DEVELOPING A COMPETENCY-BASED CURRICULUM IN AGRICULTURAL ECONOMICS

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In a recent article in the American Journal of Agricultural Economics, Manderscheid suggested several guidelines for curriculum changes. In particular, he suggested that curricular change is a dynamic process which requires efforts to monitor developments both in the discipline and in supporting and complementary disciplines and requires an integration of individually planned instructional activities into a systematic whole. In addition, he hypothesized that "curricula are often based on teaching rather than learning objectives."

This paper reports on the process employed in developing a competency-based undergraduate curriculum in the Department of Agricultural Economics, University of Kentucky. The methodology used is similar to the framework suggested by Manderscheid. While applying competency-based instructional techniques to academic programs in higher education is not new, use of these techniques in our profession is somewhat more unique. Basically, a competency-based curriculum is an attempt

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to identify desired *outcomes* of an educational process (vis-a-vis *experiences*) and to certify these on the basis of demonstrated behavior (O'Connell and Moomaw).[1] The department chose this approach for it was felt greater weight should be given to the student's learning needs and objectives vis-a-vis faculty teaching interests and objectives.

A competency-based approach was also chosen in view of the era of accountability into which higher education seems to be moving. It is likely that funding sources, especially state legislatures, will increasingly look upon the ability of an institution of higher education to produce a product which is employable, socially useful, and productive. In addition, students today appear to be demanding more *a priori* information on what they can expect "to learn" from a course or program of study or on the application which can be made from their training program. Will consumer concerns such as "truth in labeling" be applied to areas of higher education such as course descriptions and objectives?

In addition to the need for a competency-based curriculum, some additional factors prompted the department to conduct a comprehensive review of its undergraduate program. Foremost was the fact that such a review of the total program was long overdue. Courses had been added over the years primarily on an individual basis and with little attention

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[1]Most adaptations of competency-based programs in higher education have involved developing multi-media, self-paced courses as a substitute for the formal classroom. Our interest is limited to designing learning objectives on a competency-basis for formal classroom courses, yet supported by multi-media instructional activities.

devoted to appraising their relationship with other courses, to the total curriculum, or to educational needs. For the most part, the structure of the curriculum did not lend itself to an integrated program of instructional activities. Second, the College of Agriculture had recently adopted a new curriculum which allows departments greater flexibility to develop curricula and program options than permitted under the previous college curriculum.

Finally, several external developments which affect the market for graduates and the currency of curricula had become apparent. These include:

1. Phenomenal expansion of world marketing and trade which agriculture has experienced in recent years, and resultant demand, supply, and price implications.
2. Structural changes in farming, agricultural industries, and rural America.
3. Increased concern over environmental issues, and allocation and utilization of finite natural resources.
4. The apparent lack of real understanding of agriculture by the general public and by decision makers - especially those in a position to influence agricultural and rural policy.

5. Reduced percentages of students in colleges of agriculture who come from farm backgrounds.
6. Increased activism in areas of consumer interests.

These factors imply changes regarding the nature of demand for agricultural economics graduates and the types of training which they should receive. They also have implications for the service role of an agricultural economics department in the total university.

PROCEDURES

Major Guideline

Since developing a competency-based curriculum represented a significant change in direction, the department opted for a comprehensive review of the entire undergraduate program and in a manner to be independent of the previous curriculum. To help assure this, the primary guideline established for the review was that the department would conduct the review as though a totally new program was being designed and that no current program existed - rather than designing it around existing courses, program options, and resources. Thus no existing course would be continued in the new curriculum unless deemed an essential part of it by the review process.

Organizational Structure

Overall responsibility for conducting and coordinating the review was vested in the department's undergraduate program committee. The committee was composed of five faculty members and of one student

representative elected by the undergraduate Agribusiness Club. While the committee maintained overall control and responsibility, major tasks were assigned to three subcommittees representing (1) Marketing and Agribusiness, (2) Farm Management and Production Economics, and (3) Natural Resources and Rural Development. Several factors prompted identification of these three subcommittees. Foremost was the fact that student outputs tend to fall within these areas. Nearly all faculty members (research, teaching, extension) were assigned to and involved in the work of one of these subcommittees. Such "grass roots" involvement of the faculty appears to have been a critical factor in subsequent acceptance of the revised program by the department.

In order to profit from experience gained in developing undergraduate training programs in agricultural economics on other campuses, representatives of the department visited four other agricultural economics departments. An effort was made during these visits to develop an understanding of the structure, philosophy, and orientation of their undergraduate programs, and to derive useful insights and ideas which might be incorporated into Kentucky's program. The four departments visited were selected for various reasons including size and change in size of undergraduate program, recent organizational change, emphasis given to undergraduate training, and geographic balance.

