Selecting Media for Instruction: An Exploratory Study

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Abstract. The purpose of this study was to compare the media selection decisions novice instructional developers make when they use an intuitive approach versus the decisions they make when they use a formal media selection procedure. The subjects, who were beginning graduate students enrolled in a media design course, were first asked to identify, on an intuitive basis, the appropriate medium to employ in a given instructional situation. After studying the media selection procedures described by Reiser and Gagne (1983), the subjects were asked to use those procedures to select the appropriate medium to use in another situation. Results indicated that more than twice as many subjects made the "correct" media selection decision when they used the formal selection procedures. The number of factors the subjects considered when they made their decisions also increased when they used the formal procedures. The implications of these findings and suggestions for further research are discussed.

At some point in every instructional development project, decisions must be made about the media that will be used to deliver instruction. Media selection is a major component of most comprehensive instructional systems development models (e.g., Branson et al., 1975; Department of the Air Force, 1978). It is also the subject of two recent books (Anderson, 1983; Reiser & Gagne, 1983) and numerous journal articles. With so much attention being devoted to media selection procedures in the instructional development literature, it is surprising to find so little attention devoted to the study of their effectiveness or usefulness.

Reiser and Gagne (1982) reviewed ten media selection procedures and identified two major differences among the procedures which were likely to influence media selection decisions: the physical form used to display the procedures and the selection factors employed in them. The procedures reviewed were displayed in flowcharts, in two-dimensional matricies, and in worksheets. The flowchart form was considered easier for those with minimal experience to use. The selection factors employed in the procedures included characteristics of the learning task, the instructional setting, the learner, the events of instruction, the capabilities of media, and practical concerns.

Although formal media selection procedures have been developed to aid instructional developers in selecting appropriate media for instruction, it is difficult to find information about their effectiveness. We have been able to locate only two studies in which the effectiveness of media selection procedures has been evaluated.

Romiszowski (1974) studied the effectiveness of lesson planning algorithms and checklists which included media selection procedures. He had 52 experienced teachers and 58 inexperienced teacher trainees develop lesson plans for teaching four instructional objectives. The inexperienced trainees were given a lesson planning job-aid to use when planning their lessons. A team of educational technologists rated the 440 lesson plans (110 teachers x 4 objectives) as ideal, acceptable, or poor. The inexperienced teachers produced more lesson plans classified as ideal (72%) and fewer classified as poor (less than 1%) than did the experienced teachers, who had fewer plans classified as ideal (37%) and more classified as poor (15%). The results of Romiszowski's study indicated that teacher trainees were able to use a job-aid that included media selection to prepare lesson plans which met judges' criteria for ideal or acceptable plans.

In another study, Braby (1973) trained six instructional designers to use nine different formal media selection procedures. He then had them use each of the nine formal procedures plus an informal intuitive procedure to select media for seven training objectives. Two experts in training systems design then rated each of the 420 media choices (6 designers x 10 procedures x 7 objectives) on a five point scale for its ability to meet the training objectives. The experts ratings were then combined and the relative utility of each selection procedure was determined. The experts' mean ratings for the 10 procedures ranged from 2.18 to 3.6. The procedures that received the highest ratings were a procedure developed by the Training Analysis and Evaluation Group (1972), an informal intuitive approach, and Briggs' (1970) procedure.

Does the use of formal media selection procedures result in better media selection decisions? Braby (1973) did not find this to be the case. Romiszowski (1974) demonstrated that novice teachers who used a formal planning procedure, which included a media selection component, could prepare lesson plans which were judged to be "ideal" or "acceptable" by a team of educational technologists. He did not, however, demonstrate that the lesson plans were superior to those which the novices would have produced, had they not used a formal planning procedure.

This study was designed to compare the media selection decisions novice instructional developers make when they use an intuitive approach versus the decisions they make when they use a formal media selection procedure, in this case the procedure described by Reiser and Gagne (1983). Two aspects of the media selection decision process were examined: the appropriateness of the media selected for given instructional

design problems and the factors considered when selecting media. These two aspects of the selection process were studied under conditions in which novice instructional developers used their experience and intuition to select media and in which they used a formal systematic procedure to select media. In previous studies of media selection, subjects were given sets of instructional objectives for which to select media. In this study the subjects were given descriptions of instructional design problems that included information about five factors commonly employed in formal media selection procedures: learning tasks, learners, instructional settings, instructional events, and practical considerations. Unlike previous studies, the design problems used in this study were designed to elicit a single appropriate instructional medium (though it may be part of a multi-media presentation).

