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LEVEL OF TEACHING SKILLS AND INTEREST IN TEACHING IMPROVEMENT AS PERCEIVED BY FACULTY IN A LAND-GRANT COLLEGE OF AGRICULTURE

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Abstract

This study described the level of skills, and interests in learning more about, selected teaching activities and educational technologies among ***faculty*** *with teaching appointments in the College of Agricultural, Food and Life Sciences at the University of Arkansas. As part of a United States Department of Agriculture grant, the study served as a needs assessmentfor designingfaculty development activities. Teaching faculty perceived that they had relatively high levels of skills in traditional classroom teaching areas such as lecture and discussion methods. However, they had high levels of interest in learning more about these skills. Their self-perceived levels of skills were low in such non-traditional areas as case studies, discovery learning, and peer observation, and they expressed little interest in learning more about these topics. There was little relationship between their level of skill and level of interest in learning more about teaching methods. These faculty rated their levels of skill in educational technologies lower than for the teaching methods. However, they expressedgenerally high levels of interest in learning more about the technologies. A substantial positive relationship was found between level of skill and interest in learning more about educational technologies.*

Introduction

Public opinion appears to have resulted in a renewed interest in the quality of teaching in America's college classrooms. Articles in the popular press, legislative hearings, and radio talk show "experts" each have called for efforts to improve instruction in higher education. Concomitant to this interest, those involved in delivering college-level instruction in agriculture, faculty members and administrators alike, are placing new emphases on quality teaching (Board on Agriculture, National Research Council, 1992).

The primary clients of higher education, the students, consider teaching as the most important function of the faculty member. In a study of students at 17 institutions, Wiedmer (1994) reported that 96% believed that teaching was the most important job of the professor, followed by service and then research.

However, the importance of teaching to the mission of the Land-Grant college has yet to become a major influence in faculty personnel decisions. Ernest Boyer, in Scholarship Reconsidered (1990), noted that the commonly held view of being a scholar is being a researcher, and that publication is "the primary yardstick by which scholarly productivity is measured" (p. 2).

Boyer (1990) called on American higher education to redefine scholarship from an exclusive focus on conducting and publishing research to a broader view which includes the scholarship of teaching.

> Surely, scholarship means engaging in original research. But the work of a scholar also means stepping back from one's investigation, looking for connections, building bridges between one's theory and practice,

> and communicating one's knowledge effectively to students. (p. 16)

While the improvement of teaching may be an accepted goal for colleges and universities, Jackman and Swan (1995) have suggested that faculty must be intrinsically motivated to improve their teaching performance. They declared that intrinsic motivation results in faculty who are more committed to improving their instructional skills. However, Boyer's (1990) view of teaching as a component of scholarship equal to research includes equal rewards for both functions. These rewards include promotion, tenure, and salary considerations.

In spite of the recent interest in the importance of teaching, little training is provided for instructors (Simerly, 1990). Ely and Ragland (1989) noted that the graduate education required to become a university faculty member is generally devoid of instruction in teaching.

> At every level of education, except the university, instructors are trained to teach and must become certified to do so. We train M.S. and Ph.D. candidates for two to five years to conduct research, but in general, we do not train them to teach. (p. 43)

Lowman (1995) also noted that few college teachers receive formal instruction in how to present intellectually exciting lectures, to lead engaging discussions, or to relate to students in ways that promote motivation and independent learning. Boyer (1990) cited a written comment on a questionnaire by a professor of mathematics at a comprehensive university, " It is assumed that all faculty can teach, and hence that one doesn't need to spend a lot of time on it. Good teaching is assumed, not rewarded" (p. 32).

Some authors have called for more emphasis on training in teaching in graduate education programs. Bowman, Loynachan, and Schafer (1986) stated that,

> Teaching is one of the most important activities of a college professor. Completing M. S. and Ph.D. degrees should make one professionally competent in his or her technical field, but this may not be adequate preparation for teaching. (p. 96)

In a study of agriculture faculty at the University of Idaho, 79% felt that participating in a teaching methods course would improve their teaching (Pals, 1988). Over 50% felt that they could use assistance in improving their skills in several traditional teaching areas.

