Application of a Curriculum Design Model to College Instruction

J. Michael O'Malley

Recent criticisms of college instruction have generated a number of innovations in approach that seem to have produced genuine improvements in instructional outcomes (e.g., Keller, 1968). These innovations have not been described within the context of a model for instructional design, however, and may lose coherence when the rationale for their development is explored. The approach recommended here is to develop instructional innovation within the context of a theory and to use the feedback from successive applications to aid the design of future instruction. A series of attempts to modify a single course within the context of a model for instructional design will illustrate the usefulness of this approach.

A model for college instruction is available in Glaser's (1962) discussion of the elements considered in the design of a curriculum. The model consists of the following elements: statement of goals and objectives, evaluation of entering behaviors, design of instructional components, and evaluation of whether or not the objectives were achieved. Goals have been defined by Mager (1962) as general statements of purposes or aims, separated into units of content, from which specific objectives, separated into specific performance skills, can be extrapolated. To this aspect of the model can be added Gagne's (1969) discussion of curriculum hierarchies. Curriculum objectives are sequenced hierarchically in terms of difficulty and/or whether or not they are components of other objectives, with the more elementary objectives being presented early in the sequence. The entering behaviors in Glaser's model are those abilities possessed by students as they enter the instructional sequence that relate to the objectives of instruction. The relative abilities of the students will determine the extent to which the course objectives have already been achieved. The instructional components in the model, i.e., the methods and materials, are designed to move the students from their status on the entering behaviors to acceptable criterion performance of the terminal objectives. Finally, evaluation consists of requesting students to perform the objectives of each instructional unit. A request for mastery performance on unit objectives functions as both a criterion-referenced test (Glaser, 1963) and a prerequisite for advancing to the next unit. The model acts as a synchromechanism in that information regarding student performance on the criterion-referenced tests is used to modify the instructional system. Student ability at the time of testing therefore reflects the success of the instructional system rather than the success or failure of the students. A course designed with this model might resemble in large measure the approach used by Keller (1968), as described by McKeachie in the lead article to this issue of *Educational Perspectives*.

Applications of the Instructional Model

An attempt to implement this model at the college level was made by the writer in four different presentations of Educational Psychology 408, "The Emotionally Disturbed Child," over a period of two semesters and one summer at the University of Hawaii. Various aspects of the model were successively introduced in each presentation of the class. Also, modifica-

tions were made in each presentation based on the information obtained at the time of evaluation.

Application I: Fall, 1969

The goals formulated in this application of the model were based in large measure upon the writer's accumulation of information in graduate school regarding behavior modification and his experience working with it in applied settings. The goals were arranged into units and the units into objectives. Since the students were themselves teachers, their entering behaviors were influenced by a wide variety of teaching styles, years of teaching at all different grade levels, and stages of academic experience and familiarity with behavior modification. Some of the teachers were at the time or had in the past taught special education, but the majority taught regular classes and were interested in obtaining techniques with which to manage the typical acting-out child in a classroom. A secondary but nevertheless important interest was to manage students who would withdraw and not participate in learning. The writer had been cautioned that teachers are extremely difficult to instruct, since they are tired and irascible following a long day of work with children. The lectures were therefore supplemented by arranging for student-led small groups of 6-8 to discuss topics relevant to the overall curriculum following a lecture presentation of approximately 45-60 minutes. While spending a small amount of time with each discussion group (in a class sized 60), the writer planned to support groups whose activities were oriented toward the solution of the discussion problem and to prompt or encourage those groups who were having difficulty. The length of the lectures was to be reduced over the semester once a firm historical and theoretical foundation of the topic had been established. The students would demonstrate their understanding of the theoretical foundation by repeatedly applying the principles in small group discussions to existing classroom problems they had submitted. Criterion-referenced tests following each unit were not used since one of the first requests by the students was to eliminate all testing procedures and attendance requirements. The "compromise" reached was to have only a final examination, but to require attendance at all but three class sessions. The class, as implemented, probably differed little in outward appearance from most lecture-discussions, except for the group discussions and the fact that an instructional model was used in the design and sequencing of the instructional content.

The success of this application of the model was determined from student comments, informal observations of class attention and participation during lectures and small group discussions, and inspection of the content and performance on the final examination. The students indicated no more than a few months beyond the start of the semester that the lectures were too unrelated to their concerns, but that the group discussions seemed appropriate and should be continued. The assumption that theoretical foundations in behavior modification are prerequisite to its application was thus, under encouragement from the students, rather forcefully rejected. Lecture-discussions dealing with behavior problems submitted by the students and group discussions dealing with these same problems were instituted full time and continued to the end of the semester. Informal observations of attention and participation in class and discussions with the students suggested that this change resulted in more frequent working behaviors. The final examination was comprised of short answer definitions and essay questions dealing with specific applications of behavior modification principles to children with a variety of disturbed behavior patterns in a classroom. The exam was graded as a criterion-referenced rather than a norm-referenced test. The content of the final examination was not of a difficulty level the writer would have desired due to the lack of completion of many of the units planned at the beginning of the semester. The students generally performed at a minimally acceptable level of accomplishment on this relatively easy examination. This reflected, as would be expected from the model, the inappropriate design of an instructional system for students with these entering behaviors, not the lack of intelligence or motivation of the students.