In addition to visits to other campuses, a broader insight on the structure of undergraduate education in the United States and Canada was obtained through a mail survey of agricultural economics departments in nearly 80 public institutions of higher education.

Developmental Phase

Student Learning Needs. The most critical and time consuming step in the developmental phase was identifying and preparing a set of learnings, competencies, and skills needed by graduates. Such a step seemed a logical starting point in developing a competency-based curriculum and was designed to serve as the basis for identifying courses needed in the curriculum. This phase involved obtaining information and ideas from several different groups.

Employers were surveyed regarding job titles, descriptions, duties, and overall training needs of B.S. graduates in agricultural economics whom they hire. Specifically, guidance was sought in determining those areas of training in which graduates are typically adequately prepared, and those usually found to be lacking in persons interviewed or hired. Recent graduates of the department were also surveyed regarding their job titles, descriptions, duties, and overall types of training needed to perform their jobs. Based upon their job experiences, they were asked to help identify areas of training which should have been provided in their B.S. programs but which were inadequately treated. Major responsibility in this phase was assumed by the departmental faculty, both in assimilating data from employers and former students and in identifying the type of training needed to provide the student with a sound academic program.

Involvement of employers and former students provided a most useful information source. Further, it is a source which the department hopes to continue relying upon for as Dale Butz stated, "Too often . . .

professors, department heads, or others assume that they know best what should be in the curriculum and how it should be presented, without bothering to research the market. . . I believe that most agribusiness economists and executives would be willing to advise on training needs if they were asked to do so." French also stated at the same session that "we (colleges and agribusiness) need to get together on training and recruiting."

Course Proposals. Descriptions of student learning and training needs were developed by each subcommittee. These were assessed to determine whether the training could be provided within the department or would require training in other departments. Attention was also given to the level of learning needed in some topical areas using Bloom's taxonomy. For those learnings which fell within the department's area of teaching responsibility, potential courses were identified by grouping those learnings which could logically comprise a common set to be provided within a given course. These potential courses were of varying size ranging from one to three semester credits. Topical outlines and broad course objectives were prepared. Where learnings were to be provided through courses in other departments, their offerings were assessed to determine the extent to which desired learnings could be provided by existing courses. When necessary, new course proposals were discussed or developed in cooperation with relevant departments.

Program Options. The next step was identification of potential program options within the agricultural economics major. Identification of these options, and their content, was strongly influenced by the

surveys and discussions with employers and by other information gathered by the department. Program options were defined with sufficient specificity to reflect meaningful categories of jobs, yet were broad enough to permit the student some alternative employment opportunities across options. Courses considered essential to provide the needed training were specified under each option.

Critique and Approval of Proposed Curriculum. Upon completion of the initial set of course proposals and program options, an initial draft reflecting the proposed structure of the revised undergraduate curriculum was developed. This was presented for critique both in written form and orally to the department faculty, other departments on campus which might be affected by the revision, employers, and former and current students. In addition, three agricultural economists were invited to compus for the purpose of meeting with the committee and later with the department faculty to critique the proposed program. As noted later, this was one of the most productive steps in the review process.

Concurrent with critique of the proposed curriculum, the committee began balancing the optimal model of courses and program options with immediate and long-run resource availability. Essentially, this involved determining availability of faculty to staff the proposed set of courses, extent to which other departments would cooperate in course changes, and extent to which space and equipment would be available when and where needed. Two steps were taken in those cases where more courses were proposed in an area than could be offered by existing

faculty resources. First, a determination was made as to which courses could be combined while still meeting learning needs. Where combination was not possible, an effort was made to prioritize courses and learnings, and thus determine which learnings must remain unmet due to current resource limits.

Information gained during critique of the initial draft of proposals, plus outcome of efforts to adjust the optimal model to available resources, served as major ingredients in preparing a second draft of proposals. This second draft was presented to the department faculty for response and approval. Ensuing faculty discussion coupled with information solicited from the faculty regarding courses which they would be interested in teaching, permitted the faculty to offer their approval with full knowledge of likely demands on their time resulting from implementation of the revised program.

At this point the departmental faculty approved the overall structure and future direction of the curriculum. Approval was made with the understanding that not all facets of the curriculum would be implemented immediately, but that approval was being given to a long-range planning model for the department's undergraduate curriculum.

Following approval by the departmental faculty the revised program required approval by the college and university. This process was made easier because of cooperation and support of the review by administrators at all levels in the university. Without this support and cooperation, the approval process would most likely have been a more laborious procedure.

