THE DESIGN AND DEVELOPMENT OF A GRADUATE COURSE FOR OFFERING VIA DISTANCE EDUCATION: A DESCRIPTIVE CASE STUDY

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by

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ABSTRACT

The offering of a course by distance education, whether new or existing, requires considerable course development activity, since the course should be in keeping with the particular advantages and limitations of the various distance education technologies. Hence, even in the case of the existing courses, major adaptations are frequently required.

This case study describes the development of a graduate distance education course - L6521 Instructional Development. The course has been offered on campus as a required graduate course on three programs leading to the Master of Education degree. Because of increasing demands by students residing outside of St. John's, the decision was made to offer the course via distance education.

In developing the course for distance technology, the core content remained essentially the same, with only minor changes made through the introduction of a new text and a revised student evaluation plan. Major changes were made in the instructional methodologies employed in the course.

Based on research in the areas of instructional development and distance education, the course developers selected the audio-tutorial system of education developed by S.N. Postlethwait as the most appropriate instructional method for this course. The audio-tutorial system can incorporate a variety of media systems, including audiotape, print, and videotape, making it a very flexible system.

This descriptive study focuses on the implementation of the course development process and presents, in brief descriptive terms, the materials developed by the course development team.

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These pages could be said to be a record of my life of the past two years. The completion of this thesis did not come easily...no good thing ever does. It is the result of sweat and frustration, torment and toil, with a few good laughs thrown in for sanity's sake. It could only have been accomplished with the assistance of many caring people - my colleagues, my friends, my family.

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I dedicate this work to my father who continues to inspire me daily.

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CHAPTER 1

BACKGROUND TO THE STUDY

Introduction

Memorial University of Newfoundland currently offers a graduate course in Instructional Development, numbered L6521. This course is offered, according to Memorial University's Departmental Regulations and List of Courses printed in the University Calendar (1991-92), to students who have met general admissions requirements for the Master of Education degree. L6521 is listed as a required course on three M.Ed. programs: Educational Communications and Technology, School Resource Services, and Teaching. It is a closed elective (completed by approximately 90% of students) on the Curriculum and Instruction program, and an open elective on the Educational Administration program. It is also a required course on the Master of Nursing Education program recently established at Memorial University. Because L6521 crosses a number of graduate programs the demand for the course is high. A review of the past enrollment history was carried out and is reported in Chapter 3. This review, based on the reactions of students who had enrolled in the course in the past, pointed to the need for an alternate means of making the course available to the many students who are either required to or who wish to complete the course, and who reside outside St. John's, Newfoundland, the location of the university. Hence,

the decision was made by the instructor, and approved by the faculty, to offer L6521 via distance education.

Purpose of the Study

This study is a descriptive case study of course design for distance education. Its purpose is to document the process of course development, in the expectation that readers will (a) understand the complexity of changing a course from delivery via live instruction to delivery via distance technology; and (b) through the situational audit carried out by the researcher, understand how a course can be systematically designed through the application of an instructional development model.

Research Model: The Case Study

> The case study methodology is, in its essentials, the presentation of information about a situation or process in action ... In general, the case presented is expected to act as an example of a situation from which something of more general applicability can be learned. (Romiszowski, Mulder & Pieters, 1990, p. 46)

Among the many advantages of the case-study method are the following:

1. the pooling of the experience of a group;
2. the promotion of the process of synthesis of many

concepts and principles into one multi-faceted explanation or plan of action;

3. the promotion of a problem-solving based learning situation that is a close simulation of the real-life situation from which the case data is extracted;

4. personal involvement;

5. group cooperation;

6. relevance to a known situation.

(Romiszowski, Mulder & Pieters, 1990, p. 46)

Merriam (1988) states that case study research, and in particular the qualitative case study, is an ideal research design for understanding and interpreting observations of educational phenomena (p.2). Unlike experimental, survey, or historical research, the case study does not claim any particular method for data collection or analysis. Any and all methods of gathering data, from testing to interviewing, can be used in a case study (Merriam, 1988, p. 10). The researcher is the primary instrument for data collection and analysis (Merriam, 1988, p.53).

Yin (1984) supports the case study as a research methodology which helps to explore or describe issues and concerns in real life situations. It is particularly rich because of the variety of research strategies it permits.

Borg and Gall (1989) confirm the case study's validity as a method of research and discuss its increased acceptance (a) in terms of the generalizations which are now possible, and (b) in terms of the credibility now associated with qualitative research methods which are an accepted and much used part of case study methodology. They list five types of case study research: historical case studies of organizations, observational case studies, oral histories, situational analyses, and clinical case studies (p. 403). Of the five, the historical case study and the situational analysis are most pertinent in the context of this study, in that they involve the tracing of developments over time to get a more in-depth understanding of the event or process being studied.

Goetz and Lecompte (1984) discuss the researcher's membership in a discipline as influencing his or her world view and how this, in turn, influences the researcher's design. According to Goetz and Lecompte the design of the research is influenced in terms of:

1. the focus and purpose of the study and the question it addresses;
2. the research model used and the justification for its choice;
3. the participants or subjects of the study and the setting(s) and context(s) investigated;
4. the researcher's role in the study;

5. the data collection strategies used;
6. the techniques used to analyze the data collected during the study;
7. the findings of the study and their interpretations and applications (pp. 34-35).

Lincoln and Guba (1985) focus on the researcher's paradigm or set of beliefs. This, they indicate, most determines the character of the research (p.15). According to Morgan, Taylor and Gibbs (1984),

> research and evaluation studies which have adopted qualitative methodologies generate rich descriptions of learning in specific contexts...This type of research tends to raise people's awareness of activities and events in particular settings so that links and parallels can be drawn to inform practice in other settings and new contexts (p.265).

This is particularly important when the focus of the study is a new initiative or experiment as in the case of this research study.

All of the above descriptions have implications for the methodology used in this research. The researcher was in fact the primary instrument for data collection. The focus of the

study, the context, the researcher's role, and the model used all influenced the design of the study.

The context was that of recording a process in action: the development of a course currently offered live on campus for offering via distance education to students around the province. Various types of data were collected using a variety of sources and methods. Initially a series of interviews and conferences were held with the course instructors to carry out a feasibility study or needs assessment. This was followed by a mail-out survey questionnaire, the results of which were analyzed in a quantitative manner to provide support for the statement of needs. The researcher actually became involved in the design process and used a journal to document the process from her point of view. In addition to the subjective perspective there was continuous and ongoing contact with the course instructor who was interviewed on a number of occasions regarding the design process, and with the laboratory instructor, whose eventual task it would be to evaluate the course during its pilot offering.

Significance of the Study

The study is significant in that it provides a description of the instructional development process as applied to distance education course development. Distance education adds a

dimension to the instructional design process which significantly influences design decisions. Furthermore, the application of the particular delivery system used the - audio-tutorial method - is the first at a graduate level at Memorial University. In fact, the development of L6521 is the first approved graduate distance education course at Memorial University of Newfoundland. It is certainly not likely to be the last, and documentation of the course development process may prove helpful to those contemplating graduate distance education course offerings in the future.

Limitations of the Study

The research method selected is, in itself, a limiting factor. The ultimate objective of developing a generalization requires more than exposure to and discussion of a single case or even cases - it also requires participants to engage in deep processing of the general principles involved, through a process of reflection and abstraction (Romiszowski, Mulder & Pieters, 1990, p.47).

Case studies are not as broadly generalizable as other methods of research. This study presents a description of the development of one particular course, L6521 Instructional Development. Applications of the development process described herein should be considered in light of this particular case, a single case study of a graduate level course. Findings

should be limited to that type of application because the instructional design may not be broadly applicable to other cases.

Definition of Terms

In this study the terms distance education and instructional development are of prime importance to the reader.

Distance education. For the purpose of this study, the adopted definition of distance education will that of Zigerell (1984): distance education is "formal or nonformal instructional situations where learning takes place at sites removed from the point of origination and is characterized by varied degrees of access to the teacher, tutor, or peers" (p.55).

In other words, it is an education system wherein the learner is separated from the instructor in time and/or space. Moore (1973) summarized it as being "the family of instructional methods in which the teaching behaviors are executed apart from the learning behaviors" (p.664).

Instructional Development. "Instructional development is the entire process of analysis of learning needs and goals and the development of a delivery system to meet those needs" (Briggs, 1977, p. XX). It is

> ...concerned with understanding, improving, and applying methods of instruction. As a professional activity done by teachers and instructional developers, it is the process of deciding what methods of instruction
>
> are best for bringing about desired changes in student knowledge and skills for a specific course content and a specific student population (Reigeluth, 1983, p.7).

There are a broad range of terms related to instructional development which are encountered in the literature, including instructional technology, educational technology, and instructional design. These various terms used in the sources cited are an indicator of the ongoing developments in the field of educational technology.

Organization of the Study

This present chapter provides an overview of the study, the research parameters and procedures. It also outlines the case study methodology which was used in carrying out the research. Chapter II is a report on the related literature. Two main areas were the focus of this review: distance education and instructional development. The literature review provided a theoretical framework for the study and provided guidance in both the design process and the study and documentation of that process. Chapter III provides a detailed account of the

instructional development process as it occurred. Chapter IV describes the product development which was completed to make the course accessible to students via distance education. Finally, Chapter V provides a summary of the study and makes recommendations for future research based on the case study experience.

CHAPTER 2

REVIEW OF RELATED LITERATURE

Research in the fields of instructional development and distance education and their interrelationship provides the reader with a context for understanding this study. For the researcher it provided a theoretical framework and a means of clarifying the research process.

Distance Education

Definition

Distance education refers to learning systems that:

> serve relatively dispersed populations and involve a minimal reliance on face-to-face teaching. In so doing they liberate the student from the constraints of space, time (and often age) associated with conventional provision permitting him a degree of flexibility as to the regularity, timing and location of his study activities... (Kaye and Rumble, 1981, p.1)

In short it is a delivery system which offers students the opportunity to access instruction at a distance.

According to Kaye and Rumble (1981) the key features of distance education are an enlargement or opening of

educational opportunity to new target populations; flexibility in curriculum and content of the learning materials through, for example, modular structures; the conscious and systematic design of learning materials for independent study; and the planned use of a wide range of media suited to the needs of the students. It is an assumption in the literature that distance education is an accepted form of educational delivery for adults. Bates (1982) states that learning at a distance helps to provide a better future for millions of people by maintaining a dynamic relationship with changing patterns of employment, leisure and work.

History of Distance Education

Holmberg (1986) suggests that the origin of distance education is correspondence education. As early as 1728 the Boston Gazette advertised opportunities for people wishing to learn short hand to have lessons sent to them (p.6). In 1833 a Swedish newspaper offered the possibility of studying composition "through the medium of the post" (p.7). Verduin and Clark (1991) noted that the founding of a language correspondence school in Berlin in 1856 was a landmark in distance education (p.16). In 1878 Skerry's College, Edinburg, began preparing candidates for Civil Service examinations by correspondence (Holmberg, 1986, p. 8). These examples provide evidence that distance education

correspondence programs existed in both Europe and North America as early as the eighteenth century. By 1910 there were 200 correspondence schools in the United States and the demand increased through to the recovery years after the second World War.

By the early 1970s correspondence education began to evolve with the enhanced opportunities for mediated communication that new technologies permitted. Zigerell (1984) states that the growth of distance education is a result of an historical coincidence: a public demand for more educational opportunities for adults at a time when media (especially electronic media) capable of delivering instruction to people wherever they may be, are proliferating (p. 17). It has grown because of its proven versatility in having satisfied a wide range of educational needs.

The British Open University (BOU) was chartered in 1969, and Howe (1977) argues that the chartering of the BOU was as significant an event as the establishment of the United States of America land grants to colleges in the 1860s. "Each provided a serious sustained learning opportunity for large numbers of people for whom higher education had never been available" (p. ix). The BOU was a propelling force in distance education. Its forerunner was a white paper in 1963 proposing a "University of the Air" which would "harness the

technological advances in media of mass communications to the service of education" (Perry, 1977, p.9).

In 1965 the Minister responsible for the Arts in the British government, Jennie Lee, took responsibility for the project and determinedly set about developing programs that would provide both excellence and equality of opportunity (Zigerell, 1984, p.37). The first students were admitted in 1971. By 1980 the BOU was offering almost 120 courses and its success had inspired the establishment of a number of distance and open universities throughout the world.

The types of programs delivered through distance education are many and varied, and span the five continents. However, researchers in the field note that there are basic similarities. Zigerell (1984) points out that distance learning systems in other parts of the world emulate features of the BOU and vary only to the degree that they meet their own national need and rely on their available resources (p. 45). The surface diversity of distance education appears to mask a basic similarity in institutional type and administrative style.

There are programs in language learning (Abrioux, 1981); in teacher training and inservice (Ansere, 1979; Nashif, 1982); in music (Ottem, 1982); in business education (Loudon, 1982);

and even in "affective" education (Marchand, 1982). The success of these course offerings via distance education is well documented and, as Marchand (1982) reflected - by relying on the principles of andragogy and distance education, it was not only possible to meet the challenges of developing distance education courses but the courses, once developed, generated more broadly based demand than originally anticipated and the interest of the participants was sustained.

Reactions to Distance Education

Resistance and Reverence. While distance education may be an accepted form of delivery, this like any other change does not become accepted without some predictable resistance. Most significant is the fact that in many cases, the method of delivery literally puts instruction into the hands of students who are, for the most part, independent of the teacher. Many educators will always wish to exercise their perceived right to control the instructional events in the classroom. There is usually reluctance to give up control, or to be relegated to the position of providing guidance. Heinich (1985), in outlining the structure of education, acknowledges the fact that the fundamental premise on which the education system is built is that the "responsibility and authority for

instruction are vested in the person who is in face-to-face contact with students in the classroom" (p.10). Furthermore, the structure of the system in which the teacher works supports the autonomy of the classroom instructor. Megarry (1983) points out that at the policy and decision-making levels, the institution itself and its governance are central to the problem. The structure of the institution and its current lines of authority are fixed, and teachers, like any other professionals, respond to the organizational structures of which they are a part. Heinich (1985) agrees, noting that to change the behaviors of educators regarding technology, the organizational structures have to change.

