

# Learning Modules: A Concept for Extension Educators?

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Effective use of modern technology in teaching has long been a concern of Extension professionals. An alternative to traditional methods of teaching is described and proposed by the authors. It combines a new concept—learning modules—with individual, small group, and programmed instruction, and has the potential of using computer-assisted technology. Does it look like it has potential in your teaching?

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Learning modules are called various names, including “molecule-of-learning packets,” “unipaks,” “teach kits,” and “edkits.” Almost invariably they have evolved as a subsequent technique to programmed learning. Learning modules contain many of the features of programmed learning that are considered beneficial, but they try to eliminate some of the handicaps that accompany programming. Without question, the chief characteristics of learning modules are that they are flexible and use mediated instruction adapted to individual or group learning situations.

Extension educators are continually searching for more effective techniques of instruction.<sup>1</sup> Lately, this research has focused on the use of conceptual models that can be used to produce a desired behavior.

The methodological goal is to have the learner achieve discrete behavioral objectives. Enough similarity exists between the desired outcomes of Extension education and the potential effectiveness of learning modules to warrant serious consideration and some experimentation by Extension educators.

This article defines learning modules and describes their development. It also examines the applications of this method of instruction and describes a project that represents a first attempt to adapt learning modules to Extension education.

## What Are Learning Modules?

Since many campuses and school systems are developing and using learning modules, no common

definition can be formulated presently. However, the following question-and-answer series, adapted from Crittenden's article,<sup>2</sup> will try to describe the concept.

Q: What is a learning module?

A: It's a packet of teaching materials consisting of behavioral objectives, a sequence of learning activities, and provisions for evaluation.

1. The objectives are written in behavioral terms, are specific, and embody the accomplishment of microscopic bits of changed behavior (which, by the way, is the definition learning module theory is based on).
2. The sequence of learning activities is designed to:
  - a. Provide instant feedback to the learner on his achievement.
  - b. Proceed from lower to higher cognitive levels.
  - c. Contain materials with intrinsic interest for the learner.
  - d. Provide optional and recycling paths to achieve the objective.
  - e. Be self-continuative to the conclusion of the module.
  - f. Equip the learner to achieve the stated behavioral objective.
3. The evaluation procedure focuses on the stated behavioral objective. It enables the instructor to determine whether the learner

has achieved the objective.

Q: What is the purpose of a learning module?

A: It has many purposes. Some of them are:

1. To individualize (or to permit use of teams of learners in) instruction.
2. To provide a conceptual model for learning that minimizes the need for conventional, verbalized, instructional techniques.
3. To enable (or require) teachers to analyze the learning process.
4. To improve instruction through improved evaluation, resulting from the formulation and measurement of learning outcomes expressed in measurable terms.
5. To maximize the effective use of instructional media and group exercises.
6. To permit learning to occur outside the presence of the teacher.

Q: How does the use of modules help in individualizing instruction?

A: Modules help to individualize instruction by:

1. Providing mediated (teacher free) activities for one or more learners simultaneously.
2. Permitting students to work at their own rate of learning.
3. Providing immediate feedback to the learner and the educator.

4. Using intrinsic interest materials (which, by definition, are *relevant* materials).

5. Enhancing learners' chances of successful achievement.

Q: Where can you get learning modules?

A: They're made by educators. Although some commercial firms are beginning to manufacture modules that have potentially wide application, spontaneity may be sacrificed. It's important that kits be prepared specifically to fit the unique needs and interests of particular learners.

Q: Does the average educator have the skills needed to manufacture modules?

A: Yes and no. Yes, because training and experience have equipped the teacher to know the needs of learners, and thus teachers can create learning modules to fit the unique needs of learners. No, because the creation of learning modules requires more time than is readily available to most educators. However, once a module has been made, it can be revised easily or used over and over, because the teacher's ability to match module and learner is enhanced by intimate knowledge of each. A builder of modules need not be an artist, author, playwright, or creative genius.

