

Curricular Changes for Colleges of Agriculture: Student Perceptions and Future Trends

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Agriculture and natural resources as a program area addresses the most basic requirements of man, i.e., adequate food and a safe sustainable environment in which to live. The American food and agricultural system is the world's largest commercial industry with assets exceeding \$1 trillion and it employs more than 23 million Americans (Wolf, 1986). Yet colleges of agriculture have experienced a decline in enrollment in recent years, and at rates greater than the average decline within all colleges nationally. Why that decrease has occurred, and at the proportionately higher rates, is not known for sure. However, such occurrences as

- decrease in number of family run farms which means fewer youth have direct experience with agricultural production and agribusiness interactions, and
- farm "crisis" in the early 1980's created impression among many on- and off-farm youth that agriculture is no longer a secure vocational area

are bandied about as causes. In the future, regardless of what we do, some declines may be unavoidable because

- the youth population, ages 15-24, is expected to fall 21-25% by the middle 1990's (Snyder, 1987; Wentzel, 1987);
- there is a perception among youth, based somewhat on fact, that a college degree may not necessarily be a ticket to a good job (Hodgkinson, 1985).

If colleges of agriculture are to hold their own with future enrollments, changes must be made. That message is clear from those who project into the future and from our own students. The purpose of this paper is to report what present and former students in one college of agriculture suggest as curricular needs and to discuss these in light of 21st Century projections by a number of prominent writers. The bottom line is that students — college of agriculture and natural resources consumers — have pretty clear ideas about present and future needs. Needs they do not identify also tell about the integrity of the curriculum to which they are exposed.

Procedure

In the spring of 1987, random samples of present and past students of the University of Maryland College of Agriculture (UMCA) were surveyed by mail to determine their ratings of experiences in UMCA. The present student population included all students — freshmen through seniors — enrolled as of April 1,

1987. Past students were those graduating in 1985 and 1986 on the UMCA Alumni Association list. Each sample (N=100, each) was selected to yield +10 percent precision at a confidence level of 95 percent. Response rates after three attempts at contact were 89 percent and 87 percent for present and past students, respectively. The percentage return rate by department was approximately the same as the percentage each department's enrollment represented of the total college enrollment. Assuming no other bias, results should be accurate at +11 percent. Acceptance of the validity of these results was enhanced by the respondents answering all items — they did not skip or leave items blank, they wrote comments freely, and they wrote their written comments correlating closely with their responses on quantitative items.

Student experiences were defined within four broad goals for an undergraduate curriculum: vocational, intellectual, social, and professional. These goals were interpreted as 16 statements to which students could indicate amount of agreement or disagreement, plus an open-ended question on what pleased/displeased them most about their experiences at UMCA. Only those items and comments pertinent to curricular change are discussed in this paper.

Results

Student Identified Needs

More than 80 percent of the respondents voluntarily wrote some explanation about their experiences in the UMCA and most of these comments were about the curriculum (76 percent present student commentors and 82 percent past-). Among curriculum comments, the most-mentioned concern pertained to practical application of course work. Students discussed this as need for more hands-on experience, more practical application of courses, better balance between theory and practice, more career information, and more laboratory experiences. Nearly a third of the present student commentors and a half of the past felt that the information they receive(d) at UMCA is (was) not as useful to them as it could be.

These students have indicated that they are missing (have missed) the essence of the aim of higher education according to Whitehead's view and one of the three central aspects Gamson considered necessary to a **liberating education**. Whitehead (1949, p. 16) said that all higher education is "the acquisition of the art of the utilization of knowledge"; Gamson and Associates (1984) defined a liberating education as consisting of three aspects: (1) leading students to broad critical awareness, (2) **helping them to apply what they learn to everyday life**, and (3) increasing their sense of power.

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Gamson and the more recent text by Lynton and Elman (1987) on NEW PRIORITIES FOR THE UNIVERSITY each speak to the need to help students make application on the job and as citizens. Lynton and Elman point out, though, that "the faculty can accomplish this only to the extent to which they themselves are familiar with the relationship and the applications of their discipline to external problems and issues" (p. 60).

The second most-mentioned concern in the non-career-related curriculum written comments was for more, better, or different courses. Some of the students wanted a greater variety of courses while others wanted specific additions. Suggestions for specific additions were varied with some students suggesting courses in business and business management, and options in agribusiness. This is consistent with Harris' (1986) assessment of agriculture and agribusiness moving into an era of management. He describes previous eras as mechanization, then breeding technology, then agricultural chemicals. A more generalized differentiation may be: first production and now management.

These two concerns may be one and the same — students want more information on how to use/manage the abundance of technology to which they have already been exposed.