Finn (1964) delineates the need for acceptance of technology in education.

> (It) is a way of organizing, a way of thinking involving at the center, to be sure, man-machine systems, but including systems of organization, patterns of use, tests of economic feasibility. And in the times in which we live there is a higher-order interacting system between technology and science...An age of technology does need the softness of the humanists. However, technology is the way to solve the educational problems of the future (p.26).

More crucial to this study is the view expressed by Postlethwait (1977) who acknowledges why the technological revolution has been met with mixed emotions, but goes on to

say that this does not mean that one should reject the utilization of all technical devices in the development of an instructional system. The success of his audio-tutorial system is testimony to the positive potential of distance education.

Delivery Modes for Distance Education

As previously stated there are a variety of courses offered by means of distance education. The approaches for program delivery are equally diverse; courses are delivered using a variety of media. The British Open University, Athabasca University, located in Alberta, Canada, the United States' University of Mid-America as well as the International University Consortium, a consortium of approximately 25 U.S. and Canadian Universities, have all developed delivery models. While the BOU still relies heavily on print, radio is used extensively at the Australian School of the Air, the Ryerson Open College , the Japanese University of the Air and the Voice of Kenya. Audiocassettes have been used extensively at the University of Waterloo, Canada and the External Studies Division of Adelaide College of Advanced Education, Australia. Educational television has been used in Universities in Colombus, Ohio and in Japan.

The variety of media used and the integration of media in delivery systems would indicate that no one medium is best,

and indeed research has established that media selection alone is not the most important variable in course design. Schramm (1977), commenting on the instructional process, says that there are more crucial issues than which medium is best. What is more important is the instructional strength of the material, the cultural and situational context, the student access to various media and the resources available to the program (p. 13).

Issues in Distance Education

Many issues have evolved through the history and development of distance education. The designing of instruction for delivery at a distance, the administration of a program where the instructor is, in fact, the institution, the particular problems of meeting the needs of the adult learner, ensuring the quality and equality of programming with that of on-campus courses, are just a few. Notably though, the research literature is abundant on one subject in particular - that of attrition rates.

Attrition Rates. One thing seems clear - attrition rates are generally high, both in absolute terms and in comparison to traditional institutions. (Pantages & Creedon, 1978), and Shale (1982) confirm that it is generally accepted that the dropout rate in higher education is more serious in distance education, although its magnitude is difficult to ascertain

(p.113). In his case study at Athabasca University, Shale applied two different formulae, demonstrating course completion rates of 28.8% and 58.2% accordingly. The first formula, known as Orton's Total Enrolment Formula, calculates rate of course completion by multiplying the number of course completions by one hundred and then dividing that number by the total number of registrations in the course. This resulted in a reported rate of 28.8% course completion. In this formula there is no consideration of the fact that many of those who registered for the course may actually never have started it. The second formula, resulting in the 58% completion rate takes into account an important factor - the number of course registrants who never start the course. It is calculated by subtracting the number of non-starts from the number of registrants in the second part of the formula. Shale raises the question of whether these students can be considered dropouts if, in fact, they had not begun the course.

He further reported that students who make a start but do not complete typically do about one third of the course before dropping out (p.115). Zigerell (1984) suggests that "given open admissions and the difficulties associated with independent learning at a distance, a relatively high drop out rate is to be expected"(p.50).

Accessibility. One of the fundamental premises underlying learning at a distance is the assumption that it is important to provide individuals access to learning that might otherwise be denied to them. With an increasing need for access to education among the population distance education is becoming an acceptable mode of study at all levels of education. In addition to its importance to the immediate clientele, Waniewiez (1982) stresses the importance of lifelong adult education as being an essential influencing element in the education of children and young people. Distance education, then, means progress not just for today but for the future. Coldeway (1982) reports that distance learning institutions have accepted the challenge to deliver instruction in a unique way and so have already confronted entrenched traditional values and practices. He believes that it is time that it accept a second level of challenge by defending the right of every individual to learn.

Programming Success. Holmberg (1981) outlines the benefits of distance study at the post-baccalaureate level. He cites research to report that post baccalaureate distance study of the "widening" type (as well as distance study at the undergraduate and secondary levels) has been favored by a number of factors which include:

1. the well known effectiveness of the method;
2. the possibilities for individualization of study pace;

3. the students' assumedly habit forming experience of work on his or her own which is felt to develop independence and lead to greater autonomy than other types of study;
4. its applicability to large groups of students as a kind of mass communication;
5. the economy both of the large-group approach and the fact that the need for residential teaching has diminished and that study can take place during leisure time and anywhere;
6. the feasibility for large-scale projects to enlist the services of the very best subject specialists and educationalists (p.259).

Ashworth (1979) provides an opposing view. However successful pure distance study has proven to be, traditionalists still insist that face-to-face sessions represent something indispensable. During the 1970s and 1980s the value of post-baccalaureate distance study was frequently judged on the basis of the amount of supplementary resident study with which it was combined. Thus non-traditional doctoral study was considered to be of low quality mainly because it waived requirements for full-time study, or for residence on campus (p.174). Vertecchi (1990) reports on the overwhelming success of LaSapienza's University where the distance education program is meeting the increasing demand of teachers for professional development and upgrading. The establishment of

post-baccalaureate distance courses in 1986-87 has seen enrollment increase from 300 in the first year to 4000 in 1990. According to Vertecchi " the high number of enrollments is good feedback which proves the validity of the enterprise and how it matches the needs of teachers" (p.34).

Distance Education Course Design

University distance education courses are offered by two types of institutions - those that are exclusively devoted to course offerings via distance education and those offering courses mainly on campus but with some distance education offerings. In the case of the latter, the courses offered are often not actually designed for offering by distance education. In most instances the courses offered via distance education are simply an application of a distance technology to the traditional on-campus course. The instructor accesses a teleconference system and lectures as if he or she were in front of a group of students taking the course live on campus. The only adaptation may be the designing of a brief manual which might be little more than information on how to access the lecture through the teleconference network.

Nevertheless, the literature describes several models of course development and design procedures in distance education. Garrison (1989) noted that design models ranged from the sophisticated course design team, used to design the

Australian extended classroom model to an intuitive and often individual approach (p.98). He quotes Moore's and Young's (1987) study listing the five qualities that learners identified as being important in the design of courses for distance education: communication of knowledge in an understandable manner; guidance; active involvement; feedback; and general support (p.99).

Howard (1987) underlines the importance of communication and feedback in light of the separation of teacher and learner. He cautions against allowing structural and media issues to entirely decide the instructional design. Howard firmly believes that learner feedback must be designed into distance education courses on the basis of instructional criteria before considering the constraints of a particular delivery environment (p.38).

Kaufman (1989) delineates three generations of course design in distance education and characterizes them as:

1) control by the learner;
2) dialogue;
3) development of thinking skills (p.61).

First generation course design is often referred to as correspondence education. In this, no choice is provided to the learners, who follow a fixed course or program. Little

support is provided except for written feedback on assignments. Evaluation is by a final examination.

Second generation course design is the predominant model used in current programs and allows for some choice within the course, although the institution offering the course does specify requirements. The degree of support is significant in second generation design. There may be pre-enrollment counselling, a phone-in tutor system, and audio-teleconferencing or interactive television system. While the focus is still on content coverage, there is some emphasis on thinking skills.

Third generation is referred to as open distance education. The learner is given a choice of why, what, how, where, and when to study. Two-way interaction is available at any time through the use of computer-mediated communication. In the curriculum, the major emphasis is on developing thinking skills, problem-solving, decision-making, and critical thinking. (Kaufman, 1989, pp.67-69)

Verduin and Clark (1991) point out that because the main function of distance education is to deliver instruction to adults who are not normally in a contiguous setting, the instructional delivery system is of utmost importance. They

make the following points about the implications for course design.

1) Meaning is difficult to communicate at a distance.
2) Two-way immediate interaction is not always possible. Therefore, misunderstandings and misperceptions may arise and threaten the students' continuation in the course.
3) To be truly effective, distance education must assess the issues that are important to learners and relevant to their needs.
4) To reach many adults, instructional activities should be task oriented and include active participation by the learner (pp. 143-147).

Holmberg (1981) says that many of the problems connected with course development in distance education are identical to those of the development of learning materials in general (p.43). He follows Gagné's model which outlines essential functions for course developers. Among them are the need to arouse attention and motivate through the presentation of objectives that are within close reach; the need to make students aware of the expected outcomes of the study; and the need to link up with previous knowledge and interest. The developer has the task of presenting the material to be learned; of guiding and structuring, of activating and

providing feedback to promote transfer and to facilitate retention (p.56).

In addition the writers of distance programs need to look closely at a range of considerations to define their objectives. Baath (1983) offers this checklist of factors to be considered:

1) the budget for the course;
2) the type of course and its purpose;
3) the type of distance education (media options);
4) the nature of the subject;
5) the target groups (age, educational background, etc.) (p.49).

Keegan (1990) summarized trends in distance education course development. He noted that up to the late 1980s courses were usually designed by individual academics supported by specialist development staff. He also reported that print is the medium used in most courses and is supported by audio in a large number of instances and by audio-vision or video in a smaller, yet growing, number of cases (p. 203).

Instructional Development

Definition

Heinich, Molenda, and Russell (1989), offer the following definition of instructional development. "... (It) is the process of analyzing needs, determining what content must be mastered, establishing educational goals, designing materials to help reach the objectives, and trying out and revising the program in terms of learner achievement" (p.439).

There is, within the field of educational technology considerable overlap of terminology, with authors frequently using the terms instructional development and instructional design interchangeably. Other authors differentiate between these terms. The researcher concurs with the latter authors, believing that instructional design is subsumed within instructional development. Instructional design principles are applied in instructional development. Romiszowski (1986) distinguishes the two by using the analogy of what happens on the drawing board (the design) and what happens in the workshop (the development). Others in the field, Briggs (1977), Reigeluth (1983), Knirk and Gustafson (1986) and Richey (1986) have added their own trademark definitions, none significantly different in essence from the others. All contain the notion that instructional development is a systematic way of solving instructional problems.

Instructional Development: A Part of Educational Technology

Instructional development belongs to the field of educational technology. It is important to understand that field and to have a clearly defined concept of what it is in order to fully understand instructional development. Early North American educational technology had its beginnings in the audiovisual education movement. In the 1960s a National Commission on Instructional Technology was established in the United States. Its mission was to explore the emerging role of technology for learning. After receiving extensive testimony the commission issued a definition of instructional technology which emphasizes the process of designing systematic learning conditions. The definition is reflective of what Gagne & Briggs (1974), Romiszowski (1988) and others have adopted as a basis for their definition of educational technology.

The Commission wrote:

> Instructional technology can be defined in two ways. In its more familiar sense it means the media born of the communications revolution which can be used for instructional purposes alongside the teacher, textbook and blackboard. The second and less familiar definition of instructional technology goes beyond any particular medium or device. In this sense instructional technology is a systematic way of designing, carrying out and evaluating

> the total process of teaching and learning in terms of specific objectives, based on research in human learning and communication and employing a combination of human and nonhuman resources to bring about more effective instruction (p.18).

It is noteworthy that the Commission referred specifically to human and nonhuman resources, highlighting the fact that educational technology is not simply hardware. As Melton (1990) points out, educational technology was originally perceived as technology offering educators a scientific approach to the design and development of the whole process of teaching and learning, and during the early days the prime concern of researchers in the field was to reduce the vagaries of human judgement to a minimum. However with the passage of time it was increasingly recognized that human judgement has an important part to play in the design and development of teaching and learning, in other words, educational technology has an important human dimension (p.26).

The Council for Educational Technology in the United Kingdom (CET) offers this definition of educational technology: "Educational technology is the development, application and evaluation of systems, techniques and aids to improve the process of human learning." (Percival and Ellington, 1988, p.20). Both the CET and the U.S.A. Commission for

Instructional Technology definitions emphasize the primary function of educational technology, which is the improvement of the efficiency of the process of learning.

The History of Instructional Development - The History of Educational Technology

To trace the history of instructional development it is necessary to look at the history of educational technology, the field to which instructional development belongs. While it would be futile to designate any particular event or date to mark the beginning of a science and technology of instruction, which we now call educational technology, there is agreement that two important historical events influenced the instructional design and technology field. The first was Sputnik in 1957 and the ensuing federal funds for large scale curriculum projects for schools and colleges, the second was the baby boom after World War II, which meant that schools and colleges were overwhelmed by large numbers of students (Seels, 1989, p.11).

Elton (1980) states that the discipline first emerged in its own right at the end of the second world war and that since that time educational technology has undergone a continuing change of emphasis, from mass instruction with a theoretical basis in industrial technology to individualized instruction, the catalyst for which was Skinner's behavioral psychology, to

group learning which has a theoretical base in humanistic psychology.

Some would argue that the developments of any devices or techniques of communication, even as early as the first writings on clay tablets thousands of years ago, could be said to be the beginnings of the development of a technology of instruction. Our more modern day inventions or technological advances have included the blackboard and pen and ink. However, these technologies, though they were revolutionary in the effect they had on education, seem less significant when one considers the advances of the communications revolution of the 20th century. Printing presses, photography, motion picture, radio, television, and computer technology have transformed the way messages can be transmitted and in so doing they have transformed the way we view the world, socially, politically, and otherwise.

