

PRIORITIES FOR THE UNDERGRADUATE AGRICULTURAL CURRICULUM, INTERNATIONALIZATION, AND THE COMPARISON DILEMMA

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Abstract

In a long-term effort to adapt to major social, cultural, technological, and globalization forces, higher education scholars have ongoing discussions of the purpose, structure, and content of higher education in agriculture in the United States. Change in the undergraduate agricultural curriculum is imperative. The question is, however, who will champion the change, who will implement it, and whether or not faculty are prepared and willing to be part of the process. The purpose of this study was to analyze what the faculty of selected land-grant colleges of agriculture perceive to be the priorities for the undergraduate agricultural curriculum; and what these faculty perceive to be the degree of relevance of the internationalization of the undergraduate agricultural curriculum. To gather data, the researcher asked a census of undergraduate teaching faculty in colleges of agriculture of two land-grant universities to respond to an on-line questionnaire with both quantitative and open-ended questions, and also conducted eight one-hour interviews. The study found that faculty gave preference to enhancing student development of analytical and communication skills over enhancing technical contents of the curriculum. Increasing international awareness ranked last on faculty priority lists. On the other hand, faculty also indicated that internationalization of the curriculum was very relevant. The tendency to compare and contrast issues often waters down the emphasis given to internationalization, especially if it is viewed as a mutually-exclusive alternative to other efforts. This tendency to compare is referred to in this paper as the "comparison dilemma."

Introduction

Throughout the years, higher education scholars have discussed the purpose, structure, content, and rigor of higher education in the United States, resulting in numerous changes in content, process, quantity, and quality of the core curriculum, and in institutional reorganizations. Figure 1 summarizes the rationale behind some of these changes.

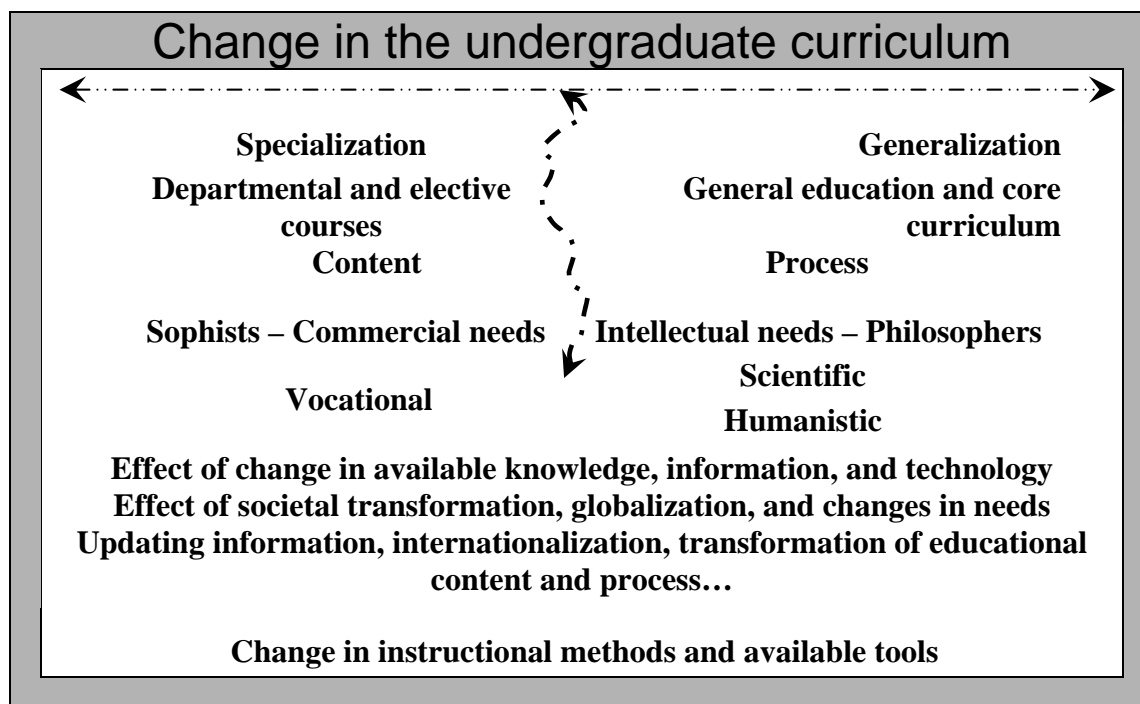


Figure 1. Rationales behind the transformation in the undergraduate curriculum.