Application II: Spring 1970, Off Campus

The second presentation of the course occurred in the Spring semester and was taught off campus to approximately 50 teachers. Goals, units, and objectives from the previous semester were inspected for content and modified to incorporate a broader range of ideas in treating behavior disorders. Additionally, the entire course was put into the framework of the model used to design the course. It was assumed that teachers must be familiar with the four components of Glaser's system in order to effectively deal with any area of instruction, including the treatment of disturbed children. Teachers should be familiar with how to formulate goals and objectives, assess entering behaviors, design instructional systems, and evaluate their instruction when they are attempting to instruct children in the performance of appropriate classroom behaviors (and,

by definition, the nonperformance of inappropriate behaviors of the sort usually considered "disturbed"). The course units thus consisted of these four major areas, and the objectives consisted of a wide range of exemplars specifically related to the treatment of children with behavior disorders. The units and objectives were transcribed and distributed to the teachers for their inspection and approval prior to the onset of the course. The objectives were introduced as a pool of items from which would be drawn the final examination. The lectures were rarely longer than 30 minutes and the group discussions were more intensely focused on what the teachers would be doing to implement their knowledge in each of the units of instruction. In contrast to the practices of the previous semester, little emphasis was given to the historical background of the special education of children with behavior disorders, the range of practices and services in non-classroom settings, and the theoretical and research rationale for the development of current practices and procedures in behavior modification. The same statement of request for no attendance or testing requirements was made by this group as had been made by the group the previous semester; thus, the students were again not requested to interview or to take criterion-referenced tests at the end of each unit. The only student assessment was a final examination, and attendance was again limited to no more than three absences.

The plan described worked extremely well for this group of students. Contrasted with the previous semester, attendance was generally higher, informal comments were more often of a favorable sort, attention and participation were more consistent, and the final examination performance of the students improved even though the judged content of the final was more difficult. The model of instruction in this application thus served as a foundation for redesigning the course based on the feedback from the prior semester's experience. When the evaluation component was conceived as informal commentary and observation as well as the final criterion-referenced testing, the information seemed to provide an adequate basis for redesigning an improved course. This suggests that attention and performance should be stated explicitly as part of the objectives of college instruction, and that continuous monitoring of attention and performance are important indicators of the need for course improvement.

Application III: Spring 1970, On Campus

The third application of the model was in a Spring semester, on campus course taught to undergraduate students at the University who for the most part intended to become teachers. By following the same general procedures as in the second application of the course, an interesting evaluation was provided of the generality of the instructional procedures with students whose entering behaviors were markedly different. That is, the entering behaviors of the students in the off campus course were relatively advanced compared to students in the on campus course as a result of their experiences in prior teaching and graduate course work. Although the units and objectives had been designed and modified for students whose characteristics were representative of the more experienced group, it was expected that the on campus group would be able to synthesize and project the lessons and class experiences to their future role as teachers.

Evaluation of the third application of the course was obtained through the same general procedures mentioned previously. The attention and participation of students in the class were extremely varied. From informal discussions it was discerned that students who demonstrated high attention and performance were either exceptionally achievement motivated or experienced to varying degrees in teaching. Also, students then involved as in-service teachers or as tutors seemed to attend better and participate more consistently in terms of asking questions or participating in group discussions. The majority of the students, however, failed to project the lectures and discussions to future teaching applications and generally had very poor attention and participation. The group discussions were, in some cases, terminated by the students before the end of the period because they reportedly had completed the assignment—a ruse designed to mask, according to a later comment, their lack of interest. In later informal discussion with one of the high achievement oriented students, the writer was informed that in the small group discussions some of the students made a game, a non-assigned activity to be sure, of devising new words from the letters of the words "behavior modification." To some students, the two letter acronym for these words apparently represented their impression of the instructional procedures. Periodic checks of the extent to which reading assignments were followed by the students showed a general decay of interest as the semester progressed and a sudden thrust of interest as the date of the final examination approached. The final examination was identical with that administered in the second application of the course, but the performance of the students was generally poorer. In fact, the perform-

ance of the students was comparable to that of the students who took the first presentation of the course.

The importance of considering entering behaviors in course planning cannot be overemphasized. Among the few students who profited from the on campus course were those who probably resembled the off campus students due to their past experiences or concurrent in-service training. Thus, not only are entering behaviors important in course planning, but concurrent experiences that affect behavior are important as well. The concern that teachers in off campus courses will not work found little support except in instances, as in the Fall class, when the instruction was not appropriate to their personal objectives and interests. Students taught on campus, as in the Spring, demonstrated they also have little interest in a class that is not adapted to their needs and interests.