The approval process was also simplified by contact with other departments and colleges within the University in which a potential conflict could arise. This enabled most conflicts concerning specific courses, subject matter areas, and interest in offering particular subject matter to be settled prior to submission for approval. Thus, departments likely to be affected by changes in the agricultural economics program had voice in the process at the formative stages.

Implementation Phase

Several steps are envisioned for implementing the revised curriculum. The initial step was organizing a faculty workshop on writing and using competency-based learning objectives for departmental courses. An external resource person conducted this workshop.

Course Development. The workshop served as the basis for developing specific learning objectives and content of courses. Committees of two to three persons have been assigned to develop each course. The instructor for each course will most likely be one of the committee members that designed the particular course. This is the most intensive and critical phase in curriculum revision, for it is the implementing link between the desired and the realized curriculum. This step uses the broad course objectives and topical outlines developed for each proposed course as a starting point. For each course, major subject areas or learning units within the topical outline are identified. Within each unit, statements of competency-based learning objectives are developed along with an estimated amount of time to be

spent on the unit, prerequisite material necessary for that unit, and identification and preliminary development of instructional and learning activities including assigned reading, field trips, audio visual soft ware, papers, reports, exercises, etc.

Media Center. Along with development of course content, the course committees were also assigned the task of identifying those topics or units within a course which would require supplementary learning aids. A part of the department's long-range plan is development, in conjunction with the college, of a multi-media learning resource center. Such a center could serve a variety of purposes. For example, to more efficiently utilize formal class time, the department feels that greater adherence to satisfying prerequisite material is essential. If prerequisite materials have been identified for enrollment in a particular course or section of a course, then students who have not satisfied the prerequisite, or who feel additional review is needed, can utilize available materials (slide-tape presentations, audio visual cassettes, etc.) which are in the learning resource center. As another example, some students within a class may require more repetition than others in certain topical areas in order to achieve the desired learning level. For these students, supporting materials provided in the learning resource center can substitute to some extent for class time.

Director of Undergraduate Studies. Another major step in implementing the program is design of an appropriate structure for administering the undergraduate program. A position of Director of Undergraduate Studies is contemplated to work under the department

chairman in coordinating the undergraduate program. The individual would also serve as chairman of the Undergraduate Program Committee. A major responsibility would be to develop a means for continuous review and evaluation of the curriculum. This would likely involve periodic review and revision of the learnings and competencies needed by graduates, as well as revisions in course content and program requirements as learning needs change. Additional areas needing coordination include development of a system of contact with employers and former students, coordinating the department's advising efforts, and supervising recruitment of potential students.

NEW FEATURES IN CURRICULUM

Several new features of the revised curriculum are noteworthy, particularly in view of procedures followed.

Master Plan

The department now has a master or long-run plan for its undergraduate program. While various facets will be implemented in phases, a specific direction has been taken and a commitment has been made. The importance of a strong undergraduate program in the department has been recognized and established.

New Program Options

Under the old college curriculum, any student in the college, regardless of his departmental major, would satisfy the requirements in one of three curricula: technology, science, or business. Under the

revised college and depaıtmental program, a student majoring in agricultural economics specifies an option within the department. In the area of Agricultural Marketing and Management, students can choose from among: Agribusiness Management, Agricultural Financial and Credit Management, and Farm Management. In the area of Natural Resources and Rural Economic Development, options are provided in Natural Resource and Environmental Economics and in Rural Economic Development.

Change in Thrust

The revised curriculum represents a reorientation in thrust in some learning areas. In particular, greater emphasis will be given to economic principles, methodologies and their application (linear programming, computer science applications, etc.). Increased emphasis will also be devoted to oral and written communications. On the other hand, emphasis will be redirected in some areas, such as agricultural commodities, to provide greater flexibility for more emphasis in particular areas depending on student interests. An appropriate sequencing of the entire undergraduate offerings has been developed along with identification and enforcement of prerequisites for each course.

Variable Course Credits

Developing the set of learnings, and consequently grouping related learnings into courses, resulted in several courses which were shorter than the common three-credit course. This has led to identification, in several areas, of basic prerequisite material to be covered in a three-credit course, with an option for an application course in

a variety of one-credit modules. These one credit modules will be taught the same as a three-credit course but for one-third of the semester. In a given semester, a student will be able to choose from among a number of modules to be taken at various times throughout the semester. One credit modules will be offered in marketing agricultural commodities, farm and agribusiness management topics, data processing, linear programming, and agricultural credit institutions.

Service Role

The department has developed improved communications with other departments in the college and hence improved understanding or appreciation for its potential service role in providing applied economic content to programs in other departments. A minor in agricultural economics is being established as one means of expanding this role. This is only one of two minors in the University, and the only one in the College.