Mirroring what has happened with general education, the undergraduate agricultural curriculum has also experienced many changes influenced by social, cultural, technological, and globalization forces. It was already clear during the 1990s that managers were more interested in their employees' personal attributes and behavioral abilities than cognitive skills, and valued communication, analytical, problem solving, and interpersonal skills more highly than academic performance or technical knowledge (Boland & Akridge, 2003; Harvey, Moon, & Geall, 1997; Hayes, 1995b, Kranz, 1995; Moy, 2000; Townsend & Kunkel, 1996). In addition, the interest for employees with a global outlook, and with the ability to perform in international and multicultural contexts has been growing "exponentially" since the beginning of the 21st Century.

Interestingly enough, however, many reports and reviews of colleges of agriculture indicate that faculty, students, and external partners consider that the curriculum is successful in developing student's professional and technical competence, but it is still deficient in all other areas such as communication, interpersonal, analytical, and global competency (Johnson, von Barga, & Schinstock, 1995; Kranz, 1995; University of Exeter, 1994). In answer to all these publications, educators in agriculture have often indicated that "Change is imperative. . . . The traditional approaches can no longer suffice" (Kunkel, Maw, & Skaggs, 1996, p. 3), or, as Ratcliff, Johnson, La Nasa, and Gaff (2001, p. 17) put it, "for the curriculum to be alive and engaging, it must be dynamic and resonate to the needs and interests of current constituents, while fulfilling its perennial obligations of providing students with essential content, skills, and personal qualities."

The questions are, then, why haven't we seen yet a radical transformation of the agricultural curriculum in most universities of the United States, and who will get it done. Lunde (1995c, p. 1) argues that "Higher education and its faculty . . . [are] notoriously resistant to change," and indicates that in most cases faculty are "the major agents of change in reforming

curricula, renewing themselves, and improving instruction” (Lunde, 1995c, p. 2; see also AIEA, 1995a; Baker & Thomas, 1995; Hayes, 1995a; Kunkel, Maw, & Skaggs, 1996; Lunde, 1995b; Vietor, John, Thompson & Kunkel, 1996), and therefore, for any curricular change to succeed, it needs "to be the product of individual and collective faculty thought and debate" (Nelson, 1996, p. 108). In consequence, additional questions arise regarding whether or not faculty understand the need for change, are willing to be part of the process, are prepared to reform curriculum, and have the necessary resources to engage in a comprehensive and long-term process.

Purpose and research questions

The purpose of this study was to analyze what the faculty of selected land-grant colleges of agriculture perceive to be the priorities for the undergraduate agricultural curriculum; and what these faculty perceive to be the degree relevance of the internationalization of the undergraduate agricultural curriculum. The research questions were as follows:

1. What do faculty of selected colleges of agriculture perceive to be the priorities for the undergraduate agricultural curriculum? What is the level of priority given to internationalization?
2. What do faculty of selected colleges of agriculture perceive to be the degree of relevance of the internationalization of the undergraduate agricultural curriculum?
3. How do demographics, priorities given to curriculum, and perceived degree of relevance of internationalization relate to one another?

Methods and data sources

The research for this study was non-experimental, applied research, and used descriptive and causal-comparative research methods. The populations under study were all faculty members with undergraduate teaching responsibilities in two colleges of agriculture of two land-grant universities in the South of the US. This research was in part meant to produce a report with specific recommendations for administrations of the colleges involved to be used in their efforts of curriculum improvement and internationalization.

The researcher used a researcher-developed on-line instrument with both quantitative and qualitative, open-ended questions to provide an opportunity for the respondents to personalize or clarify answers given to the quantitative questions. In addition, the researcher performed eight one-hour interviews with selected individuals in order to complement the data from the questionnaires with additional examples and insights. The researcher also used a reflexive journal throughout the study.

