

The use of audio-visual and teaching aids.

More emphasis on undergraduate research or independent study courses.

A scheme under which students can establish a course of their own general design, providing they can find an instructor to be in charge and can entice a sufficient enrollment.

A swing toward more courses that try to put the fragments together and which try to deal with current problems.

More team effort in teaching and research. If we think about plant protection, then entomology, pathology, chemistry, microbiology, farm management and other subjects will all need to be considered. In a sense we are now doing by force of circumstance what the effective teachers have always done to create interest — show how the subject they are teaching relates to the solution of real problems and how other subjects the student is studying contribute to the solution.

A greater infusion of scientific discipline into some of the less exact scientific areas of agriculture, agricultural economics and rural sociology, for example, with the resultant effect on courses and course content.

Deans of resident instruction could no doubt add to this list, but these are the things that occur to a non-Dean simply as a result of osmosis.

### Some Observations and Conclusions

1. The curriculum planners of a hundred years ago were just as "broad gauge" in their approach as we fancy we are today. They couldn't help it that they didn't have the last hundred years of research and discovery out of which to manufacture courses.

2. If an agricultural college graduate is not educated it is not because he didn't have certain way — it is because during his whole college career he was never imbued with the idea of becoming educated. Many fall into this category, and no more than a proportionate share are graduated from colleges of agriculture.

3. Opportunism is a good thing. (For support see Robert Burns)

4. Depth and breadth go together. It is probably impossible to truly have one without the other.

5. When we say that our program is more sophisticated it may mean that we have ceased to pay any attention to something quite fundamental.

6. One course well organized and well taught constitutes a better curriculum than seven courses not well organized and not well taught.

7. The fact that we find courses like physics, entomology, accounting and bacteriology — even geology — in and out and then back in and then back out simply means that they don't stand the competition for inclusion quite as well as some other courses — chemistry, botany and zoology, for example. They fall

into one of the many categories of things about which well informed men of good will can differ.

8. The college through its faculty must maintain its independence to decide what courses shall be taught and what curricula shall be offered, but its judgment in these respects should be influenced by inputs from its students, the advice it gets from citizen committees and requests it receives from farm, industry, business and consumer groups.

9. Since more than half of the courses leading to a degree in agriculture are taught by departments in other colleges it is imperative that a cooperative and friendly relation exist with these colleges and departments so agriculture can have an effective voice in improving the teaching and the content of those courses which affect it most. There should be an adequate committee mechanism for doing this — and for initiating and establishing new courses.

10. Many points of view exist about how, when, and what with regard to the general education content of the curriculum. A good case can be made for many different ways of doing it. But regardless of what we finally agree upon, the impenetrable will still not be penetrated.

The educational needs of students vary in ways we cannot possibly accommodate. No two are the same. Experience, background, capacity, intention and motivation make us all different. Analyzing the student is an important part of the process. This means the introduction of a human element. In my view, colleges of agriculture have done somewhat better than their sister colleges in introducing this element. It can make up for many curricular deficiencies.

### One Final Comment

Kellogg and Knapp concluded in 1966 that colleges of agriculture are not vestiges of the past!

This is due in no small measure to a strong interest on the part of those in charge to not let them become so. One could say that rather than lose, they changed the game.

In passing judgment on our predecessors it often seems that when we look back thirty years we find them shortsighted; when we look back 100 years, we find them very wise. We today may get our best reading 100 years hence.

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<sup>1</sup>This article edited by the author from his original presentation before the 1971 RICOP Summer Work Conference, Aug. 4-6, 1971, Branson, Mo.

NACTA Manuscript No. 5-1-72-5

## CURRICULUM REFORM: A CASE EXAMPLE

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What judgment can you make when you discover one faculty of agriculture changing its curriculum to a form (structure) that the next institution you visit is in the process of abandoning? Is it that one form is appropriate at a given place and time? Or is the problem one of a different magnitude — a magnitude that a faculty, disenchanted with the present form of its curriculum, has failed to recognize?

