

# Prototype Development Of A Self-Instructional Program In Media Selection

---

Elaine A. Weiss

## Introduction

The purpose of this study was to develop and test a self-instructional program in media selection, for use by teachers, librarians, and media specialists. The program was developed by applying design criteria from systems approaches to instructional development. This article will describe the instructional development model used to generate the instructional program, the development procedures utilized, and the results of the study.

## The Model

The study used a systems model<sup>1</sup> to design the self-instructional program. There are several advantages to using a systems approach to instructional design. They include: the specification of learning objectives; identifying and selecting alternative ways of meeting these objectives; and feedback, in the process of developmental testing, to validate the design. Articulation of the development process, as in this case study, allows for both replication of the process and, hopefully, some insights into the reality of instructional development. The flow chart in figure 1 illustrates the instructional development model used in the design of this program.

## Development Procedures Utilized

The problem was to develop a self-instructional program in media selection which would be appropriate for graduate students in a variety of educative fields. The proposed program was to constitute the entire curriculum of a five-week course on media selection, offered each semester at Teachers College, Columbia University. The course was scheduled to meet once a week, for two hours each session.

Three goals were developed for the course:

1. to acquaint students with the literature on media selection
2. to familiarize students with the information sources<sup>2</sup> available for media selection
3. to help students develop a set of criteria for evaluating instructional media

The program objectives were derived from a study of the competencies identified in the literature on media selection. A wide variety of sources were consulted in an effort to develop course objectives which reflected the needs of the field. Among the most helpful were the competencies identified in the JIMS study<sup>3</sup>, and the AASL School Library Manpower Project<sup>4</sup>. An ERIC search under the descriptor "Media Selection" identified four existing self-instructional programs in media selection. A review of these programs was made to determine the necessity of developing a new program for the identified setting; however, none of the programs met the needs of the identified target population at Teachers College. In the process of deriving the objectives, an extensive bibliography on media selection was compiled, and eventually incorporated into the course. The following objectives were derived:

1. Match the type of information useful in media selection with the appropriate information sources.
2. Discriminate between examples and non-examples of behavioral objectives.
3. Match instructional media with descriptions of their characteristics.
4. Name at least one strength and one limitation for each of the instructional media reviewed.

5. Name criteria to be considered when selecting any medium or media mix.

6. Develop an evaluation form for any medium which applies criteria developed in objective 5.

7. Discriminate between the Kemp and Goodman models of media selection.<sup>5,6</sup>

8. Match an instructional objective to the most appropriate medium or media mix, and defend the choice in writing.

Once the objectives were developed and refined, test items were developed which were congruent to these objectives. The test, which consisted of matching, completion, and essay questions, was administered to learners as both a pre- and posttest. A criterion level of 80% was set for program mastery. In addition, data gathered from a comparison of pretest and posttest scores was used in the revision cycles of the development process. To further aid in the revision of the program, an attitude questionnaire was administered to learners upon completion of the course. A draft of the questionnaire was first submitted for review to a colleague in the Department of Measurement and Evaluation at Teachers College, and revised according to her suggestions. There was no formal validation of the questionnaire. It was felt that, since the purpose of the questionnaire was to gather data for revision only, face validity was sufficient.

Although the final form of the program was intended to be self-instructional, the first prototype to be developed and tested was teacher-directed. The prototype used a lecture and discussion format, and constituted the entire curriculum of the course. This instructional strategy was purposely chosen to give the investigator valuable data for revising the ma-

terials. In a teacher-directed course, the teacher is in direct verbal communication with the learners during the entire time of instruction. The investigator made use of this close contact with the learners to gain additional feedback on the course content and structure, above and beyond the performance measures described above. It was this "on-the-spot" feedback that provided much of the information necessary for transforming the course from a teacher-directed to a self-instructional format.

### Developmental Testing

The self-instructional module was developed, tested, and refined in three cycles. Each cycle included:

1. administration of a pretest, to determine which objectives the learners could meet prior to the program
2. presentation of the instructional materials to the learners
3. administration of a posttest, to determine which objectives the learners could meet as a result of the program
4. evaluation and revision of the objectives, performance measures, content, and instructional strategies based on an analysis of pretest and posttest scores and feedback from the learners

The performance of these four steps constituted one complete cycle.