A total of three e-mails (initial presentation e-mail plus two follow-ups) requesting recipients to answer the questionnaire were sent to all faculty in the sampling frame (census, N = 439). Due to low response rate (44% final), to be able to increase response rate and, most importantly, to be able to appropriately assess and handle non-response error, the researcher also contacted personally twenty-one prospective respondents who had not responded to any of the three e-mail requests, and, for analysis purposes, labeled them as “reluctant respondents.” Twenty “reluctant respondents” (95%) participated in the “error-analysis” endeavor of the study.

The quantitative data obtained from the questionnaire were analyzed using the Statistical Package for the Social Sciences (SPSS), version 11.5.1, with the probability level of statistical significance set at 0.05. Content and construct validity of the questionnaire were

established by panels of experts at each of the two universities surveyed. Questionnaire reliability was estimated by calculating the Cronbach Alpha. The Cronbach Alpha for the reliability analysis of the different constructs of the study ranged between 0.6582 and 0.8833. Please note that many of the constructs of the general study are not reported in this paper.

The interviews and open-ended questions were analyzed following procedures outlined by Lincoln and Guba (1985) including unitizing, categorizing, filling in patterns, member checks, and peer-debriefing.

Results

Analysis of non-response error

Given the low response rate obtained with the e-mail inquiry, the researcher used several methods and procedures to assess and handle non-response error, including methods such as the comparison of results obtained between early and late respondents (*t*-tests), and between “waves” of respondents (ANOVA), for all the variables (Dillman, 2000; Lindner, Murphy, & Briers, 2001). In addition, the researcher used a more detailed and stringent analysis using data from additional “reluctant respondents” (Navarro, 2005): Comparing respondents to e-mail requests with “reluctant respondents” (*t*-test), as well as comparing early, late, and waves of respondents including data from “reluctant respondents.” No significant differences were found for any of the comparisons indicated above, for any of the variables presented in this paper. It is important to note, however, that although the data used in this paper did not reveal any non-response error, the low response obtained may limit the external validity of the study, and one should be cautious before making any generalization. In fact, some constructs not reported in the paper did indeed reveal non-response error when data from the “reluctant respondents” were used.

Demographic characteristics of respondents

For the purpose of this paper we selected the following four key demographic traits to characterize the respondents. Gender, rank, department type, and institution. Responses were as follows:

1. Gender: 83% male, 17% female;
2. Rank: 5% temporary faculty, 17% assistant professors, 27% associate professors, and 51% full professors;
3. Department type: The vast majority (77%) of the faculty were in life sciences departments, with 22% in social sciences departments;
4. Institution: 59% responses were from Institution 1, 41% from Institution 2.

Faculty priorities for the undergraduate agricultural curriculum

To analyze what faculty perceived to be the priorities for the undergraduate agricultural curriculum, the researcher explored respondents’ perspectives about the interest in emphasizing a set of skills, competencies, and experiences (thereafter identified as skills) in the undergraduate agricultural curriculum. The set was chosen to parallel what is listed in studies analyzing characteristics that employers of graduates of colleges of agriculture seek in their new hires. A new item, international awareness and/or experience, was added to the list in order to put into context the priority of internationalization, and see how it leveled and compared with the skills discussed in the literature. Note that these were questionnaire items and not complex

constructs, divergence justified because the author was interested in having faculty *comparatively* “ranking” the skills, instead of just scoring them. Table 1 presents the description, means, confidence intervals, and separation of means of faculty ratings of the level of priority in the undergraduate agricultural curriculum attached to the different skills in the list (1 comparatively least relevant, 5 comparatively most relevant).

Table 1. Means, Confidence Intervals, and Separation of Means of Faculty’s Ratings of the Levels of Priority Associated with Emphasizing a Set of Skills, Competencies, and Experiences in the Undergraduate Curriculum in Two Colleges of Agriculture, 2003.

Skill	<i>M</i>	<i>SE</i>	95 % Conf. Interval		Separation of means ^a
			Lower	Upper	
S ₅ International: International awareness/experience	3.31	0.0684	3.18	3.45	a
S ₇ Experience: Prior work or internship experience	3.63	0.0608	3.51	3.75	b
S ₆ Computer: Computer skills	3.67	0.0549	3.56	3.77	b
S ₁ Interpersonal: Interpersonal skills	4.05	0.0616	3.93	4.18	c
S ₄ Technical: Technical competency (in the major)	4.23	0.0475	4.14	4.32	cd
S ₃ Communication: Communication skills	4.39	0.0556	4.28	4.50	d
S ₂ Analytical: Problem solving and analytical skills	4.58	0.0522	4.47	4.68	e

Note. Listwise $N = 188$. ^a Means that do not share same letter in this column differ significantly at $p < .05$, using Bonferroni’s adjustment for multiple comparisons.