Q: If an educator uses this mode of instruction, doesn't he have

to make one module per concept per learner, which is impossible?

A: No, one module per concept would be quite sufficient. In fact, it would be almost ideal. Learners can use a single module successively, or several can use it simultaneously. Modules are keyed to the concepts that they're intended to teach. Skill in prescribing the proper module and exercises for each learner are the determining factors in module usage. Actually, it's not likely that you could manufacture a learning module for every concept taught . . . even in a lifetime with a factory of elves. We suggest they be made one at a time. Over the years, you'll accumulate a collection of them. Each module created provides a variety of activities for one or more learners.

Q: What are the advantages to the educator in the use of learning modules?

A: The ideal instructional model (using modules) would make each "course" or program of study a collection of concepts to be internalized through "performance" or "competency-based" activities by learners. Responsibility for achievement of preset goals is placed on the learner. The instructor in such a system coordinates, evaluates, helps in logistic requirements, counsels, and guides. Such activities are assumed to

enhance the professional status of the teaching role.

Q: These learning modules sound a lot like programmed materials. Are they?

A: Programmed learning sequences and learning modules have many features in common, but it's their differences that make the module more advantageous.

1. The teacher has the skill needed for making modules, because in his role he's continually designing learning sequences for learners with needs he has already diagnosed. On the other hand, he may not have the skill for preparing programs, which require fractionization of learning into the most minute steps possible.
2. Programmed instruction is usually cognitive and verbally oriented, while the module may be cognitive or affective and depend very little on reading ability.
3. The module is more flexible and incorporates more team-centered learning exercises.
4. The educator, who prepares the modules, has a superior vantage point in diagnosing the particular needs of individual learners.

Q: What are the potential benefits to Extension education in training leaders to use module strategies?

A: Extension education stands to benefit from the use of modules in ways similar to other disciplines. (See the answer given to the question on the purposes of learning modules.) Individualizing learning, less stress on verbalized instruction, increased skills of teachers in analyzing the learning process, improved evaluation of achievement, maximizing effective uses of media, and the occurrence of learning outside the presence of the educator are valid objectives for Extension education.

#### **Educator's Role**

The use of behavioral objectives in education is spreading throughout the nation in practically all disciplines.<sup>3</sup> At the same time the role of the educator is changing too. But there are those who warn that there's danger in oversimplification. Too great a dependence on quantifiable goals<sup>4</sup> in evaluating results is a questionable tactic.

Whether Extension education is to adopt the behavioral objective strategy as its sole instructional model, or use this technique in conjunction with others, it's important that teachers, in their respective disciplines, learn to formulate objectives in observable, behavioral terms. They should determine their objectives this way to avoid the dangers of becoming isolationists in methodology.

By observing the behaviors of students, a teacher can more easily

evaluate achievement. These same skills are needed in Extension education, whether in an off-campus classroom, a youth camp, a home, or a county Extension professional's office. Clients' demands for service in a wide spectrum of areas (crop production, youth work, community development) dramatize the need for Extension educators to use new and improved methods. By using learning modules, the emphasis in the learning process changes to what the learner can demonstrate he has learned rather than what the teacher can tell us he has taught.<sup>5</sup>

If the learning module strategy is properly implemented, the role of the educator can be described as that of an "orchestrator" of learnings, creator of learning activities, and an adviser during learning discovery. Thus, as we see in Figure 1, the new role of the module instructor is as far removed from that of the programmed learning instructor as that role was from the traditional teaching strategy.

Extension educators, who develop the skill to use learning modules through coordinating the functions of programmed instruction and

use of behaviorally defined objectives, guided discovery, team activities, and mediated instruction, should effect improvements in current instructional strategies.

