EDITORIAL

Authors Robert Price and Judi Repman argue that the unique features of distance instruction necessitate use of an instructional planning model that takes these characteristics into account. They present here such an instructional design (ID) model, which they designed specifically for college course delivery via interactive television. Readers interested in additional perspectives on course design in distance education may wish to read other articles on this topic, including Egan, et al.'s (1993) "Identifying Performance Improvement Prescriptions for Distance Learning and Teaching" and Murgatroyd's (1993) "The House of Quality: Using QFD for Instructional Design in Distance Education."

EDITORIAL REFERENCES


INSTRUCTIONAL DESIGN FOR COLLEGE-LEVEL COURSES USING INTERACTIVE TELEVISION

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INTRODUCTION

The effectiveness of courses delivered over a distance, like face-to-face instruction, depends on the planning of the course, class activities, and the instructional materials used. The use of systematic instructional design (ID) in course planning can help to make any instruction more successful in promoting learning.
However, there are significant differences between face-to-face instruction and distance learning. In this article, an instructional design model designed specifically for college course delivery via interactive television is presented.

CHARACTERISTICS OF DISTANCE EDUCATION

An understanding of the characteristics unique to the distance education environment will aid the design and planning processes. Keegan identifies five characteristics of the distance education environment (Keegan 1990). Included are the quasi-permanent separation of teacher and learner throughout the length of the learning process; the influence of an educational organization both in the planning and preparation of learning materials and in the provision of student support services; the pervasive use of media - print, audio, video, or computer - to unite teacher and learner and carry out the content of the course; the provision of two-way communication; and the quasi-permanent absence of the learning group throughout the length of the learning process (Keegan 1990). According to an Office of Technology Assessment study, students, teachers, course material and presentation, and interaction are all affected; distance learning creates a new context within which the education process and student-teacher interaction take place. Old styles of teaching and learning may not be most appropriate or effective when mediated by telecommunications technologies. In designing distance courses or modules, teachers and instructional designers have had to find ways to restructure interactivity.(Office of Technology Assessment 1989, 93)

The Texas Education Agency states that "because of the intercession of distance and devices between the teacher and the student, new instructional techniques, varied uses of material and modification of class management may be appropriate." (Texas Education Agency 1987, 5)

The consideration of these characteristics during the design and planning stages will help the educator or instructional designer plan for the unique opportunities made available with the communications technologies being used to deliver instruction.

ADAPTING ID MODELS TO COURSE DELIVERY VIA ITV

Parker and Monson contend that specific techniques should be incorporated into the course development process. The techniques include humanizing, participation, message style and feedback:

Humanizing refers to the creation of an accepting environment which breaks down the barrier of distance and generates feelings of rapport between teacher and students. Participation deals with the extent of interaction among participants in the interactive situation. Message style refers to ways of enhancing the interest and appeal of a presentation. Planning for short instructional segments, varying tone of voice and volume, and supplementing programs with visual aids maintain the interest and attention of the students. Feedback allows instructors to determine if their presentations were clear and effective. Both verbal and
written feedback should be obtained, and can include questionnaires, interviews, or group reports. (Moore and Thompson 1990, 21)

Allen and Carl list seven characteristics necessary for the creation of a successful distance learning program (Allen and Carl 1988). This model was adapted from guidelines found in the publication Guide to Distance Learning as an Alternative Delivery Procedure, published by the Texas Education Agency. The characteristics include

1. high standards are established for their teachers and mediators (student site contact persons; also called proctors, monitors, aides, etc.);
2. consistently train and retrain staff;
3. carefully evaluate teaching sessions and/or the course packages before distribution by telecommunication or other means;
4. provide for easy communications between students, instructors and proctors;
5. develop rigorous and valid testing programs which provide rapid response times and feedback;
6. package the course content;
7. provide ready accessibility to resources such as mediators and ample audiovisuals, print and other media for student use. (Texas Education Agency, 1987, pp. 4-5)

Wilson concludes that students learn when all of the above conditions are considered and the following provisions, which are more specific to distance education, are also included: (a) self-pacing is allowed; (b) feedback is in the "fastest turn-around time that is feasible"; (c) interaction with the institution is friendly and nonthreatening; (d) curriculum is structured to guide the student in linking instruction with previous knowledge and interests; and (e) students are self-motivated (Wilson 1991).