The increasing use of educational technology places additional demands on faculty members. Kirby, Waldvogel, and Over-ton (1998) studied agriculture faculty at North Carolina State University to determine their level of skill and in-service needs related to educational technologies. Faculty members in this study expressed a need for instruction in educational technologies such as multi-media formats, web page construction, and computer and presentation graphics.

How do college faculty members view their own abilities and interests in teaching? What are their levels of teaching skills and what types of teaching improvement strategies are they most interested in learning more about? Identifying the needs of college faculty with regard to their teaching skills is critical to developing a staff development plan to assist them in improving. According to Engleberg (1991), "Needs assessment is the essential first step in developing an effective staff development plan" (p. 221).

Purpose of the Study

This study was conducted as a part of a

needs assessment for a United States Department of Agriculture grant to improve instruction in agriculture. Specifically, the study sought to determine the perceptions held by teaching faculty in a Land-Grant college of agricultural, food and life sciences about their skills in selected teaching activities and use of educational technologies, and their interest in learning more about selected teaching activities and technologies. The following research questions were posited to guide the study:

1. What are the perceptions of faculty members about their level of skills in selected teaching activities?

2. What levels of interest do faculty members have in learning more about selected teaching activities?

3. What are the perceptions of faculty members about their level of skills in the use of educational technologies?

4. What levels of interest do faculty members have in learning more about the use of educational technologies?

5. What is the relationship between faculty members' perceived levels of skill and interest in learning more about both teaching activities and educational technologies?

6. What are the relationships between the faculty members' levels of interest in learning more about teaching activities and technologies, and their teaching-related demographics?

Methods

This was a census study ofteaching faculty in the College of Agricultural, Food and Life Sciences at the University of Arkansas. A list of all current faculty members was obtained from the dean's office. Departmental administrative assistants helped to identify those faculty members who had taught one or more courses within the previous two years. A total of 138 faculty members was identified and included in the study. Completed surveys were returned from 113 faculty members after two mailings for an overall response rate of 8 1.9%. Responses were received from all departments, with the departmental response rates ranging from 67% to 100%.

Data were collected using a survey instrument which required respondents to rate both their self-perceived "current level of skill" and their "level of interest in learning more" about two categories of teaching items: **teaching activities** (20 items) and **educational technologies** (12 items). The instrument also included five questions concerning the respondents' teaching appointment and experience. The instrument was based, in part, on an instrument by Baker, Hoover, and Rudd (1996).

The instrument was reviewed by a panel of teaching faculty members representing each department in the college to assess content validity. It was determined to be valid. A test-retest procedure was employed using 11 graduate students in a college teaching course at a four week interval to establish a coefficient of stability ($r = 0.68$).

Following data collection, a factor analysis (oblique rotation) was performed on the instrument to assess construct validity. An item was said to load on a given factor if the factor loading was 0.35 (standardized regression coefficient) or greater for that factor, and was less than 0.35 for the other factor. For the assessment of "current level of skills" possessed, the 20 items related to teaching activities loaded on the first factor, while the 12 items related to educational technologies loaded on the second factor. These two factors explained 63.5% of the variance in the raw data. For the assessment of "level of interest

in learning more," 18 items related to teaching activities loaded on the first factor and eight items loaded on the second factor. The two factors explained 72.2% of the variance.

Results

An analysis of the data revealed a mean of 14.9 years of university teaching experience among the subjects (Table 1). The mean appointment was 27.7% time assigned to teaching, with 6.2 semester credit hours of instruction (4.0 undergraduate and 2.2 graduate) per year. Average class size among respondents was 21 students.

Table 1. Respondents' Teaching-Related Demographics Characteristics

Characteristic	n	M	SD	Md
Current FTE teaching assignment (% of time)	108	27.70	25.5	20.0
Number of years teaching at college level	110	14.91	9.97	13.5
Number of credit hours taught per year - graduate level	111	2.24	1.72	3.0
Number of credit hours taught per year - undergraduate level	110	3.95	3.60	3.0
Average class size	108	20.94	15.27	15.5

Question 1.