Despite the fact that there is no one event that represents a turning point, Saettler (1968) writing from a historical perspective, has been able to highlight a series of events which may be considered as the beginnings of what we now know as educational technology. It is important to review these events since the current practice of educational technology can only be understood in the context of the history and

philosophy which underlies it. Among these events or contributions were:

1. John Dewey's influence from his analysis of thinking in reflective, problem-solving terms and the application of pragmatism to education - the notion that education was life;
2. Thorndyke's application of quantitative research to instructional problems;
3. Kilpatrick's Project Method which took a purposeful approach to education where he reorganized the curriculum as a succession of projects suitable to the interest of the learners;
4. Kurt Lewin's field theory which would have a technology of instruction that provided for analysis of the instructional situation as a whole; and
5. Skinner's model of operant conditioning and development of teaching machines which influenced and guided the mainstream of developments in programmed instruction in the late 1950s and early 1960s.

According to Saettler (1968) Thorndyke's analysis of human learning, his scientific studies of mental testing, his pioneering work in the application of quantitative measures to certain socio-psychological problems are among the contributing factors that make him "the historic starting point for any study or analysis of modern instructional technology" (p.53). Thorndyke enunciated a number of laws of

learning which contributed to the basic principles for the development of a technology of instruction. His overall theory, connnectionism, although modified, was always based on stimulus-response hypothesis.

John Dewey contributed to the acceptance of instructional media through his theory that learning involves the interaction between the environment and the learner and the importance of individual differences. This provides a rich philosophical basis for the introduction and acceptance of educational media.

Later B.F. Skinner (1968) proposed a science of instruction based on reinforcement theory. His programmed instruction has been called the first technological change in teaching and learning since the printed book. Bjerstedt (1972) wrote that the phase-by-phase development of a self-instructional course or instructional programming can be said to be the field where the current type of educational technology was born (p.5). Skinner's theories, in fact, became the theoretical underpinnings for the emergence of the instructional development movement within the field of educational technology.

As evidenced here, the field of social psychology has had and continues to have a major impact on the practice of education.

This field, considered together with communications, marked the early stages of educational technology. From this brief survey of selected instructional theories which have had an impact on educational technology it should be clear that almost every system of instruction, from the time of the ancient Sophists to the present day, has left a residue of theory and technique which are reflected in the evolution of the field.

The basic view of the behavioral science concept of instructional technology is that an applied behavioral science approach to the problems of learning and instruction is fundamental to instructional technology, and educational practice should be more dependent on the methods of science as developed by behavioral scientists in the broad areas of psychology, anthropology, sociology, and in the more specialized areas of learning, group processes, language and linguistics, communications, administration, cybernetics, perception, and psychometrics (Bjerstedt, 1972, p.5).

More recently, the growth in cognitive psychology since the early 1970s has brought about another potential shift in the learning theory foundation for educational technology and instructional development. Tennyson (1990) discusses the implications for educational technology and proposes a cognitive paradigm of learning for the discipline which, as he

states, is as yet undefined because there are so many competing cognitive learning theories, and within the field of educational technology a dominant model for the cognitive paradigm has not emerged (p.16). Tennyson has specified that whereas behavioral paradigm assumes that new knowledge comes only from external stimuli, under the proposed cognitive paradigm of learning it is necessary to consider instructional strategies that include direct reference to internal cognitive processes of knowledge acquisition and employment as well as the ones that rely only on external sources (p.16).

According to Bjerstedt (1972) the field of educational technology has been defined in various ways because people have changed their focus over time. Some have focused simply on the use of new communications media in the classroom, thus dealing primarily with equipment and hardware (p.5). Gagne (1987) insists that educational technology should not be equated with hardware. While the layman may equate educational technology with relating machines to instruction, the more sophisticated definition of educational technology which should be understood by the educational technologists themselves is that educational technology is the application of systematic techniques and accompanying practical knowledge for designing, testing, and operating schools as educational systems, in other words - instructional development.

Educational technology in this sense is educational engineering.

Ivor K. Davies (1978) summarizes the history and evolution of the field through classifying three archetypes: the audio-visual archetype of the 1930s which continued to the end of the second world war, the engineering archetype which came into prominence with the emerging interest in programmed learning in the early 1960s, and finally, the problem-solving archetype which is currently evolving (p.21-23). These are referred to by Davies and others as the three paradigms of educational technology: Educational Technology I, II and III.

Educational Technology I. Educational Technology I, which was the prevalent paradigm in the field which evolved during and after the second world war to 1955, was based on a hardware approach to the field. This is what Romiszowski called technology in education, where educational technology could be equated with the actual technology - the machinery used to aid the teacher in the goal of educating. The process of teaching and learning was automated and the ability to reach the masses through devices that could transmit, amplify, reproduce, and record characterized this paradigm.

Educational Technology II. Educational Technology II followed the hardware approach and emerged in the late 1950s

or early 1960s. It is a software approach which emphasizes the aids to learning based on applying behavioral sciences to the problems of education. It is predominantly the technology of message design where appropriate aims are identified, objectives set, content and subject matter identified and various methodologies chosen and applied. Finally there is an evaluation both of the learning experience and of the design of the instruction itself. As the step-by-step procedure suggests this is a very systematic approach to instructional development founded on goal setting, task analysis, motivational principles and evaluation. Its focus is on the individual and his/her learning needs.

Educational Technology III. Whereas Educational Technology II is a systematic approach to problem solving in education, Educational Technology III is a systemic approach. It applies systems analysis concepts to education whereby there is an expansion of the focus. Its bias is somewhat less toward the individual and his/her specific learning needs to the group or team in which the individual plays a role and the system in general, since all are seen to be interrelated. Any educational problem is analyzed, not in the confining context of where it may appear as a problem, but in the broader context of the system. One would ascertain where the root of the problem lies, what may be causing the problem, and what

consequences to the system any adjustments to any one component would have.

Educational Technology III involves making the right decisions based on dissenting opinions rather than on a consensus of the facts, focusing on opportunities rather than on problems and on those few key areas that will produce outstanding results, rather than on trying to achieve everything and failing through lack of time. (Davies, 1978, p.15) Educational Technology III is a problem solving approach to educational technology. It is based on systems theory and the analysis of a problem as it relates to the entire system rather than any of its individual constituent parts. Any changes in any part of the system, any new development in the system, is seen in the light of the implications these changes would have for the system as a whole.

Instructional Development: From Theory to Practice

Instructional development may be viewed on two levels: a practical level and a theoretical level equating with Davies' Educational Technology II and III. From the practical point of view it is a subset of educational technology which involves the theoretical application, production, and evaluation of instructional materials through a phased and orderly sequence of events leading to the attainment of specified and operationally defined objectives (Davies, 1978).

From a theoretical point of view it is, within the context of the field of educational technology, a disciplined approach to the creative organization of resources for learning. Seels (1989) reports that the research base for the instructional design aspect of educational technology has been derived from two psychological paradigms: behaviorist and cognitive. Seels notes that the field of instructional design has not stressed the importance of using only one paradigm, but rather has incorporated theories from each. A third paradigm has had less impact, the constructivist paradigm, which states that learning occurs because personal knowledge is constructed by an active and self-regulated learner who resolves conflicts between ideas and reflects on theoretical explanations (p.13).

B.F. Skinner advised educators to apply knowledge about behavioral reinforcement theory to the design of instruction in an article entitled The science of learning and the art of teaching (cited in Seels, 1989). Skinner was proposing that a technology of instruction be developed. Seels (1989) explains that programmed instruction was the first instructional technology: "...because it was the first system for instruction based on a theory of learning. It was the impetus to the study of variables of instruction which came to be known as design characteristics" (p.11).

James Okey (1990) notes that numerous models of instructional

development have been proposed in the literature. While they may vary slightly, all have common characteristics. There is an initial analysis phase in which outcomes are specified, a development phase in which instruction is planned and produced and an evaluation phase in which the conduct and impact of instruction is assessed.

Knirk and Gustafson (1986) identify five common elements of instructional development models. They are:

1. data collection;
2. assessment of learner entry skills;
3. specification of behavioral objectives or performance tests;
4. a procedure for selecting presentation methods and media; and
5. an implementation, evaluation and revision procedure (p.21).

They present in detail six instructional development models, two of a general nature, two military, one industrial and one offered by Knirk and Gustafson themselves. (See Figure 1)

MODEL	KEY FEATURES
Kemp 1986	guides user to look at general problems and purposes of instruction; studies learner characteristics, subject content and evaluation
Instructional Development Institute Model	characterized by three stages divided into nine functions: Stage 1 - **define** Functions - identify problem, analyze setting, organize management Stage 2 - **develop** Functions -identify objectives, specify methods, construct prototypes Stage 3 - **evaluate** Functions - testing prototypes, analyzing results, implementing system
Interservice Procedures for ISD Model	designed for U.S. Army training program of the 1960s; consists of five major phases: to analyze, design, develop, implement and control
Criterion-Referenced Instruction Model	developed by Robert F. Mager; uses a task analysis followed by the development of instructional objectives, media selection, program development and evaluation
UNESCO IDS Model	stresses the analysis of the educational system and its social implications; emphasis on planning while de-emphasizing product development
Knirk and Gustafson ID Model	characterized by three phases, each with designated functions; Phase 1 - **Problem determination** Functions - identify problem, determine learners' entry behaviors, identify general instruction goals and organized management Phase 2 - **Design** Functions - develop instructional objectives, specify instructional strategies, and specify media. Phase 3 - **Development** Functions - selecting and/or developing materials, analyzing results, revising materials, and implementing

Figure 1: Summary of Knirk and Gustafson's Description of Six Instructional Development Models

Nervig (1990) examines the systems constructs of Instructional Development Systems and describes a "reconstructed" ISD model which is a synthesis of the military ISD training models and the educational models (Banathy, 1968; Briggs & Wager, 1981). Its five phases - analyze, design, develop, implement and control - are based on the following key elements:

1. The system is perceived as an open system sensitive to all inputs, internal and external;
2. Focus is on the individual learner/trainee. The needs of the individual with special differences or characteristics must be considered;
3. Information feedback loops are included for constant monitoring and adjustment at all levels of development;
4. Specific job/life-relevant education/training criteria are based on the systems goals/purpose and are stated as performance objectives" (p.46).

Implications of the Literature for this Study

The literature has provided an overview of existing programming in distance education and underlines some of the issues that the researcher needs to consider in conducting the study: attrition rates and how to retain students, different modes of delivery and their relative success, acceptance and credibility by both the offering institution, the students and

the educational community at large, and the advantages versus disadvantages of offering or completing a course via distance.

These particular issues have implications for the instructional design of the distance education course. There are factors particular to distance education which influence the design of instruction. Although the course described in this case study exists as an on-campus course, it should not be assumed that the content can be delivered in the same format to students off campus. Finkel (1982), commenting on Athabasca's most successful courses, noted that they were successful largely because of an artful combination of imaginative course design and appropriate delivery strategy.

All of the related research findings regarding distance education, including its history, reactions to Distance Education programs and issues such as attrition rates and programming successes, as well as the research on instructional development and the models it offers for the redesigning of content, have implications for this current study. It is this knowledge of the field that guided the instructional developers in the redesigning of L6521, from the fundamental decisions regarding the design model to the more specific choices as in the case of media selection. The impact of the results of past research as documented in the

literature are evident in the course design and development to be described in the following chapters.

CHAPTER 3

THE INSTRUCTIONAL DEVELOPMENT PROCESS

As evidenced in the previous chapter, the literature is abundant with instructional design models. While their conceptual framework may be different they are fundamentally similar in their application. A generic instructional development model, based on behavioral and cognitive field theories was used in the development of L6521. Elements of this generic model are presented here as a record of the development process implemented by the course development team.

Needs Assessment

At the very initial stages of the process a needs assessment was carried out. There are many ways of viewing needs assessment and these can be broadly classified as follows:

1. discrepancy view - analysis of any discrepancy between desired or ideal conditions and existing or observed conditions; the discrepancy is the basis for the need.

2. democratic view - a need is determined on the basis of a democratic and/or collective viewpoint that there is one; there is a need because the majority says there is one.

3. diagnostic view - a need is seen in light of a program or system becoming inoperational or dysfunctional because of the absence of some essential element.

4. analytical view - the system is examined to assess future needs for improvement.

The decision to proceed with the course development was based on a needs assessment which revealed characteristics of all four views: discrepancy, diagnostic, democratic and analytical. Informal knowledge of the situation supported the democratic view that there was a need for a distance education course offering in instructional development. The following circumstances support the democratic and diagnostic view. Summer sessions for the existing L6521 course are frequently oversubscribed, generally by full time teachers or others who are availing of this singular opportunity to do the course. Over the past number of years there have been numerous informal requests for graduate courses to be offered by means of distance education. The majority of those in the teaching profession who are employed full-time and wish to access this course live and work more than two hours commuting distance from the city of St. John's, the location of the main campus of Memorial University. Enrollment in the course has been

limited because of the one-on-one tutorial type instructional model.

This was followed up by a more formal analytical approach to the needs assessment. A situational analysis was carried out in an attempt to determine the support for distance education courses at the graduate level and particularly for this course if it were to be offered via distance. the situational analysis provided evidence of the diagnostic need and confirmed the existence of a discrepancy between the ideal and the real.

The first step in the process involved interviewing the course instructors. Through this process the development team was able to ascertain that the request for distance education course offerings had already been made informally and that the L6521 course was currently a high demand, oversubscribed course. Secondly, an attempt was made to document the need. This was done by means of a survey.