The delivery of instruction via ITV should be done in a manner that is effective and efficient in providing for the learners' needs, and it should use all available resources to achieve this goal. The use of certain teaching methods can aid in the teaching/learning process. Heinich, Molenda and Russell include eight methods to deliver the instructional message (Heinich, Molenda and Russell 1989): presentation, demonstration, drill-and practice, tutorial, gaming, simulation, discovery, and problem solving. Determining which model or method is best depends on the learners involved and the content of the lesson. Information concerning learner characteristics and learning styles is therefore important in planning and delivering instruction via ITV.

The preparation and delivery of instructional lessons to the distant learner involves understanding the learner's previously acquired knowledge and learning capabilities. Lessons should be prepared to meet the knowledge levels of the learners and provide the best method to transfer important information to them. In targeting the adult learner, Knowles' andragogical model makes the following assumptions: (a) Self-concept moves from that of a dependent personality to that of a self-directed human being; (b) Adults accumulate a growing reservoir of experience that becomes a rich source of learning; (c) Readiness to learn becomes increasingly oriented to the developmental tasks of their social roles, (d) Their orientation to learning shifts from subject centeredness to performance
centeredness. (Wilson 1991, 42)

AN INSTRUCTIONAL DESIGN MODEL FOR COURSE DEVELOPMENT VIA ITV

Drawing on what we have learned from general instructional design models, the unique characteristics of distance education, and several years of experience with teaching college courses via ITV, we have developed an instructional design model for courses delivered via ITV. Important considerations incorporated into our model include the delivery system, available resources, course content, the target learner audience, and student learning styles. Clearly, designing any ITV course can be a complex, time consuming task. There are many pieces to fit together during the planning process that aid in the development of course production. However, to be practical in terms of planning and development time as well as cost effectiveness, ITV courses must be planned and conducted with resources similar to what is afforded traditional campus-based courses.

Based on the literature and our own experience with distance education via interactive television, we suggest the following nine step model for designers of college level ITV courses:

1. Identify course goals
2. Analyze and organize content
3. Write performance objectives
4. Identify learner characteristics
5. Develop lesson plans
6. Develop and select instructional materials
7. Design and conduct formative evaluation
8. Conduct instruction and modify instructional plan
9. Design and conduct summative evaluation

This model is an adaptation of the Dick and Carey model discussed previously. It is based on the unique characteristics of distance learning via ITV and our own research. We think that it is well suited to the delivery of graduate level courses and takes into consideration the mature learner. It is well suited to situations which do not have large support staffs and budgets for ITV. The model is implemented as follows.

THE PLANNING TEAM

The purpose of the planning team is to structure academic content in a form suitable for study by distant learners (Moore and Thompson 1990). Instructional experiences can be carefully designed and developed so that they can be used by a wide variety of learners possessing similar learner-related characteristics (Dwyer 1990). The course planning process can involve many specialists. Members of such a planning team might include subject authors, instructional technologists, illustrators, media specialists, librarians, photo-librarians, and editors (Moore, and Thompson 1990, p. 4). Brinkley, Pavlechko, and Thompson suggest a team consisting of the course instructor, an instructional designer, a producer/director, a graphic artist, and an on-air director (Brinkley, Pavlechko and Thompson 1991). However, the individual instructor may be the entire planning team and will provide the necessary course content to be edited and published for an ITV course. A realistic planning team for a typical ITV course might consist of the instructor, an instructional
technologist (instructional designer), and a student or potential student of the course. Development of course content can begin by representing it in a manner that enables the planning team to develop a "course description, general aims, instructional goals, units and lessons/ modules to drive the content " (Brinkley, Pavlechko and Thompson 1991, 51).