When asked to assess their **current level of skill** on 20 teaching activity items , six items received a mean score of 3.0 or higher (excellent = 4, good = 3, fair =2, none =1)(Table 2). Over 75% of respondents rated their own abilities as "good" or "excellent" on eight of the items. Based on the obtained mean values, respondents perceived that they had the highest level of skill in traditional instructional areas such as lecture, and designing and revising a course. Conversely, respondents rated their level of skills lowest in less traditional areas such as developing teaching portfolios, discovery learning activities, and peer observation. More than 50% of respondents rated their level of skills as "good" to "excellent" on 15 of the 20 teaching activity items.

Question 2.

Table 3 presents the data regarding the respondents' **level of interest in learning more about** the teaching activity items. Mean ratings ranged from a high of 3.3 5 to a low of 2.68 across all of the 20 items (high = 4, moderate = 3, low = 2, none = 1). Twelve of the 20 items were rated above a 3 .O, with at least 75% of the respondents indicating a "high" or "moderate" level of interest in learning more about these items. Over 50% of the respondents reported a "high" or "moderate" level of interest in learning more about each of the 20 items.

Question 3.

Subjects were asked to assess their **current level of skill** on 12 items related to **educational technologies** (Table 4). No item received a mean rating above 2.56. The only item for which at least 50% of the respondents rated their own ability as "good" or "excellent" was the use of presentation graphics. Additionally, fewer than 25% rated their own ability as good or excellent on seven of the 12 items.

Question 4.

Subjects were asked to indicate their **level of interest in learning more about** items related

to the use of **educational technology** (Table 5). Obtained mean ratings for these 12 items ranged from 3.30 to 2.57, indicating that the respondents had some interest in learning more about each of the items. Interest in five of the items was rated as "high" or "moderate" by more than 75% of the respondents, and at least 50% of respondents indicated a high or moderate interest in all items.

Question 5.

For both teaching activities and educational technologies, items were rank ordered based on the mean values reported in Tables 2 and 3 (teaching activities) and Tables 4 and 5 (educational technologies). Spearman correlation coefficients were then calculated to assess the relationships between respondents' perceived levels of skill and their interest in learning more

Table 2. Respondents' Level of Skill in Teaching Activities.

Teaching Activity	n	Percent of Respondents by Level of Skill				M	SD
		Excellent	Good	Fair	None		
Lecture	112	25.9	68.8	5.4	0.0	3.21	.52
Designing / revising a course	111	24.3	68.5	6.3	0.9	3.16	.56
Hands-on exercises and activities	110	29.1	57.3	11.8	1.8	3.14	.68
Preparing course syllabi	111	27.0	59.5	12.6	0.9	3.13	.65
Demonstration	107	27.1	57.0	15.9	0.0	3.11	.65
Preparing instructional materials	111	25.2	60.4	14.4	0.0	3.11	.62
Preparing effective lesson plans	111	17.1	63.1	18.9	0.9	2.96	.63
Motivating students / creating interest	113	18.6	57.5	23.9	0.0	2.95	.65
Encouraging critical thinking	110	19.1	54.5	26.4	0.0	2.93	.67
Hands-on problem solving activities	107	20.6	53.3	23.4	2.8	2.92	.74
Discussion-based instruction	111	16.2	51.4	27.0	5.4	2.78	.78
Evaluating student learning	111	8.1	63.1	26.1	2.7	2.77	.63
Evaluating my teaching	107	12.1	51.4	34.6	1.9	2.74	.69
Improving student reading / writing	110	9.1	56.4	32.7	1.8	2.73	65
Cooperative learning (group projects)	108	12.0	44.4	37.0	6.5	2.62	.78
Alternative teaching methods	108	5.6	43.5	43.5	7.4	2.47	.72
Case studies	104	12.5	36.5	30.8	20.2	2.41	.95
Faculty peer observation	98	7.1	36.7	31.6	24.5	2.27	.91
Discovery learning activities	95	6.3	31.6	43.2	18.9	2.25	.84
Developing a teaching portfolio	103	7.8	21.4	38.8	32.0	2.05	.92

"Excellent = 4, Good = 3, Fair = 2, None = 1

Table 3. Respondents' Interest in Learning More About Teaching Activities.

