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ABSTRACT

This paper discusses instructional design for distance education. The first section summarizes principles of instructional design systems, including the systematic process, considerations related to planning for instruction, and issues associated with the separation of the instructor and students. Issues to address in the planning process are discussed in the second section, including who the learners are, what the essential content is, and what teaching strategies and media to use. The third section addresses the learning environment, focusing on technology and resources. How to determine the quality of the instruction is considered in the final section, including reflection on the action or activity and examining the instructional event in terms of what worked. (MES)

INSTRUCTIONAL DESIGN FOR DISTANCE EDUCATION

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Instructional design is critical to distance education and planning for effective teaching is needed for learning to occur. Greater emphasis needs to be placed on the planning process. The instructional design process organizes and systematizes planning. It is essential to consider elements such as the content, the learner, the strategies for teaching, and the means for assessing the learning experience. By following through with this process, the instructor will find that teaching at a distance is an exciting and dynamic experience. One that will be welcomed by both the instructor and the learners.

Adapted from Dick & Carey, *The Systematic Design of Instruction* 1996

The instructional design process considers all aspects of the learning environment, following a well organized procedure that provides guidance to even the novice distance instructor. Viewing the instructional environment as a system, fosters a relationship among and between all the components of that system - the instructor, the learners, the material, and the technology. When this procedure is followed, attention is drawn to considering the components of the system. Especially when planning for distance education, the instructor must make decisions that will affect all aspects of the distant instructional system (Moore & Kearsley, 1996). Focusing on the distant system will help the instructor plan for effective learning experiences and the instructor will have a greater opportunity for developing a balanced distant learning experience.

Principles of Instructional Design Systems

Systematic Process

With the goal of student learning in mind, an instructor can consider the components of a successful learning system (Dick & Carey, 1996). The interaction of the components - learner, content, method/material, and environment - provides results in creating the type of learning experience necessary for student learning. These components must interact both efficiently and effectively to safeguard quality learning experiences. There should be a balance among the components, none can take on a higher precedence over the others. This equal interaction of the system's components safeguards that the instruction will reach the goal of student learning.

Planning for Instruction at a Distance

The planning and organization for a distance education course is multifaceted and must occur well in advance of the scheduled instruction. To eliminate trial and error preparation, distance learning faculty should consider the following:

- Courses previously taught in traditional classrooms may need to be retooled. The focus of the instruction shifts to more visual presentations, engaged learners, and careful timing of presentations of information.
- As traditional classroom materials that have been used during instruction are revised, considerations for illustrating key concepts, or topics, using table, figures and other visual representations need to be made.
- Activities that encourage interactivity need to be incorporated. Planning for interactivity helps learners. Not only does the instructor have to plan for interaction, but students may require training to participate actively in these types of distant interactive activities.
- Activities that allow for student group work need to be well planned. This helps construct a supportive social environment. For example, the instructor could present case studies related to theories and concepts covered in the course, then groups of students, perhaps in different sites, could discuss case study questions and reach consensus on a solution to the problem.
- Technical problems can occur, so alternatives for the class must be considered. If equipment fails, it is important for students to have projects and assignments independent of the instructor and alternative means of communication (e.g., fax, phone, e-mail). Prior discussion of the plan for technology failures with students will eliminate confusion and loss of productive class time (Herring and Smaldino, 1997).

In addition to considerations related to planning for instruction, there is also a need to examine issues associated with the separation of instructor and some or all of the students. Time constraints for class delivery, lack

direct contact, visualization of the materials, and planning for interaction requires a reconsideration of classroom dynamics. Often instructors use visual cues, such as student facial expressions, within the traditional classroom or conversations with students after class to decide quickly to adjust the instructional approach for a course. These cues give instructors insights that help them personalize the instruction for the students and insure a quality learning experience for all. Teaching at a distance eliminates many of these cues. Alternative approaches to on-going evaluation of instruction must be incorporated. If instructors ignore this area of preparation, and plan to teach as they always have, they will feel frustrated. Likewise, students may feel alienated and will begin to "tune out" the instructor. The instructional development process should be based on the unique characteristics and needs of students, meshed with the teaching style of the instructor and the course goals and content. Interaction should be maximized, visual potential of the medium should be explored, and time constraints addressed.