Results in Table 1 show what was important to emphasize in the undergraduate agricultural curriculum from the perspective of faculty. It is important to note that respondents were not asked to just score the importance of the skills, but to score the *comparative level of priority* in emphasizing them in the curriculum. This meant that even if a faculty member considered communication skills more important than technical skills, this same faculty member could have indicated a higher interest in emphasizing technical skills if he or she assumed that communication skills were to be acquired elsewhere other than through the agricultural curriculum (e.g., life experience, core curriculum, etc.) In spite of this, technical skills were ranked only third of the list, after communication and analytical skills. This was consistent with much literature and many employers’ reports emphasizing preference for graduates with good communication, analytical, and interpersonal skills, rather than very competent technical experts (Boland & Akridge, 2003; Harvey, Moon, & Geall, 1997; Hayes, 1995b; Kranz, 1995; Moy, 2000; Townsend & Kunkel, 1996). It was, however, surprising, because colleges of agriculture and their faculty are often criticized for continuing to emphasize, and concentrate almost uniquely, on technical “training.”

As one can note in Table 1, when asked to prioritize skills, faculty scored S₅International as the least important of all the skills in the list. In the open-ended questions, respondents had a wide array of explanations to justify their preference ranking, such as, for example: “Curriculum internationalization ‘competes’ for time with the curriculum’s necessary technical content,” “Internationalization takes away from . . . majors,” “the curriculum is already too full,” and “it would have to replace other . . . things.”

Associations between demographic characteristics and faculty priorities for the undergraduate agricultural curriculum

To test whether or not there were significant associations between faculty demographic characteristics and faculty priorities regarding what was to be emphasized in the undergraduate agricultural curriculum, the researcher grouped all “skill” or S variables in Vector “S Curriculum priorities” and then performed a series of multivariate analyses of variance (MANOVA), testing the statistical significance of the difference between group centroids with Wilks’ lambda, as shown in Table 2. For tests yielding a significant Wilks’ lambda the researcher performed additional tests to determine which of the skills or “priorities” had a different pattern than the rest. The researcher followed this procedure to reduce the risk of obtaining a “false” significant differences (Type I error) (Gall, Borg, & Gall, 1996).

According to the Wilks’ lambda of the MANOVA in Table 2, one expects to find significant differences between the ratings of faculty members in different types of departments (life sciences vs. social science) for at least one of the variables representing faculty’s priorities for the curriculum. In the exploration of the significance of the main difference with multiple pairwise comparisons, with Bonferroni’s adjustment for multiple comparisons, the two variables that have significantly different values between types of department are S₄Technical, valued and ranked higher by faculty in life sciences departments ($M_{life} = 4.336$, $M_{social} = 3.951$) (df = 182, dif. = 0.384, SE dif. = 0.110, sig. = 0.001), and S₅International, valued and ranked higher by faculty in social sciences departments ($M_{life} = 3.250$, $M_{social} = 3.585$) (df = 180, dif. = -0.335, SE dif. = 0.159, sig. = .037).

No other associations were expected between demographic characteristics and faculty’s priorities for the curriculum (the Wilks’ lambda of the MANOVA in Table 2 is not significant for any of the analyses corresponding to the other demographic characteristics).

Table 2. Multivariate Analysis of Variance for Vector S^a, Curriculum Priorities, by Selected Demographic Characteristics.

Vector	Wilks' lambda					N
	Value	F	Hyp. df	Error df	Sig.	
D1 Gender						
S Curriculum priorities	.983	0.531	6	179	.784	186
D5 Rank						
S Curriculum priorities	.862	1.503	18	501.117	.084	186
D6G Dept type						
S Curriculum priorities	.900	3.217**	6	174	.005	181
Institution						
S Curriculum priorities	.938	1.992	6	181	.069	188

^aThe variables in Vector S Curriculum priorities are S₁Interpersonal, S₂Analytical, S₃Communication, S₄Technical, S₅International, S₆Computer, and S₇Experience. * $p < .05$. ** $p < .01$.

