state of globalization in north central colleges of agriculture. Major findings for a 1-year period included: 1) over 1,000 students participated in study and work abroad; 2) over $300,000 in study abroad scholarship money was available to students through their colleges of agriculture; 3) over 2,500 international students studied at these colleges; 4) few colleges require the study of a foreign language; 5) 1 college offers a degree and 4 colleges offer a major or secondary major with a significant focus on global dimensions; and 6) over 1,000 faculty and staff traveled to other countries. This baseline can serve as a benchmark for measuring progress toward the implementation of the GASEPA initiative.

Literature Cited

Acker, D.G. and C.G. Scanes. 1998. The Case for Internationalizing Colleges of Agriculture. Jour. of International Agricultural and Extension Education 5 (1):59-62.

Food and Agricultural Education Information System (FAEIS). 1998. Fall 1997 Enrollment for Agriculture, Renewable Natural Resources and Forestry. Available from Food and Agricultural Education Information System, Texas A&M University, College Station, TX 77843-2124.

Ford Foundation. 1997. Annual Report. Available from Ford Foundation Headquarters, 320 East 43 Street, New York, NY, 10017.

National Association of State Universities and Land Grant Colleges, International Agriculture Section. 1997. Globalizing Agricultural Science and Education Programs for America. Available from National Association of State Universities and Land Grant Colleges, International Agriculture Section, 1307 New York Avenue, NW, Suite 400, Washington, DC, 20005-4701.

North Central Region Curricular Committee Project. 1989. Educating for a Global Perspective: International Agricultural Curricula for 2005. Available from Higher Education Programs, Office of Grants and Program Systems, Cooperative Research, U.S. Department of Agriculture, Washington, DC.

The Use of Time by Undergraduate Students

Amy K. Gortner[1] and Carl R. Zulauf[2], Department of Agricultural, Environmental, and Development Economics, The Ohio State University, Ag. Admin. Bldg., Room 235 2120 Fyffe Road, Columbus, OH 43210

Abstract

Data on the use of time were collected via a one-week time diary from 136 students enrolled in three agricultural economics courses at Ohio State University. Average hourly use of time per week for these students was: sleeping (55.3), studying (21.3), planned recreation/leisure (19.0), in-class (16.4), job (12.3), travel (10.7), TV (10.3), eating (8.1), personal hygiene (7.1), student activities (3.6), telephone (1.4) and other (2.6). This time profile generally is similar to that of the American population, except that "being a student" is the primary job. Time spent on academics (in-class and studying) exceeded other uses of time, excluding sleep. This suggests school was a top priority. Studying, recreation, job, TV, and student activities exhibited the most variation among the respondents. Advisors need to help students understand incongruities that exist between their objectives and allocation of time. No significant bivariate relationships were found between any time-use activity and quarter GPA. Thus, the relationship between time use and academic performance, if it exists, is a complex interaction of

[1]Graduate student in the CollegeStudent Personnel Program, Dept. of Educational Leadership, Miami Univ., Ohio.
[2]Professor of Agricultural Marketing and Policy, Dept. of Agric., Environmental and Development Economics, The Ohio State Univ.

The authors thank Bernard Erven, Richard Meyer, Larry Miller, and L.H. Newcomb for their comments and suggestions.

multiple factors. This finding suggests that the simple advice of "study more" needs to be replaced with a richer set of recommendations based on research that seeks to understand how students use time and its relationship to performance.

Introduction

How do college students use their time? This question is of concern to educators who often complain that students should spend more time on academics (Marchese, 1996). A review of literature found several studies that examined the impact on academic performance of the amount of time students spent on academics, usually studying, and/or spent working (Frisbee, 1984; Kember et al., 1995; Long et al., 1994; Pappalardo, 1986; Schmidt, 1983; Schuman et al., 1985). Other uses of time were rarely mentioned even though they are important to daily life, e.g., sleeping and eating, or to the undergraduate experience, e.g., student extracurricular activities. Understanding the total use of time by students is important in placing academic and job use of time in their appropriate perspective. To analyze how students, specifically students in a college of agriculture, use their time, time diaries were collected from students enrolled in three agribusiness and applied economics classes offered Autumn Quarter 1997 at The Ohio State University. The methods and findings of this survey are discussed below.

Methods

The time diary was collected for a period of one week. A one-week survey period is recommended by Robinson and Godbey (1997), based on their 30-year study of how Americans use time. The time diary survey instrument used in this study is shown in Figure 1. It had been used for several years as part of a class assignment, and thus, was field tested.