Application IV: Summer 1970

The final presentation of the course was to a heterogeneous group of 53 students during the Summer of 1970. Entering behaviors were surmised from inspecting the characteristics of the students. Roughly 50% of the students were mainland teachers, and the remainder were, for the most part, local teachers. A few of the students were regularly enrolled undergraduates at the University. The course design from the previous semester was refined by including more applications and conceptual activities among the objectives as contrasted with memorization tasks. More so than in previous presentations of the course, the students were provided a variety of avenues through which they could pursue the course objectives. This attempt to adapt instructional techniques to student interests and aptitudes, i.e., to individualize instruction, grew out of the hypothesis that part of the failure of the on campus course may have grown out of the lack of availability of instructional alternatives. A bibliography was distributed accompanying the course objectives, and the students were informed they could prepare for the criterion-referenced tests without attending class; simply by reviewing the material in the bibliography that pertained to the objectives. The objectives were distributed and the students were briefed on a modification of Ferster's (1968) interview procedures in which peers alternate roles as interviewer and interviewee on successive questions. These interviews were conducted weekly and constituted the unit criterion-referenced tests. They were assigned points for completion, not for quality, by the student who conducted the interview and were assigned additional points for completion by the assigned date. The midterm and final examinations were extrapolated from the criterion-referenced test items. Lecture-discussions were interspersed with a larger variety of examples, many of which proved useful in maintaining attention and provoking comments and debate among the students in the class. The topic of discussion activities in each group was selected by the students from a range of available alternatives or from their own experience. Grading was determined from a weighted combination of points for completing assigned readings (5%), interviews (15%), a paper on either a self-selected topic or on experiences tutoring an emotionally disturbed child (30%), a midterm examination (20%), and a final examination (30%). Students thus were graded on a variety of behaviors, consistent with the notion that the student may pursue a variety of avenues to attain course mastery.

The course evaluation was conducted by focusing, as previously, on class attendance, attention and participation, informal commentary, and the final examination. Class attendance, even though voluntary in this instance, was comparable to the Spring off campus course and far exceeded attendance for the Spring on campus course. Reading assignments were completed at a consistently high rate throughout the semester, suggesting the importance of providing an incentive for this form of student participation. The tutoring experiences proved rewarding and educational for those who undertook the task. On the examinations, which had been increased in difficulty corresponding to the course objectives, students generally demonstrated superior performance to that shown in the on campus course the previous semester.

Conclusions

The successive applications of the model of instruction discussed here resulted in marked improvements in the course as determined from a variety of indices of student performance. The model also provided a rationale for explaining the results in an application where improvement was not found. At the college level it seems important to include as objectives, and to continually assess, even if informally, the extent to which students attend class, show attention and participation during lectures and small group discussions, and offer positive comments regarding the instructional methods. Adjustments in course method or content can be made until a satisfactory level of these behaviors has been achieved. Over successive applications of the course, the content difficulty can be gradually incremented until

performance feedback indicates that a maximal level has been reached. Instruction techniques should be varied to maintain the interest of students with different entering behaviors.

Student interviews were demonstrated here with only a peer to assess responses and give feedback, a substantial savings in personnel over Ferster's (1968) use of student assistants to administer and grade quizzes. The use of student assistants who quiz may alleviate the problem of dyads who interview sharing erroneous responses to the same item, but the probability of sharing erroneous responses to test items could be substantially reduced by forming triads rather than dyads.

Many of the problems of student anxiety over tests can be alleviated by including on the examinations only the short answer essay items that appeared among the earlier interviews. Where transfer of training is of greater interest than retention, modifications of item content to meet the purposes intended can be made without introducing surprises or areas in which the students have not been adequately instructed. Scoring short answer essay questions, even in large classes, can be accomplished within reasonable tolerances of duress and time limitations once adequate criteria for item responses have been established.

The steady increments in course quality discussed here will hopefully serve to illustrate that the design of college courses can be improved by using an instructional model. The application of such models seems readily acceptable for education at lower grade levels, but college teachers frequently balk when asked to prepare instruction under the guidance of a structure other than the one in which they had been taught in their own career. The opportunity to obtain feedback regarding the quality of instruction and to see greater percentages of students succeeding should be strong motivators for the extension of this instructional model to other curriculum areas.

J. Michael O'Malley has had a continuing interest in college teaching since his student years at San Jose State College in California where he obtained a community college teaching credential accompanying his Master's Degree in psychology. Following a period of teaching, he attended George Peabody College for Teachers to work on a Ph.D. in psychology, which he received in 1969. Although his principal interest since attending Peabody has been the development and evaluation of programs in early education, he has recently revived his interest in college instruction by writing this article and by assuming principal editorial responsibility for this issue of Educational Perspectives.

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