### Evolution of Learning Modules

We were among a group of educators in Texas who began experimenting with mediated instruction combined with behavioral objectives and intra-class groupings in the late 1960s.<sup>6</sup> These educators called their instructional vehicles "learning modules"<sup>7</sup> and "molecules-of-learning packets."<sup>8</sup> Teachers and prospective teachers were trained in perfecting the skills needed to use the kits that would result in learner achievement of a prescribed behavior.<sup>9</sup>

The learning modules used contained mediated instructional techniques, text and reference materials, demonstrations, team activities, and individual case studies. Visual aids, small groups, and a system of feedback were used. Some techniques included provisions for branching or repeated subterminal activities to help students obtain mastery. Modules were designed both for individ-

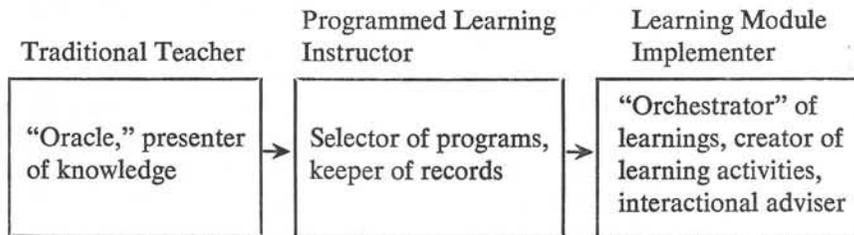


Figure 1. Roles of the teacher.

uals and for small groups. They began with behavioral objectives and included concrete learning aids. The technique was highly flexible. Significant gains in student and teacher achievement occurred in mathematics and in interpersonal skills.<sup>10</sup>

Programmed learning has been discussed in this article as if it were fully developed. Programmed learning can be improved to fulfill the outcomes of learning module strategies. The work of Bitzer and his colleagues at the University of Illinois with the Programmed Logic for Automatic Teaching Operations IV (PLATO IV) system has entered a new stage . . . allowing for *limited types of open-ended, spontaneous interaction between learner and machine*. Bitzer and his colleagues have also simplified the programming technique through use of an "author" mode that can be easily learned by advisers.<sup>11</sup>

The greatest weakness of all other programmed teaching is probably its "locked-in" or "closed reaction" to student responses.<sup>12</sup> PLATO IV is *locked-in to a conceptual model rather than to a multiple choice answer set*. It includes a multitude of responses in a master program, which gives some spontaneity to the learning situation. It also includes a computer console and color visuals on a TV-type screen,<sup>13</sup> which can be located up to 150 miles from the university campus.

PLATO IV is an exciting follow-up to and an improvement over earlier attempts at programmed computer-assisted instruction. However,

it's still limited to verbal, pictorial, and abstract learner activities — and learning theorists such as Bruner are saying that learning must be concrete as well as abstract. Learning modules contribute to concreteness in the teaching situation. Computer consoles and module applications can supplement each other in providing an innovative thrust toward improving instructional methodology.

### Relevance for Extension Programs

The use of modules for Extension instruction is worth considering, because they're flexible and combine many aspects of modern instruction theory. Concept formation and conceptual models fit naturally into this instructional medium. Combining the modules with computer-assisted technologies, such as PLATO IV, is likely to increase teaching effectiveness. At the heart of the process is the ability to create individually prescribed instruction for particular learners.

How can the Extension adviser use these new instructional techniques when he's located far away from a university? Advance computer-assisted systems and learning modules seem uniquely suited for use in county Extension education. Anywhere that a mobile unit or a computer-assisted learning console can be set up and connected by telephone with a computer terminal, the computer-assisted program can be used effectively.

Since instruction on computer consoles and the learning modules

can be designed to fit almost any situation for any group of learners, the flexibility of both methods makes it possible for Extension educators to create personalized programs of study for clients with different interests.

Gronlund states that evaluation of the products of education is more valid when behavioral objectives are formulated as an integral part of the process because positive reinforcement and other principles of learning theory can be easily applied by the teacher, peers, or the teaching machine in this instructional mode.<sup>14</sup> The Extension educator will become more of a professional educator as a result of participating in the experience, for as he designs learning activities to accomplish previously formulated objectives, he may analyze the process of "how the learner learns" for the first time.