Issues to Address in the Planning Process

Who are the Learners?

Taking the time to learn about the learners in the class yields a more productive learning environment. Along with the general information about the learners, an instructor needs to know more specific information about the students in the class. Factors such as whether the students are from urban or rural areas, age range, grade range, and educational background can have a marked impact on the levels of interaction among students. The instructor may have to plan more carefully for the types and levels of interaction to ensure a quality learning experience for all members of the class.

The cultural, social, and economic backgrounds of the students is also important information for the instructor (Willis, 1994). Educational expectations of learners can also influence the quality of the learning experience. The attitude and interest students bring to the class will impact the learning environment. Thus, an instructor who is interested in creating a quality learning experience for all members of the class, with the ultimate goal of learning as the outcome, will be certain to account for these variables in planning.

Students who are less social may find the distance education environment more comfortable for them. Students may become more expressive because of the perception of privacy and the informative nature of mediated communication. They may perceive the increased and varied interactivity and immediate feedback as a positive input to their interface with the learning experience.

Additionally, students can benefit from a wider range of cognitive, linguistic, cultural, and affective styles they would not encounter in a self-contained classroom. The emphasis should not be on the inherent efficiency of the distance learning, but on the values and services offered to students through their exposure to others (Herring & Smaldino, 1997). Relationships can be fostered, values can be expanded, and a shared purposes or goals can be developed.

To be effective, an understanding of the target audience is necessary. Willis (1994) suggested the following questions be asked prior to development of distance-learning environments:

- What are student ages, cultural backgrounds, interests and educational levels?
- What is the level of familiarity of the students with the instructional methods and technological delivery systems under consideration?
- How will the students apply the knowledge gained in the course, and how is it sequenced with other courses?
- Can the class be categorized into several broad subgroups, each with different characteristics?

What is the Essential Content?

The content of a course needs to reflect articulation within the curriculum. It is essential to examine the nature of the content, as well as the sequence of information. In any distance learning environment, one particular issue, that of time constraints, impacts other planning areas. Time constraints refer to the actual on-line time for delivery, which is often limited and non-flexible. The issue of limited time makes it necessary to closely examine the essential elements of the course content. The instructor needs to balance content with the limited time for learning activities and possibly remove extraneous, nonessential information.

Generally speaking, the scope of the content for a course needs to be sufficient to ensure the entire learning experience will lead to the desired outcomes. Concepts, knowledge, and specific skills need to be identified (Dick & Carey, 1996). Supporting information or knowledge is important to the scope of content analysis. Follow-up and applications of the content should be considered.

It is important to remember that no matter which media are used, the trend is to reduce the "amount" of information delivered and to increase the "interactive value" of the learning experience (Herring & Smaldino, 1997). Thus, the instructor may need to "throw out" content that had been included in a traditional presentation of a course. Or, the instructor may need to reconsider means of "delivery" of the information through alternative means, such as additional reading, booklets designed specifically for the tasks, links to special sites, etc.

What Teaching Strategies and Media to Use?

Successful teaching at a distance places the recipients' needs before organizational convenience and at the center of planning and decision making. The individual needs of the learners are brought to the forefront in education that uses electronic technology, because separation of learners from the instructor requires students to take more responsibility for learning. Consequently, the learner's opinions and needs play a more important role in decision making than is usual in an instructor-centered environment (Macfarlane & Smaldino, 1997).

It is oversimplified to suggest that there is one better way to teach at a distance. In any given content area there are several potential ways of providing a quality learning experience for the students (Heinich, Molenda, Russell, & Smaldino, 1999). What is essential in deciding which strategy or strategies to employ is the issue of engaging the learner. The one thing that has been repeatedly demonstrated through research is that lecture, or the "talking head," approach is the least successful strategy to employ in distance education (Schlosser and Anderson, 1996).