**Cycle 1:** The prototype presented in cycle one was in the form of a teacher-directed course, as stated previously, to gather data on content and instructional strategies before developing the final self-instructional module. This prototype was presented to a class of fifteen graduate students at Teachers College, Columbia University. Field notes were recorded for each lecture, to identify issues and concerns which might be of value in developing the self-instructional program. Students were pre- and post-tested, and an attitude questionnaire was administered on the last day of class. Figure 2 shows a comparison of pretest and posttest scores, by program objective. An analysis of this data indicated the need for numerous revisions. None of the students had reached the 80% criterion level set for mastery of the course (see figure 5). It was clear that changes would have to be made. Among these were:

1. *Changes in course objectives.* Four objectives were eliminated, and three new ones were added. All students had

passed Objective 2 on the pretest, so it was felt that it was unnecessary to include this objective in the course. Objectives 4, 6, and 8, while valuable in terms of their content, were difficult to measure in a classroom setting. Therefore they were eliminated as terminal objectives. An additional objective was included to supplement Objective 1, as this was an area in which the students experienced confusion. And two more objectives were added in the area of media selection literature, based on student responses in class and on the attitude questionnaire. The new objectives read as follows:

- 1) Match the information useful in media selection with the appropriate information sources.
- 2) Identify key features of specific selection tools.
- 3) Match instructional media with descriptions of their characteristics, using Kemp's summary of characteristics of audiovisual materials as a referent.
- 4) Name five criteria to be considered when selecting any medium or media mix.
- 5) State Gerlach and Ely's basic rule for media selection.<sup>7</sup>
- 6) Discriminate between the Kemp, Goodman, and Allen models of media selection.<sup>8</sup>
- 7) List Diamond's five factors in the media selection process.<sup>9</sup>

### 2. *Changes in performance measures.*

Student responses on the pre- and posttests occasionally indicated some confusion with specific items. These items were subsequently clarified. In addition, essay items were changed to either multiple-choice or completion format, for ease of scoring and analysis.

### 3. *Changes in instructional strategies.*

The decision to transform the course into a self-instructional module was confirmed by an analysis of the data. Lecture-discussion format was replaced with library assignments, self-study worksheets, and hands-on experiences with information sources. A totally self-directing module was developed, which included a list of program goals and objectives, instructions on how to use the materials, and work-sheets to accompany specific library assignments. Materials were placed on reserve in the Teachers College library, and worksheets were corrected and returned to the students within 24 hours of the time they were turned in.

**Cycle 2:** The self-instructional module was presented to a class of eleven graduate students at Teachers College. After the students took the pretest, they were given copies of the module and told that they had five weeks in which to complete the materials. Students were free to proceed through the module at their own speed, within the five-week limitation. They were encouraged to call upon the instructor for individual help if the materials were unclear or if other problems arose. Several students took advantage of this offer, and offered constructive criticism. This feedback was particularly helpful in identifying unclear instructions within the module. At the end of five weeks, a posttest and an attitude questionnaire were administered. Figure 3 shows a comparison of pretest and posttest scores, by program objective. Although an analysis of the performance measures indicated the need for some revisions, the most interesting data emerged from the attitude questionnaire.

Student responses clearly indicated that, for the most part, students were unhappy with the self-instructional format of the course. All but one student indicated a preference for an instructional strategy which included discussions. Although the majority of the students found the course well-organized, they felt that the work was neither challenging nor interesting.

*Only half the students reported gains in learning (although posttest performance clearly contradicted this report) and only half said they would recommend the course to other students. When asked to name the single weakest feature of the course, students generally indicated that they felt deprived of the opportunity to share their discoveries and questions with the instructor and their peers in a classroom setting, and resented being "shunted off" to the library. These responses were particularly surprising, in the light of the fact that 100% of the students had passed the posttest (see figure 5). Clearly, although the instructional setting was successful insofar as mastery of objectives was concerned, the program had not met all the needs of the students. It is interesting to note that, had the design decisions been based on performance measures alone, this discovery and the subsequent revisions would have never been made. Instead, this unexpected finding led to a major revision in the final prototype of the module. The decision was made to change the totally self-instructional na-*

ture of the course, since student response to this strategy was so clearly negative. The course curriculum was still based on the module. In addition, however, two discussion groups were scheduled during the five weeks, to give students an opportunity for group interaction. The agenda for these two group meetings was incorporated into the module, along with specific library assignments as prerequisites for the meetings. Several minor revisions were also made in the organization of the module, including:

1. The addition of a matrix, showing the relationship between course objectives, assignments, and reference pages in the module. This was included because the instructor received numerous telephone calls throughout the five weeks from students who were unclear about course assignments. A frequent source of this confusion was the relationship between the list of course objectives and the items on the task sheets. It was felt that a matrix would alleviate this problem.