In the fall of 1991 a questionnaire was sent to the 394 graduate students registered in the various Master of Education programmes for which the L6521 course is either a required course or an accepted elective. These included Educational Communications and Technology, School Resource Services, Teaching, Curriculum and Instruction, Educational

Administration, and Educational Psychology. A copy of the survey questionnaire can be found in Appendix A. The results of that survey supplied further evidence of the need for the development of the course as a distance education course.

Of the 394 questionnaires mailed out, 132 or 33.5% were returned.

Table 1 shows a breakdown of respondents by programme.

Table 1

Respondents' Selection of Graduate Programme

Programme	Respondents (N=132)
Educational Communications and Technology	6%
School Resource Services	20%
Teaching	14%
Curriculum and Instruction	30%
Educational Administration	27%
Educational Psychology	3%

Of the 132 respondents 36 had already taken L6521, and of those who had done the course 31 were able to enroll the first

time they selected the course, while 5 had had to be placed on a waitlist.

In response to what motivated students to take L6521 - Instructional Development, the following choices were given and the percentage of responses for each choice is indicated in Table 2.

Table 2

Cited Reasons for Enrollment in 6521: Instructional Development

Choices	N=36
It was the only course offered at the time that would give me credit toward my programme.	8%
It was a required course for my programme.	86%
It was a course which interested me and I was able to choose it as an elective on my programme.	5%

Questionnaires were returned by 96 people who had not yet completed the course. When asked about future intentions

regarding 6521, 54% of respondents indicated that they intended to enroll in the course; the remaining 46% were undecided as to whether or not they would choose L6521 as part of their Masters programme.

Of the 96 respondents who had not yet completed 6521, 62.5% indicated that they would be interested in completing the course via distance. The same number said that the distance option would be convenient.

Table 3 presents a summary of information from both those who have already taken the course and those who have not, regarding their feelings about completing that course or other courses via distance education.

Table 3

Need for Graduate Distance Education Courses

Opinion	N=132
A D.E. offering would be advantageous	83%
A D.E. offering would offer no advantage	2%
There is a need for D.E. at the graduate level.	91%

Over 65% of the respondents (86 people) offered further comments in the space allocated. Only 8 of the 86 people who wrote comments were against the idea of offering courses via distance education at the graduate level. One person suggested that although s/he had nothing against it in principle s/he felt it was it was impractical and, therefore, inadvisable. Another four respondents cited the interaction among students as an important element of a graduate program.

All of the commentaries have been summarized and categorized and are reported, along with the complete survey results, in Appendix A.

Design Considerations

Having decided to proceed with the course design and development there were many decisions to be made regarding the types of changes that would be necessary in the course and the feasibility of making these changes. Among the many things to be considered were demographics, enrollment, materials, delivery and support services. These have been documented and are described further in this study.

Description of Potential Learners

Since the survey respondents were either the past subscribers to the course or the potential future students, the information they provided was useful in helping to describe the target clientele. The following is a brief description of that group.

The learners in L6521 are graduate students, mostly enrolled in programs within the Faculty of Education. As graduate students they have all attained a minimum undergraduate average of 65%, the minimum acceptable for entry into graduate studies. They are all adult learners with a minimum of two years of work experience. There is a high degree of motivation as evidenced by the large number of students who are on part-time programs, thereby committing themselves to as much as seven consecutive years of summer study.

Although there are many commonalities, there is also diversity in this group of learners. The course L6521 is a required course on three degree programs within the Faculty of Education: a program for the preparation of school library specialists, one for the preparation of educational technologists, and a program for classroom teachers who wish to pursue an advanced degree. It is also completed as an elective by most students (over 90%) on the curriculum program and by a considerable number of students on the educational administration program. Diversity is also evidenced in the undergraduate preparatory backgrounds. While the majority have education degrees, according to the course instructors approximately 25% of their students have degrees in disciplines such as nursing, arts, public relations, and business.

Another area of diversity among the learners is their previous work experience and their current circumstances. While many are employed in the provincial education system as teachers, administrators, resource center personnel, or program co-ordinators, others are employed in a variety of settings. These include schools of nursing, government departments, business, and post-secondary education. It is reasonable to assume that all of these people expect the course to be meaningful to them in their particular situations. The needs and expectations range from the educational technologists who

require a high level of expertise to the classroom teachers who need only a rudimentary knowledge of instructional development. The consideration of these varied needs and expectations was essential in making decisions regarding the course content (the task and concept analysis). It was decided that L6521 was to remain an introductory course, offering basic information in instructional development. Those requiring more advanced study would be expected to complete courses beyond L6521.

Design Decisions

The task the instructional designer must perform always involves the interplay among theory, research, and application. The theories were studied through the review of relevant literature; the research into both content and potential modes of delivery were part of the initial design phase and the application represents the developmental phase.

Milheim (1991) in trying to provide potential distance education course developers with basic information to help design and develop distance education programs and instructional materials focussed on technology, economics, personal needs, delivery systems and the design of materials. His conclusion was that while courses offered through distance education have a great deal of potential, there are a great

number of factors which can affect the overall effectiveness of the course. He lists them as follows:

1. budgeting for short and long term needs;
2. planning for teaching and support staff;
3. choosing an appropriate delivery system;
4. using instructional design principles for the development of the instructional materials and
5. delivering the materials to students in an accurate, timely manner (p. 53).

The design of this course took into account Naidu's (1988) suggested approach to the design and development of instructional materials for distance education. Naidu situates the various design/development approaches on a continuum from the solo author intuition model, being the least collaborative, to the course team model, the most collaborative (p. 168). He advocates the CBAM (Concerns Based Adoption Model) as the best framework for a systemic approach to the management of any form of collaborative approach to instructional materials design for distance education (p. 178). The present study involved the highly collaborative model of a three-person team: an instructional developer who was also responsible for documenting the process; a content expert who originally designed the existing L6521 course now offered live on campus and who has been the course instructor for approximately 25 sessions; and an evaluator who has

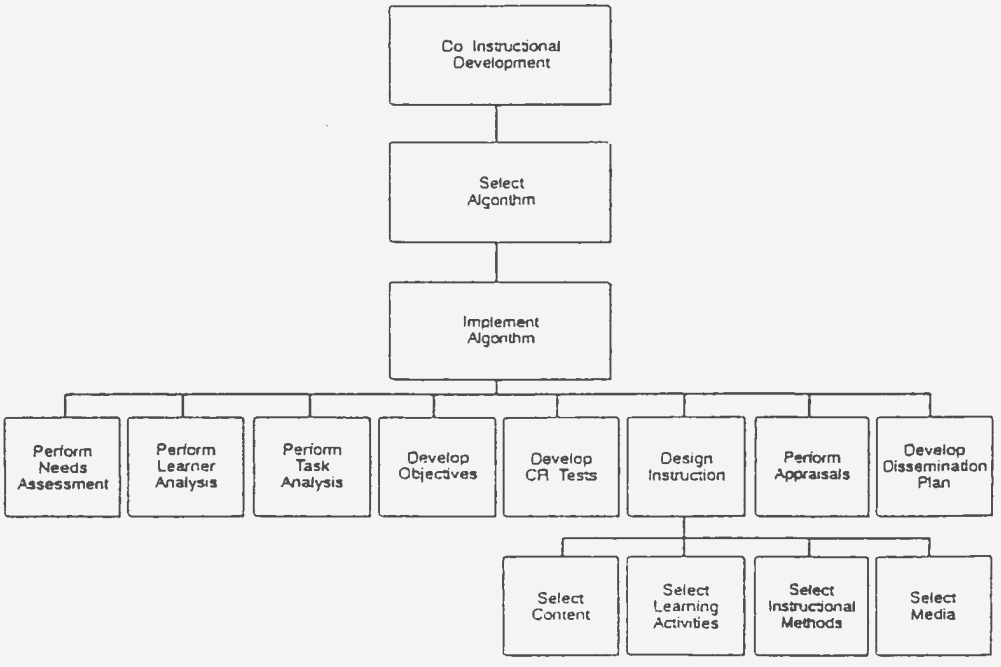
maintained an ongoing research audit in preparation for the evaluation to be completed as a follow-up to this study.

Determination of Course Content: Task and Concept Analysis

The design began with a task and concept analysis. These clarified for the instructional developer the determination of essential content. Furthermore it defined the tasks to be completed which would represent the achievement of that content. The completion of the task and concept analysis was accomplished partially through research into instructional development models but largely through a series of conferences with the content expert. The development of the task and concept analysis flowcharts mapping out the essential content and the necessary tasks represented perhaps the most crucial step in the process since everything else flows from these two charts.

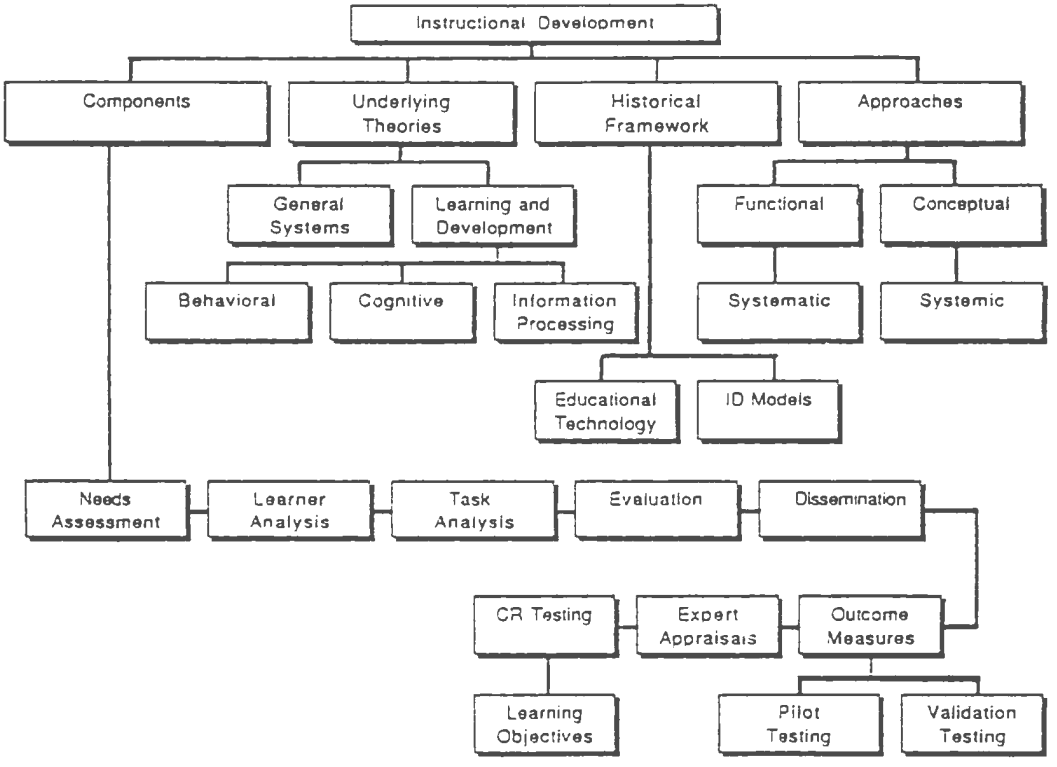
TASK ANALYSIS

Instructional Development



CONCEPT ANALYSIS

Instructional Development



The course objectives were written based on the task and concept analysis and the course content was, in turn, based on the objectives. Everything in the developmental phase was linked to the task and concept analysis.

Course Objectives

The following objectives were set for the graduate distance education course in Instructional Development:

1. Learners will develop an understanding of the historical framework of educational technology and instructional development.

2. Learners will develop an understanding of the underlying theoretical frameworks of systems theory, communication theory, behavioral and cognitive learning theories.

3. Learners will distinguish between systematic and systemic instructional development and understand their historical roots.

4. Learners will become conversant with terminology and principles of instructional development.

5. Learners will become conversant with instructional development models.

6. Learners will apply principles of instructional development in the design and production of an instructional module.

Course Evaluation

The evaluation plan was developed with the objectives in mind. There are three components to the evaluation plan:

1. Three short assignments, with a total value of 30%, on specific components of the instructional development process: task analysis, objectives, and criterion-referenced test. This evaluation activity tests objectives 2, 4, and 5.

2. The development of an instructional module, with a value of 40%, based on the framework of the three small assignments. This evaluation activity tests objectives 2, 5, and 6.

3. A final examination, with a value of 30%, on the assigned readings and lectures covering the theoretical framework of instructional development. This evaluation activity tests objectives 1, 2, 3, and 4.

Other than content related matter, the design of this course had to also take into account the fact that it was to be offered by distance education. Therefore, there was a second phase in the design process, that of exploring the various modes of delivery available for offering the course at a distance.

Delivery Systems

Once the course content was decided it was necessary to consider the means of delivery. Naidu (1988) provides a reminder that the most distinctive characteristic of distance education is the separation of the teaching and learning activities. Since much of the teaching activity is incorporated in the instructional materials prepared well in advance of the learning activity, the proper development of these materials becomes very important to the ensuing learning activity (p. 167).

Meierhenry (1983) reinforces the view that the decision to use a particular learning resource should be made within the total context of the instructional plan. The decision to use a certain type of material should be made because, to attain an objective, the experience presented by the resource is crucial to an understanding of the material to be learned (p.6). A variety of factors should be considered by the instructional designer when decisions are being made concerning the selection and use of the learning resources, in addition to the characteristics of the material itself.

> The choice of materials becomes integral to effective instruction and their use is essential to accomplish learning objectives. Materials used under these conditions are not add-on activities, but an integral part of the instructional plan...

> they provide the impetus and motivation that make useful and pertinent human interactions and lead to meaningful learning (p.11).

All media were considered as potential delivery systems and, as with each step in this process, research into the various modes was conducted to determine their effectiveness. Sive's (1983) Media Selection Handbook and Reiser and Gagne's (1983) text Selecting Media for Instruction proved to be invaluable tools in the process of media selection.