Pre-specified time-use activity categories were provided to the survey participants. They were instructed to report only their primary use of time for each half-hour time block. Multiple uses of time can occur within a half-hour time block and two or more activities may occur at the same time. However, post-survey conversations with the students revealed that these situations caused few reporting problems.

The three courses surveyed during Autumn Quarter 1997 were: an introductory course in agricultural economics, which draws freshman through seniors; an introductory course in agribusiness management, which draws sophomores through seniors; and a senior-level policy course in agricultural economics. To standardize the collection of data among the three classes, the time diaries were collected during the week of the first midterm. Because more studying than normal may occur during a midterm week, the students were asked how many more or fewer hours than normal they studied during the survey week. The first midterm week was selected because it avoids the start-up period during the first one to three weeks of the quarter when study time is probably less than normal, and the end of the quarter rush when time devoted to studying and paper writing is probably greater than normal.

Students were asked several questions about their personal situation, such as their marital status. They also were asked for permission to obtain data from their college record. If permission was given, the following variables were collected: age, gender, hours taken and completed during the quarter, ACT score, cumulative grade point average at the end of Autumn Quarter, and Autumn Quarter grade point average. In total, 136 useable observations were obtained.

The mean, standard deviation, minimum, maximum, and coefficient of variation was calculated for each time-use category. Standard deviation measures variation in numerical value, while coefficient of variation (standard deviation divided by mean) measures variation relative to the mean. Coefficient of variation is a useful measure of variation because standard deviation tends to increase as the mean increases. Mean use of time also was calculated for the respondents disaggregated by gender, class rank, and fall quarter GPA. Analysis of variance was used to test for significant differences among the various categories of these characteristics. Last, Pearson correlation coefficients were calculated to examine bivariate relationships among the time-use categories.

Results and Discussion

Description of the Respondents

On average, the 136 respondents had completed 114 quarter hours or over half of their undergraduate program prior to Autumn Quarter 1997. The respondents were enrolled in 16 credit hours during the quarter. Nine percent of the respondents were freshman: 19 percent were sophomores; 33 percent were juniors; and 39 percent were seniors. Forty-two percent were majors in Agribusiness and Applied Economics, 17 percent were majors in Animal Sciences, 38 percent were in other majors in the College of Food, Agricultural, and Environmental Sciences, and 4 percent were majors in other colleges. Both distributions were expected given the three courses involved in this study.

Sixty-four percent of the respondents were male; 36 percent were female (Table 1). The average age was 21.3 years, with a range from 17 to 57 years. Seven percent were

DAILY SUMMARY:

In Class (**IC**)	_____	Television (**TV**)	_____
Studying (**ST**)	_____	Planned Recreation/leisure (**PR**)	_____
Eating (**E**)	_____	Student Organization/activities (**ACT**)	_____
Sleeping (**SL**)	_____	Personal Hygiene, laundry, etc. (**PH**)	_____
Job (**J**)	_____	Other _____	_____
Travel Time (**TT**)	_____	Other _____	_____
Telephone (**TEL**)	_____		

TIME	ACTIVITY	TIME	ACTIVITY
Midnight-12:29 am		Noon-12:29 pm	
12:30-12:59 am		12:30-12:59 pm	
1:00-1:29 am		1:00-1:29 pm	
1:30-1:59 am		1:30-1:59 pm	
2:00-2:29 am		2:00-2:29 pm	
2:30-2:59 am		2:30-2:59 pm	
3:00-3:29 am		3:00-3:29 pm	
3:30-3:59 am		3:30-3:59 pm	
4:00-4:29 am		4:00-4:29 pm	
4:30-4:59 am		4:30-4:59 pm	
5:00-5:29 am		5:00-5:29 pm	
5:30-5:59 am		5:30-5:59 pm	
6:00-6:29 am		6:00-6:29 pm	
6:30-6:59 am		6:30-6:59 pm	
7:00-7:29 am		7:00-7:29 pm	
7:30-7:59 am		7:30-7:59 pm	
8:00-8:29 am		8:00-8:29 pm	
8:30-8:59 am		8:30-8:59 pm	
9:00-9:29 am		9:00-9:29 pm	
9:30-9:59 am		9:30-9:59 pm	
10:00-10:29 am		10:00-10:29 pm	
10:30-10:59 am		10:30-10:59 pm	
11:00-11:29 am		11:00-11:29 pm	
11:30-11:59 am		11:30-11:59 pm	

Figure 1. Time Diary Form for a Study of Time Use by Undergraduate Students at The Ohio State University

engaged to be married, three percent were married, and three percent had children. None reported being the primary care giver for someone else (i.e. disabled, elderly, or siblings).