2. The inclusion of a bibliography on media selection (one copy of such a bibliography had been placed on reserve in the library, but students expressed a desire for their own reference copies);

3. More introductory material, to clarify each of the library assignments;

4. Answers to the worksheets were posted, to make the library assignments self-correcting.

Cycle 3: Cycle three was presented to a group of eight graduate students at Teachers College. Students were pre-tested, and copies of the module were distributed. As in cycle two, students were permitted to proceed through the module independently. However, the two group meetings, with their prerequisite library assignments, lent some structure to the students' use of the module. The class met twice as a group during the five-week course, and attendance was high (seven students) for each meeting. At the end of five weeks, a posttest and attitude questionnaire were administered. Figure 4 shows a comparison of pretest and posttest scores, by program objective. A comparison of figures 3 and 4 reveals that, objective-by-objective, posttest performance was slightly higher for cycle 3. In addition, student response on the attitude questionnaire was highly favorable. Students found the library

assignments to be extremely valuable in meeting course objectives, and enjoyed the self-instructional portions of the course, as well as the group discussions. The data from cycle 3 indicated that this final prototype met the demands of the original design criteria, i.e., to develop a course on media selection which was appropriate to the needs of graduate students at Teachers College. As a result, no further revisions were made in the module.

### Conclusion

This article has attempted to describe the process of implementing an ID effort on a small scale, in a typical and believable setting. Although the ID literature is replete with comprehensive planning and development models, the fact remains that the majority of instructional development is carried on by overworked faculty members, in cramped offices, within under-funded departments. Nonetheless, the end results are often satisfactory, and occasionally spectacular.

Bridging the gap between general principles and the constraints of the real world is something we rarely learn until we are out there doing it. If so much of the ID work currently being done is on this small scale, then there is value in publicizing and articulating examples of it for the benefit of others in the field. Three implications for other instructional developers emerged from this study. First, when the final format of a course is to be self-instructional, there is a lot to be said for beginning with a teacher-directed course. Prototype testing conducted in this format provides valuable baseline data for subsequent revisions; data which would otherwise be unavailable to the developer. In this case, useful information was gathered on the entering skills of the students; confusing issues in the course content; and amount of time required to master the objectives. If the first prototype had been self-instructional, designed without benefit of this data, many more design decisions would have of necessity been based on intuition rather than fact, and the resulting product would have been weaker.

Secondly, student confusion on how to use the module during the second cycle carries a clear message to potential designers of self-instructional materials. The research on self-instruction revolves around the presentation of content, *eg.* number and type of feedback items; response mode; pacing; and step size. But

an equally important factor is the clarity of the instructions to the learner on how to use the materials. A self-instructional program is only effective if its users understand how it works. And the longer it takes a learner to decipher directions, the less time is spent on actual instruction. Thus developmental testing of self-instructional materials should include an evaluation of the instructions, as well as the instruction. Finally, it is strongly recommended that developmental testing include an analysis of student attitude, as well as test performance. As this study clearly showed, posttest gains alone do not necessarily indicate that student needs<sup>1</sup> have been met. The instructional developer has a responsibility to design instructional materials which not only promote learning, but which are acceptable to the students. If learners emerge from an instructional sequence educated but hostile, we have let them down.

### References

- <sup>1</sup>Many "systems models" appear in the ID literature; their common elements are an explicitly stated and systematically applied approach to the solution of an instructional problem.
- <sup>2</sup>*eg.*, the NICEM Indexes, the Westinghouse Learning Directory, and EPIE reports.
- <sup>3</sup>Wallington, C. James, et al., *Jobs in Instructional Media*, Washington: Association for Educational Communication and Technology, 1970.
- <sup>4</sup>School Library Manpower Project, "Behavioral Requirements Analysis Checklist," Chicago: American Library Association, 1973.
- <sup>5</sup>Kemp, Jerrold E. "Which Medium?" *Audiovisual Instruction*, Dec. 1971.
- <sup>6</sup>Goodman, R. Irwin. "Systematic Selection." *Audiovisual Instruction*, December 1971.
- <sup>7</sup>Gerlach, Vernon S. and Ely, Donald P. "The Selection and Use of Instructional Media," chapter 13 in *Teaching and Media: A Systematic Approach*. Englewood Cliffs, N.J.: Prentice-Hall, 1971.
- <sup>8</sup>Allen, William J. "Media Stimulus and Types of Learning," *Audiovisual Instruction*, January 1967.
- <sup>9</sup>Diamond, Robert M. "Piecing Together the Media Selection Jigsaw," *Audiovisual Instruction*, January 1977.

