Contingent Commitments:
Bringing Part-Time Faculty Into Focus

Methodology Supplement

Introduction

Center reporting prior to 2013 focused primarily on descriptive statistics (frequencies and means) of student and faculty behaviors. The goal of the analyses reported here and in *[Contingent Commitments: Bringing Part-Time Faculty into Focus](#)* is to understand the engagement of part-time or contingent faculty in various activities that are directly related to student learning (e.g., holding office hours, participation in high-impact practices such as learning communities, student success courses, accelerated developmental education, etc.) as well as opportunities to be involved in non-instructional roles (e.g., review and/or development of curricula, service, institutional governance, and participation in professional development). This paper also examines these roles in comparison to full-time faculty to understand where there are differences in opportunities for part-time faculty.

Because full-time and part-time faculty, by definition, have different levels of participation in these activities, it is important that the statistical methods used to analyze the data appropriately account for the other measured variables that may impact the time dedicated to these activities. One way to control for this expected difference is to use analysis of covariance (ANCOVA). ANCOVA is designed to evaluate differences between groups on a single dependent variable after removing the effects of covariates known to be associated with the dependent variable. A covariate is a variable that is known to have a relationship with the dependent variable. In these analyses, one critical covariate is the number of credit hours the faculty member is scheduled to teach for the current academic year. (Employment status is also an important variable, but that is the independent variable.) Center analysts also tested models with several other covariates which will be described later.

Analysis of covariance serves as a statistical matching procedure and is useful in analyses like those conducted for this report, where assignment to experimental groups is not possible but groups occur naturally in the data. ANCOVA adjusts group means to what they would be if all respondents had the exact same values on the covariates. By statistically removing the effects of covariates, ANCOVA addresses the question of whether mean differences between groups on the dependent variable are likely to have occurred by chance. However, it is critical to remember that ANCOVA results have no implication of causality (Tabachnick and Fidell, 2007).

Data Sources

The data used in the analyses for the special report are from the *Community College Faculty Survey of Student Engagement (CCFSSE)* administrations from 2009 through 2013. Items that

are not related to high-impact practices include respondents from all five years, while data pertaining to high-impact practices will include respondents from 2011 through 2013, as the high-impact practice items were not added to the survey until 2011. The total number of respondents for all five years is 71,451 and for the latter three years is 47,696. The number of respondents in the analyses will vary depending on missing data. The data may include multiple responses from a given faculty member if that faculty member completed the survey more than once during the five-year timeframe.

Methods

The majority of the data presented in *Contingent Commitments* are descriptive statistics identifying differences between part-time and full-time faculty vis-a-vis engagement in different practices. Full-time and part-time faculty would be expected to engage in many activities at different rates simply due to their employment status. However, teaching loads vary among full-time faculty and among part-time faculty, depending on commitments outside of the classroom. Therefore, analysis of covariance was used to control for a number of covariates. Analysis of covariance is a method that allows one to test for statistical differences between group means while taking into account, or controlling for, the variability in a dependent variable due to covariates, or sources of variability other than the independent variable(s) of interest. These additional sources of variability (covariates) can mask the relationship between the independent variable – faculty employment status – and the dependent variable – time spent on selected activities in and out of the classroom. By removing the effect of the covariates, it is possible to say with more confidence that the remaining variability in the dependent variable is likely to be attributable to the faculty employment status.

The analyses summarized here and in the special report (see page 10) were conducted using PROC GLM in SAS (SAS Institute, Inc., 2013). Two options were included in PROC GLM to aid in interpretation of the output: the EFFECTSIZE option on the MODEL statement and the LSMEANS statement. The EFFECTSIZE option (an experimental option in SAS 9.3) on the PROC GLM Model statement adds measures of effect size to the statistical output. Whereas the *F test* statistic indicates whether the mean difference between two groups might be "real" or occurs by chance, the effect size indicates how much variation in the dependent variable is explained by the independent variable after removing variation due to the covariates in the model. The analyses conducted for this report include the independent variable (employment status) and several covariates; therefore, the effect size measure used is *partial eta-squared (partial-η^2)*.

Under these conditions, *partial-η^2* represents the variance in the dependent variable explained by employment status after excluding the variance explained by the covariates.

In addition to the standard MODEL statement in GLM, which specifies the dependent variable (faculty activity), the independent variable (employment status), and the covariates, Center analysts also requested that PROC GLM estimate the least squares means (LS-means) for the dependent variable. LS-means are also referred to as *predicted population margins* or *estimated marginal means*. Unlike a standard or algebraic mean, LSMEANS estimates the mean of the dependent variable for each group of the independent variable (employment status) so that they equal what would have been observed if full-time and part-time faculty had the same average values on all covariates.