Table 1 also presents a comparison of the respondents with students enrolled in the College of Food, Agricultural, and Environmental Sciences and Ohio State University. Though not selected via a random sample, the respondents were similar to students in the College and University with regard to average age, ACT test score, Autumn Quarter GPA, and cumulative GPA. In contrast, a much higher percent of the respondents were males. This difference in gender should be kept in mind when interpreting the results.

Table 1: Comparison of Selected Characteristics of Students, Autumn Quarter 1997

Characteristic	Survey Respondents	College of Food, Agricultural, and Environmental Sciences	Ohio State University
Number of students	136.00	1,370.00	35,647.00
Percent of students Who are male	63.97	54.53	52.07
ACT Test Score	22.50	22.90	23.60
Age	21.34	21.16	21.81
Autumn Quarter GPA	2.86	2.79	2.77
Cumulative GPA	2.78	2.67	2.78

SOURCES: Original Survey Data; Linda S. Katunich, Statistical Information Specialist, Office of the University Registrar, The Ohio State University

Description of Time Use

The mean, standard deviation, minimum, maximum, and coefficient of variation of hours reported by the respondents for each time-use activity are presented in Table 2. Sleep was the largest use of time for 99 percent of the respondents. It averaged 55.3 hours during the week, with a range of 38 to 71 hours/week. As a comparison, in 1985 employed American men and women reported that they spent approximately 55 hours/week sleeping (Robinson and Godbey, 1997).

Eating and personal hygiene can be combined with sleep into a category called biological necessities. In total, the student respondents spent 70.5 hours/week or 42 percent of their time on biological necessities. They averaged 8.1 hours/week eating and 7.1 hours/week on personal hygiene. Robinson and Godbey (1997) reported that employed American men and women spent a similar amount of time eating. The activities included under personal hygiene differed somewhat between this study and Robinson and Godbey's (1997) study. Nevertheless, a similar amount of time was reported for personal hygiene.

One respondent reported zero time for eating while another reported zero time for personal hygiene. A zero was reported probably because of the time diary methodology used, not because it was the actual amount of time. As discussed above, the students were instructed to report only the primary use of time for each half-hour block of time.

Table 2: Descriptive Statistics for Student Use of Time During First Midterm Week, Autumn Quarter 1997

Time-Use	Mean	Standard Deviation	Minimum	Maximum	Coefficient of Variation[z]
	hours per week				Percent
Sleeping	55.3	6.3	38.0	71.0	11.4
Studying	21.3	9.4	0.0	58.5	43.9
Recreation	19.0	10.2	2.5	62.5	53.5
In-Class	16.4	4.1	2.0	28.5	25.2
Job	12.3	12.2	0.0	64.5	99.6
Travel	10.7	4.5	0.0	19.5	42.1
TV	10.3	8.2	0.0	45.0	79.5
Eating	8.1	3.1	0.0	21.1	38.1
Personal Hygiene	7.1	3.5	0.0	21.0	48.5
Student Activities	3.6	6.3	0.0	46.5	177.4
Phone	1.4	2.0	0.0	13.5	141.7
Other	2.6	4.4	0.0	25.8	169.8

[z] Coefficient of variation is the standard deviation divided by the mean
SOURCE: Original Survey Data

With respect to academics, the respondents averaged 21.3 hours/week studying and 16.4 hours/week in-class (Table 2). Study time ranged from 0 to 58.5 hours/week, while in-class time ranged from 2 to 28.5 hours/week. The respondents reported that they studied 2.5 hours/week more than normal during the survey week. Thus, the respondents normally spent 18.8 hours/week studying.

Adding together study and in-class time, the respondents averaged 37.7 hours, or 23 percent of their total time on academics (Figure 2). Even when using the normal amount of study time, the respondents averaged 35.2 hours/week on academics. In 1985, employed American men and women spent 35.5 hours per week at paid work (Robinson and Godbey, 1997). By this comparison, the student respondents were "fully employed" in academics.