Approximately 30% of the students felt that something is (was) lacking in terms of their receiving a quality education. Seven items on the questionnaire focused on this area (Table 1). Encouragement to be creative received least agreement (60%), followed in ascending order of agreement by encouragement to deal with important issues, application of learning, thinking independently, acquisition of knowledge in course of study, acquisition of long term useful skills and competencies, and problem solving (about 80%). Comments written by students pertaining to this issue were:

- it has been a rare occasion when an instructor has been willing to deal with real issues facing our society;
- they should encourage independent and creative thinking, not just their ideas;
- some professors encouraged creativity.... but most offered a "recount the facts" format;
- the school should encourage more in-depth thought and problem-solving techniques.

These quantitative results and illuminating statements should be reason for pause among college of agriculture faculty. In an age and a curriculum dominated by science and technology, e.g., expert systems, robotics, and biotechnology, members of society must be able to deal with a complex and multifaceted physical and social environment. Such coping requires skill in the use of a variety of intellectual processes in addition to the acquisition of technical information. A high-technology economy requires a more general diffusion of inquiry skills and more

Table 1. Mail survey: Do students feel they are receiving/did receive a quality education?

| | Present | | Former | | Total | |
|--|---------|------|--------|------|-------|------|
| | Agree | Mean | Agree | Mean | Agree | Mean |
| A. Within my studies in the UM College of Agriculture, I am (was) encouraged | | | | | | |
| -to think independently | 71.4% | 2.24 | 74.1% | 2.38 | 72.7% | 2.30 |
| -to be creative | 60.0% | 2.54 | 58.6% | 2.64 | 59.4% | 2.59 |
| -to solve problems | 75.7% | 2.09 | 82.8% | 2.17 | 78.9% | 2.13 |
| -to think about important issues | 65.7% | 2.39 | 66.7% | 2.46 | 66.1% | 2.42 |
| -to apply what I learn | 76.8% | 2.16 | 62.1% | 2.52 | 70.1% | 2.32 |

B. As a result of my experiences in the UM College of Agriculture, I will (have)

| | Present | | Former | | Total | |
|---|---------|------|--------|------|-------|------|
| | Agree | Mean | Agree | Mean | Agree | Mean |
| -acquire(d) a great deal of knowledge in my course of study | 78.6% | 2.19 | 74.1% | 2.24 | 76.6% | 2.21 |
| -acquire(d) skills and competencies that will be useful to me for a long time | 77.1% | 2.10 | 77.6% | 2.17 | 77.3% | 2.13 |

Strongly Agree was coded as 1.0, Agree as 2.0, Uncertain as 3.0, Disagree as 4.0, and Strongly Disagree as 5.0. Strongly Agree and Agree are summed for "Agree" but their coded value is retained for the mean.

widespread sophistication in reasoning, analyzing, and interpreting information (Clinton, 1987). Complex decisions will require the ability to find, collate, retrieve, model, and transact information from both public and private networks (Miller and Hartung, 1987). This advanced economy will demand more creativity and more capacity to adapt to rapidly changing work demands and job structures. Competence on the job and as a member of society "require that the emphasis be shifted from answering questions to deciding which are the right questions to ask. Both of these... need to assume 'responsibility for the affective as well as the cognitive, for process as well as content'" (Hahn and Mohrman, 1985, p. 11).

According to INTEGRITY IN THE COLLEGE CURRICULUM (Association of American Colleges, 1985), the opportunities are present in the undergraduate curriculum to incorporate critical analysis, inquiry, judgment and moral choice, and other literacy and humanistic skills; however, acceptance of the challenge to make these changes is beyond the interest and capacity of most college teachers because they are so involved in specialization and scientific understanding of their specialities.

Three statements on the questionnaire pertained to preparation for next steps after graduation (Table 2).

Sixty-nine percent of former students said they left the UM not knowing what was required to be successful in a career and only 40% said they were able to decide next steps after graduation. The present students were a bit more optimistic, but even so, approximately 50% said they will be ill-equipped to deal with securing a job after graduation.

These data are confirmed by a short statement in the May 5, 1987, WALL STREET JOURNAL (p. 1) which reported a survey of 377 male and female undergraduates showing today's college kids to be naive about the work place. They are also confirmed by other studies comparing alumni ratings of college experiences with those of presently enrolled students. For example e.g., Wise, et al (1980) found that enrolled students and alumni rated departments about the same on most variables but were less satisfied than the enrolled students with the vocational guidance (or lack of) they had received. Rossman (1978) surveyed alumni from eleven independent liberal arts colleges in the midwest and found that the alumni rated certain cognitive and affective skills as important for success on the job but said they had not adequately learned those skills while in college. The skills considered important were sensitivity, team membership, supervision of work, and oral communication. Ochsner, et al (1979) found that most alumni rated their college as very useful in increasing general knowledge but only a third rated the college as useful in increasing their leadership ability and helping them choose life goals.