The type of discovery referred to above has been made — and recently. It has been made by four-man study teams which constitute part of a five-year, comprehensive, systematic effort at curriculum design/development being undertaken by the Faculty of Agriculture, University College, Dublin (Ireland).<sup>2</sup> In these studies of curricula in agriculture we have found almost exclusive attention being given to curriculum, form (structure), and scarcely no attention being given to substance.

The purpose of this article is to sketch an overview of the pro-

ject by discussing some of the activities which the strategy (the operational basis) of the project provide for and the rationale (conceptual basis) by which the project is designed. Before going further, however, I should reveal the meaning attached to certain terms.

By form of curriculum I'm referring to the collection of various courses (subjects) into a range of options or areas of major, the ordering of these courses over a span of time, the labels to be attached to the various courses, combination of courses, options or majors and the like.

Substance refers to those "things to be learned" that the student is expected to give his attention to, how these "things to be learned" are organized into useful experiences for the learner, how the teacher directs his own efforts at facilitating the learner giving attention to critical "things to be learned" and developing the necessary proficiency with them.

My definition of curriculum goes considerably beyond the identification of "content" by its usual connotation. It includes not only the "things to be learned" but all the experiences provided for students participating in the course of study. It includes how these experiences are provided; how they are structured and organized; how they are sequenced and integrated; how the outcomes are assessed.

Let me proceed by posing some questions. What, for example, do you take into account when considering some revisions in the curriculum you offer to students studying for degrees in agriculture? Are your teaching efforts directed primarily at "covering" X amount of material in the time allocated? Or do you determine critical "things to be learned" and concentrate your efforts at directing the learners' attention and energies to these critical things to be learned? Or do you expect them to do something beyond using words with these "things to be learned"?

There are many other questions that could be raised. For example, how much thought do you give to your own learning behavior and experience when you are designing courses? Or do you expect learners to start where you are now — you who have spent some years studying (mastering) the subject? How about what students bring to your course (their experience, previous study, attitudes, etc.)? What about what they are preparing to become? Are they preparing to do what you're doing? That would be the easiest assignment for you; you are regularly with them — a visible, operating role model. But what if they are not anticipating becoming college professors who research and teach? Suppose they are to thrust themselves into the world where they're expected to use what they know in dealing with the problems of some segment of society?

You might consider how you assess the consequences of your efforts to facilitate the students' learning. Or do you see your role as professing on your subject (as one professor of agricultural zoology expressed it): whether the student gets anything from your "professing" is his responsibility, not yours? Of all the things your examinations might reflect, do they reflect best of all the students' skill (and motivation) at memorizing and regurgitating?

Am I completely away from talking about curriculum? Not so, according to my definition. As a matter of fact, most of the questions I have raised are concerned principally with what I'm calling substance. I would maintain that if you deal adequately with substance you cannot avoid dealing with form. However you can consider form and ignore substance (that appears to be what often happens).

When a faculty starts a critical examination of its curriculum, what questions might guide its efforts? How does the faculty come to "know" what question to entertain — the ideas that could guide its deliberations to more intelligent decisions? Consideration of such questions alerts us to the fact that we're victims of our own experiences. We have difficulty thinking outside what we have been exposed to ourselves. We "teach" pretty much as we have "been taught." We organize curriculum pretty much as we have seen others organize it or as we interpret what was involved in organizing the curriculum we were exposed to when we were students.

The experiences of the Faculty of Agriculture, University College, Dublin, in its efforts at curriculum design/development may help to focus on some critical questions. The staff of the faculty decided at a meeting in October 1970 that it was not altogether pleased with what it was doing. Part of that displeasure stemmed from the feedback coming from students. Part of the displeasure came from the faculty's feelings of uneasiness about whether it was doing as well as it might be doing and was capable of doing.