Having considered all of the factors presented in the literature and through many consultations, the design team decided that a variation of the audio-tutorial system developed in the early 1960s at Purdue University by Samuel N. Postlethwait would best suit the needs of students.

The Audio-Tutorial System

The audio-tutorial system has evolved slowly, however the basic philosophy is relatively unchanged and very simple. It began with Samuel Postlethwait's model where:

> A "good" teacher is asked to assemble the items he would use to teach one student and, while sitting among these items, to record on audiotape the conversation he would have with the student as he

> tutored that student through a sequence of learning activities. The product - the tape, tangible items, visuals and printed materials can be duplicated as many times as necessary to accommodate any number of students (Postlethwait, 1969, p.66).

Romiszowski (1984) characterized the main features of the audio-tutorial system of instruction as "...individualized audiotapes as the main medium of communication, with print materials taking a supporting role" (p.24). According to Romiszowski, "the method's strength lies in its attempt to present instructional activities in the sensory mode preferred by the learner and to integrate experiences from various modes into a meaningful whole" (Romiszowski, 1984, p. 66).

Purdue's program started as lectures on tape, relying exclusively on audiotapes as the medium of communication. Eventually other media were added to provide whatever learning experiences and activities were necessary to attain the course objectives.

There were and are many advantages to the student who enrolls in a course using this learning system as opposed to a conventionally taught course. They include:

1. The possibility for repetition.

In the conventional instructional system, teachers cannot always be expected to repeat. There are instances when repetition is essential to one student and unnecessary for another in the same class. The audio-tutorial system addresses this issue because it allows the student to determine if and how much repetition is necessary and gives him or her the means of making it happen.

2. Accommodation of learning conditions or learner preferences.

In the conventional delivery system all students are exposed to the same learning environment and the same delivery system. Typically, during the theoretical part of the on-campus 6521 course the environment is a classroom where students are lectured by an instructor. Students are involved in note taking and listening. While for some this may be the ideal learning environment, for others it is not at all conducive to learning. The method proposed allows the student to determine his learning conditions. For some this could be a very formal setting in a structured, scheduled time period. For others it could be a very casual environment and the student may decide to work on the course at his or her leisure, whenever it is most convenient to do so.

Related to this is the use of multi-media. Individuals differ in their responsiveness to different media and they also respond differently to the same medium. For example, some students respond best to print through simply reading, others need to react, to take notes or to formulate examples. Yet others respond more readily to auditory communication. In this era for some students the computer terminal or the interactive video screen may be the most user-friendly learning tool. There is considerable choice and variety in the way the student can exploit the medium which communicates most effectively for him/her.

3. Accommodation for learning pace.

Some students may work through materials very quickly; others will proceed slowly. People vary considerably in the amount of information they can process in a given period of time. According to Postlethwait, Novak, & Murray (1972) programmers have demonstrated that most people can learn almost anything if it is broken down into enough units and the student can take the necessary time to assimilate the information at his or her own pace. The audio-tutorial system allows the student to proceed at a pace commensurate with his/her ability and needs.

The fact that these decisions are in the student's control is very empowering and makes the student responsible for his/her

own learning. In the case of this particular course the students are both adults and graduate students. It is reasonable to assume that that responsibility for learning is likely to be accepted by these students.

The decision of the design team was that the following components of the audio-tutorial system would be used to deliver the course: a series of audiocassettes accompanied and supported by a course manual, a commercial textbook, a book of selected scholarly reading, a programmed instruction text, and a series of videocassettes.

Feedback

According to Howard (1987) aside from the careful design of instruction, for the delivery to be effective, the quality of feedback given to students studying at a distance is likely to be of critical importance to the experience of the learners and to the outcomes of that experience. Four different criteria appear to be important in designing learner feedback, according to the literature on instructional design: content feedback, the degree of the individualization of feedback, the immediacy of feedback, and the format of the feedback. (Gagne, 1985; MacKeracher, 1985; Howard, 1987)

A considerable amount of the feedback for this course is built into the programmed instruction booklet. The course

instructor is to be available to the students directly by telephone, facsimile or postal services. She will be indirectly able to assist students through an on-site coordinator with whom students will be able to have contact whenever necessary through telephone, facsimile, regular postal service or the electronic mail system via the university mainframe computer. In addition to this there will be two scheduled teleconference sessions during the thirteen-week semester.

CHAPTER 4

DEVELOPMENT: THE PRODUCTS FOR DELIVERY

The next step in the process was the development of materials based on the design decisions. With the exception of the text (which had to be selected), the other components had to be developed in accordance with the content determined in the task analysis. This was accomplished using as a primary resource the regular course instructor, who was responsible for designing the original on-campus course.

The text selection and development and production of the other course components became a major focus of work for a ten month period beginning September 1991. During that period there was extensive consultations among team members who sometimes worked independently or in pairs. These meetings as well as the resulting discussions and decisions were recorded and documented and the results are the products described below.

Text Selection and Book of Readings

Marland, Patching, Putt & Putt (1990) investigated the ways in which distance learners used and responded to textual materials during actual study. Marland and his fellow researchers made a number of recommendations regarding the use of textual materials which were particularly significant for the design team in decision-making related to the choice of

text and the compilation of scholarly readings. Among the things which had to be considered were:

1. that the volume of reading material assigned for detailed study should be carefully set to ensure that students could do it justice;

2. that the assessment load should likewise be realistic and not so onerous as to cause students to attend only to assessment matters;

3. that assessment activities should be designed to optimize student interaction with the text and require the exercise of high level cognitive abilities.

It was not assumed that the text currently used in the on-campus course would be the text for the distance education course. Several texts were reviewed for content and readability. (See Appendix C.) Following considerable discussion it was decided that a recent (1992) Educational Technology Publications text by Cynthia B. Leshin, Joellyn Pollock, and Charles M. Reigeluth, entitled Instructional Design Strategies and Tactics would best serve the needs of the students. It was well designed, included all the elements of the instructional design process which were identified in

the task analysis as essential course content, and used examples that went beyond the educational context. The authors, in their introduction to the book, specified that it is meant for both educators and those involved in instructional systems development outside the formal education system. In the text examples of both educational contexts and job-related or training contexts are used. This was felt to be important since past enrollments have shown that the course has been taken by many that are not working within the formal educational system.

Considering that no text could possibly cover the realm of instructional development, theory and practice, it was decided to select from among the literature a series of articles which would highlight and capsulize major issues in instructional development. The task then became to research and to select those readings which would be most appropriate. Having read a number of articles on key issues in instructional development, the team members selected those articles that had consensual agreement, and categorized them according to issues. Finally once the list was compiled it was necessary to prepare the appropriate documentation for the university administration to request official permission from the authors/publishers for the copying and distribution of these articles as part of the course materials.

The book of compiled readings contains:

1. an introductory section of two readings to familiarize students with the notion of instructional development and to provide them with a basic definition;

2. a section on functional instructional development including three articles focusing on the algorithm for instructional development;

3. a section on conceptual instructional development - four articles looking at instructional development from a systems perspective;

4. a section on cognitive science - two articles which look at the future of instructional development. (See Appendix C.)

Videocassettes

Having developed a scope and sequence plan for the course based on the course objectives, (See course manual), it was determined that certain concepts could be best illustrated through examples that simulate experiences that might be encountered by students or that may be familiar to them. These could have been illustrated through narrative descriptions as is the case of the live course. It was decided that the use of video would enhance this aspect of the

course considerably by giving students an opportunity to actually see the situation being described. It was thought that videos could also play a very important affective role in initially introducing the students to the course instructor and other university personnel with whom they might be in contact.

Four videotaped programs were produced with the technical assistance of the University's Educational Technology Division. The scripting for these was the responsibility of the instructional development team, as was the many logistical arrangements such as seeking permission from school boards, schools, teachers and parents for the right to film in classrooms, accompanying the film crew on shoots, and guiding the editing process in the final stages of production.

The videotaped programs are as follows:

Program 1: Introduction to the Course

Program 2: Instructional Delivery Systems

Program 3: Task Analysis

Program 4: Objectives and Criterion-Referenced Testing

Audiocassettes

Bates (1982) expounds upon the utility of the audiocassette. He states that "video cassettes, video discs and satellite TV are exciting technologies that arouse great interest in educational circles but ... the greatest media development ...has been the humble audiocassette" (p. 11). Bates supports this claim by giving several reasons why the audiocassette is such an effective tool:

1. The academics feel they have more control over their use and can integrate them more tightly into their course design;

2. They have a variety of uses and can be used to back up other media, for example, print;

3. Students like audio cassettes. In a majority of courses they are ranked as the most useful component after the text.

Furthermore, they are accessible to all, economical, and they are convenient.

Hardwick (1984) studied the use of audiocassettes at the British Open University. Her study

> confirms that the use of different media (e.g. unit, tutor, cassette) working in a co-ordinated way, can

> provide useful reinforcement of essential material... The value of an audiocassette, used in conjunction with written material, lies in the fact that it can help students develop course-specific skills based on looking/reading/hearing/thinking. Because the student can both look and listen at the same time, the audiocassette and notes are arguably better than course units alone for teaching close reading (p.32).

The evidence clearly supported the use of audiocassettes and it was decided that this medium would be used to deliver what was referred to as "armchair lectures". Using her class notes as a reference, the course instructor scripted and recorded the audio lectures, which are meant to expand upon the readings and the programmed instruction booklet. They are not meant to carry all of the essential content, but rather to flesh out and reinforce the content in print. Furthermore they include anecdotal and even humorous "asides" which the developers felt to be important in developing and maintaining interest and in adding a human element to the course.

The audiotaped programs are as follows:

Lecture 1: Introduction to Instructional Development

Lecture 2: Instructional Formats

Lecture 3: Needs Assessment

Lecture 4: Learner Analysis

Lecture 5: Task Analysis

Lecture 6: Objectives

Lecture 7: Criterion-Referenced Testing

Lecture 8: Sequencing Instruction

Lecture 9: Instructional Message Design

Lecture 10: Evaluation

Lecture 11: Systems Theory and Communications Theory

Lecture 12: Behavioral and Cognitive Learning Theories

Programmed Instruction Booklet

The purpose of the programmed instruction booklet is to provide students with a basic algorithm for instructional development. By having students actively work through a programmed text including both content and practice, and follow in a linear fashion an instructional development algorithm, they would learn the what and the how of functional or practical instructional development. Other parts of the course, the text, programmed readings, and audio and video cassettes, would assist students in moving beyond the functional level.

The programmed instruction booklet required the authoring of a text. Firstly, the algorithm had to be defined and the content mapped out. This was done with the content expertise of the course instructor. The following list of the sections

in the Programmed Instruction Text give the reader an overview of the content of that text.

Section 1:	Introduction to the Course
Section 2:	Instructional Formats
Section 3:	Needs Assessment
Section 4:	Learner Analysis
Section 5:	Task Analysis
Section 6:	Objectives
Section 7:	Criterion-Referenced Testing
Section 8:	Evaluation
Section 9:	Dissemination

Once the content was drafted in narrative form it had to be developed in the form of a programmed instructional text. This process required that the development team become familiar with effective programming techniques. A sample unit from the Programmed Instruction text is located in Appendix D.

Course Manual

The course manual (See Appendix E) is the student's guide to the course, providing essential information for the students beginning the course and eliciting from them essential information for the instructor. It included the following:

1. Student Profile Sheet

The student profile sheet was a questionnaire to be returned to the University. It was designed to give the instructor information about the students' age, level of education, reasons for subscription to the course and access to technology necessary to complete the course.

2. Pretest

The pretest was also to be completed by students before beginning the course and returned to the course instructor. It was intended to establish the students' baseline knowledge of instructional development and to be used in a comparative way with the posttest at the end of the course as part of the determination of the degree to which course had achieved its objectives.

3. Course Overview

The course overview provided for the students a complete picture of the course including course components, evaluation, required text, teleconference sessions, videotaped programs, audiotaped programs, and contact hours.

4. Course Time Line

The course time line provided students with a thirteen-week modular approach to the course, suggesting for students a way of proceeding through the course in keeping with the

University's regularly scheduled calendar. For example, Module 1 for Week 1 lists the following:

Audiotape 1. Introduction to Instructional Development

Videotape 1. Introduction to the Course

Programmed Instruction Text

Section 1: Introduction to Instructional Development

Text (Leshin et al). Pages 1-8. Introduction

Book of Readings

Seels: The Instructional Design Movement in Educational Technology

5. Course Description

The course description provides a brief introductory statement and is followed by a listing of the course objectives, the course evaluation plan, directions for the completion of assignments and the examination, and a teleconference guide.

The result of this work in the selection and development of resources is a comprehensively designed course which can, for the most part, stand alone. Instructor intervention may be limited to feedback on assignments and the pre-scheduled teleconferences. The design will be formally evaluated in its first pilot offering in the fall semester of 1992. The instructional developers are confident that having taken into account the nature of the learners, that they are adults and

professionals pursuing graduate studies, and having taken direction from the literature on distance education and instructional development, the course design is one which will permit students to attain the objectives of L6521 and will meet the standards of the evaluation.

CHAPTER 5

SUMMARY, IMPLICATIONS, AND RECOMMENDATIONS

Summary and Implications

This study set out to describe a process of course development and thereby to inform the field as to the particular considerations for the application of an instructional development model in the context of designing a course for offering by distance education. It is hoped that, through examining the process described in this study, others may appreciate the need for using an instructional development approach when responding to distance education course development needs. The case described provides a specific example of the implementation of an instructional development model, from which others might base a similar study or design.