Teaching Activity	n	Percent of Respondents by Level of Interest					
		High	Moderate	Low	None	M[a]	SD
Motivating students / creating interest	108	53.7	31.5	11.1	3.7	3.35	.82
Encouraging critical thinking	110	53.6	30.0	11.8	4.5	3.33	.86
Improving student reading / writing	107	49.5	31.8	13.1	5.6	3.25	.89
Alternative teaching methods	108	40.7	45.4	11.1	2.8	3.24	.76
Evaluating my teaching	108	40.7	45.4	9.3	4.6	3.22	.80
Evaluating student learning	109	43.1	37.6	16.5	2.8	3.21	.82
Lecture	109	35.8	43.1	17.4	4.0	3.11	.82
Hands-on problem solving activities	104	29.8	56.7	7.7	5.8	3.10	.77
Cooperative learning (group projects)	105	32.4	47.6	17.1	2.9	3.10	.78
Hands-on exercises and activities	104	27.9	48.1	21.2	2.9	3.10	.78
Discussion-based instruction	110	33.6	43.6	20.9	1.8	3.09	.78
Demonstration	105	31.4	47.6	21.0	1.0	3.08	.75
Preparing instructional materials	109	30.3	42.2	22.9	4.6	2.98	.85
Preparing effective lesson plans	109	30.3	42.2	22.0	5.5	2.97	.87
Designing / revising a course	109	30.3	38.5	23.9	7.3	2.92	.91
Discovery learning activities	93	26.9	39.8	26.9	6.5	2.87	.89
Faculty peer observation	104	23.1	44.2	24.0	8.7	2.82	.89
Case studies	101	26.7	38.6	24.8	9.9	2.82	.94
Preparing course syllabi	108	22.2	41.7	26.9	9.3	2.77	.90
Developing a teaching portfolio	107	23.4	37.4	23.4	15.9	2.68	1.01

"High = 4, Moderate = 3, Low = 2, None = 1

about the items. Davis' conventions (1971) were used to describe the magnitude of the relationship. A low positive relationship existed (r = .16) between level of skill and interest in learning more about teaching activities. However, a substantial positive relationship (r = .69) existed between level of skill and interest in learning more about educational technologies.

Question 6.

Teaching related demographics were correlated with level of interest in learning more about each of the items in the survey. Because of the nature of the data, the Spear-man correlation coefficient was calculated for each. In order to provide practical guidance in identifying groups of

Table 4. Respondents' Current Level of Skill in Educational Technologies

Educational Technology	n	Percent of Respondents by Level of Skill					
		Excellent	Good	Fair	None	M[a]	SD
Presentation graphics	113	23.9	30.1	23.9	22.1	2.56	1.09
Computer projection systems	111	15.3	27.0	25.2	32.4	2.25	1.07
Document or image scanners	112	11.6	31.3	19.6	37.5	2.17	1.06
Digital cameras (still image)	107	12.1	24.3	25.2	38.3	2.10	1.05
Interactive technology based instruction	109	5.5	28.4	35.8	30.3	2.09	.90
Computer multimedia materials	107	8.4	14.0	36.4	41.1	1.90	.94
Internet course web pages	111	5.4	15.3	28.8	50.5	1.76	.91
Digital video cameras	104	3.8	16.3	23.1	56.7	1.67	.89
Internet course discussion groups	111	4.5	8.1	21.6	65.8	1.51	.83
Teaching via distance education	104	0.0	7.7	30.8	61.5	1.46	.64
Video conferencing technologies	109	0.9	4.6	23.9	70.6	1.36	.62
Teaching via interactive video	107	0.0	4.7	15.0	80.4	1.24	.53

[a]Excellent = 4, Good = 3, Fair = 2, None = 1

faculty members who may have interest in specific items for in-service instructional activities, only items with a "moderate" correlation of .30 or greater were considered (Davis, 1971). Years of experience was the only demographic variable with a moderate association with faculty members' level of interest in learning more about selected topics. The following items were moderately negatively correlated with years of experience: cooperative learning ($r = -.30$), discussion ($r = -.37$), discovery learning ($r = -.33$), and developing a teaching portfolio ($r = -.41$).

Conclusions and Recommendations

Subjects in this study were teaching faculty in a Land-Grant college of agriculture. Among the participants, the average annual full-time equivalent devoted to teaching was about one-quarter time, or about one three-credit course per semester. In spite of their limited teaching assignments, respondents' levels of interest were high.