COURSE DESIGN

1. Identify Instructional Goals.
   
   Goals are the broad statements of expected outcomes for the course. Identification of the instructional goals is primarily the responsibility of the course instructor. If the course is designed to meet a specific purpose (eg., certification or degree requirements), the basic content of the course may be predetermined. The goal statements will therefore reflect this. Usually, courses taught via ITV are also taught in traditional campus classrooms. The goals of the ITV course should be basically the same as campus-based courses. We have offered an introductory course in computer applications for educators, both on campus and via ITV. Some sample goals for this course follow:

   * Demonstrate an understanding of basic computer terminology, hardware, and software, both as a classroom and personal productivity tool.
   
   * Evaluate, select, and recommend educational software and apply appropriate instructional design in order to integrate the use of small computers into specific content areas.
   
   * Explore developmental issues related to the creation of appropriate instructional software.

   These goals appear on the course syllabus for both the regular on-campus classes and ITV classes.

2. Conduct Content Analysis
   
   The teacher is a content specialist and therefore will be knowledgeable concerning the content of the course. Texts, accreditation association guidelines, and state curriculum guides may also be helpful. We divide the course into logical segments representing one class each and begin to develop a lesson plan for each class. The topics and content outline for each class are specified first. The instructional time for any college course must meet the minimum requirements of the college/university and the accreditation agency, usually 35-40 hours each for a 3 credit hour course. However, allocation of class time may be different for ITV courses than for on-campus courses. Some courses will require guided practice at remote sites, which are not part of televised lessons. This may be scheduled as a laboratory or may be conducted as part of regular instructional time.

3. Write Performance Objectives
   
   Measurable objectives are written for each lesson. These are taken from the goal statements and are stated in terms of observable student behaviors. Measurable objectives help clarify exactly what is expected in the minds of both the teachers and the learners. Techniques of stating performance objectives
are beyond the scope of this paper. The following set of objectives for a lesson on integrated software for our educational computing course is given here as an example:

**Topic:** Introduction to Integrated Software  
**Objectives:**  
Students will be able to  
1. Define integrated software.  
2. List several examples of integrated software packages.  
3. List examples of computer applications which are frequently included in integrated software.  
4. List examples of products which may be produced with integrated software.  
5. Discuss the relative advantages and limitations of integrated software packages as compared with stand-alone software.

If the teacher is not an instructional designer, the technologist should assist the course instructor in stating performance objectives for each class. The student member of the planning team can be asked to review the evolving lesson plans for suggestions. Clarity of goals and objective statements, terminology used, and suggestions concerning content to be included can be reviewed.

4. Identify Learner Characteristics

There are many ways to identify learner characteristics. First, we gather information at the initial class meeting. This begins with introductions and completion of a brief student profile form which includes such information as student’s major course of study, reason for taking the course, previous experience relevant to the course, and place of employment. We also use both the Canfield Learning Styles Inventory and a teacher-made pre-test that is given at the first class meeting. The Canfield LIS measures the conditions of learning, the content of learning, the mode of learning, and student expectations in a learning situation (Boyd and Kerstiens 1989). The instrument measures these categories through thirty items in which the students are asked to rank order their preferences among four choices. According to Boylan and Kerstiens, the Canfield LSI includes several specific elements associated with the four dimensions mentioned (Boylan and Kerstiens 1989).

Under the category of conditions of learning, these student preferences are measured:
1. Affiliation - pleasant, friendly, and warm relations with other students or faculty;
2. Structure - orderly, logical, and well-defined goals, objectives, and study plans;
3. Achievement - independence, self-determined goals and objectives in relation to perceived skills and interests; and
4. Eminence - competition, knowledge of one's own performance in relation to other's, need for control or authority.

Under the category of Content, the instrument measures student preferences for working with various sorts of content. These content sub-categories include numerical, qualitative, (working with words or language), inanimate (working with things), and working with people.

Canfield agrees with Gagne’s notion of "Channel
efficiency," the idea that in every individual, some channels of perceiving and processing information are more efficient than others. As a result, his instrument also measures students' preferred mode of learning. The categories under this heading are listening, reading, iconics (learning through illustrations, movies, slides, graphs, and pictures, etc.), and direct experience (Canfield 1967).

