Instructional Modules At Macdonald College

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Abstract

A case study of a Canadian instructional effort using modules, an independent unit of a planned series of learning activities designed to help the student accomplish certain well-defined objectives.

The professor is getting ready to lecture to his large, first-year class (five minutes before it is scheduled to begin). He mumbles to himself, "Now, what was I going to cover today. . .ah yes, here are the notes, but weren't there some drawings to go with these. . .they seem to be missing. . .well, I guess I'll have to do without them. . let's see if I still understand this stuff." The bell goes and the professor enters the class having only read over the first two pages of his notes — hoping that the rest are in order and comprehensible. Fifty minutes later the bell rings again and the students pour out of the class, talking to one another. "What the hell was he about today?" "I don't know, I didn't follow a word of it." "I slept through most of it." "Oh, you can borrow my notes if you like — we covered the same thing in another course I'm doing." "I'm dreading the exam — I can't imagine what questions he'll set." "I'll be glad when this term finishes." "I'll be glad when I'm finished with University."

While this is fictitious the recent findings of the Carnegie Commission on Higher Education are not. One third of the undergraduates and half of the graduates surveyed cited lack of quality instruction as a major problem in universities.

Universities have responded by allocating funds for the purchase of teaching aids and some have established units charged with upgrading teaching and learning, e.g., McGill's Centre for Learning and Development. Much audiovisual aids equipment is being purchased, often under the pressure of the manufacturers who are capitalizing on the situation, and much of this unfortunately ends up in the cupboard or is inefficiently used. Professors are being encouraged to state behavioural objectives for their courses and individualize their instruction by converting their courses to a modular format.

What Are The Problems?

What are the underlying causes of our teaching and learning problems? Why don't audio-visual aids always help? What are behavioural objectives, individualized instruction and modules, and how can they help? These are some of the questions that I will try to answer in this article. A model for examining teaching and learning in universities is provided in Figure 1. Here are some of the factors that are behind our current problems:

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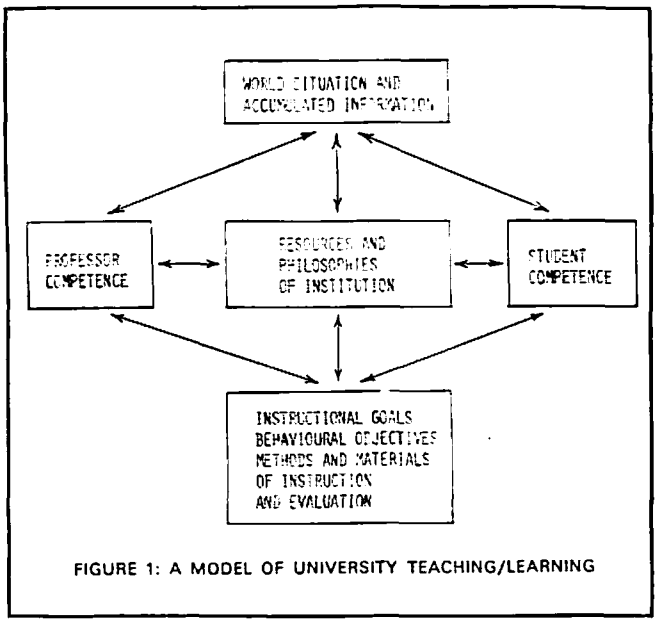

FIGURE 1: A MODEL OF UNIVERSITY TEACHING/LEARNING

1. Student Differences. The background, experience, interests, learning abilities, preferences for particular media and for the timing of their learning differ among students. As traditional methods of teaching and evaluation largely ignore these differences, they create problems for some learners. The validity of the grades awarded in such courses are consequently open to question.

2. Population Explosion in Universities. As class size increases, students feel more isolated from their instructors. Students react by demanding more personalized forms of instruction.

3. Information Explosion. While this has led to the subdivision of some courses others have retained their old format but have shed some of their content. Many educationalists argue that unless we state the behavioural objectives for a course we have no valid basis for deciding what to retain and what to leave out. Another, more indirect, outcome of the information explosion is the establishment of multi-disciplinary, team-taught courses. These are very susceptible to duplication and a lack of coordination. By stating behavioural objectives for each unit these problems can be considerably reduced.

4. Student Influence in Universities. Student influence on teaching is increasing through representation on committees, through formal course evaluation surveys, and through articles in student newspapers. Most students would like to have more influence over the design of courses and programs. The various forms of individualized instruction permit programs to be more flexible and actually rely on student inputs for their updating.

5. Increasing Government and Public Interest in Universities. More and more often universities are being asked to justify their programs and state their objectives. The stating of university and program objectives is making it easier to state course objectives.

Thus, there is a need to find forms of instruction that take into account student differences and are personalized, that provide us with a valid framework for selection of course content, that encourage student inputs, and that can be justified to those outside universities.