The confusion among learning theorists over the most productive and most scientific teaching may not be resolved as a result of the learning module strategies. But, in-depth analysis reveals that most of the sounder recommendations of educational sociologists and psychologists are included in module applications.

DeVault and Kriewall have described the current status of instructional theory, listing the limitations of programmed teaching and pointing out the need for a new vehicle of individualized instruction.<sup>15</sup> The learning module, when properly implemented, seems to fit their prescription of what's needed for a creative, flexible, and produc-

tive method of classroom, small group, or laboratory education. There is reason to believe that learning modules will serve effectively in numerous Extension educational programs.

### **Process Skills Project**

The hypothesis developed in this article is now being tested in a special "process skills" project among Extension educators at the University of Illinois. It's called "Process Skills in Organization Development and Human Relations" and is funded by the Extension Service-USDA and the University of Illinois. "Process skills" are defined as skills in understanding, developing, and managing personal and group behavior to cope with the realities surrounding the Extension professional.<sup>16</sup>

The objectives of the project are: (1) to foster the development of improved organizational morale and better management of delivery systems, (2) to develop more effective behavior and interpersonal skills among the professional staff, and (3) to aid Extension systems in their collective community development efforts.

Learning modules, designed specifically to provide the instructional strategy for developing process skills of Extension educators, are being used in the project. The concepts chosen for modulization were based on their relevance to organization development and human relations.<sup>17</sup> They're organization styles,

leadership styles, team skills, change implementation, conflict management, communications, motivation, stress, "games people play," and prejudice.

A team of 18 Extension educators and a consultant is developing the modules for each concept. The team members were selected to represent various levels and interests within the Cooperative Extension Service and were oriented to the nature and objectives of the project. They have begun to develop the behavioral objectives and learning exercises that relate to various roles in the Extension Service.

When the first draft of each module is completed, it's to be field-tested in small group learning situations. Revisions will be made after observing learners and their reactions to the modules. Results of post-tests built into each module will also be used for module revision and improvement.

Two types of learning modules are planned: (1) those that can be portable, completely self-contained, and usable with small groups of learners and (2) those adapted to individualized, programmed, computer-assisted instruction.

Team members are critiquing each component of every learning module throughout the process of development. A study identifying behaviors conducive to successful Extension roles is underway. The list of desired behaviors is being used as the basis for formulating objectives and designing learning activities.

Several instruments are being

developed to provide feedback on learner needs and achievement. Items in behavior inventories correspond to module subjects and objectives. Learners will rate their current behaviors before participating in the instruction sessions. Simultaneously, the learners will solicit parallel ratings of their behaviors from randomly selected peers, subordinates, and superiors in Extension.

Profiles will indicate to learners and trainers the pre-assessed behavior skills of learners. The modules, dealing with the various skills, will then be presented, and post-tests will be made several months after training to measure any changes in behaviors.

Another research instrument is being completed by participants at the end of each learning module to obtain feedback on learners' opinions of the clarity, relevancy, and helpfulness of the curriculum. Additional techniques of feedback and evaluation of participant behavior include video tapes of learners in role-playing exercises and team activities. Each learner will be able to view and evaluate his behavior and compare his rating with feedback he gets from fellow team members.

This feedback is compared with the analysis of behavior received from a subject's peers, subordinates, and superiors before he began the instruction and provides a basis for self-analysis and personal goal setting.

## **Conclusion**

Learning module theory offers Extension education an alternative

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to traditional methods of teaching and influencing clients' behaviors. To use this strategy properly may require retraining for many Extension educators. New models of training will be needed for future Extension leaders.

In other disciplines, but most particularly in professional education, the module theory has been extensively developed and is being empirically tested. The Illinois project described in this article represents a first attempt to implement module theory in the Cooperative Extension Service field. Findings of the project should be helpful to Extension leaders in evaluating this new technique before adopting it for full implementation.

#### Footnotes

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