Teaching activities

Faculty members were asked to rate their personal level of skill on each of 20 teaching activities. They rated their level of skill as generally good to excellent for the more traditional teaching activities such as lecture, demonstration, preparing teaching materials, and motivating students. Faculty members rated their skill lower on the less traditional teaching activities such as alternative teaching activities, using cooperative learning and case studies, and faculty peer observation. Overall, faculty members perceive that they possess relatively high levels of skills in traditional teaching activities. It would be interesting to assess the instructors' abilities on

Table 5. Respondents' Interest in Learning More About Educational Technologies

Educational Technology	n	Percent of Respondents by Level of Interest					
		High	Moderate	Low	None	M	SD
Interactive technology based instruction	109	47.7	36.7	13.8	1.8	3.30	.78
Internet course web pages	111	41.4	33.3	21.6	3.6	3.13	.88
Computer multimedia materials	108	36.1	43.5	15.7	4.6	3.11	.84
Presentation graphics	110	42.7	33.6	12.7	10.9	3.08	1.0
Computer projection systems	112	30.4	47.3	17.9	4.5	3.04	.82
Digital cameras (still image)	108	28.7	44.0	18.3	9.2	2.94	.87
Document or image scanners	109	28.4	43.1	21.1	7.3	2.93	.89
Digital video cameras	109	28.4	44.0	18.3	9.2	2.92	.91
Internet course discussion groups	109	28.4	27.5	31.2	12.8	2.72	1.02
Teaching via distance education	106	24.5	33.0	2.92	13.2	2.69	.99
Video conferencing technologies	107	22.4	34.6	29.9	13.1	2.66	.97
Teaching via interactive video	106	23.6	30.2	25.5	20.8	2.57	1.07

"High = 4, Moderate = 3, Low = 2, None = 1

these skills from students and faculty peers to compare with these results.

Although they had rated their abilities as high to moderate, respondents also rated their interest in learning more as relatively high. They indicated high interest in learning more about such skills as motivating students, encouraging critical thinking, using alternative teaching activities, and evaluating teaching and learning. High to moderate interest was even indicated in learning more about such skills as lecture and demonstration.

The relationship between the respondents' perceived level of skill and their level of interest in learning more about teaching activities was low, having less than three percent of variance in common. Thus, self-perceived level of skill in teaching activities was not a good indicator of interest in learning more about these items.

Educational technologies

When asked to rate their level of skill on 12 educational technologies, respondents rated their abilities much lower than their self-ratings of teaching activities. Over 50% of the faculty members rated their skill levels as fair or none on 11 of the 12 items. Further, over 50% reported that they had no skills in six educational technology areas related to Internet course delivery and distance education.

Faculty members were asked to indicate their interest in learning more about each of the technologies. While the data indicate a positive interest in all of the items, those technologies which integrate the computer received the highest levels of interest. This would indicate that the

faculty members acknowledge a need for training on such skills as interactive technology based instruction, Internet web pages, and computer multimedia materials.

These two findings are likely an indicator of the limited exposure of the faculty to the use of these technologies, or the limited expectations for their use in the past. However, faculty members will be expected to possess some level of skill on these technologies in the future. It is assumed that faculty members are aware of this, as indicated by their level of interest in learning more about these educational technologies.

There was a substantial positive relationship between the respondents' perceived level of skill and their level of interest in learning more about educational technologies. While they rated their skills in many of these technologies as low, they tended to show interest in learning more about the technologies with which they had some level of skill. For those technologies in which level of skill was especially low, interest in learning more was also low.

Clearly, there is a need for in-service training of faculty members in the use of modern educational technologies. Further, addressing this need among graduate students aspiring to be faculty members could limit the scope of faculty teaching-related deficiencies in the future.

Because there were few practically significant relationships found between the demographic variables and interest in learning more about teaching activities and technologies, participation should be open to all interested faculty members regardless of demographics. However, more experienced faculty members may be less interested in learning about non-traditional classroom teaching activities.

Recommendations

It appears that teaching faculty in this college are interested in a wide variety of topics related to instructional improvement. A faculty development plan is being planned and implemented in the college. Based on the results of this study, the following topics should receive priority in planning faculty development activities: motivating students, encouraging critical thinking, using interactive technology in teaching, techniques to improve student reading and writing, alternate teaching methods, evaluating teaching, and evaluating student learning.

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