Publications where n = 42.

Table 4. Logistic Regression

Factors	Current Submissions			Current Publications				
	(N=43)			(N=42)				
	Beta	S.E.	Exp(B)	Beta	S.E.	Exp(B)		
Educational level	2.41	1.57	11.09	-0.63	0.97	0.53		
Academic rank	0.10	1.73	1.11	0.80	1.16	2.23		
Teaching experience	-0.44	1.43	0.65	-0.55	1.01	0.58		
Compensation	-0.23	1.10	0.79	-0.40	0.61	0.67		
Faculty development	6.59*	2.96	730.53	1.68	0.90	5.36		
Sabbatical	4.28	2.91	72.18	8.86	42.70	7076.15		
Teaching load	-1.46	0.82	0.23	0.13	0.32	1.13		
Personal motivation	-0.71	1.34	0.49	0.59	0.75	1.81		
Support network	2.79	1.63	16.36	-0.05	0.52	0.95		
Supportive attitude	1.59	1.41	4.88	0.10	0.63	1.10		
Research integration	-2.44	1.28	0.09	-0.57	0.68	0.57		
Routine engagement	-0.42	0.86	0.66	0.27	0.47	1.31		
Constant	1.38	7.57	3.96	-1.47	3.93	0.23		

^{*}p<.01, **p<.05

Appendix A



We appreciate your taking the time to complete this survey.