Finally, the Canfield LSI assesses student expectations of learning, i.e., their anticipated level of performance. The levels of anticipation include outstanding or superior performance, good or above-average performance, average or satisfactory performance, and below-average or unsatisfactory performance.

Researchers have classified individual learners as Field Independent (FI) or Field Dependent (FD). FI learners are those who prefer "solitary situations and self-defined goals, strategies and reinforcement." FD learners are those who prefer "group situations, externally defined goals and reinforcement, and explicit instructions or definitions" (Canfield 1967, 43). The literature indicates that the FI learner is more likely to succeed at distance education (Wilson 1991). Applying interactive television in a manner that provides learning opportunities for both FI and FD learners will ensure that methods that are suitable for both groups are included.

Identifying learner characteristics and determining learners' learning styles will help the instructor determine what instructional style(s) and delivery method(s) to implement. Course content can be delivered so that the students' academic success is high. Although existing research in distance education is inconclusive concerning the effect of learning style preferences on achievement, course design and assessment will play a critical role in determining what learning styles are best suited for the information and instruction delivered via interactive television technology.

The course pre-test provides information about how much the student already knows about the course goals and objectives. Since we deal with mature learners, we often ask for self-assessment. The information from these instruments is promptly sent to the instructor by FAX or data communications. The data is analyzed and detail is added to the lesson plans based on the information. For example, if most of the students are found to be field-independent learners, more activities that provide for independent study may be included in the course. Student profile cards are also made to be referred to by the instructor as the course progresses. We use these to try to make assignments relevant to the student's interests, level of knowledge, and learning style.

5. Develop Lesson Plans

The basic instructional plan is the syllabus, which is prepared first. However, the details of the instructional plan are contained in the lesson plans. The framework of each lesson plan was established in the content analysis and writing of performance objectives for each lesson. Now it is time to add detail to each lesson. With knowledge of the learners, the objectives and topics can be adjusted, relevant examples can be developed, activities can be planned, and requirements for media and materials can be determined. The technologist works with the teacher to plan activities that work best with the ITV medium. Lesson plans will be fully developed as the course is conducted. However, it is important to have long range plans.
In addition to the basic need for good planning, the ITV staff
will need to know what to expect and production of materials
must be done in advance. Final plans need to be ready at least
two weeks in advance of each class.

6. Develop and Select Instructional Materials
   Earlier it was pointed out that ITV is an inherently visual
medium. If a traditional lecture is a poor choice of technique in
a regular class, it is deadly on ITV. Visuals, video
demonstrations, and commercial media can be used to present
the content in a manner that is more likely to maintain the
students attention and help them understand and retain the
information. Specifications for the media are developed in the
instructional plan. Frequently, the teacher produces the media;
the campus media service, ITV staff, or students may help.

7. Design and Conduct Formative Evaluation
   As the course progresses, frequent feedback is obtained both
informally and formally. Question and answer sessions are
held during each class. Brief quizzes are given and student
assignments are collected regularly. We specifically try to
determine which methods and materials are preferred and to
what degree objectives are being mastered.

8. Conduct Instruction and Modify Instructional Plan
   Modifications to the lesson plans are made as the course
progresses based on feedback from the students. The student
member of the planning team is also frequently used as a
sounding board and to make suggestions. Material that was not
mastered may be clarified by presenting it in another manner.
Sometimes, new timely topics are added.

9. Design and Conduct Summative Evaluation
   At the conclusion of the course, a post-test and a course
evaluation are administered. The post-test is either the same as
the pre-test or a more detailed version that provides detailed
information concerning how well each objective was mastered.
The course evaluation that we use is a standard course
evaluation used at Texas Tech to which we have added several
items concerning delivery of the course via ITV. This
information is useful in evaluating the success of the course and
for providing information for the next time the course is offered.
The course planning team reviews and evaluates the data and
makes recommendations for future courses.

SUMMARY AND CONCLUSIONS

College-level course delivery via ITV is an exciting and
growing phenomenon. However, the unique characteristics of
ITV and distance education necessitate careful planning in order
for the courses to be effective. The use of the instructional
design model presented here or other systematic approaches to
ID in course planning can help to make instruction more
successful in promoting learning.

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