The analysis used the default setting for LSMEANS in PROC GLM for covariates, which means that the estimated means do not reference a specific subgroup, but rather apply to the "average" faculty member in terms of the covariates. Because the focus is on differences between full-time and part-time faculty in the various activities, the objective of the covariates is to remove associated variation or noise in the relationship between level of engagement in an activity and employment status that might be caused by population subgroup membership.

The dependent variables for the ANCOVA analyses (faculty use of professional time on a particular activity in a typical week) are ordered categorical variables with the following eight response options: 0=None, 1=1 to 4, 2=5 to 8, 3=9 to 12, 4=13 to 5=16, 17 to 6=20, 21 to 30, and 7=30+ hours. Because the LS means of these categorical variables would be difficult to describe concisely, analysts opted to summarize the results for three particularly interesting faculty activities rather than present the LS means in graphical format. Additional investigation indicated that graphing the distribution of responses without controlling for the number of credit hours scheduled to teach provide a similar representation compared to the adjusted results; therefore, these frequency distributions are presented in the main report. However, this document will provide the results of the ANCOVA models for the 15 dependent variables tested.

In addition to the 15 items asking faculty how many hours per week they spend on certain activities, the Center also tested 11 additional dependent variables that ask what percentage of class time is spent on various activities (e.g., lecturing, teacher-led discussion, faculty-student shared responsibility, small group activities, hands-on activities, etc.). While all of these models were statistically significant overall, differences between full-time and part-time faculty on these

dependent variables did not meet the criteria for notable differences. As such, the results are not included in this report supplement.

Almost all analyses conducted in preparation for this report yielded statistically significant results. However, from a practical perspective, minute differences between groups, even though they might be statistically significant, are not always practically significant or useful to college administrators for making decisions. As such, the Center defined a decision rule for including results in the special report. To be included, a model had to explain over 3% of the variance in the dependent variable (R^2 > .030) and the variance explained by employment status had to be at least 1% (*partial-η^2* greater than or equal to .010). Results meeting these criteria were considered to reflect a "notable difference" in faculty use of professional time on a particular activity in a typical week between part-time and full-time faculty. These notable differences, in turn, are considered to be large enough to inform policy discussions at the campus level.

Covariates

Through a series of models, five covariates were included. These included

- FSECTIONS: What is the total number of credit hours you are scheduled to teach during the current academic year (including summer sessions) at this college? Response options: 1 = 1 to 3, 2 = 4 to 6, 3 = 7 to 9, 4 = 10 to 12, 5 = 13 to 15, 6 = 16 to 18, 7 = 19 to 21, 8 = 22 to 24, 9 = 25 to 27, 10 = 28 to 30, and 11 = More than 30 hours.

- TEACHDEV: Do you teach developmental/basic skills/college prep courses at your college? Response options: 1 = Yes, I teach ONLY developmental courses; 2 = Yes, I teach both developmental and college-level courses; and 3 = No, I teach only college-level courses.

- FACADRANK: Which of the following best describes your academic rank, title, or current position? Response options: 1 = other, 2 = Lecturer, 3 = Instructor, 4 = Assistant Professor, 5 = Associate Professor, and 6 = Professor.

- FDEGREE: What is the highest degree you have earned? Response options: 1 = Other, 2 = Associate degree, 3 = Bachelor's degree, 4 = Master's degree, 5 = Doctoral degree, and 6 = First professional degree (e.g., M.D., D.D.S., J.D., D.V.M.)

- FYEARS: How many years of teaching experience do you have in any college/university, not including graduate teaching assistant positions? Response options: 1 = 40 years or more, 2 = 30 to 39, 3 = 20 to 29, 4 = 10 to 19, 5 = 5 to 9, 6 = 1 to 4, 7 = First-year teacher.

- TCHLIBARTS: Based on the field the faculty respondent reported in FTEACHAREA (the area the respondent teaches), faculty respondents were classified as either teaching a

liberal arts course or a non-liberal arts course. Values: 0 = non-liberal arts and 1 = liberal arts.

The models introduced each of these covariates individually. Based on the review of these results, different combinations of covariates were tested. The results for all of the models with the number of hours spent on various tasks during a typical week are presented in the next section. Since all but two of the models for percentage of class time spent on various activities failed to meet the criteria for inclusion in our results, none of the results for these models are included in this report.

Limitations

It is important to remember that the ANCOVA model does not imply causal relationships. The model simply demonstrates group differences in the dependent variable based on variations in the independent variables and covariates included in the model. So, while results may allow analysts to posit that there is a relationship between group membership and variation in the dependent variable, we *cannot* conclude that group membership *causes* a higher or lower scores on the time allocated to the various activities. Causality requires a temporal component that ANCOVA does not accommodate.

For additional questions, please contact Mike Bohlig, Senior Research Associate, Center for Community College Student Engagement at Bohlig@cccse.org.

References:

Tabachnick, B. G., & Fidell, L. S. (2007). *Using multivariate statistics (5th ed.)*. Boston, MA: Allyn & Bacon/Pearson Education.