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Use of Technology among Higher Education Faculty Members: Implications for Innovative Practice

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Abstract

Prior research findings suggest that incorporation and use of technology in college are associated with increased educational gains and learning outcomes for students. Thus, faculty members are expected to use technology in their teaching more now than ever. Yet, more information is needed about the frequency and nature of faculty use of technology. Using data from the *NSOPF:04*, this study examined higher education faculty members' use of technology and compared their use to instructional faculty not in higher education. Implications for future practice are discussed in detail.

Introduction

During a recent conversation with a faculty colleague about teaching and pedagogy, we mused about the way in which we teach our graduate students. As faculty members in higher education graduate programs, we wondered how many of our colleagues use technology in their classes and how technology was put to use.

To explore this issue, it was necessary to review the literature on the use of technology in higher education. Generally, this body of research can be conceptualized into two broad categories. One line of inquiry focuses on students' use of technology in college (Flowers, 2004a; Gatz & Hirt, 2000). A growing segment of this work estimates the impact of technology use on student learning outcomes (Flowers, Pascarella, & Pierson, 2000; Kuh & Hu, 2000; Redding & Rotzien, 2001; Strayhorn, 2006). Findings provide compelling evidence that technology use is associated with increased gains and skill development. In addition, this body of research consists of studies about affective outcomes such as students' attitudes toward technology use in educational settings (Ali & Elfessi, 2004; Slate, Manuel, & Brinson Jr, 2002).

A second stream of research focuses on the use of technology among teachers with respect to their teaching. Some studies highlight specific ways to incorporate technology such as using the web in classroom settings (Bento & Bento, 2000). Other works focus on the use of technology in higher education programs (e.g., distance learning) (Institute for Higher Education Policy, 1999; Karr, Weck, Sunal, & Cook, 2003). Obscured in the present body of research are the experiences of instructional faculty whose principal field of teaching is higher education. Flowers (2004b) studied higher education faculty members but focused on their use of course-specific websites. In addition, he analyzed data from the 1999 *National Study of Postsecondary Faculty*. More recent information about how higher education faculty members' use of technology compares to all instructional faculty members is needed. This is the gap addressed by this study.

The purpose of this study was to examine the use of technology in the classroom among faculty members whose principal field of teaching is higher education. Using nationally representative data from the *National Study of Postsecondary Faculty* (NSOPF:04), the following research questions guide this investigation:

(a) To what extent do higher education faculty members use technology in their teaching?
(b) Are higher education faculty members different from all other faculty members in terms of their use of technology?

Method

Data Source

The most recent data from the National Study of Postsecondary Faculty (NSOPF:04) were used to explore the use of technology among higher education faculty members. These data were deemed appropriate since the NSOPF:04 database contains survey responses from a nationally representative sample of faculty members in the United States (Abraham et al., 2002). In fact, the sample consists of approximately 34,330 faculty and staff members from 1,070 postsecondary institutions. Of these, approximately 56% were employed full-time and 62% of full-time faculty members reported teaching as their principal activity.

A two-stage stratified probability sampling designed was employed to select the NSOPF sample. That is, researchers categorized institutions into two strata based on their degree offerings and federal research dollars. Then, they sampled institutions within those strata to include public and private for- and not-for-profit, 2- and 4-year institutions. The NSOPF database provides nationally representative data on faculty members' productivity, workload, benefits and salaries, and even institutional policies and practices affecting faculty members (e.g., tenure).

Sample

For data analysis, the sample was reduced to full- and part-time instructional faculty members whose principal field of teaching was higher education, as measured by the NSOPF questionnaire. The weighted (see Thomas, Heck, & Bauer, 2005 for fuller discussion) sample consisted of approximately 1,400 higher education faculty members who responded to questions about their use of technology in their teaching and teaching-related activities. Table 1 presents additional information to describe the analytic sample.

Table 1
Characteristics of higher education faculty members, NSOPF:04 (N=1,400)

Characteristic	%
Gender	
Men	59
Women	41
Highest Degree	
PhD/Professional Degree	63

Master's	35
Bachelor's	3
Control of Institution	
Public	69
Private	31
Employment Status	
Part-time	71
Full-time	29

Note. U.S. Department of Education, National Center for Education Statistics, 2004 National Study of Postsecondary Faculty (NSOPF:04).