The difference between the two groups might be expected since the former students have already had to face finding and adjusting to a job. The actual amount

Table 2. Do students feel they are being (were) prepared for next steps after graduation?

A. Within my studies in the UM College of Agriculture, I am (was) encouraged

| | Present | | Former | | Total | |
|---------------------------------------|---------|------|--------|------|-------|------|
| | Agree | Mean | Agree | Mean | Agree | Mean |
| -to explore opportunities for careers | 47.1% | 2.71 | 39.7% | 3.10 | 43.8% | 2.89 |

B. As a result of my experiences in the UM College of Agriculture, I will be (was) able to decide what my next steps will (would) be after graduation

| | | | | | | |
|--|-------|------|-------|------|------|------|
| | 57.1% | 2.44 | 39.7% | 3.09 | 49.2 | 2.73 |
|--|-------|------|-------|------|------|------|

I will (do) know what is required to be successful in a career

| | | | | | | |
|--|-------|------|-------|------|-------|------|
| | 50.0% | 2.57 | 31.0% | 3.29 | 41.4% | 2.90 |
|--|-------|------|-------|------|-------|------|

Strongly Agree and Agree are summed for "Agree" but coded values of 1.0 = Strongly Agree... 5.0 = Strongly Disagree are retained for the means.

of agreement with the items by both groups, though alarming, was also not a surprise, based on literature about higher education's seeming unwillingness to be concerned about the vocational needs of its students (e.g., see Lynton and Elman, 1987; Stark, Lowther, and Hagerty, 1986; Riesman, 1979; Jencks and Riesman, 1968).

Critics see both undergraduate and graduate programs as having curricula that are too narrowly confined to technical skills, with too much emphasis on purely cognitive and analytical material, too much abstract classroom work, and too little hands-on experience. ...the affiliation of professional schools with universities has, over the years, tended to de-emphasize the schools' occupational commitments and encouraged 'a more academic and less practical view of what... students need to know...' (Lynton and Elman, 1987, p. 73).

One former student commented that faculty "should wake up to the fact that very few go to college for the pure sake of learning." Apparently the students see little evidence of acceptance, in practice, of data that have been trickling in for some time about students' reasons for attending college. Lynton and Elman (1987) report surveys by the UCLA Higher education Research Institute (ACE/UCLA, 1986) and the Carnegie Foundation for the Advancement of Teaching (1984) which indicate that more and more university students view their education as preparation for a career. In the Carnegie study, 75 percent of the respondents identified occupational training and skills as the most important objective of going to college; the UCLA poll of freshmen entering higher education in the fall of 1985 showed a 16 percent increase between 1973 and 1985 (from 56 to 72 percent) in the number who agree that increasing one's earning power is the chief benefit of a college education. These data are similar to those in a survey conducted in 1977-78 of agricultural students in 13 southern Land-Grant colleges: 97 percent of more than 3,000 agricultural students listed preparation for a career as the reason for choosing agriculture as a major (Dunkelberger et al 1982).

If a job is as important a motivator for college attendance as the above statistics suggest, then it is no wonder that college enrollments have declined, especially in light of Hodgkinson's (1985) report that the current group of college students would graduate and work in jobs requiring no college education. That situation along with students' perceptions that their college experience has not adequately prepared them for "next steps" would certainly dampen recommendations to others to attend a college of agriculture, or any other college.

What Students Did Not Say

Agriculture in the U.S. is now faced with serious competition among world agricultural forces. More than ever before, the successful farmers, ranchers, and owners/managers in agribusiness are characterized by intensive, complex management decisions, with decision-making and information management couched in a global perspective (Miller and Hartung, 1987). The most recent call for this competence was in the March 7, 1988, issue of U.S. NEWS AND WORLD REPORT. That article indicated that the 21st Century executive must be a global strategist (as well as a master of technology, a politician par excellence, and a leader/motivator): "The U.S. cannot reclaim the unchallenged economic dominance it enjoyed in the 1950's and 1960's. Instead, the watchwords of the future are global interdependence" (p. 50).

The Association of American Colleges (1985), and many others, are now expressing an urgency to the need to include international and multicultural experience in the undergraduate course of study. This need for increased international understanding and a perspective of world issue and cultures was not identified by students in their written comments nor was an item related to this area included in the quantitative section of the questionnaire. Perhaps this lack of awareness by the students is not unexpected given that college teachers have put little emphasis on local and national curriculum applications (so why expect international application), and even "Many of America's corporate kingpins boast little of that foresight (global interdependency) — nor do they prize international experience" (U.S. NEWS, 1988, p. 50).

