

The Resource Center: A Report From Purdue

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It has been said that the only way to evaluate effective teaching is in terms of student learning (2). There are several levels of learning, ranging from the lowest level, discrimination, to the highest level, which is the ability to utilize a sequence of concepts. All of us are constantly looking for ways to increase learning by our students, be it through increasing their ability to recognize that breeds of livestock differ (discrimination), or by increasing their ability to predict what will happen to U.S. soybean prices if the U.S.S.R. has a favorable sunflower growing season (the ability to utilize a sequence of concepts). We also wish to do this in a manner that the student finds interesting and motivating.

We've all tried innovations to increase student learning; some have been successful, and some have not. Innovations fail for many reasons, and sometimes the reason certain methods do not work is simply that the learner does not have the prerequisite skills.

Students are heterogeneous, and our agricultural students are becoming even more so. Traditional agricultural courses such as agricultural engineering, animal sciences, agronomy, and agricultural economics no longer are composed largely of farm boys with similar previously learned skills. We are finding that these courses are enrolling many non-farm students who major in agriculture and wish to spend their adult life outdoors. More young ladies are also enrolling in agriculture. In 1975, our agricultural schools contained 25% girls (4). The collection of previously learned skills of these students is very diverse, thus making it difficult to mold all of these students into the same learning pattern, especially when they are combined with the farmreared and oriented student. The materials for learning for this diverse group of students therefore must be diverse. The career objectives of our students also vary greatly and we do not always provide what the student wants or really should have.

Therefore, in an individual course, we have the difficult problem of trying to enhance learning of a diverse group who wishes to learn different things, to differing depths, and for different reasons. This creates the difficult situation in which many of us teach. In order to enhance the learning of our heterogeneous students, we felt we were ready to adopt another teaching tool: the resource center.

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The resource center is a room where students enrolled in several courses can congregate. Physically, the room should be located near the center of teaching activity. Instead of being course oriented, the facility is subjectmatter oriented. Emphasis is placed on topics which may be of interest to students enrolled in several courses.

In the resource center at Purdue we provide a cafeteria of learning experiences for students enrolled in crops, forages, turfgrass and crop ecology courses. First, an instructor is necessary and must be on duty whenever the center is open. In addition to keeping the equipment operating, the instructor must be there to help explore topics in depth and to instill a sense of professionalism about the subject. He must also be able to explain the displays, and if necessary, work with the student and his peers as a team in learning the material. In addition, the instructor provides the student someone with whom he can identify.

Our resource center contains a small library, which does not duplicate the main library, but provides trade journals, required readings, and popular items in the area of agronomy for the student to read. It is also a source of specialized material such as soil test and variety trial reports, and similar material. The small library provides the student with immediate access to the most popular materials that are needed for most of their assignments. It also encourages students to consult printed material because it is more easily accessible, and the student doesn't have to spend a lot of time looking for information as often is the case in the main library.

Audiotutorial facilities are also included in the resource center and it is adapted in varying degrees to the different courses. In our situation, the primary use of audiotutorial is to help the student learn crop and weed identification. We have also developed short agronomic problems which are coordinated with study guides and slides. Lecture reviews, and other review tapes are also provided on occasion. The audiotutorial facility is not designed to be, nor does it function as, the primary part of the resource center. It is only one portion that is used for the various courses when it appears student learning can best be enhanced through its use.

Very important parts of the resource center are the displays and study aids. The study aids include pre-prepared and commercially available plant identification materials, mounts, charts, seed and plant samples, and other material. Also, material from previous laboratory exercises is available for students to review as they desire, or for students who for some reason had to miss a laboratory. Space is provided for staff-prepared displays which provide examples of practical applications of material presented in lecture. The displays are also used as drill over the initial learning which has occurred, thus aiding retention (2). Other displays are prepared by students who work in groups on topics of their choice. Learning is not possible unless the learner is involved (2), and this provides another avenue of increasing student involve-

ment. McCreary (3) states in his ten principles of learning that students: 1) enjoy learning when provided a choice of learning materials and activities; 2) learn when they discover important relationship and principles on their own; 3) learn when they perform roles of significance, and help others; 4) learn when their work receives recognition by others, especially their peers. The interactive displays aid in all four of these principles, and evaluations have shown that students enjoy these tremendously. Constructing a display is strictly voluntary, however students who do construct displays are rewarded extra credit for these projects.

Our resource center also contains a computer terminal. It is used for two reasons: first, to simulate real live situations; and second, as a grade storing-record keeping mechanism. In any discipline the possibilities for computer-assisted instruction are tremendous and are limited mostly by the staff's ability to construct and effectively use the computer. We have used a student interactive program which simulates the photosynthetic reaction in the field. This has been used by students in the crop production course to examine the interrelationships of environmental effects on plants growing under simulated conditions. This aids in providing a reason for knowing, for example, the effects of light, temperature, and other environmental factors on plant growth.

The resource center is equipped with extra tables and study areas. This is where much of the peer instruction occurs. The advantages of peer instruction are well known (1) as this provides real life training in how students will function after graduation. We are taught from the very beginning to "do your own work" but all of us constantly consult our peers and use their expertise to help us solve problems. Students should be encouraged to discuss technical problems with their peers while still in college. This also provides a place for the students to be "immersed in agronomy" between classes.