In chapter 1 certain limitations were noted in terms of this study. It describes a single case for which certain parameters were pre-determined. It was known, for example, that the course was to be offered across the province in September of 1992. It was meant to be accessible to as many graduate students as possible in as many locations as necessary. This influenced important design decisions such as which technologies to use. In ensuring access across the province it was determined that computer technology, EMail, and sophisticated telecommunications technologies could not be

used. Furthermore, choice of technologies was limited by the parameters set by the School of Continuing Studies - the academic unit responsible for course delivery. These types of concerns certainly have implications for all distance education course developers. This case study focused on the design and development of a graduate course - a course required on a number of graduate programmes. Those completing the course are both adults and professionals, and are certainly capable of taking responsibility for their own learning. In fact, they would prefer to be given such responsibility. The design of 6521 took into account these characteristics of the learners, and while a course time line suggested a pattern of proceeding, it was offered for general guidance rather than as an imposed sequencing guide. It is important to realize that the inherently flexible design of the course is probably best suited to highly motivated, adult, professional learners.

Perhaps of most significance in this present study is the realization, through the development experience, of the importance of applying the instructional development process. The use of a model allowed for a team to work together and communicate with ease, keeping a checklist of progress as various components developed. It is significant that it took two developers, along with the course instructor who knew the content well, and a production team to design and produce the

course over a period of 10 months. This required the design team to work through and plan for all contingencies, from the planning phase through to the evaluation. The decision to use the audio-tutorial method allowed for a multi-media approach which was not dependent on unavailable or too costly technologies, given the enrollment and frequency of offering.

The content of L6521 remained relatively unchanged; however, the course is significantly different in its modes of delivery, and in the way it is received and completed by the student. These differences were not accidental or incidental, but rather they were built into the design of the course.

Recommendations

In September 1992 L6521 was to be offered to graduate students of Memorial University for the first time by distance education. A maximum of 15 students, located throughout the province, were to be enrolled in the course. While this may be perceived as evidence of the success of the endeavor, it is but a beginning, a pioneering effort for Memorial University of Newfoundland which will require the continued attention of the researchers and developers. In conclusion, the author makes the following recommendations:

1. That during this first implementation period the instructional developer monitor the process in an informal

way. Furthermore, it is recommended that a formal evaluation be carried out involving all of the stakeholders: the university administration, the instructional developer, the course instructor, the on-site coordinator, and the students.

2. That there be a follow-up evaluation after the course has had the opportunity to be modified or adapted on the basis of the evaluation data gathered during the pilot study.

3. That the existing on-campus course also be evaluated in the light of feedback from the field on the distance education offering. While it is frequently assumed that a distance education course must prove its worth through a favorable comparison with its on-campus equivalent, it may indeed be the case that the distance version of the course is superior to the on-campus course because of the year-long development effort. The on-campus course has been offered for more than ten years with only one extensive review. Through the redesign of the course as a distance education course, it has undergone intense scrutiny and will be further evaluated as it is offered. It is therefore logical to use the distance course as a standard against which to judge the effectiveness of the on-campus course.

4. That the possibility of reformatting some of the course materials be considered for those students who may have access

to computer technology in the future. The Programmed Instruction Text, in particular, was written with this possibility in mind and would readily lend itself to programming as a computer-assisted instruction module.

5. That other graduate courses in education be identified and targeted for development as distance education courses.

6. That all graduate courses which may be developed in the future for offering via distance education use an instructional development approach, and be the result of a collaborative or team effort.

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APPENDIX A

NEEDS ASSESSMENT

TO THE ATTENTION OF ALL GRADUATE STUDENTS IN EDUCATION

RE: Course offering via Distance Education

The graduate course L6521, Instructional Development, is a required course on a number of graduate programmes leading to a Masters of Education degree including the Educational Communications and Technology programme, the School Resource Services programme, and the Teaching programme. It is also completed by a majority of candidates on the Curriculum and Instruction programme and by many students in the Educational Administration programme.

This course is being redesigned to meet the specifications for distance education offering.

To determine the interests of potential students in this course we are seeking your cooperation in filling out the attached questionnaire and returning it in the enclosed envelope.

Thank you in anticipation of your kind cooperation.

Dr. Mary Kennedy
Associate Professor,
Faculty of Education
& Project Advisor, MUN

Beverley Park, Graduate Student

Diane Janes, Graduate Student

L6521 - INSTRUCTIONAL DEVELOPMENT

DISTANCE EDUCATION OFFERING: NEEDS ASSESSMENT

1. Indicate which degree program you are pursuing:

___ Educational Communications and Technology
___ School Resource Services
___ Teaching
___ Curriculum and Instruction
___ Educational Administration
___ Educational Psychology

2. Have you taken L6521 - Instructional Development as part of your program?

___ Yes ___ No

3. If yes, were you able to enroll in the course the first time you selected it?

____ Yes ___ No

or

Did you have to be placed on a waitlist or wait a term (or a year in the case of summer students)?

___ Yes ___ No

4. What motivated you to do this particular course?

___ It was the only one offered at the time that would give me credit toward my programme.
___ It was a required course for my programme.
___ It was a course which interested me and I was able to choose it as an elective on my programme.
___ Other (Please specify: _____)

5. If you have not done this course as yet, do you intend to do it?

___ Yes ___ No ___ Undecided

6. Would you be interested in doing the course via distance education?

___ Yes ___ No

7. Do you see any advantage for you in having this (or any other course) offered through distance education?

___ Yes ___ No

8. If you chose to do L6521 by Distance Education, would your choice be based on either

a) interest in subject _____

or

b) availability/convenience of the distance education offering _____

9. Do you think there is a need in this province for distance education courses at the graduate level?

___ Yes ___ No

10. Please feel free to make any additional comments which you feel may help us in determining the need for such an option.

_____

_____

_____

_____

_____

Analytical Needs Assessment

Summary of Questionnaire Results

Assessment is the first step in planning. A questionnaire was sent to all currently registered (December 1991) graduate students in the faculty of education, a total of 394 students. These students may have been registered in either of the following Master of Education programs: Educational Communications and Technology, School Resource Services, Teaching, Curriculum and Instruction, Educational Administration, or Educational Psychology. The information requested in the survey dealt with the students' expressed desire to take the course, the reasons for wanting to take this course in particular, the availability of the course, interest in this course if it were available through distance education and finally, their opinion on whether there is a need for any course offerings via distance education at the graduate level. A space was provided for further comments. A copy of the questionnaire is included at the end of this appendix.

Of the 394 questionnaires mailed out, 132 or 33.5% were returned. Of this number 8 were students in Educational Communications and Technology; 27 were enrolled in School and Resource Services; 18 in Teaching; 39 in Curriculum and Instruction; 36 in Educational Administration and 4 were Educational Psychology students.

36 of the 132 had already taken L6521 and of those who had done the course 31 were able to enroll the first time they selected the course while 5 had to be placed on a waitlist.

In response to what motivated students to take this course the following choices were given and the number of responses for each choice is indicated:

__3__ It was the only course offered at the time that would give me credit toward my programme.

_31_ It was a required course for my programme.

__2__ It was a course which interested me and I was able to choose it as an elective on my programme.

__0__ Other

Of the 96 respondents who had not already completed the course 52 students indicated that they intend to do so and another 44 were undecided. 60 indicated that they would be interested in doing the course via distance education. 60 of the 96 indicated that the option of doing the course by distance education would be very convenient for them. 109 of 132 respondents see an advantage in having the course offered by distance education. Only 23 indicated that they did not see any advantage to this option.

An overwhelming percentage of respondents, 120 of 102 or 91%, indicated that they feel there is a need for distance education courses at the graduate level.

At the end of the questionnaire over 65% of the respondents (86 people) offered further comments. These have been summarized and categorized below.

Only 8 of the 86 people who wrote comments were against the idea of offering courses via distance education at the graduate level. One person suggested that although she or he had nothing against it in principle s/he felt it was it was impractical and, therefore, inadvisable. Another four respondents cited the interaction among students as an important element of a graduate program. This group's response can perhaps be best summarized from these comments:

"Masters courses should not be completed through Distance Education. It is through in-class interaction with other professionals in your field of study that the learning experience is enhanced. Students on graduate programs that complete courses through distance education would lose out on this important interaction and as a result the graduate program would be compromised."

"I feel that the benefit of enrolling in any program, whether graduate or any other, is the not just completing the required courses, but interacting and exchanging ideas with fellow graduates. From my experience I found that the interaction is tremendously helpful in understanding the problems our educational system is experiencing. Not all problems can be solved by individuals or just by completing courses."

Two respondents were encouraging and supportive of the need for alternative ways of reaching students, however they issued a word of caution related to accessibility of resources off-campus.

Of the remaining comments there was overwhelming support for the proposed initiative. A number of specific reasons were given for this support. Among them, the most frequently quoted reason was the inequity of educational opportunity for those students who reside outside the St. John's area. 52 people mentioned this specifically. The issue of money and the required payment of continuance and maintenance fees when one is unable to take courses, except in the summer semester, was noted by 9 people and 19 others commented on the cost of relocating to St. John's for as many as seven summers. (It is noteworthy that this cost is not only a monetary one. There were comments about the cost of time missed with the family and missed summer vacations.) Another specific category of respondents cited the need for the university to take advantage of the possibilities made available through technology. The following comments quoted from the questionnaires serve to illustrate the concerns raised and further underline the need as it was expressed through this survey.

"Part time graduate students are currently paying graduate fees for maintaining a program for which, through no fault of their own, they cannot get courses...The program as it currently exists discriminates against those graduate students whose homes lie outside a 100-125 km. radius of St. John's."

"Any course that I can do by distance education will save me time so that I can finish my program faster and use it at my place of work. It will also save me money. If I only get 2 courses by distance education it means another summer to vacation with my children. And on and on the advantages go. The people near to St. John's have an advantage over me to

finish early and to get a job that I might otherwise get. Please give me and my family a break..."

"It is ludicrous that in this age of advanced technology that anyone wishing to pursue a graduate degree here in Newfoundland at Memorial University has to "drag" to St. John's in order to do any of the courses int he program...I don't expect to be able to do the whole program off-campus. However, if I had been able to complete two courses off-campus, it would have saved me approximately $2000. and would have enabled me to take a vacation. My annual leave is now spent at MUN and my vacation dollars are spent on accommodations and travel."

"I live one and a half hours from St. John's. I have taken on-campus evening courses, involving 3 hours of winter night driving combined with a 3 hour class after a day's teaching. I need not say how difficult this is...The prospect of doing on-campus part-time courses must be horrendous for students who live off the Avalon, even though I know of a group of students who drive from the lower Burin Peninsula and the Bonavista area to do evening courses in St. John's. There definitely is a need!"

"I hope that those in control at Memorial realize that it is Memorial University <u>of Newfoundland</u>. Right now it does not satisfy the requirements of those living off the Avalon."

Generally it could be said that these comments covered the full spectrum of identified needs. There were expressions of hope that this project may be a means of helping them achieve their educational goals, of encouragement to the researchers, of frustration at the university system as a whole, of anger at the inequity that exists between those who have access to the university and those who do not, and also, not to be ignored, there were a few expressions of rejection for this option and discontent that it would even be considered. Whatever the means of analysis, however, this offers clear

evidence to support the need for the offering of distance education courses at this level.

APPENDIX B

TEXT SELECTION

Text Selection

The following books were reviewed for their suitability as a text. The criteria for suitability was both content and the book's application to a broad audience of users.

L.J. Briggs, K.L. Gustafson, M.H. Tillman (Eds) Instructional Design: Principals and Applications, Educational Technology Publications, Englewood Cliffs, N.J., 1991

S. Forsman, The Systematic Design of Instruction (3rd. Edition), Glenview, IL, 1990

F.G. Knirk, K.L. Gustafson, Instructional Technology: A Systematic Approach to Education Holt, Rinehart and Winston, Inc. Fort Worth, TX, 1986.

C. B. Leshin, J. Pollock, & C.M. Reigeluth Instructional Design Strategies and Tactics, Educational Technology Publications, Englewood Cliffs, N.J. 1992

C.K. West, J.A. Fermer, P.M. Wolff, Instructional Design: Implications from Cognitive Science, Prentice Hall, Englewood Cliffs, N.J., 1991.

APPENDIX C

LIST OF READINGS

List of Readings

The following articles appear in the Book of Readings:

Part I - Introduction

The Instructional Design Movement in Educational Technology
Barbara Seels
From: Educational Technology, May 1989, pp. 11-15.

Definition of Instructional Design
Stephen M. Corey
From: Programmed Instruction: NSSE 66th Yearbook, 1967, Part II, pp. 5-27. Published by University of Chicago Press, Chicago, IL.

Part II - Functional ID

Procedures of Lesson Design
James R. Okey
From: Instructional Design: Principles and Application, 1991, 2nd. Edition, pp. 193-208. Published by Educational Technology, Englewood Cliffs, NJ.

Writing Instructional Text

James Hartley

From: Designing Instructional Text, 1988, 2nd Edition,pp. 48-60. Published by Nichols Publishing Company, East Brunswick, NJ.

Part III - Conceptual ID

Instructional Development: A Conceptual Approach

Jean Brown and Mary Kennedy

Paper presented at AMTEC 1988, the 18th National Conference on Educational Technology, Monday, June 20, 1988, Halifax, Nova Scotia.

Algorithms, Heuristics and Instructional Development

Diane P. Janes

Unpublished paper.

Instructional Systems Design: Five Views of the Field

Shirl S. Schiffman

From: Journal of Instructional Development, 1986, Volume 9, Number 3, pp. 14-21. Published by Association for Educational Communications and Technology, Washington, DC.