### The Strategy

Part of that decision made in October 1970 included a commitment to a strategy calculated to facilitate, over a span of five years, the design and development of an altered curriculum.

Since this would be the first experience of the faculty at undertaking such a comprehensive curriculum effort, the strategy had to take into account a number of matters. Obviously, it had to lead, in some logical fashion, to a redesign of the curriculum that could be judged to be an improvement over the existing one. Perhaps less obvious was the need that the faculty "learn its way through" the effort. In other words, in order to make intelligent decisions the faculty had to acquire some understandings (and perhaps skills and attitudes) beyond what existed. It was evident that what had been providing clues to needed change had not been adequate; otherwise it would be reasonable to expect that necessary changes would already have been made. The problem would not have arisen.

The rationale (conceptual basis) for the project may be more comprehensible if I first briefly discuss some of the activities in which the faculty has been engaged during the first 15 months. These activities will reveal something of what is called for by the strategy.

As stated earlier, the strategy is considered to be the operational basis for the project. Among the premises on which the strategy is based are these:

1. For any curriculum design/development to achieve its potential, those who are to implement the curriculum (the teachers, administrators, etc.) must be the ones to examine the situation, to make the decisions, and test and judge what is to be implemented. It's the understanding of the teacher that makes the important difference in any reformed curriculum.

2. The primary purpose of a curriculum in agriculture is to prepare students to function as professionals; that is, to do something about real-to-life problems by bringing what they know to bear on these problems.

3. Because students studying agriculture are concerning themselves with real-to-life matters, they have the potential for becoming among the best educated students a university can produce; they have the opportunity for connecting the abstract (theoretical) and the concrete. What they learn can become more than a talking/writing acquaintance with the critical things to be learned.

4. To deal effectively with curriculum design/development there are ways of thinking about a range of matters that the faculty must acquire. These ways of thinking do not accrue to most agriculturally educated academicians through their usual courses of formal study and faculty experience.

5. The real test of any alterations in curriculum must be judged on the basis of what learning-seeking activities the student engages in that differ from what prevailed in the prior curriculum. A renaming of subjects, a shuffling of options and various requirements will not achieve the desired outcomes.

### Symposium

The first major activity of the project was a symposium on professional leadership for the agricultural industry in Ireland. Ten papers were presented by representatives of various segments of the agricultural industry. We wanted to find out what leaders of the industry think about the following questions:

1. What will Irish society be like in the foreseeable future as it may affect demands to be made for and on university graduates in agriculture?

2. What competencies are required of the agriculturally educated professional for your segment of the industry?

3. What contribution can your segment of the industry make to the continuing education of the agricultural graduate once he is in your employment?

4. What contributions to the education of the agricultural professional should the university make?

The faculty, students and representatives of industry participated in this two-day activity. We were interested not only in what thoughts these questions might stimulate in the minds of these leaders of industry but what the faculty and students might learn about what is expected of graduates as these leaders see it.

In addition to stimulating considerable interest within the industry, a number of common points emerged from these papers. Among them:

1. The industry needs graduates who are problem-solvers — not givers of preconceived answers.

2. Knowledge of technical agriculture alone is not sufficient preparation for all that will be required of the agricultural professional.

3. Employment opportunities will change at an accelerating pace in the foreseeable future.

4. Preceding and during his formal education the student needs to conceive of a broad range of career opportunities.

5. Industry does not expect the university to prepare graduates for specific jobs.

### Task Forces

Taking a lead from ideas generated by the symposium, five staff task forces were organized to investigate, in considerable depth, five critical questions. You will note the similarity between some of these questions and those dealt with in the symposium papers. One task force was assigned to each of the following:

1. What is (and is likely to be in the foreseeable future) the nature of Irish society in relation to agriculture?
2. What competencies are required of the agricultural professional?
3. What competencies are required of the agricultural professional that are appropriate concerns of the university?
4. What are the anticipatable career patterns for the agriculturally educated university graduate?
5. What are the characteristics of students in agriculture?