There are many other ways in which a resource center can be used. We have included pre-testing and reinforcement facilities. These may be as extensive or as minimal as desired, and several commercially prepared systems are available. A refreshment area containing a coffee pot and instant drinks has just been added to encourage students to visit the resource center.

Perhaps one of the most unique characteristics of the resource center is that it is used by students from several different courses simultaneously. Students from the introductory course may be using it at the same time as students from the forages course, the grain crops course, or the crop ecology course. This, we feel, has several advantages. It encourages peer instruction. It is also an economic advantage in that many courses using the same facilities simultaneously reduce initial costs and the duplication of equipment. Perhaps another advantage is that the resource center is staffed by graduate students and professional staff who teach the various courses. This insures that the entire teaching staff is familiar with other aspects of the curriculum, thus reducing course

Table 1 How the Crops Resource Center Was Used by Students Enrolled in Three Courses.

	Course		
	Crop Production % of students responding	Forages % of students responding	Turf
To study plant identification material	88	100	6
To review laboratory material	50	39	NA*
To study or discuss class material	38	36	3
To observe displays	74	28	16
To complete assignments or read assigned material	55	43	72
To learn about a topic of particular interest to me	36	18	10

*NA - not applicable

TABLE 2 Student Feedback On the Crops Resource Center

		Course		
		Crop Production % of students responding	Forages % of students responding	Turf
1. Average hours/week Resource Center was used:	<1	43	38	98
	1-2	39	35	2
	> 2	17	27	
2. Simultaneous use of the Resource Center by several classes was:	disadvantageous	6	6	3
	had no effect	62	57	48
	advantageous	32	37	49
3. How effective was the Resource Center motivating you to learn about agronomic topics:	motivating	80	76	53
	no effect	10	23	37
	unmotivating	10	0	10
4. How effective was the Resource Center in helping learn course material:	not effective	3	0	18
	slightly or partly effective	43	9	48
	fairly effective	41	36	21
	very effective	11	55	13
5. How conducive to learning was the Resource Center:	not conducive	7	0	19
	occasionally	20	39	41
	usually	67	39	27
	always	7	22	12

duplication and encouraging the "team approach" to teaching crop science.

Student feedback on the Crops Resource Center was obtained from three different courses. Feedback indicated that students used the resource center mostly to study identification material, and to observe displays (Table 1). Over one-half of the students used it to complete assignments, and to review laboratory material. In two classes surveyed, over one-third of the students used it as a place to study or discuss material with other class members. Generally, students felt that more than one class using the resource center simultaneously either was an advantage or had no effect on the learning that occurred (Table 2). Over one-half of the students examined unassigned material over 50% of the time they visited the resource center. Perhaps of greatest interest is the fact that only 10% of the students felt the resource center did not increase their motivation to learn about agronomic topics.

The resource center is a concept that could be used by many departments and in many different situations. It

may be as elaborate or as simple as the instructors and the administration desire, or as there is room to permit. It is another tool that can be used to increase student learning on all levels, and provide students with the motivation and reason for knowing the material presented to them in other portions of courses. It provides the teacher with another method of challenging the superior student, as well as providing an opportunity for the less prepared student to "catch up."

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Competency-Based Curricula: A Means to Effective Teaching

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In a recent article in the *NACTA Journal*, Zurbrick suggested one approach to curriculum development that merits attention involves the identification and utilization of competencies (skills and knowledge) as a means of developing a relevant and articulated instructional program (3, p. 23). Zurbrick then reports in some detail utilization of that approach in developing a set of core competencies for agriculture students at the University of Arizona.

Recently, a modification¹ of this approach was used at the University of Kentucky in developing curricula in Agricultural Economics (1).

While both of these reports focus on the procedures for developing a competency-based curriculum, one aspect which has not been addressed is the impact of such on teaching *per se*. An examination of the positive affects forms the basis for this paper. Specifically stated, the objective is to examine and attempt to evaluate the poten-

tial benefits of a competency-based curriculum as it relates to, or influences, classroom instruction. Any emphasis on procedures will be only in terms of understanding the ultimate influence on teaching.

Why Competency-Based Curriculum?

One of the major decisions faced by the committee charged with curriculum review was the method to use. Several factors weighed heavily in our decision to move in the direction of competency-based curriculum. Basically, a competency-based curriculum attempts to identify desired *outcomes* of an educational process (*vis-a-vis experiences*) and to certify these on the basis of demonstrated behavior(2). Thus, a competency-based curriculum would require an integrated instructional program, and our existing program was weak in this regard.

Second, a competency-based approach was chosen in view of the era of accountability into which higher education seems to be moving. It's 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 detailed information on what they can expect "to learn" from a course or program of study or the application which can be made of their training program.

This approach was chosen to assure that greater weight would be given to the student's learning needs and objectives as opposed to faculty teaching interests and objectives. While applying competency-based in-

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¹Most adaptations of competency-based programs in higher education have involved developing self-paced, multi-media courses as substitutes for the formal classroom presentations. As students satisfy the requirements of a given learning level, they move up to the next level of learning activities encompassed in another self-paced course.

While the program being developed at the University of Kentucky is not entirely a competency-based program since it will not be oriented in that learning objectives were developed on a competency basis for formal classroom courses.