A weekly time diary collected from 34 students in a mechanical engineering course at Hong Kong Polytechnic found an average study time for a non-exam week of 23.6 hours (Kember et al, 1995). A one-day time diary collected from 273 students in the Literature, Science, and Arts College at the University of Michigan (Schuman et al, 1985) found a median study time of 2.9 hours per weekday. While the data collection parameters are not the same and some differences across majors and cultures are to be expected, these numbers do not appear to differ substantially from the numbers generated by this study. Other studies either did not report specific hours or asked students to estimate their use of time over a previous period of time rather than using the time diary approach. Robinson and Godbey (1997) argue that estimates

of previous time use are biased toward over reporting.

A commonly quoted rule of advice to college students is that they should spend at least two hours studying out of class for each hour spent in class. Only 18 percent of the respondents followed this rule. For the average respondent, the ratio equaled 1.3-to-1 or 1.1-to-1, depending on whether reported study time or normal study time is used. Kember et al (1995) reported a 1.2-to-1 ratio of study to in-class time.

The respondents averaged 12.3 hours/week of employment. Twenty-eight percent did not work during the survey week, while 23 percent reported working 20 or more hours. Only three percent reported working 40 or more hours. Fourteen percent of the respondents spent more time working than on academics.

Planned recreation and leisure, not including time devoted to watching TV, averaged 19.0 hours/week, while watching TV averaged 10.3 hours/week. Similar to class and work schedules, TV program schedules provide defined time anchors around which other, more flexible activities are managed. This characteristic can impart a greater significance to such time anchors than the number of hours actually devoted to them.

The phone may be used for personal, leisure, or business activities. Conversations with students suggested that the phone was largely used for leisure activities or to plan them. When the time spent on planned recreation/ leisure, TV, and phone are summed, the respondents averaged 30.7 hours/week, or 19 percent of their time on leisure activities. This was 19 percent less than the time devoted to academics, but 150 percent more than the time spent working.

On average, respondents spent 10.7 hours/week traveling. As a comparison, Robinson and Godbey (1997) found that in 1985 employed Americans averaged approximately 10 hours/week traveling. Information was not collected from the students regarding the activities associated with travel time. Thus, it is not possible to determine if their travel time was largely devoted to commuting to school or work, going home on the weekend, participating in recreational activities, or running errands. Such information would be useful to collect in future surveys.

Fifty-seven percent of the respondents participated in at least one student activity during the week. Eight percent devoted 10 or more hours to them.

Combining the standard deviation with the coefficient of variation provides insight into which uses of time exhibited the greatest variation among the 136 respondents. Studying, recreation, job, TV, and student activities had relatively large standard deviations and coefficients of variation. This high degree of variability suggests that it is these five activities that students most tailored to fit their needs and wants.

Use of Time by Selected Characteristics

Table 3 displays the use of time by gender, class rank, and Autumn Quarter 1997 GPA. These characteristics are frequently of interest when reporting research on students.

Analysis of variance revealed that, compared with females, males spent significantly less time on personal hygiene (2.8 hours less), traveling (2.5 hours less), and the phone (0.9 hours less). In contrast, they spent significantly more time watching television (3.7 hours more) and eating (1.2 hours more). With one exception, Robinson and Godbey (1997) found the same differences in their study of Americans. The exception was that men generally spent more time traveling than women.

When analyzed by class rank, only hours spent working and on student activities differed significantly at the 0.05 level. Compared with freshman and sophomores, juniors and seniors spent approximately five more hours working and 1.5 more hours on student activities. The increase in number of hours spent working probably results from financial necessity. Potential causes include diminished savings, fewer scholarship opportunities, which are often disproportionately directed at freshman and sophomores as recruitment incentives, and less willingness on the part of parents to help an "older child". The increase in hours devoted to student activities probably reflects many factors, including a greater sense of confidence among juniors and seniors regarding post-graduation goals, thus allowing them to better identify appropriate student activities; a larger circle of friends, some of whom are involved in student activities; and an increasing awareness of the value that many employers place on student activities.

Analysis of variance revealed no statistical differences for any of the time-use activities when disaggregated by Autumn Quarter 1997 GPA. Furthermore, almost no patterns existed relative to an increase in GPA. For example, the respondents with the highest and lowest GPAs spent the most number of hours studying. Those with a 2.0 or lower GPA averaged less time in-class, but they were enrolled in fewer credit hours.

Correlation among the Uses of Time

Due to space constraints, the table of Pearson correlation coefficients is not presented; however, it is available from the authors. Of the 66 possible correlation coefficients between the time-use activities, 73 percent possessed a negative sign. A negative correlation implies

that the time-use activities are substitutes, while a positive correlation implies that they complement each other. Substitute relationships were expected to dominate because the amount of time in a week is fixed.