Perception of relevance of internationalization of the undergraduate agricultural curriculum, and associations with demographic characteristics

In order to analyze and quantify faculty perspectives regarding the degree of relevance of internationalization from a broader perspective, a more “solid” construct, $T_{1\text{Relevance}}$, was calculated from five different items of the questionnaire, all based on a Likert-type scale from 1 (very low/negative) to 5 (very high/positive). The Cronbach Alpha for the reliability analysis of $T_{1\text{Relevance}}$ was 0.8046. On a 1 to 5 scale, $T_{1\text{Relevance}}$ had $Min = 1.4$, $Max = 5$, $M = 3.70$, and $SD = 0.75028$ ($N = 191$). The mean of 3.70 represented a value between “average/neutral” and “high/somewhat positive.”

When testing for associations between demographic characteristics and $T_{1\text{Relevance}}$, the t -tests revealed that there were significant differences between faculty in the two types of departments in their perception of degree of relevance of internationalization ($t = -2.070$, $df = 182$, $sig. = .040$, $mean\ dif. = -0.2674$, $SE\ dif. = 0.12919$), with $T_{1\text{Relevance}}$ being lower for faculty in life sciences departments ($M_{life} = 3.6516$, $SD = 0.76322$, $N = 142$) than for faculty in social science departments ($M_{social} = 3.9190$, $SD = 0.63100$, $N = 42$).

Construct $T_{1\text{Relevance}}$ added a holistic point of view that was not provided by $S_{5\text{Internationalization}}$. As discussed, when asked to respond to the item corresponding to $S_{5\text{Internationalization}}$, faculty members were given a whole set of other skills, and a comparison, or even a virtual ranking among them, was expected. This meant that even a faculty member who was usually very vocal about the importance and pressing need for internationalization could have ranked $S_{5\text{Internationalization}}$ on the low side, by trying to emphasize the essentiality of, and intersection with, the other skills. The situation for construct $T_{1\text{Relevance}}$ was different: Some of the items forming the construct were introduced individually, were not presented under any comparison list, and focused on the “personalized” interests and perspectives of the respondent toward internationalization when thinking exclusively about it and not comparing it with other issues. It is precisely the tendency to compare and contrast issues that often diminishes the perception of degree of relevance of internationalization, especially if it is viewed as a mutually-exclusive alternative to other efforts. In fact, many survey respondents saw internationalization as a “replacement of something else,” as it pervaded many of the answers to the open-ended questions, for example: “The curriculum is already overloaded,” “[internationalization] compete[s] with other activities, “. . . at the expense of gaining technical expertise,” and “no one wants to discuss what will be left out of the curriculum when ‘internationalism’ is added.”

A similar problem was found by the 2003 strategic planning committee of one of the institutions studied. One of their first public steps was to ask all the College faculty, staff, students, and stakeholders to vote on issues that they considered most important for the college. Sixteen issues were put to vote and each respondent was to vote for only three issues. One of the issues was globalization, and was phrased as “How can the college address the issue of globalization to benefit our students and clientele?” There were 3,406 votes cast. The issues that received the most votes were: “What is the role of the college in improving sustainability and profitability of agriculture and natural resources in the state?” and “What can we do to further improve staff morale and job satisfaction?,” each with 344 votes. Third was “How should the college be structurally organized to best fulfill its mission and make its management operations more efficient and effective?,” with 330 votes. The issue receiving the fewest votes was “globalization,” with only 68 votes.

Although not surprising, the results required some introspection and interpretation. One of the conclusions reached was that even strong supporters and faculty active in the

internationalization process were likely to have voted for issues other than globalization, not because they did not consider it important, but because the issue of globalization was at a different level and discourse than some of the other issues. For example, even if a respondent thought that internationalization was at the forefront of the educational reform and improvement process, this person probably voted for the broader issue “enhance education” rather than “globalization,” just because globalization could in fact be considered as one of the important tasks in enhancing the education. The strategic planning committee understood this dilemma. However, they did not want to completely eliminate internationalization from the strategic planning process, and they charged the modeling committees dealing with the top seven issues (based on numbers of votes) to include diversity, globalization, and internationalization into their models: “The Task Force consciously chose not to model diversity and globalization as separate issues, because they should not be the responsibility of separate offices within the college, but a part of everything we do” (CAES Strategic Planning Task Force, 2003, p.2).