The experience and previous study of most members of the agricultural faculty had not acquainted them with the resources and types of investigations these assignments involved. To illustrate: Various task forces got into the literature of sociology, cultural anthropology, behavioral science research methodologies. They consulted sources of information (by interviewing, studying existing documents, etc.) they were not accustomed to consulting.

The task forces pursued their efforts from the Fall of 1970 until May 1971. At that time they presented their findings in a week-long staff seminar. Their findings confirmed some of the observations made in the symposium. Among the pertinent matters which evolved are the following:

1. Traditional sources of employment will not continue absorbing the number of agricultural graduates as in the past.
2. Changes occurring in primary and secondary education will influence the type of student entering the university to study agriculture.
3. The agricultural graduate, typically, engages in a variety of professional roles during his career; the extent of that variety is likely to increase over the foreseeable future.
4. Public eating habits, advances in food processing and merchandizing technology, changes in population distribution (urban/rural), are among social factors that will have a direct impact on what is required of the agricultural professional.

There were more. The above will illustrate. Task forces concerned with the competencies required and what is appropriate concern of the university (a philosophy of the faculty as to its mission) were judged to require further study. Those problems are being pursued.

### Teaching/Learning and Curriculum Workshop/Seminars

I suggested earlier that prior experience of faculty would likely not prepare them for some of the demands that would be made in conducting this project. For example, it was decided that certain "ways of thinking" about teaching, learning and curriculum could assist the faculty in its efforts. In order to introduce these "ways of thinking about . . ." workshop/seminars were organized. Each member of the staff had opportunity to participate in one of five 6-day workshop/seminars. Most did.

These workshop/seminars, conducted in 1970 and early 1971, were aimed at increasing the faculty's understanding of some key notions:

1. Learning occurs as a result of activities in which the learner himself engages.
2. Learning involves changes in what or how we think, changes in how we do things (our skills) and changes in our attitudes (how we feel).
3. In order for the teacher to guide the students' attention to what is important to be learned, the teacher must first have what is to be learned clearly in mind.
4. The most effective, useful and lasting learning occurs when the learner's attention is directed to central/key/critical organizing ideas (concepts).

Subsequent activities in the strategy were designed to elaborate and further refine these ideas.

### Course Content Analysis

Perhaps the most demanding (and frustrating) effort undertaken to date relates to the identification of those key organizing ideas (things to be learned, concepts) referred to above. Each member of the staff is undertaking to identify, within the subject(s) he teaches, those key/critical things to be learned. A "thing to be learned" can include concepts/principles/

generalizations, skills, attitudes, as well as facts. Our first effort is directed to the identification of concepts. One reason such an effort proves to be so difficult is that, especially in production and husbandry-type subjects, little effort has ever been directed to clearly identifying what these major organizing ideas are (those things we think with).

Our textbooks and other literature, as well as our lecture notes, are typically organized around topics which may or may not represent a "way of thinking" (a concept). These topics more often encompass a range of descriptive materials that can be dealt with, assuming that somehow the learner grasps "the significant idea". If you want to test this out, take some of your textbooks or reference materials (or lecture notes) and see if the critical "ways of thinking about" the phenomena (the concepts) are easily identifiable. Better still, ask some of your students to identify from memory, their lecture notes, or textbooks what the critical ideas are in your subject.

Perhaps there is no part of the project that will be more demanding — or contribute more — to the eventual utility of the curriculum. The judgments to be made about the eventual structure of the curriculum and the overall definition of its content will rest upon how adequately these critical "things to be learned" have been sorted out from all that could conceivably be included to be learned.

### Study Tours

Study tours have already been mentioned. Five 4-man study teams from the faculty have observed and studied institutions offering university-level education in agriculture. Between August 1971 and April 1972 these teams have visited 15 universities in the U.S., 2 in Canada, 7 in Britain and 5 on the continent. These study tours were not undertaken until after participants had been engaged in the project for a year. Study-team members' involvement in the various activities previously described provided a substantial basis for conducting their 3-5 day studies at each institution.