As time spent on one activity increases, time devoted to at least one other activity must decline. The highest absolute value of any correlation coefficient was 0.45. In contrast, 28 and 24 correlations had an absolute value between 0.00 - 0.10 and 0.11 - 0.20, respectively. Thus, as a group, the correlation coefficients were relatively small. The remaining discussion focuses on the correlations with an absolute value of 0.20 or greater.

Job had a negative correlation with study time (-0.45) and in-class time (-0.27). The negative correlations reflect the trade-offs today's students confront between employment and academics, some out of economic necessity and others out of lifestyle choice. Job also was negatively correlated with planned recreation (-0.35) and eating (-0.21). Therefore, having a job impacted more than just the time spent on academics.

Study and in-class time had a positive correlation (0.36). This was expected because they are related through the number of course credit hours taken. Studying also had a positive correlation with time spent eating (0.25). One possible explanation is that most studying may be done at home which may be more conducive to spending time preparing food and eating.

TV viewing had a negative correlation with time spent in-class (-0.28) and studying (-0.22), as well as on student activities (-0.24). These relationships are consistent with the commonly heard complaint among educators about the negative effect of TV on academic commitments.

Time spent traveling was negatively correlated with TV viewing (-0.26), recreation (-0.23), and studying (-0.20). Proximity of the student's residence to campus is one factor that affects travel time. Commuting reduces time available for other activities, specifically academics and leisure among these respondents. Time spent traveling and on the phone was positively correlated (0.31). This relationship is consistent with another factor that affects the amount of time students spend traveling: a "long-distant" relationship with another person or place, such as a farm.

Summary

In many respects, the use of time reported by the 136 undergraduate student respondents examined in this study was similar to that of the American population, except that "being a student" was the primary job. While the specific activities in which students engage may differ from the average American, students may look a lot more like the average American in their broad use of time than is widely held. This perspective suggests the need to rethink the advice that is given to students on how best to use their time, or at least to rethink the context in which the advice is presented to them.

The preceding finding suggests that these surveyed students were no more harried than the average American. This suggestion is at odds with opinions often expressed about college students in the popular literature. The immediate question is, where are these harried students in terms of majors and institutions, or is this perception more myth than reality? Additional studies are needed to answer this question, but at least for the students in this study, the harried student appears to be more myth than reality.

Studying, recreation, job, TV, and student activities were the uses of time that varied the most among the surveyed students. An important role for advisors and others consulting students is to help them understand incongruities which exist between their objectives and their allocation of time, as well as how their choices provide insights into their strengths, weaknesses, and motivations.

Time spent on academics (in-class time plus study time) exceeded all other uses of time, except sleep. These findings suggest that, in general, school was a top priority of these surveyed students. Furthermore, no statistically significant bivariate relationships were found between any of the time-use activities and Autumn Quarter GPA. In particular, no significant bivariate relationship existed between studying, i.e. effort, and GPA. Kember et al (1995) and Schuman et al (1985) reported similar findings. Clearly, these results suggest that the relationship between effort and academic performance, if it exists, is complex and involves the interaction of multiple factors. While it is beyond the scope and objectives of this article, Frisbee (1984), Pappalardo (1986), and Schmidt (1983) provide evidence that this relationship is indeed complex. However, more research is needed so that the simple advice of "study more" can be replaced with a richer set of recommendations that can aid the student in setting and then attaining reasonable and appropriate academic and personal goals.

Literature Cited

Frisbee, W. R. 1984. Course Grades and Academic Performance by University Students: A Two-Stage Least Squares Analysis. Research in Higher Education 20(3): 345-365.

Kember, D., Q.W. Jamieson, M. Pomfret, and E.T.T. Wong. 1995. Learning Approaches, Study Time and Academic Performance. Higher Education 29: 329-343.