The “comparison dilemma” explains partly why it is so important for internationalization supporters and scholars to clarify the meaning of internationalization and present it as a *process* embedded in all programs, rather than an additive, another discipline or focus, or a mutually-exclusive alternative. In fact, some survey respondents shared this perspective and tackled the idea. In their own words: “Internationalization is understood as just an additive, not as what it should be, a quality perspective, a revitalization of the curriculum,” and “people do not understand what internationalization means: They have a one-sided view, and do not look at it from a multidimensional perspective,” and “internationalization should be viewed and implemented as a whole, not as a cut-and-paste at the pleasure and needs of some.”

Conclusions

1. Faculty preferences and priorities for the undergraduate agricultural curriculum were similar to the ones expressed by most employers of graduates from colleges of agriculture, giving priority to analytical and communication skills (Boland & Akridge, 2003; Harvey, Moon, & Geall, 1997; Hayes, 1995b; Kranz, 1995; Moy, 2000; Townsend & Kunkel, 1996);
2. Faculty in life sciences departments ranked (and scored) technical skills as a significantly higher priority for the undergraduate agricultural curriculum than faculty in social sciences departments;
3. When compared with other skills, competencies, and experiences, emphasizing international awareness or experience in the undergraduate agricultural curriculum ranked last (significantly different Bonferroni groups) on faculty priority lists;
4. When asked to indicate the degree of relevance of internationalization *per se*, and through non-comparative measures, faculty assigned significantly higher values to internationalization than when they had to assign values on a comparative basis. The tendency to compare and contrast issues often waters down the perception of degree of relevance of internationalization, especially if it is viewed as a mutually-exclusive alternative to other efforts. This tendency to compare is referred to in this paper as the “comparison dilemma;”
5. Faculty in social sciences departments had a significantly higher perception of degree of relevance of internationalization of the undergraduate agricultural curriculum than faculty in life sciences departments;

6. No significant differences were found for any of the comparisons performed to test for non-response error, for any of the variables reported in this paper. However, given the low response rate, and that there were indeed constructs that showed non-response error patterns (not presented in the paper), one may conclude that the external validity of the study is limited.

Implications and educational importance

1. Efforts to further emphasize student development of analytical and communication skills in the undergraduate agricultural curriculum could be enhanced if faculty were given more support, development opportunities, and resources;
2. Curriculum internationalization efforts could be best designed and accepted by faculty, students, and employers if integrated with efforts to further emphasize student development of analytical and communication skills;
3. If not given other perspectives, people often view internationalization as a mutually-exclusive alternative to other efforts. Because of this, it is important to present internationalization as a multifaceted effort of curricular reform, a *process* embedded in all programs, and a necessary ingredient in everything we do (rather than an additive, another discipline, or a mutually-exclusive alternative);
4. There are differences among faculty in their priorities for the curriculum and their perception of degree of relevance of internationalization. People leading curriculum improvement efforts should take into account these differences and foster the interests of each faculty member and department;
5. One of the problems of internationalization is the lack of clarity of its significance, rationale, benefits, relevance, and implications to students, faculty, and other stakeholders. To enhance internationalization (and other curriculum improvement efforts), it is vital to clearly define and agree upon the purpose, objectives, rationale, significance, benefits, relevance, and implications of the process;
6. Given the limited external validity of the study, and one should be cautious before making any generalization.

In summary, this research contributes to updating and increasing the knowledge base for the redesign of the undergraduate agricultural curriculum. It helps evaluate the preparedness and perspectives of faculty as the main agents of change. The analysis of the comparison dilemma emphasizes why it is so important for internationalization supporters and scholars to explain the meaning of internationalization and clarify that it “is not a strand which should be separated from the overall [curricular] reform” (Ellingboe 1997b), but a synergistic *process*, a process of integration, a multifaceted and universal package of educational improvement and reform (Ellingboe, 1997a, 1997b; Groennings & Wiley, 1990; Harari, 1992; Klasek, 1992a; Knight, 1997a; Mestenhauser, 1998).

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