Method

Subjects

The subjects in this study were 22 graduate students enrolled in a media design course at Arizona State University. The students had completed from 3-9 semester hours of graduate courses in Educational Technology. Some were part-time students who worked in training departments in local businesses. None had used formal or systematic procedures for selecting media for instruction. Four students who did not participate in both phases of the study were dropped from the analysis. Data are presented for the 18 students who participated in both phases of the study.

Materials

Four media design problems were prepared for use in this study. The problems were written descriptions of various instructional situations for which instructional presentations had to be developed. Each problem involved a different content area, a different type of learning task, and a different instructional setting. The problems were titled Personnel Interviewing, Aircraft Instrument Comprehension, Instructional Objectives, and C.T. Scan, each title designating the instructional content covered in the situation described. The Personal Interviewing Problem is presented in Figure 1.

Each problem description included a statement of the general purpose of the instruction and specific instructional objectives. The problems also included brief descriptions of the characteristics

Figure 1. Personnel Interviewing Problem

General Purpose

The client desires a program that will train bank managers and supervisors to conduct a hiring interview in compliance with equal employment opportunity (EEO)/affirmative action (AA) policies.

Instructional Objective

The trainee will conduct a hiring interview, under role-play conditions, that complies with EEO/AA policies.

Instructional Functions of Media

Persuade managers of the importance of complying with EEO/AA policies. Present rules and performance models for proper interviewing. Provide practice in identifying interviewing techniques that are and are not in compliance with EEO/AA policies.

Audience Characteristics

The audience for this program includes managers and supervisors from all bank branches and bank departments. There are both male and female managers. Their education backgrounds range from high school to university graduate level. All bank managers are required to participate in the training program.

Presentation Setting

The program will be presented in classrooms and conference rooms in 22 branch offices statewide. The number of trainees will range from 8 to 20. Cassette television playback equipment is available in each bank branch office. Equipment for presenting overhead transparencies and slide-tape programs is available for each branch from the corporate office. The program is part of an annual two-day management-development seminar. The program is presented by a specialist in personnel practices from the bank's corporate headquarters. Other program support materials include bank personnel manuals and role-playing exercises.

Production Arrangements

In-house production available for print, television, slides, and audio tape. Budget available for this production is 8,000 dollars.

Production Schedule

Finished program needed in three months.

of the intended learners, the nature of the setting in which the instruction was to take place, the media production budget that was available, and the intended instructional functions of the media that were to be selected.

After the problem descriptions were developed, two instructional designers with considerable design experience were asked to identify the medium they would select for each problem by using the media selection procedures developed by Reiser and Gagne (1983). Afterwards, the choices made by the two designers were compared and were found to be the same. For each problem situation, the medium the designers agreed upon was designated as the "correct" medium for use in that situation.

Procedures

During the first phase of the study, one of the four media design problems was randomly assigned to each of the students enrolled in the media design course. The students were directed to read the media design problem given to them, and then use their knowledge and experience in order to select the most appropriate medium or media to use in the situation described in the problem. They were also asked to write a brief rationale for their media selection. Students received no feedback on the correctness of their media selections or on the adequacy of their rationales. This phase of the study represents the informal intuitive approach to media selection.

Table 1

Percentage of Students Making Correct and Incorrect Media Selections

Media Selection Problem	Correct Medium		Correct Medium and Other Media		Incorrect Medium	
	Informal Intuition	Formal System	Informal Intuition	Formal System	Informal Intuition	Formal System
Personnel Interviewing	00	00	100	100	00	00
Aircraft Instrument Comprehension	20	25	00	00	80	75
Instructional Objectives	25	60	50	0	25	40
C.T. Scan	20	50	40	33	40	17
Mean	17	39	44	28	39	33

Table 2

Mean Number of Selection Factors Reported and Percentage of Students Reporting Factors by Factor Category

Factor Category	Pretest		Posttest	
	Mean Number of Factors Reported	Percentage of Subjects Reporting These Factors	Mean Number of Factors Reported	Percentage of Subjects Reporting These Factors
Learning Task	1.0	78	1.9	92
Learners	.5	33	1.0	67
Instructional Setting	.9	72	1.5	75
Instructional Events	1.3	78	1.7	79
Practical Concerns	.8	50	1.2	71

During the following week, the students were assigned to read a review of the characteristics of media selection models (Reiser & Gagne, 1982) and that portion of the text by Reiser and Gagne (1983) in which they describe how to use their media selection flowchart.