Long, J. D., P. Gaynor, A. Erwin, and R.L. Williams. 1994. The Relationship of Self-Management to Academic

Table 3: Use of Time by Gender, Class Rank, and 1997 Autumn Quarter GPA

Characteristic	Time Use											
	Sleeping	Studying	Recreation	In-Class	Job	Travel	TV	Eating	Personal Hygiene	Student Activities	Phone	Other
	hours per week [z]											
Gender												
Male	55.3	21.4	20.1	16.7	11.7	9.8**	11.6*	8.5*	6.1***	3.3	1.1**	2.4
Female	55.2	21.2	16.9	15.9	13.3	12.3**	7.9*	7.3*	8.9***	4.0	2.0**	3.0
Class Rank												
Freshmen	57.6	20.8	17.4	17.7	9.8*	10.9	11.5	8.3	7.2	1.8***	1.0	4.2
Sophomore	56.0	23.4	17.7	17.3	7.2*	11.7	11.6	8.6	7.8	2.8***	1.8	2.1
Junior	54.5	21.1	20.7	16.4	12.7*	10.1	9.4	8.1	7.1	4.0***	1.4	2.7
Senior	55.1	20.6	18.4	15.7	15.0*	10.7	10.2	7.8	6.8	4.0***	1.3	2.4
Fall Quarter GPA												
< 2.00	56.7	23.3	17.7	15.3	11.5	10.8	10.3	9.7	6.7	3.1	1.9	1.1
2.00-2.49	57.3	19.1	20.2	16.0	12.4	10.6	12.1	7.5	7.3	1.7	1.2	2.6
2.50-2.99	54.5	18.9	18.9	17.1	15.1	11.7	10.3	7.9	7.4	2.2	2.0	2.1
3.00-3.49	54.8	21.5	19.7	16.2	12.4	10.4	10.3	7.4	7.0	4.9	0.8	2.7
3.50-4.00	54.2	24.6	17.7	16.8	9.4	10.3	8.6	8.9	7.1	5.3	1.4	3.8

[z] Analysis of variance was used to test for statistical difference between (among) the means for a specific characteristic and time use. For example, did the amount of time spent sleeping by males statistically differ from the amount of time spent sleeping by females?

* = .05 significance level. ** = .01 significance level. *** = .001 significance level

SOURCE: Original Survey Data and Analysis

Motivation, Study Efficiency, Academic Satisfaction, and Grade Point Average Among Prospective Education Majors. Psychology: A Journal of Human Behavior 31(1): 22-30.

Marchese, T. 1996. Resetting Expectations. Change: The Magazine of Higher Learning 28(6): 4.

Pappalardo, J.A.. 1986. Financial Aid, Labor Supply-Study Time Trade-Offs, and Academic Performance Production: An Economic Analysis of Students Resource Allocation. PhD Diss., Cornell University, Ithaca, New York.

Robinson, J.P. and G. Godbey. 1997. Time for Life: The Surprising Ways Americans Use Their Time. University Park, PA: Pennsylvania State University Press.

Schmidt, R.M. 1983. Who Maximizes What? A Study in Student Time Allocation. The American Economic Review 73(2): 23-28.

Schuman, H., E. Walsh, C. Olson, and B. Etheridge. 1985. Effort and Reward: The Assumption that College Grades Are Affected by Quantity of Study. Social Forces 63(4): 945-966.

Diffusion of Instructional Technology in a College of Agriculture: Observations of Acceptance and Resistance

Jan G. Hogle[1], Department of Instructional Technology
The University of Georgia
Athens, GA 30602-7144
Gene M. Pesti[2]
Department of Poultry Science, The University of Georgia, 30602-2772
James M. King[3]
Department of Instructional Technology, The University of Georgia
Athens, GA 30602-7144

Abstract

This paper summarizes observations on three technology adoption projects: (a) a College-wide telecommunications capabilities study, (b) development of a departmental Web site, and (c) a multimedia lecture development and training project. It describes resistance to the adoption of technology in an academic department, with the belief that a problem must be understood before progress can be made to overcome it. Resistance among staff centers around defensive responses ("I already have too much work to do!") and anxiety from negative prior experience with technology changes ("There is no reward for learning something new"). Types of resistance among faculty include computer phobia, difficulty comprehending how the technology will be useful in the classroom, and beliefs that any extra effort expended in teaching is wasted or at least unrewarded. We conclude that change efforts become possible when the group involved sees that technology is being adapted to them (rather than conversely), and when they have power to make decisions on their roles in the effort.

Introduction

Many educational researchers believe technology changes are inevitable in institutions of higher education (Oblinger, 1994; Cummings, 1995; DeSieno, 1995; Sargeant, 1997). From observations made at the University of Georgia Department of Poultry Science in the College of Agricultural and Environmental Sciences (CAES) it is clear that the faculty, staff, and administration of the College agree. Over the past two years, the College has experienced several

[1] Doctoral Candidate in Instructional Technology
[2] Professor of Poultry Science and Animal Nutrition
[3] Professor of Instructional Technology