The teams have observed the broad range of ways curricula are organized and presented. They have examined procedures used in studying and adjusting curricula, the ways curricula are organized, how students are "exposed" to the curricula, etc. They were seeking ideas that might be adapted not adopted. They found they were asking probing questions that their host faculties had not entertained in their own efforts at defining curriculum.

### The Rationale

I asked a number of questions at the beginning. These questions were intended to prompt your thinking about some of the factors that might be important in curriculum development. What questions should guide a faculty as it undertakes such a comprehensive project? Or, do the kinds of activities that have been described happen to be a collection of randomly selected things that "might" provide something of interest?

The project and its strategy are based on a curriculum rationale proposed by Ralph W. Tyler.<sup>3</sup> The rationale consists of a set of questions designed to direct inquiry that can lead to reaching more intelligent decisions about curriculum. I will not attempt to suggest the specific connections between the activities we have engaged in and the rationale. They seem reasonably obvious. The rationale consists of four major questions. The first deals with determining the objectives (purposes) a faculty (or department or institution) should pursue. Tyler suggests three sources of objectives:

1. A study of the learners — their interests, needs, abilities and similar characteristics that would provide clues to possible objectives.
2. A study of contemporary society — the opportunities it may provide, the problems it poses, the demands it is likely to make on those who avail themselves of the learning opportunities under consideration.
3. A study of the subject matter — the present level of knowledge in the field(s) likely to provide content, the structure(s) that have been imposed on existing knowledge, the basic organizing ideas guiding inquiry into fields of concern.

Since these three sources are likely to produce more objectives than can be realistically pursued in any educative effort,

Tyler suggests two screens for reducing objectives to a manageable number. One is the philosophy of the institution. Certain things, explicitly or implicitly, are taken to be acceptable/desirable concerns; others, however desirable in a broad sense, may not be considered within the domain of the specific institution or segment of it. The second screen involves what is known about how learning occurs (the psychology of learning). For example, there are some useful guides as to how much time a learner requires to reach a specified level of proficiency in a given field. It is known to take longer to develop a comprehension of an idea than to simply memorize materials related to it. It takes longer to be prepared to use an idea than merely to be able to demonstrate a comprehension of it, etc. Another example: learning is facilitated if the learner has clues as to the relationship between the material he is studying and his notion of what he is preparing to do (to become).

The second question of the rationale asks what learning experiences will be provided. Some of the same ideas useful in the screen on how learning occurs provide leads as to the type of learning experiences that will most likely facilitate the required learning. Inquiries into learning experiences focus on the notion that learning occurs from the activities carried on by the learner (what he gives his attention and efforts to). Consequently the question becomes: what will the learner be doing (since that's what his learning will result from), rather than simply what will the teacher do.

The third question asks how the learning experiences will be organized. Three criteria guide inquiry related to this question:

1. Continuity – how to provide for the learner's continuing use, in a progressively expanded, elaborated and increasingly comprehensive manner, of the basic ideas and skills to be learned.

2. Sequence – how experiences to be arranged will provide for the learner's acquiring an initially useful notion of basic ideas and skills and how each experience builds on those that precede. Usually this can best be accomplished through a series of sequenced experiences throughout the duration of the course of study.

3. Integration – how experiences are to be provided to facilitate the learner's dealing with the inter-relationships that exist between the ideas he works with in one discipline or field of study as compared to the others. This criterion relates especially to the use to be made of the central ideas as he later attempts to deal with problems of the "real world."

Tyler's fourth question concerns evaluation – the assessment of the consequences of efforts to facilitate learning. Typically three broad ideas are involved:

1. How to provide useful clues (feedback) to the learner as to how well he's doing, where he's having difficulties, successes, etc.