Employer discussions and surveys indicated that agribusiness recruits two major categories of agricultural graduates. First, are those potential employees whose primary training is in agricultural economics and agribusiness, with training in technical agricultural being of secondary importance. But a sizable demand was identified for persons whose primary training is in technical agriculture, with some competence in agricultural economics or agribusiness. The agricultural economics minor addresses this latter category. In addition to the minor, more courses in the department will likely provide a

service component than under the previous curriculum. As a result of the discussions and sessions with other departments on campus, particularly in the College of Agriculture, there is an improved understanding by both groups of the offerings available and their potential benefit in the various undergraduate programs.

Communications

The revised curriculum will give greater emphasis to both oral and written communications, a requirement which was dropped from the College curriculum a few years ago. Surveys of employers showed that this is the greatest weakness among graduating students. In reinstating the requirement, a flexible approach is to be followed. The student will be required to take courses in the area, but at a course level appropriate to improve his or her existing level of competence in communications. Clearly, one or two courses in communications will not bring all students to a satisfactory level of competence, thus it is recognized that instruction within the array of departmental offerings must also stress the improvement of written and oral communication skills.

PRELIMINARY ASSESSMENT

While assessment of the revised curriculum is premature, some observations on the procedures used are appropriate.

1. The initial guideline of proceeding as if the department was designing a totally new program was an essential and critical step in insuring

faculty involvement in the process, and also in faculty realization that *significant change* was under way. If they wanted to influence the direction of the new program, it was incumbent upon them to participate through one of the subcommittees.

2. Developing the list of learnings and competencies needed by graduates, while time consuming in itself, assisted in identifying training areas to be provided and in structuring courses with a minimum of repetition or overlap. It was also useful in those cases where repetition of topics between courses was needed, but at different learning levels.
3. Visits to other agricultural economics departments were most helpful. These visits were made early in the review process; thus, the timing proved useful in incorporating selected ideas and philosophies of undergraduate education into the curriculum revision.
4. The external review by the three invited agricultural economists was a most valuable step. They pointed out previously unseen weaknesses and substantiated other findings or suggestions to the department of which the committee was

aware but which would be better received from an outside source. Some suggestions were made which were not implemented but which did cause the department to reassess or reorganize. Clearly, a much better product has evolved as a result of the outside review.

5. Discussions with other departments on campus were fruitful and would be repeated were we to conduct the review again. Both parties appear to have gained from the discussions in understanding one another's needs. Similar discussions should continue in the future, at least on a semi-formal basis.
6. Student involvement in the curriculum review provided a useful insight. The student member, as well as other students involved, pointed out problems in department offerings and proposed offerings as well as in courses in supporting departments which might otherwise have gone unnoticed.
7. At this juncture, faculty acceptance and comitment appears stronger than one might have anticipated, given the history in academic institutions of resistance to curriculum change. Importantly, the faculty has demonstrated a

willingness to support the revised program through participation in teaching undergraduate courses. Currently, half of the department's faculty has been teaching at the undergraduate level. Once the revised curriculum is implemented, roughly 55 percent have volunteered to teach undergraduate courses. This compares with 65 percent and 85 percent for the Southern and North Central regions respectively for those schools responding to the department's survey.

8. While members of the department have established contact with employers and former students in the past on an individual basis, previous efforts by the department were not formally structured to utilize the feedback into a curriculum review process. Recent contact helped the department recognize the type of product being demanded on the job market and their overall training needs. The faculty plans to continue these discussions in the future as a means to assist in identifying needed changes in the learning and competency areas and resultant changes to be made in course content and program requirements.
9. For a curriculum review as comprehensive as the one in process at the University of Kentucky, full

> support and encouragement from the appropriate university administrators is essential. This is especially true where a significant involvement by an entire department faculty is required. The department was fortunate to have such support from its administrators.

When all is said and done, what really concerns us is how well the educational program is equipping graduates for on-the-job performance, and for assuring a personally satisfying and productive role in society. As higher education moves into a period of greater accountability, the type of person trained and his or her social and economic utility will be a factor in our evaluation as a discipline. Thus, performance of graduates is a critical issue. Continued inquiry is needed into the success of programs in preparing students for the type of work they are expected to carry out and in equipping them to advance within the system.

The department has come to the conclusion that a competency-based approach to curriculum development has a great deal to offer. It considers those things which a student should be able "to do" upon graduation rather than following the common focus upon what a student should "understand." Hopefully the steps taken in developing the Kentucky curriculum will help move the student's educational process in that direction.

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