Instructional Development as an Art: One of the Three Faces of ID

Ivor K. Davies

From: Performance and Instruction, September 1981, Volume 20, Number 7. Published by the National Society for Performance and Instruction, Washington, DC.

Part IV - Cognitive Science

Introduction to Cognitive Science and Instructional Design

C.K. West, J.A. Farmer, and P.M. Wolff

From: Instructional Design: Implications from Cognitive Science, 1991, pp. 1-35. Published by Prentice-Hall, Englewood Cliffs, NJ.

APPENDIX D

PROGRAMMED INSTRUCTION TEXT

OUTLINE AND SAMPLE UNIT

Programmed Instruction Text:

Outline and Sample Unit

Programmed Instruction Workbook Outline

Section 1: **Functional Instructional Development**

ID - What it is

ID Models - How to do it

The Model - A basic Algorithm

Section 2: **Needs Assessment**

The problem

The "what is"

The "what ought to be"

The choices - adopt, adapt, develop

Section 3: **The Learners**

General characteristics

Specific characteristics

Assessing characteristics

Entry level testing

Section 4: **Task/Concept Analysis**

Learner Tasks/concepts

Essential content

Prerequisite knowledge and skills

Developing the tree diagram

Section 5: **Setting Performance Objectives**

Purpose of objectives

Form of objectives

Objectives hierarchies

Section 6: **Performance Testing**

Criterion-referenced testing

Immediate gain

Long-term gains

Attitude testing

Section 7: **Instructional Media/Format Selection**

Media characteristics

Self-instructional formats

Section 8: **Evaluation**

Process consultation

Expert appraisals

Pilot testing

Validation testing

Section 9: **Dissemination**

Packaging the product

Implementation planning

Section 10: **Summary**

The following pages present a sample module from the programmed instruction text.

SECTION FOUR: LEARNER ANALYSIS

FRAME 1. LEARNERS AT THE CENTRE

Since the learner lies at the centre of the instructional process for educational technologists, it should not be surprising that one of the main components of the instructional system to be analyzed in the instructional development process is the learners.

Educational technology has as a major theory base educational psychology - specifically human learning and development theory. It is this body of knowledge that suggests, for the instructional developer, that the characteristics of learners should be examined before major decisions regarding the actual design of instruction are made.

FRAME 2. RESPONSE FRAME

Why is the learner analysis an important part of the instructional development process?

_____

_____

_____

_____

_____

SELF-CHECK:

Because the learner is at the centre of the instructional process decisions about the design of instruction should take into account the characteristics of the learner.

If you did not answer to your satisfaction go to Frame 3.
If you did answer satisfactorily, go to Frame 4.

FRAME 3. REVIEW FRAME

One of the theory bases for instructional development is theory of learning. It makes sense, therefore, to consider the people doing the learning: the learners. The learner is, after all, the person for whom the instruction is being developed. If there were no learners there would be no need to design instruction.

FRAME 4. DEFINITION OF LEARNERS

Learners, within the framework of instructional development, are defined as all members of the group that will directly interact with, and achieve knowledge and/or skill as a result of, the instruction.

We all recognize that school children are learners. But learners also include

those in formal post-secondary institutions;
those involved in training programs in business and industry, the government, and the military;
those enroled in non-credit self-improvement courses operated by community and social agencies;

In other words, learners can include anyone from preschoolers to senior citizens. All that is required to be considered a learner is that one is the recipient of instruction.

FRAME 5. RESPONSE FRAME

Based on the information in Frame 4, list the criteria that you believe would designate someone as a learner.

TO BE CONSIDERED A LEARNER, A PERSON ...

_____

_____

_____

_____

SELF-CHECK:

You should have identified the following criteria:

To be considered a learner, a person...

1. receives instruction
2. achieves knowledge or skills as a result of instruction

If you answered correctly go to Frame 7.
If not, go to Frame 6.

FRAME 6. REVIEW FRAME

To be considered "learners" people must be involved in a context where they are actively involved in learning. There is instruction and as a result of that instruction the learner acquires new knowledge or skills.

FRAME 7. SELF- TEST

Based on the established criteria, judge whether or not these are learners:

1. a senior citizen enroled in a fifty-plus microwave cooking course

   YES or NO

   Why? _____

   _____

2. a senior citizen who visits the public library and checks out a number of books on a variety of topics

   YES or NO

   Why? _____

   _____

Check your answer on page 4-25.

If you answered both correctly go to Frame 8.
If you made mistakes and did not understand the explanation, go to Review Frame 6.

FRAME 8. REVIEW

Learners, then, are any members of a group for whom instruction has been planned and implemented. Groups can be as small as a single grade nine class, or as large as all first year university students in a multi-campus system like Indiana University, with eight separate universities located around the state.

FRAME 9. RESPONSE FRAME

In Frame 5 you identified the criteria that determined whether or not one was a learner.

1. Now, list two things that do not influence one's designation as a learner:

   1. _____

   2. _____

2. Explain what makes you a learner?

   _____

   _____

   _____

SELF-CHECK:

1. There are many that you may have listed: age, group size, material being studied, location/setting, etc.
2. You are a learner because you are involved in instruction that was planned and is being implemented for you to learn specific knowledge or skills.

FRAME 10. LEARNER CHARACTERISTICS

Most instructional developers would agree with Robert M. Gagné's approach to the analysis of learning, from the perspective of the needs of instruction. Gagné and Briggs (1979) indicate that perspectives such as individual differences, readiness, and motivation influence instructional design and the eventual delivery of instruction (Bell-Gredler, 1986).

FRAME 11. RESPONSE FRAME

1. What three learner characteristics did Gagné and Briggs indicate as having an influence on instructional development?

   1. _____

   2. _____

   3. _____

SELF-CHECK:

1.Individual differences
2.Readiness
3.Motivation

If you responded correctly go to Frame 12.
If you did not respond correctly go to Frame 10.

FRAME 12. THINK FRAME

Do you agree with Gagné and Briggs that these characteristics will influence instruction and learning?

Can you think of other learner characteristics that might influence the way learners learn or respond to instruction?

FRAME 13. INDIVIDUAL DIFFERENCES INFLUENCE LEARNING

Individual differences such as cognitive strategies, rate of learning, and entry capabilities influence the effectiveness of instruction, and methods to compensate for differences or to equalize opportunity to benefit from instruction is the responsibility of the instructional developer. Such methods include independent learning systems, small group instruction, and tutorial instruction.

FRAME 14. RESPONSE FRAME

Imagine you are an instructional developer and in the class from whom you are designing instruction have both exceptionally talented students as well as very mentally challenged students. Some have some prior knowledge of the subject, others are true beginners. Some students have very well developed learning strategies, others do not.

1. Is this relevant information for you as an instructional developer?

2. How would it influence your design decisions?

SELF-CHECK:

1. This information is very relevant because as an instructional developer you must consider the learners, those for whom you are designing the instruction.

2. You have a responsibility as an instructional designer to "equalize opportunity" by compensating for the learner differences. This means that you will have to make decisions to benefit all types of learners.

If your answers were not comparable to those given go to Frame 15.
If you answered to your satisfaction go to Frame 16.

FRAME 15. REVIEW FRAME

Instructional developers have the task of designing instruction for their learners. It is therefore important that they know the individual characteristics that make each of them different. These might include such things as the ability (or non ability) to use cognitive strategies, the rate of learning, and the prerequisite knowledge or entry level. These cannot be ignored and the instructional developer must take into account that in order for instruction to be effective for all, with all of their differences, a variety of methods may have to be used. This might include independent learning systems, small group instruction or tutorials.

Now review your answer in Frame 14 before proceeding to Frame 16.

FRAME 16. GAGNÉ'S VIEW OF READINESS

Gagné's view of readiness differs from that of other learning theorists. It is not simply the maturation view held by many psychologists, nor is it a matter of the gradual internalization of logical forms of thought view favoured by Piaget (1970). Gagné sees readiness from a more direct perspective. For Gagné learning is cumulative, hence readiness for new learning is tied to the availability of essential prerequisite knowledge and capability. So readiness refers to lower skills in the learning hierarchy of essential intellectual skills, rules, concepts, and procedural skills.

FRAME 17. RESPONSE FRAME

Briefly summarize Gagné's idea of readiness as described above.

Refer to Frame 16 to ensure that you include the essentials.

_____

_____

_____

_____

SELF-CHECK:

You should have included the notion of prerequisite knowledge and capability as readiness indicators, based on the idea that learning is cumulative.

FRAME 18. MOTIVATION

Gagné assigns the responsibility for the identification of learner motives and the channelling of those motives into productive activities to the designer of instruction (1977).

Motivation should be viewed as multi-faceted, including motivation to achieve, motivation to become competent, and incentive and task motivation, the latter two of which can be developed by incorporating reinforcement strategies in instruction.

FRAME 19. THINK FRAME

Think of the different types of motivation cited by Gagné.

Now think of yourself as a learner and what motivates you.

Do you think that the instructional developers took into account your learner characteristics when they designed this instruction?

Is there any evidence of built-in instructional strategies to channel your motivation into productive learning activity?

FRAME 20. GENERAL AND SPECIFIC LEARNER CHARACTERISTICS

So what should we as instructional developers know about the learners? Obviously we should know some general characteristics and some specific characteristics.

Try to list some characteristics in each of these categories:

GENERAL CHARACTERISTICS	SPECIFIC CHARACTERISTICS
_____	_____
_____	_____
_____	_____
_____	_____

Check your ideas in the following frame.

FRAME 21. REVIEW FRAME

GENERAL CHARACTERISTICS

Human beings have numerous characteristics, but only a small number are likely to have any impact on the instructional situation. These often include:

Age or maturation level
Grade or current designated level in the institution
Sociocultural or socioeconomic background
Sex
Previous or current work/employment background
Motivation

SPECIFIC CHARACTERISTICS

Areas that instructional developers should specifically seek information on include:

Subject matter knowledge and experience
Attitude toward instruction and toward subject matter
Language level
Tool skill level

FRAME 22. RESPONSE FRAME

How many of these characteristics had you identified in Frame 19?

Since you represent a learner draw your "general" profile by completing the chart.

Age or maturation level: _____

(You might simply indicate that you are an adult learner.)

Sex: _____

Designated level in institution: _____

Sociocultural/Socioeconomic background: _____

(This might involve information such as whether you have a family or not, etc.)

Previous or current work: _____

_____

Motivation: _____

_____

FRAME 23. HOW TO DO IT

How do we get this information? That depends on the size and scope of the group. If the learners are our own class we have numerous sources at our fingertips in the form of school records. If a large unknown group such as all Canadian students in a high school French course, a stratified random sample of teachers and/or students is often selected and consulted via mailed survey instrument.

FRAME 24. THINK FRAME

You have probably been in a situation where you were charged with instruction. How did you gather information on your learners?

FRAME 25. SUBJECT MATTER KNOWLEDGE AND EXPERIENCE

It is important to establish what the background of learners is in the subject matter area. Information such as previous achievement records, unit test scores, scope and sequence charts showing the cumulative experience in the subject matter area, and standardized test scores all contribute to an understanding of learners' entry level knowledge and skills.

Entry level knowledge and skill refer to the cumulative knowledge and competency that learners have attained prior to the current instruction. Gagné's model of instructional development places heavy emphasis on entry level testing.

FRAME 26. RESPONSE FRAME

Imagine that you are a Grade VIII Mathematics teacher and you wish to determine the entry level knowledge of your students. How might you go about doing this?

_____

_____

_____

_____

_____

SELF-CHECK:

You might look at the curriculum objectives for Mathematics at the previous grade level and the students' achievement records. You might also administer a pre-test to determine the students' knowledge of the subject.

FRAME 27. THINK FRAME

Why do you think it is important to establish learners' entry level?

THINK: Have you ever been in a learning situation where what you are learning was far beyond your entry level? How did you feel?

Have you ever been in the opposite situation where there was absolutely no challenge? How did you feel?

FRAME 28. ENTRY LEVEL

It is perhaps obvious to you why it is important to establish learners' entry level. If we are developing instruction that purports to meet the needs of individual learners, it is essential that the instruction in the subject matter begin at the appropriate level - not too advanced a level; not too basic a level. If too advanced the learners will not be able to access the instruction in a meaningful way, and if too basic the learners will waste time and energy learning what is already known.

FRAME 29. ATTITUDE TOWARD INSTRUCTION AND TOWARD SUBJECT MATTER

Learner attitudes are sometimes not taken into account in the formal education system, where certain content is to be covered because a higher authority deems it important, and as a result educators ignore learner attitudes.

But attitudes of learners always have implications for instructional developers, since they are likely to impact on achievement levels. The developer of instruction should investigate learner attitudes with the same vigour that subject matter background is pursued.

FRAME 30. THINK FRAME

Think of someone (yourself or someone you know) who has a very positive attitude toward school. Do you agree with the statement above that this could have influenced achievement levels? In what way?

Conversely, do you know of an example where a very negative attitude affected achievement? How?

FRAME 31. LEARNER ATTITUDES

Learner attitudes include general attitude toward instruction or schooling. Attitude formation is developmental and is in part a result of our experiences and in part a result of the value sets of those who influence us. Learners who have had difficulty in terms of academic achievement are likely to have a less positive attitude about instruction than high achievers, and this is especially so when parental influence is considerable and parents do not place a high value on schooling.

In addition to general attitude toward school or learning, attitudes toward the specific subject matter area being dealt with is important, on both an individual and a group basis. Commonly held group attitudes in the formal education system include the attitude that mathematics is difficult, which borders on fear for many students. It is derived from a nearly universal belief that mathematics is difficult, which in turn is derived from the fact that it uses a different symbol system than language. If learners approach given subject matter with the expectation of difficulty, it will indeed appear difficult the first time a minor problem is encountered.