2. How to provide feedback to the teacher (the facilitator) as to how well he's doing – where difficulties are arising, which students can move on, which ones need more attention, etc.

3. How to arrive at a judgment as to the level of performance of the learner – has he reached a level that can be considered of sufficient merit to signal advancement, excellence, etc.

### Conclusion

Current circumstances require that comprehensive and systematic effort be directed at improving curricula for students studying agriculture at university level. Much effort to date at designing curricula in agriculture has been directed to adjusting the form (structure). Little attention has been given to what I'm calling the substance of curriculum. This tendency. I'm suggesting, accounts for the fact that one institution shifts from its

existing form of curriculum structure to another, while an institution in another locality is shifting in almost the exactly opposite direction, each disenchanted with what it has. Each searching for the ideal.

The experience with massive curricula efforts, supported by government especially during the 1960's, suggests something missing. At least the consequences of these efforts have been less than overwhelmingly successful.<sup>4</sup> Many of the efforts have been extremely disappointing. Excellent materials have been prepared (content for curriculum). These materials simply are not being used. Why? Can it be that those who are to implement curricular revision (the individual teacher) must be involved in the entire process; that his understanding of what it's all about must accompany any useful and substantive change?

I'm proposing that the critical questions that should be directing inquiry which could provide the basis for more intelligent decisions on curriculum design/development are being overlooked. I'm maintaining that we as teachers (faculty members) are victims of our own experiences. We have not developed sufficient sensitivity to our own learning behavior as a basis for better judging what would be most helpful and useful to our students. We have most generally never been alerted to the fact that perhaps substantial insights into how learning occurs can be gained by carefully and systematically monitoring our own learning experiences.

The Faculty of Agriculture, University College, Dublin is engaged in a five year effort, half way into its second year at this writing. It is a comprehensive effort. It is systematic. We have a strategy which provides an operational basis for the effort and a rationale which provides a conceptual basis. I dare say that many members of this faculty would hardly believe the kind of questions they are now asking themselves that they had not previously considered.

Changes have already been made. More will come. The ultimate product will not be perfect. But all those in the faculty who have engaged themselves in the effort (and that's just about everybody) will have some basis for comprehending what changes have occurred and how these changes can be continually monitored, adjusted and readjusted. We are convinced that the potentials for such an undertaking will justify all the effort, the frustrations and the unavoidable disappointments that are bound to come in this effort of "learning our way through" to a more useful curriculum for the students.

### REFERENCES

<sup>1</sup>G. L. Carter, Jr., is Professor of Agricultural and Extension Education, the University of Wisconsin, and currently on leave of absence as a Visiting Professor, University College, Dublin, where he is serving as Director of the Kellogg Agricultural Extension Centre and director of the project described in this article.

<sup>2</sup>This project is being supported by a grant from the W. K. Kellogg Foundation, Battle Creek, Michigan.

<sup>3</sup>Ralph W. Tyler, *Basic Principles of Curriculum and Instruction* (Chicago: University of Chicago Press, 1949).

<sup>4</sup>For Example, see Herman T. Epstein, *A Strategy for Education* (New York: Oxford University Press, 1970), pp. 1-5; Fletcher G. Watson, "The SSCS: A Curriculum Study", *Curriculum Theory Network, Monograph Supplement, CTN 7-1971*, pp. 135-140; Francis S. Chase, "Educational Research and Development in the Sixties", *Ibid*, pp. 142-163.

## COLLEAGUE AIDED EVALUATION (CAE) AS AN EXPERIMENT IN IMPROVED TEACHING

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Students have been suggested as the most logical and reasonable evaluators of our professional teaching process and course-curriculum direction. A. H. Harrington, nominee for the Ensminger-Interstate Outstanding Teacher Award, recently stated:

... I woke up to the idea that teaching is more fitting of subject matter to the use of the student than a forcing of the student into the mold of the subject matter.

Another nominee for the same award, William J. Flocker, suggests that the teacher has three interdependent functions to