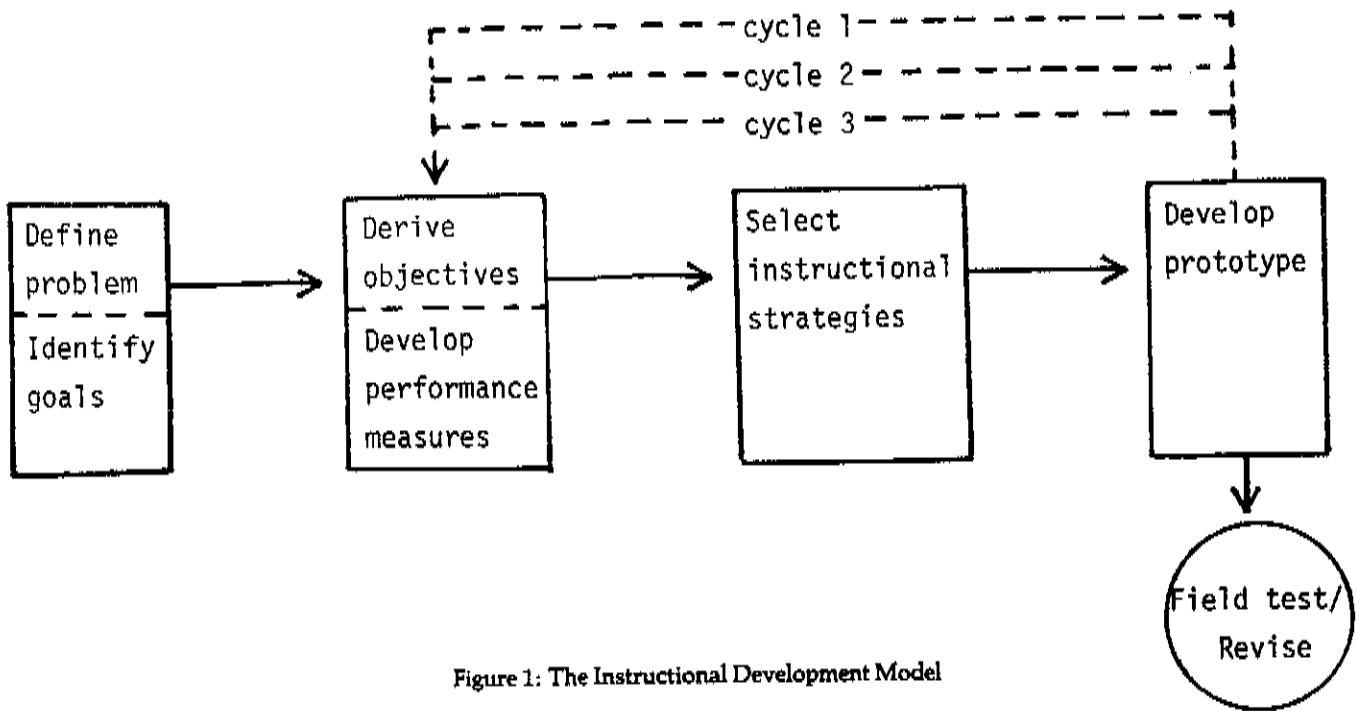


Figure 1: The Instructional Development Model

OBJECTIVE	PRETEST		POSTTEST	
	#	%	#	%
1	0	0 %	0	0 %
2	5	33 %	10	77 %
3	2	13 %	8	61 %
4	1	6 %	9	69 %
5	3	20 %	12	92 %
6	4	27 %	9	69 %
7	1	6 %	5	38 %
8	6	40 %	8	61 %

Figure 2: Comparison of pretest and posttest mastery of course objectives, Cycle 1 (pretest n=15; posttest n=13)

OBJECTIVE	PRETEST		POSTTEST	
	#	%	#	%
1	0	0 %	8	73 %
2	1	9 %	8	73 %
3	5	45 %	10	91 %
4	0	0 %	11	100 %
5	0	0 %	11	100 %
6	0	0 %	7	64 %
7	0	0 %	11	100 %

Figure 3: Comparison of pretest and posttest mastery of course objectives, Cycle 2 (n=11)

OBJECTIVE	PRETEST		POSTTEST	
	#	%	#	%
1	0	0 %	7	87 %
2	0	0 %	6	75 %
3	2	25 %	8	100 %
4	2	25 %	8	100 %
5	0	0 %	8	100 %
6	0	0 %	6	75 %
7	0	0 %	8	100 %

Figure 4: Comparison of pretest and posttest mastery of course objectives, Cycle 3 (n=8)

CYCLE	PRETEST MASTERY*	POSTTEST MASTERY*
I. Teacher-Directed (pretest n=15, posttest n=13)	0	0
II. Self-Instruction (n=11)	0	11
III. Self-Instruction/ Group Discussion (n=8)	0	8

Figure 5: Comparison of pretest and posttest mastery in three development cycles  
\*mastery level was set at 80%