The instructor needs to focus on selecting instructional strategies that engage the learners in active learning. To do this, the instructor may need to de-emphasize the "informative" part of the instruction for more "discovery" of information. The emphasis on keeping the learners engaged in learning ensures that students will be "in tune" with the class.

For the selection of media there are several models often used (Dick & Carey, 1996). One common theme with all of these models is the learning context, which is the content, the intended outcome, and the nature of the students. Practical considerations such as available resources for creating media and the technologies for delivery of instruction also play a hand in the selection process. Mainly, though, goals and objectives should be the primary influence on the selection of media.

McAlpine and Weston (1994) have delineated a set of criteria for selecting media, whether they are commercial media or media developed specifically for a particular course. The first item on the list is to match the medium to the curriculum or content. Also included are related items such as accuracy of information, motivational quality, engagement quality, technical quality, and unbiased nature of material. These should be considered in selecting media in order to match student needs to the strategies employed.

Visuals provide a concrete reference point for students, especially when they are engaged in a non-televised learning experience. Providing visuals, even if they are lists of concepts and ideas, can help students. Visuals also help learners by simplifying information. Diagrams and charts often can make it easier to understand complex ideas. A visual that breaks down a complex idea into its components, can show relationships that might be otherwise confusing to students. Also, preparing visuals that serve as mnemonics can assist student understanding. And, visuals help students in their study. They can use them to prepare for tests and other means of assessing their learning.

Finally, there are two very important additional issues to be raised. First is that of copyright. No matter what technologies are incorporated in the distance environment, the instructor needs to respect the copyright restrictions that might apply. For example, in a televised class, the instructor may not be able to use a video without first obtaining permission to display it to the class. In a Web-based class, the instructor may have to have permission to post a journal article. An instructor needs to be responsible to obtaining copyright permissions where appropriate.

The second issue is that of access. The instructor cannot assume that all students at a distance have equal access to resources. Students may not have the technologies available. Also, students may not have the facilities at hand. The instructor needs to be certain that all students have similar learning experiences, including the materials. For example, if the instructor wishes students to use certain books or journals for outside reading, it is important to check with the local library to be sure theses materials are available.

What is the Learning Environment?

Educators are familiar with classroom settings. They are comfortable with using the space available to enable learning to take place. But it is when the classroom shifts into a distance learning setting that the environment becomes a challenge to the instructor. There are several important elements to address within the distance learning environment.

Technology.

The type of setting, be it place or time shifted, will influence planning decisions. Environments that are place-shifted are those that are synchronous but are not in the same location (e.g. a live video-based distance class). Those that are time-shifted are asynchronous, where students access the class at different times. Assessing the use of the technologies in a distant setting is essential. In any distance learning environment the technology becomes the element of most concern for the instructor.

There are several issues associated with technology when teaching in a distance learning mode. First is the basic operation of the equipment. In a televised distance learning setting, switching between sites is usually a simple procedure, but it does require time to acquire the finesse to operate the switching buttons smoothly. Second, using

additional cameras in the classroom can create some concern for the instructor. The overhead camera needs to be focused and materials lined up to ensure that learners in all sites can see the material. Third, the instructor should always consider what the student should be viewing during the lesson. Is it better to see the instructor, the visuals, or other students? When a instructor has had experience with teaching with the equipment, these decisions become automatic, making learning the foundation for the decisions made (Herring & Smaldino, 1997).

In an Internet-based learning environment, the instructor should be concerned with the layout of the courseware and the types of resources available to the students at the distant sites. The instructor needs to be certain materials are designed in a way that is intuitive for the various types of learners. Further the instructor need to be concerned about student access to the appropriate hardware and software to be successful in connecting to the courseware. And, the instructor should be concerned that the students can complete the tasks expected of them. Finally, the instructor needs to be certain they understand the terminology being used.