Variables

The dependent variable in this study is a technology index measure. This index was created from two items on the NSOPF questionnaire that elicited information about faculty members' use of technology (e.g., email and websites). One item asked, "During the 2003 fall term, did you have one or more web sites for any of your teaching, advising, or other instructional duties?" Response options ranged from 0 ("no") to 1 ("yes"). The other asked, "During the 2003 fall term, how many hours per week did you spend communicating by email with your students?" Although the original variable was continuous in nature and allowed respondents to indicate the number of hours spent on email, I recoded the variable to indicate whether or not faculty used email to communicate with students. Responses were recoded on a scale from 0 ("no" or original value =0) to 1 ("yes" or original value > 0). The composite index is ordinal in nature and is placed on a 4-point scale with scores ranging from 0 ("no use of information technology") to 3 ("maximum use" as measured by NSOPF:04).

Similar to Flowers' (2004b) study, this analysis compares two groups of faculty members. Flowers compared higher education faculty members at public institutions to those who were employed at private institutions. In this study, I compared higher education faculty members to all other (non-higher education) instructional faculty members included in the national sample. Again, both samples include instructional faculty members only based on the premise, in part, that those whose principal activity was teaching would be most likely to employ technology in their work.

Analysis

Using data from a nationally representative sample of faculty members in the United States, I calculated percentages to describe the use of technology among instructional faculty whose principal field of teaching was higher education. In addition, I calculated means, standard errors, and *t-tests* to test for differences in technology use between higher education faculty and all other (non-higher education) instructional faculty in the national sample. The next section presents findings from the current investigation.

Results

Results suggest a number of findings about higher education faculty members' use of technology. In this study, 59.4% of all higher education faculty used email and no websites. In contrast, 40.6% of all higher education faculty used both email and course-specific websites. Surprisingly, no higher education faculty members used course websites without email. Table 2 presents a summary of these findings.

Table 2
Percentage of Higher Education Faculty Members' Use of Technology

Type of Technology	%
Email, no websites	59.4
Websites, not email	0
Both; email and websites	40.6

Note. U.S. Department of Education, National Center for Education Statistics, 2004 National Study of Postsecondary Faculty (NSOPF:04).

The latter finding seems a bit curious until it is considered in tandem with other results. For example, a separate item on the NSOPF questionnaire elicited information about use of course websites in teaching specifically. When taken together, findings suggest that 40.6% of all higher education faculty members used websites while 59.4% did not. This confirms that all of those who used course websites also used email.

Finally, an independent samples *t* test was conducted to evaluate the hypothesis that higher education faculty members' use of technology differs significantly from the level of use reported by all other (non-higher education) instructional faculty included in the NSOPF:04 sample. The test was non-significant, $t(\text{df}) = -1.25$, $p > .05$, despite the observable difference in the means of both groups. Higher education faculty members reported using technology more ($M = 1.8$, $SE = .24$) than all instructional faculty members ($M = 1.5$, $SE = .01$), on average.

Discussion

In short, most higher education faculty members use email rather than websites and a combination of the two. This is an important finding given recent discussions about enhancing college teaching through the use of technology. In fact, it suggests that a great deal of innovative approaches have not yet been tried by such faculty. To this end, I offer the following ideas for consideration:

1. Higher education faculty should create course websites using technologies provided by their college or university. For example, many colleges provide students and faculty with access to *Blackboard* or related software. Faculty might use such programs to design course websites that provide course-related information (e.g., syllabus, readings, assignments). In addition, academic software can be used to develop learning modules where course material can be divided

into units and sub-units. For example, faculty members who are trained on such software could design a self-contained learning module that introduces students to racial identity developmental theories posited by William Cross (1979) and Janet Helms (1990). Those who teach courses on the nature of higher education can design online modules to teach students about the differences that exist between American higher education and national systems found in Canada and Mexico, for example.

2. Higher education faculty should consider using more than one form of technology in their teaching. For example, email is a great way to communicate with students and may provide a means for asynchronous communication related to learning. Faculty might consider using email as a way to facilitate reflective writing among graduate students in higher education. In one scenario, students might react to various writing prompts via email. Prompts might include: How are values such as trust and autonomy related to higher education administration? To enhance student learning, faculty members might couple the use of email with other forms of technology such as course websites as recommended above.

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