In Conclusion

Colleges of agriculture are experiencing declines in enrollment. That phenomenon could be blamed on a number of factors, e.g., decline in college age population. However, since agriculture is experiencing greater declines than population statistics would suggest and greater than other colleges, something more must be at work. Students in one college of agriculture were concerned about the curriculum they experience. Their observations about needs are consistent with assessments based on trends and future projections and suggest that the enrollment decline may be, in part, a result of **inappropriate** and/or overly specialized curricula. Our graduates need skills and competencies different from those of the past, e.g., strong communication, leadership, and social skills; an understanding of policy development; and a perspective of world issues and cultures. As Lynton (1983) suggested, there is the need to broaden the goals of the educational program to provide competence rather than mere knowledge and to stimulate occupational and civic effectiveness and not only analytical capability.

Colleges of agriculture in the future will be called upon to attend to more than producing, processing,

and consuming concerns. Many of the problems now affecting and affected by agriculture and natural resources programs may be more social than technical in nature and thus more amenable to solution through social and informational sciences than through the technology of traditional disciplines. Our students recognize the need for a changed curriculum. Perhaps it is time we get on with these changes so that they will be prepared for the 21st Century and so that colleges of agriculture will still be a relevant part of that new era.

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Use of Alumni Survey in Curriculum Development

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The course of collegiate study greatly influences a student's chances for career success. For this reason, the establishment of a curriculum is an important task facing horticultural educators. In fact, curricular quality determines the integrity of the entire educational effort.

The horticulture curriculum requires regular evaluation because of changing student needs. Traditionally, faculty have reviewed the curriculum and have made appropriate changes depending upon their own observations. In recent years, an attempt has been made to improve this process by involving others. For example, task forces have been formed at the national level to assess groups representing education, government, business and industry to determine student's needs and to establish curricular priorities (4).

However helpful task force recommendations may be, at times faculty must face curricular decisions unique to their own institutions. In such situations, alumni represent valuable resources. As products of the educational institution involved, alumni are in an advantageous position to judge both the quality and adequacy of their education (3,7,8). They are able to identify both strengths and weaknesses in curricular composition based upon career experiences. The purpose of our investigation was to involve alumni in curricular evaluation and development through the use of a survey.

Survey Methods

An explanatory cover letter and a trifold self-mailing survey with affixed return postage requesting demographic data and options about their horticultural education and employment since graduation was mailed to 351 horticultural alumni of the University of Missouri-Columbia in July, 1985. All of the horticultural graduates between the school years of 1979-80 through 1984-85 were included. We purposefully chose to survey by mail so that our respondents would feel free to give their honest opinions in complete anonymity. There were 162 interpretable responses to this survey, or a 47% return rate. Six surveys were returned as undeliverable by the post office. Since the

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responses were anonymous, no follow-up contacts were made.

The survey was divided into 2 sections: (a) demographic questions which were forced-choice blanks, as well as short answer questions, and (b) survey of opinion questions that employed the Likert Scale (5), in addition to short answers (Fig. 1). Some short answer questions were also designed to prompt suggestions or anecdotal comments. The Likert Scale was used to elicit various degrees of responses to each question. These questions were written so that approximately half were presented positively and half negatively; all were scattered at random throughout the survey. Each Likert question addressed only one topic in a succinct manner (i.e., the average length per question was 13.9 words). To verify alumni opinion on certain key topics, 2 questions — each worded differently and separated in the instrument — were asked concerning the same topic. A tally of the data, converted to percentages, served as the basis from which most conclusions were drawn.

Results and Discussion

Theory vs. Applied Curriculum

Traditionally, the purpose of a curriculum is to develop technical skills or to increase the knowledge base in the arts and sciences, thus nurturing a life-long learning process (6). This dichotomy of training versus educating a student is discussed in horticultural circles. The perception is that horticulturists train more than educate, resulting in horticultural courses being far too applied while lacking sufficient theory.

Our survey contained 2 questions designed to determine alumni attitudes toward this dichotomy. Sixty-two percent of the respondents indicated they thought their education was well-balanced between basic theory and practical, applied learning (Table 1, survey question #2). This opinion was verified by the response to a second question on the same topic (Table 1, survey question #27). Seventy percent of the respondents felt their horticulture courses were intellectually challenging (Table 1, survey question #12).

There were no trends relating cumulative grade point average with a perceived well-balanced horticulture curriculum (Table 2). The response was similar concerning a well-balanced horticulture curriculum as related to the size of place of upbringing (Table 3).