It is essential the instructor be prepared with alternatives for each lesson in case of problems. What will the students do during the lesson time if the technology is not operating properly? The instructor and students need to be prepared for times when the entire technology system is not working properly. Pre-planned contingencies should continue the learning process even though the technology is malfunctioning. Alternative lessons must always be ready, but hopefully never needed. And, students need to be prepared to know what to do with those materials. They must be designed to be used without instructor intervention.

Resources

The second element to consider in the instructional environment is the resources available to students. What materials will they have at hand? What materials will be available in libraries and laboratories? Will students have access to resources for easy communication with the instructor?

How to Determine the Quality of the Instruction?

In the instructional design process, formative evaluation becomes an important aspect. Two questions need to be considered. The *first* relates to reflection on the action or activity: "Is this approach going to work?" (Schon, 1987). To be an effective educator, it is important to consider what can happen within an instructional event. All experiences, both those considered to be positive or negative, have some element of surprise. It may be expectations were not achieved; it may be a serendipitous event led to an altogether different, but pleasant, outcome. Whatever the nature of the event, it is essential to reflect upon what has happened.

Reflection may take the form of critical assessment of the events, satisfying curiosity about the nature of those events (Macfarlane & Smaldino, 1997). Reflection may consider the success of the learning situation. It brings the instructor into a state of knowing about the learning event. It is now possible to move into the second question of the formative evaluation process, that of considering how to improve the situation.

The *second* question then is, "How can I make this better?" The instructor needs to examine the instructional event in terms of what worked and what appears to have been a problem. The second phase of the formative evaluation is concerned with helping the instructor ensure a more successful educational experience for students. The instructor needs to consider not only issues such as the learning task, the instructional materials, and the teaching strategies, but also where the technology may have played a role in the instruction.

When examining effective instruction, it is important to look at the role technology plays in instruction. The instructor should consider the elements of technologies and their effect on the students. If a problem occurs with the lesson because of the hardware components of the system, what was the nature of the problem? Was the problem because of a temporary interference with the transmission? Was weather or some other non-controllable issue causing problems with the transmission? Can the hardware be improved? Can things be done to the interactive instructional classroom to aid instruction in the future?

If a problem does not relate to hardware, then what was the problem? Perhaps students needed to be better informed about how to use the equipment. It may be that students needed preparation for the lesson. Perhaps the instructor needed to prepare other types of handouts or manipulatives to ensure that the students could accomplish the tasks. Maybe the instructor needed to select an alternative teaching strategy to improve interactivity and student outcomes.

Because so many different factors effect the interactive learning environment, reflective teaching practices play an even greater role in developing of effective teaching practice. To consider what has transpired and how to change it creates a dynamic educational experience for both the instructor and the learners. Formative evaluation is essential for successful interactive distance learning experiences.

It is important for the instructor to think about handouts within the context of the planning process. The types of handouts will vary according to the age of the students and the content of the course. But, it is important that the instructor realize that when planning a distant course, handouts become an essential communication link with students. Therefore, the instructor needs to invest time and energy in creating quality handouts for students.

Even within a traditional class, the instructor is concerned with getting materials to the students. Often papers and books are distributed at the beginning of the class period. But, when teaching at a distance, this is not as easy as it might seem. Often the majority of the class is at a distance and distribution of materials becomes a logistical nightmare.

An instructor needs to consider: (a) getting the materials to the distant sites on time. A distribution network must be established for getting tests and other materials to those remote sites. The technology can be useful in transferring materials; (b) communicating with the students. The effect of separating instructor and students does affect this communication; (c) time delays in material transfer. Students may have to wait a longer time than normally expected to receive written feedback. Instructors may elect to use other forms of telecommunications with students to facilitate this feedback.

Summary

The instructional design process provides the framework for planning. It is essential that the instructor take the time to plan and organize the learning experience prior to implementation when engaged in teaching at a distance. The instruction will be at a standard that is acceptable in all venues. The students will be engaged and the instructor will be satisfied. Planning make the difference in a successful learning environment.

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