One week after the first phase of the study, one of the four media design problems was again randomly assigned to each student. The students were directed to read their assigned problem, then to use the Reiser-Gagne media selection flowchart to select the most appropriate medium or media, and to write a brief rationale for their media selections. This phase of the study represents the formal or systematic approach to media selection.

Results

The students' responses were analyzed to determine if they selected the "correct" medium for their assigned problems and to determine the number and type of selection factors reported in their rationale statements. The percentage of students making correct and incorrect media selections is reported in Table 1.

There were three types of responses to the media selection aspect of the study: responses that included the most appropriate medium and no other media, responses that included the correct medium as well as other media, and responses that did not include the most appropriate medium. When they used an intuitive approach to select media, 17% of the students selected the correct medium and no others. When they used a formal media selection procedure, 39% of the students selected the correct medium as their sole media choice. The percentage of students who selected the correct medium as well as additional media was 44% using an intuitive procedure and 28% using the formal flowchart. The percentage of students who did not select the correct medium was 39% using intuitive procedures and 33% using the formal flowchart.

These figures should be considered in light of the fact that on the Personnel Interviewing problem, everyone who used both the informal intuitive procedure and the formal flowchart procedure selected the correct medium as well as other media, regardless of the approach to media selection they employed. If the Personnel Interviewing problem had been eliminated from the analyses, the average percentage of subjects selecting only the correct medium would have

been 21% using intuition and 47% using the flowchart. The percentage of subjects who failed to select the correct medium would have been 50% using intuition and 40% using the flowchart.

The response patterns across the four problems were quite different. The Personnel Interviewing problem elicited the least amount of variation in type of media selected under both selection procedures. The C.T. Scan problem elicited the greatest variation in the type of media selected.

The rationales the students provided for their media selection decisions were analyzed to determine the types of media selection factors the students considered. The factors the students considered in making their media selections were classified into five categories: learning task, learners, instructional setting, instructional events, and practical concerns. The mean number of media selection factors reported in the students' rationale statements and the percentage of students naming factors in each of the five categories are reported in Table 2.

The fewest number of factors was reported in the learner category (mean of .5) by the smallest percentage of students (33 percent) when the informal intuitive procedure was used. The largest number of factors was reported in the learning task category (mean 1.9) by the largest percentage of students (92 percent) when the formal flowchart procedure was used. The mean number of factors reported, and the percentage of students reporting factors from each category, increased across all categories when the formal flowchart procedure was used.

Discussion

The results of this study suggest that when novice instructional developers use a formal media selection procedure, rather than an intuitive procedure, the choices they make are more likely to match the choices made by experienced instructional developers who use the same procedure. The novices are also more likely to consider a greater number of selection factors when they have received instruction on the rationale for a formal media selection process.

Do these results indicate that the media selection model examined in this study is superior to an intuitive method to media selection? Not necessarily. Judging the relative value of various media selection procedures is a very difficult task. There are several criteria that can be used in making such judgments. The criteria we employed are certainly not the only ones that can be considered. For examine, rather than judging the novices' media choices as correct or incorrect, we could have had experienced designers rate the choices, as Braby

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(1973) did in his study. In addition, we could have examined other variables such as the time required to orient the users to the selection procedures, the time users took to make media selection decisions, and the users' attitudes toward the two procedures.

In future studies, it may be advisable to adopt techniques to insure that subjects fully understand how to use a media selection procedure before they are required to employ it. The assigned readings and the use of the formal media selection procedure did result in a greater percentage of correct media

selection decisions and in a larger number of selection factors being considered. However, the relatively low mean percentage of students making correct media selections (39%) using the formal flowchart raises questions about the adequacy of the the students' orientation to the formal media selection procedure. Apparently, just reading about how to use the formal selection procedure is not adequate to insure that novice instructional developers can use the procedures effectively. In future studies, students might be given practice

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Most instructional development models include a component labeled "Select Appropriate Media." Although there have been several attempts to elaborate upon that component by describing formal procedures for making informed systematic media selection decisions, there have been few attempts to assess the usefulness of those procedures. It is hoped that our study will help lay the groundwork for more research in this important area.

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