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This study identified determinants of publication productivity of Ph.D. faculty in arts and science departments at undergraduate colleges. Separate analyses were also conducted of faculty publishing at public, nondenominational, Protestant, and Catholic institutions. The sample consisted of 1,216 faculty selected from the respondents in the American Council on Education-Carnegie Commission on Higher Education 1969 national survey. Contingency coefficients on 48 variables were reduced to the 10 strongest predictors for regression analysis. Habit of professional writing is the single best predictor of total productivity, even when years in higher education, rank, and other correlates are held constant. The study also interprets productivity correlates so as to assist undergraduate colleges in their concerns for faculty development. The data suggest that both dimensions of professional growth--teaching and research/publishing--be available and encouraged by four-year colleges. (Author)

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DETERMINANTS OF FACULTY PUBLICATION PRODUCTIVITY AT FOUR-YEAR COLLEGES

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ABSTRACT

This study identified determinants of publication productivity of Ph.D. faculty in arts and science departments at undergraduate colleges. (Separate analyses were also conducted of faculty publishing at public, nondenominational, Protestant, and Catholic institutions.) The sample consisted of 1216 faculty selected from the respondents in the American Council on Education-Carnegie Commission on Higher Education 1969 national survey. Contingency coefficients on 48 variables were reduced to the ten strongest predictors for regression analysis. Habit of professional writing is the single best predictor of total productivity, even when years in higher education, rank, and other correlates are held constant. The study also interprets productivity correlates so as to assist undergraduate colleges in their concerns for faculty development. The data suggest that both dimensions of professional growth--teaching and research/publishing--be available and encouraged by four-year colleges.

INTRODUCTION

Those who have conducted research on faculty scholarly publications have restricted their inquiries almost exclusively to the university setting (Axelson, 1959; Babchuk and Bates, 1962; Crane, 1965; Simon, Clark, and Galway, 1967; Clemente, 1973; Fulton and Trow, 1974). Such limited investigations are understandable in part, for the greater share of scholarly output comes from the complex and differentiated institutions. Yet about 50% of faculty at four-year colleges have published (Eckert and Williams, 1972; Fulton and Trow, 1974), and about 40% say more time for research is essential and/or very important to them (Bayer, 1973). Neglecting such an appreciable sample, one expressing a desire to spend more time in inquiry, leaves a large gap in our knowledge of faculty behavior.

Excluding investigation of faculty research productivity in undergraduate colleges has had other unfortunate outcomes as well. The professoriate is a society unto itself (Gustin, 1973; Blackburn, 1974). Unqualified acceptance in the larger culture of academic people is contingent upon published scholarship (Light, 1974). These institutions place a heavy emphasis on teaching. They also have limited laboratories and libraries, less funded research support, and no graduate students for assistants. Therefore, it is unlikely that the predictors of publication productivity for undergraduate faculty will be identical to those of university professors. Hence the need to ascertain separately what personal and environmental variables in four-year colleges correlate with publication output is important.

CONCEPTUAL FRAMEWORK

Three concepts undergird the study's investigation: (1) socialization by the graduate school for the professional norm of scholarly contribution; (2) the intrinsic motivation of college and university faculty to achieve the visible "guildmark" of career success--publishing; and (3) environmental conditions conducive to provide in faculty growth and development (an institutional concern).

DATA SOURCES

The data come from the 1969 American Council on Education (ACE)-Carnegie Commission on Higher Education (CCHE) national survey of 100,315 faculty. A one-third random sample computer tape of the 60,028 respondents was used in the secondary statistical analyses. Trow (1972) has shown that small random subsamples faithfully reproduce statistics of the 60,028 population. In order to make comparisons with studies on university faculties, the population sample was further delimited so as to include only persons with a Ph.D. in four academic areas: biological sciences, humanities, physical sciences, social sciences. The final N for refined analysis was 1216.

When coded, the 12 page ACE-CCHE questionnaire had 387 data bits per respondent. Forty-eight items based on prior research were used as potential correlates. The ten strongest predictors were selected for detailed, multiple regression analysis.

METHODOLOGY

After bivariate analyses (principally chi squared) sorted out the weak from strong relationships, Multiple Classification Analysis (MCA) (Andrews, et al, 1967; 1973) served to ascertain correlates (eta and eta^2) and predictors (beta and $beta^2$) as well as F ratios for analysis of variance, and R^2 for hypothesis testing. (MCA permits determination of the strength of individual variables when others are held constant and also identifies those independent variables which contribute the major share of the variance.) Cumulative journal articles published was the outcome measure (dependent variable).

RESULTS AND CONCLUSIONS

1. In order of statistical significance (beta values), the ten best predictor variables are: (a) habit of publishing (output over a two year period); (b) disciplinary field; (c) years in higher education; (d) academic rank; (e) interest in research; (f) preference that the institution have publication as a criterion for promotion; (g) salary received; (h) number of journal subscriptions; (i) years at current institution; and (j) communication with others. The first five (a-e) are much stronger predictors than the last five, and the strongest predictor--habit of research accomplishment--has a beta value twice as large as the second ranking, and all other predictors. (See Table 1.) The combined variables

yield a multiple R of .70 and hence account for 50% of the variance, an appreciable amount for an investigation of this kind.