Module Production

I should admit, at this point, that I did not have all these things in mind when I first decided to modularize a course. Rather I was faced, in a course in general entomology, with two groups of students with very different interests. The "agriculturalists" were mainly interested in killing insects, and the "environmentalists" wanted to learn how to live with them. I had already written down some broad goals for the course (Hill, 1971). This comprised a list containing such words as evaluate, analyse, communicate, synthesize, identify, plan, and be interested, resourceful, and experienced with special reference to entomology, e.g., "after completing the course you will be able to identify all insects, at least, to the order level" and also "evaluate, criticize and offer suggestions concerning entomological information communicated to you."

The next step was to compile a list of module titles, taking as many alternative approaches to the subject as possible. One of the aims is to provide alternative ways in which certain basic information can be learned. Thus insect anatomy, physiology, behaviour, and ecology may be studied separately in modules devoted to each of these topics (the "Traditional Approach"), or they may be studied together in modules dealing with reproduction, getting enough energy to live, getting rid of waste, etc. (the "Problem Solving Approach"), or they may be studied by examining a particular group of insects in detail (the "Classification Approach"). Other approaches include the "Habitat Approach", the "Life-Style Approach", and the "Applied Approach." In this way over 40 module titles were listed, many covering subject areas that were not previously covered in this course. When doing the course students must choose about a dozen modules from this list.

The next stage was to write behavioural objectives for each of the modules and to collect suitable resource materials.

Objectives vs. Goals

Stating behavioural objectives is not the same as stating the content or goals of a course. For example, one of the modules is entitled "Entomological Literature and Research"; one of the goals associated with this is for students to know about the literature of entomology (whatever that means); and one of the behavioural objectives associated with this goal is that "given a restricted topic in entomology you will, within a few hours, and using the major abstracting and indexing aids, be able to compile a list of all the relevant papers that were published during any year in the twentieth century." The major difference between goals and objectives is that unlike the former the latter are observable and can be tested. By stating behavioural objectives instructors are in a better position to select suitable methods of instruction and students are able to see what they are likely to get out of the course and how they will be tested (Kapfer, 1971). Other advantages for students, professors, and institutions are given in Table 1.

Having decided what abilities we are trying to develop, suitable methods of instruction can be selected, e.g., a laboratory manual, a field manual, an annotated bibliography, an introductory handbook, an audio-tape, a videotaped lecture, a synchronized slide-tape presentation, a filmstrip, a filmloop, etc.

Most of the modules that we have produced, and are producing, are in the form of handbooks, often with an associated filmstrip, although we do intend to produce some tapes to accompany filmstrips. In addition, we purchased some commercially available tapes, slides, filmloops, and filmstrips. It is very important to select the most suitable media for instruction. For example, it would be ridiculous to prepare keys on film for identifying insects as these may be needed in the field.

In addition to these materials, the module may contain an optional diagnostic pretest, a list of any prerequisites and materials required, a glossary of terms used in the module, a bibliography, a post-test, and a questionnaire for evaluating the module.

Module Defined

Thus, a module is a self-contained, independent unit of a planned series of learning activities designed to help the student accomplish certain well-defined objectives. If the student passes the pretest, he gets credit for the module and moves on to another one, and even if he does not pass he will not be reexamined on those parts of the test that he did correctly. This eliminates duplication. As students work largely on their own, the inclusion of a glossary is essential and a bibliography highly desirable. The post-test can be taken whenever the student feels that he has mastered the subject. One can only progress to the next module by passing a module. If the student finds that he has not mastered the subject he may repeat the module or do a remedial module and re-sit the test, although the pass mark, which is usually over 80 per cent, is increased the second time around.

The modules and associated A-V equipment and resource materials are available in the Centre for Modular Instruction here at Macdonald. The Centre is divided into two main sections: a quiet area equipped with carrels (desks containing the A-V equipment) and tables, and a discussion area equipped with armchairs, resource materials, and the means to make coffee! The instructor, or a teaching assistant, is available in the Centre at all times to answer questions, conduct tests, and administer the Centre.

Resources Used

The production of the modules involved a graduate assistant, a typist, the resources of the Instructional Communications Centre at McGill, and the duplicating service. Others involved were the staff of the Office of Educational Development, which provided financial support, and the personnel of the Centre for Learning and Development (both at McGill), who provided moral support.

In February 1973 our first module (Pesticides as Pollutants) was used in the Physical and Biological Aspects of Pollution course and during the fall term of the same year about half of the General Entomology course was offered in the modular format. While we have run into a number of minor problems, student response has been largely favourable. Next fall we plan to offer the entire General Entomology course in the modular format.

The question that I am most often asked by instructors is "has this lightened your teaching load?" I used to reply "No" but now I say "Yes—it hasn't decreased the amount of time I put into teaching but, by making it far more challenging and stimulating, it has turned the teaching load into a teaching trip." However, I should warn you that stating behavioural objectives for the units of instruction within a course is likely to be the beginning of an evolutionary process that leads one to question the objectives of programs, of universities, and indeed of whole societies.

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State coordinators are appointed by the regional director. The duties of the state coordinator include working with the regional director in obtaining new memberships in his state, maintaining a current list of post-secondary institutions with programs in agriculture in his state, and helping regional directors implement various goals and programs of NACTA in his state.

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