[Insert Table 1 about here.]

2. Habit or rate of production (measured by the number of publications in the two years prior to the ACE-CCHE survey) yields a high beta, viz., .45, the value when all other predictors are held constant. Those not active in the short-run fail to achieve a significant cumulative total of articles. Those who do engage in professional writings reinforce their practice. Hence, potential and promise for performance need to be encouraged and nurtured by the joint effort of individual and institution. Moreover, the failure to convert potential into habit early in the career can be a fatal error for the difference in productivity rates between high and low producers increases with the passing of time (Allison, 1974).

3. Faculty productivity rates and patterns differ appreciably between the four academic areas studied. Biological science faculty not only have the most atypical publishing profile, but the ten predictors also have the greatest statistical weight for these academics (multiple R of .78 which accounts for 61% of the variance). However, caution is needed at this point for differing norms and outputs inhibit comparisons between disciplines. Multiple authored short articles in the sciences do not compare directly with single authored books in the humanities.

4. That "number of years in higher education" predicts total output is not surprising. However, when this factor is held con-

TABLE 1

STATISTICALLY SIGNIFICANT PREDICTORS

N = 1216

Predictor	Beta	eta Squared	F Value	Value for .01 level	
Publishing over 2 years	.45	.20	95.5	3.0	
Academic area	.22	.05	38.7	3.8	
Years in higher education	.22	.05	31.5	3.3	
Academic rank	.16	.03	30.6	4.6	
Degree of interest in research	.16	.03	14.6	3.0	
Preferred criterion for promotion: teaching effectiveness or publications.	.09	.01	4.8	3.3	
Salary level	.08	.01	3.7	3.3	
Journal subscriptions	.08	.01	2.4	2.8	NS
Years at current institution	.04	<.01	1.1	3.3	NS
Degree of communication with colleagues at other institutions.	.03	<.01	0.7	3.3	NS

stant (i.e., when separate MCA analyses are run for each cluster), those who have been academics for a long time affect the dependent variable positively, whereas faculty new to their careers contribute negative effects on the outcome measure. That is to say, those who start producing early go on to produce a great deal and those who do not publish at the outset tend never to accomplish very much. Overcoming early career publishing inactivity can hardly be expected from the individual without an active policy of institutional support.

5. Rank, while correlated with years in higher education, predicts total output, even when all other factors are held constant, including years employed in colleges and universities. The significant beta (.16) results from the wide range of coefficient values between full professors (high positive) vis a vis assistant professors (high negative--that is, few publications). Moreover, while both full and associate professors normally have tenure, full professors are relatively more productive, an indication that claims of decline in output after achieving job security lack foundation.

However, atypical patterns appear for two subdivisions of academe--biological scientists and faculty at Catholic colleges. In these groups, assistant professors have established credible publishing records. The interrelated nature of teaching and research in science might explain the former, but the case of

Catholic colleges appears to be a novel phenomenon. (See #7 below.)

6. Nearly 70% of these four-year college faculty expressed an interest in doing research. In addition, the intensity of their interest significantly predicts productivity--those expressing no interest having a negative impact, and those showing the highest interest having the most positive effect on the beta value. Such extensive interest should not be thwarted by institutional neglect. Some four-year colleges even transmit a negative message, one which suggests time spent on scholarship is done at the expense of institutional goals.

7. Faculty at Catholic colleges exhibit an atypical pattern of publishing when compared to their counterparts in public, nondenominational, and Protestant institutions. The main difference is that faculty who are relatively new to the institution (4-9 years of employment) publish the most. Their atypical performance suggests a faculty dichotomized by age, rank, professional expectations, and publishing achievements. (Reverse role modeling might be tried in these colleges.)

8. The principal similarities with studies on university faculty productivity are in the variables of interest in research, rank, and early publishing. Notable differences are communications with others, and journal subscriptions, both of which are strong predictors at the university level and weak or nonsignificant for undergraduate colleges. On the average, four-year faculty produce

less than faculty in graduate institutions. The output differences may be traceable to the social nature of research.

IMPLICATIONS AND DISCUSSION

In a time of reduced career options and an aging faculty, the need for faculty growth and development programs assumes high priorities. Hence from an educational and practical perspective, this study identifies key variables and career stages for institutional focus. Administrative policies and practice which (1) facilitate faculty creativity, (2) especially heed the beginning years with support and encouragement, (3) recognize discipline differences, but (4) nonetheless induce the habit of productivity, (5) capitalize on the existing resource of active publishers at each college, and (6) provide increased outlets for faculty products should all have positive consequences. Faculty growth and development is not exclusively research publication. Nonetheless, a full career includes the scholarly dimension. Four-year institutions need to improve their personal and work environment so that nearly all (rather than about half) of the faculty grow along this line and satisfy both personal desires and professional expectations.

In addition, research and teaching are positively correlated. (The relationship is not strong--see Blackburn (1972) for a review of the research--but it is not -1.00 as many advocates of under-

graduate colleges imply when they boast that theirs is a "teaching" institution.) This positive relationship finding needs to be corroborated in four-year colleges, for, if the correlation holds, it suggests how an important institutional and individual aim, viz., improvement of teaching, could be accomplished by encouraging and supporting faculty intrinsic motivations and socialized norms.

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