Learner attitudes toward instructional treatment are also important. Learner preferences regarding group activities, individualized approaches, discovery learning versus direct instruction, major versus minor projects, examinations and assignments, when they can be accommodated, should be accommodated within the instructional setting.

Learner attitudes indicate for the instructional developer the need to incorporate motivational materials, reinforcement, and varied approaches to instruction.

FRAME 32. RESPONSE FRAME

Indicate T or F for these statements.

1. _____ Our attitudes are influenced both by our experiences and by the influences of people around us.

2. _____ Attitudes can be linked to achievement.

3. _____ Students have specific attitudes not only about subject matter but also about the instructional treatments or delivery systems.

4. _____ The instructional developer should consider student attitudes on matters of learner preferences.

5. _____ To respond to different attitudes the instructional developer needs to incorporate varied approaches to instruction.

Check your answers on page 4-25.

If you answered 3 or more correctly go to Frame 33.
If you had 3 or more errors go to Frame 31.

FRAME 33. LANGUAGE LEVEL

In addition to collecting and analyzing information on age, grade or general achievement level, and specific subject matter background, it is crucially important to establish learners' competence in terms of oral, reading, and written language levels.

These levels do not necessarily equate with current grade or general achievement level.

One of the major difficulties frequently encountered by learners is trying to decipher instruction in a given subject matter area that is presented in language beyond their capability. Their failure to achieve adequate learning gains is not because of inability in the subject, but because of decoding problems with the language. It is the responsibility of the instructional developer to ensure that instruction can be deciphered by a given group of learners.

If dealing with adult learners, unless they are enroled in a university setting, it is considered advisable, in the absence of assessment data on language levels, to assume a reading and writing level of grade eight when developing instruction. That will ensure that most learners can read and understand the instructional content.

FRAME 34. RESPONSE FRAME

Complete the summary statement by filling in the key words:

Language level refers to the student's 1. _____ in oral, reading and written 2. _____ skills. One should not assume that language levels 3. _____ with current grade or achievement levels. It is the responsibility of the instructional developer to ensure that language is at a level which can be deciphered by the target learners. A rule of thumb for adult learners outside the university setting is to assume a reading and writing level of 4. _____ .

SELF-CHECK:

Here are some possible answers. If you have used a synonym consider the response correct.

1. competence/proficiency
2. language/communication
3. equate
4. Grade VIII

If you could complete the summary go to Frame 35.
If you had difficulty completing the summary go to Frame 33.

FRAME 35. TOOL SKILLS

Thiagarajan (1976) defines tool skills as any skills and competencies that the learners must use to achieve desired outcomes or achievement gains that lie outside the confines of the specific subject matter area. In other words, existing skills and/or knowledge that the learner must transfer into the subject matter area.

Not all instruction has tool skills, beyond of course the very basic ones like reading and writing which may only have to be considered for learners with special needs. But instructional developers need to ask themselves if their proposed area of instruction requires any extraneous skill or knowledge on the part of learners to ensure that learners are not prevented from benefitting as a result of instruction.

Examples of tool skills include:

If one desired outcome of a unit in physics is an assessment and understanding of the contribution of Newton, a tool skill transferred from the subject matter area of language might be the ability to write a coherent historical essay.

If a desired outcome of a social studies unit is the completion of a computer-assisted instruction simulation package on global environment issues, an obvious tool skill would be the ability to load and use the appropriate computer software package.

The instructional developer needs to explore the area of tool skills, because they, like language level, can prevent learners from attaining desired achievement levels.

FRAME 36. RESPONSE FRAME

1. Define "tool skills".

_____

_____

_____

2. What tool skills would be necessary to complete the following assignments?

(1) Design a poster to promote good study habits.

_____

_____

(2) Evaluate student attitudes toward condom vending machines in schools by conducting a survey.

_____

_____

Check your answers on page 4-25.

If you answered to your satisfaction go to Frame 37.
If you need further review go to Frame 35.

FRAME 37. LEARNING STYLES

Some learners find certain instructional strategies and approaches more effective than others. Learners may learn most readily from direct manipulation of objects, from visual stimuli, or from reading textual materials. Attempting to discover learners' unique learning styles, then, could prove beneficial in the design of instruction.

There has been substantial research done in the area of learning styles, primarily on three fronts: human brain hemisphere functions, general learning styles (or learning conditions), and cognitive learning strategies.

While left brain/right brain research is interesting, it has not substantiated, over the past decade, the proposed theories in this area, hence it has little relevance to the development of instruction. A knowledge of general learning styles and cognitive learning styles however, may assist the instructional developer in the instructional design process.

FRAME 38. RESPONSE FRAME

1. What do you understand by the term "learning style"?

_____

_____

_____

2. There have been three streams of research in the area of learning styles:

   i. human brain hemisphere functions
   ii. general learning styles or conditions
   iii. cognitive styles

   Put an asterisk beside those which are significant for instructional developers.

SELF-CHECK:

1. Your answer should include the notion of "how the learners best learn". It is a description of what learners prefer and what their predispositions may be.
2. Of the three ii. and iii. (general learning styles and cognitive styles) are significant to instructional developers.

FRAME 39. GENERAL LEARNING STYLES

General learning styles, or learning conditions are of potential interest to the instructional developer. For those doing a learner analysis there are a number of instruments, known as learning styles inventories, that permit the analysis of conditions under which an individual prefers to learn.

Such inventories usually seek information on physical environment conditions (e.g.light, sound, furnishings); emotional conditions (e.g. personal motivation, persistence in performing learning task); sociological conditions (e.g. peer or group orientation, self-orientation); physical conditions (e.g. perceptual preferences, mobility). Profiles of learners based on inventory data can indicate effective learning environments for individual learners.

FRAME 40. RESPONSE FRAME

Imagine that you have the task of designing an inventory, a rating scale or a checklist perhaps, which would help people identify their own learning styles. What are some of the things you should include?

_____

_____

_____

_____

_____

_____

_____

_____

SELF-CHECK:

To check your answer refer to Frame 39.

FRAME 41. THINK FRAME

Have you ever had the opportunity to identify your own learning style? If so, this will be familiar to you; if not, stop for a moment and think generally about yourself as a learner. Under what conditions do you learn best? What is the ideal learning situation for you? These are clues to you as a learner.

Write some jot notes that describe your general learning style.
Some general categories are indicated as a guide.

Preferred physical environment:

_____

_____

Preferred emotional conditions:

_____

_____

Preferred sociological conditions:

_____

_____

FRAME 42. COGNITIVE STYLE

The mapping of cognitive learning strategies provides a framework for describing and diagnosing an individuals way of searching for meaning when confronted with new tasks or knowledge. Through instruments such as the Cognitive Style Interest Inventory a learner's cognitive abilities are assessed - ability to deal with visual, tactile, and auditory stimuli; ability to deal with abstractions; ability in the areas of motor coordination and social interactions.

Cognitive Style Inventories also measure learners abilities in terms of concrete experiences, reflective observation, abstract conceptualization, and experimentation.

Cognitive style data informs the instructional developer about learners' structuring of meaning, problem-solving strategies, and information-processing techniques. Such data is used by the developer to map out appropriate instructional strategies for individual learners.

FRAME 43. RESPONSE FRAME

1.If someone were to ask you to complete a Cognitive Style Inventory, what would they be trying to find out?

_____

_____

_____

_____

2.What use would the results of such an inventory be to an instructional designer?

_____

_____

_____

_____

SELF-CHECK

1.The purpose of a cognitive style inventory is to determine how learners make sense of new information as it is presented to them; how they learn.

2.Knowledge of cognitive style would assist the instructional developer in selecting appropriate instructional strategies to match the learner's particular learning style.

If you need review go to Frame 42.
If you answered correctly go to the Self Assessment checklist.

SELF-ASSESSMENT CHECKLIST

Look at the list of basic concepts dealt with in this unit.
Rate your knowledge and understanding of them using the scale below:

1 - I feel I have a good understanding of this concept.
2 - I have some knowledge of this topic but I could use some review.

If you indicate a 2 the right hand column will direct you to the appropriate frame for review.

CONCEPT/TOPIC	SELF-ASSESSMENT (Indicate 1 or 2)	FOR REVIEW SEE FRAME #
Definition of learners		4
Importance of learner analysis to I.D.		10
Gagné's view of readiness		16
Motivation		18
General and specific learner characteristics		21
Subject matter knowledge * entry level * prerequisite		25
Attitude toward instruction		29
Language Level		33
Tool skills		35
Learning styles		37
General learning conditions		39
Cognitive styles		42

ANSWER KEY

FRAME 7:

1. Yes, the senior enroled in the microwave class is a learner. She or he is receiving instruction and will achieve knowledge or skills as a result of instruction.
2. No, the senior checking out books at the library is not, in this sense, a learner. While s/he may indeed gain information or knowledge from reading the books, the books were not designed to instruct in a specific content area.

FRAME 32:

All of the answers are true.
They provide a summary of the information in Frame 31. Reread both these frames if you need review.

FRAME 36:

1. Tool skills are skills other than content related or subject matter skills which are necessary to carry out an instructional task.
2. (1) Tool skills would include design and graphic skills to produce the poster. (The subject matter or content would be the information on study skills.)
   (2) Tool skills would include how to construct and conduct a survey.

APPENDIX E

COURSE MANUAL

Education L6521

by Distance Education

Instructional Development

Course Manual
1st Edition

Dr. Mary Kennedy

Memorial
University of Newfoundland
School of General and Continuing Studies

101-673-07-92-25

Table of Contents

Student Profile Sheet

Please complete and return with your first assignment or before the end of Week Three.

1. Course Name and No.: _____

2. Age: ☐ under 25 ☐ 25–30 ☐ 31–40 ☐ 41–50 ☐ over 50

3. Sex: ☐ male ☐ female

4. Check level of education completed.
   - ☐ some high school
   - ☐ completed high school
   - ☐ one year college
   - ☐ other (specify) _____
   - ☐ two years college
   - ☐ three years college
   - ☐ university courses (specify number of courses) ___

5. Occupation: _____

6. How did you find out about this course?
   - ☐ Regional Office
   - ☐ library
   - ☐ brochure
   - ☐ poster
   - ☐ other (specify) _____
   - ☐ radio public service announcement
   - ☐ newspaper ad
   - ☐ former student
   - ☐ NTA Bulletin

7. If you are a teacher, what grade of teaching certificate do you hold? _____

8. If you are a teacher, indicate the grade level you teach.
   - ☐ K–3
   - ☐ 4–6
   - ☐ 7–9
   - ☐ 10–12
   - ☐ Special Education

9. Indicate the number and type of distance education courses you have taken.
   - ☐ correspondence
   - ☐ videotape
   - ☐ teleconference
   - ☐ live instructor

10. Why are you taking this course?
    - ☐ to complete a degree (specify) _____
    - ☐ personal enrichment
    - ☐ career advancement
    - ☐ other (specify) _____

11. Do you have access to the following?
    - ☐ audio cassette player
    - ☐ video cassette recorder/player (specify VHS or BETA) _____
    - ☐ home computer (specify brand and model) _____

12. Comments: _____
    _____
    _____
    _____
    _____

PRETEST

Please complete this test IMMEDIATELY before you begin to access any of the instructional materials. It is intended to establish that your baseline knowledge of instructional development is minimal, and it will provide us with a comparative measure to use at the end of the course as part of our course evaluation.

THIS TEST WILL NOT AFFECT YOUR GRADE IN ANY WAY. REMEMBER, YOU ARE NOT EXPECTED TO KNOW ANYTHING AT THIS STAGE, SINCE YOU HAVE NOT BEGUN THE COURSE. IF YOU PASS THE PRETEST IT PROBABLY MEANS THAT THE COURSE IS TOO BASIC FOR YOU.

Please remove the pretest and mail it as soon as possible.

Do not be alarmed if you find it necessary to return a blank test. Please return it for our records.

Student # _____

1. In your own words define instructional development.

_____

_____

_____

_____

2. List the main components of instructional development models.

_____

_____

_____

_____

3. List the main theory bases to instructional development.

_____

_____

_____

_____

4. What do the following terms have to do with instructional development? 147

Systematic and systemic

Algorithms and heuristics

Cognitive science

5. What is the difference between instructional development and curriculum development?

COURSE OVERVIEW

Course Components

1 Course Manual
1 Commercial Textbook
1 Book of Selected Readings
1 Programmed Instruction Textbook
2 Teleconference Sessions
4 Videotaped Programs
12 Audiotaped Lectures

Evaluation

Assignment 1: Task Analysis	10%
Assignment 2: Objectives	10%
Assignment 3: Criterion-Referenced Test	10%
Instructional Module Design	40%
Final Examination	30%
Total	100%

Required Textbook

Leshin, C. B., Pollock, J., & Reigeluth, C. M. (1992) Instructional Design Strategies and Tactics. Englewood Cliffs, NJ: Educational Technology Publications, 331pp.

Teleconference Sessions

Session 1: Week 6.

Topic: Instructionally Designed Instruction versus Traditional Instruction - Pros and Cons

Session 2: Week 9.

Topic: Instructional Modules - Progress and Problems.

Videotaped Programs

Program 1:	Introduction to the Course
Program 2:	Instructional Delivery Systems
Program 3:	Task Analysis
Program 4:	Objectives & Criterion-Referenced Testing

Audio-taped Programs

Lecture 1:	Introduction to Instructional Development
Lecture 2:	Needs Assessment
Lecture 3:	Learner Analysis
Lecture 4:	Task Analysis
Lecture 5:	Objectives
Lecture 6:	Criterion-Referenced Testing
Lecture 7:	Instructional Formats
Lecture 8:	Sequencing Instruction
Lecture 9:	Instructional Message Design
Lecture 10:	Evaluation
Lecture 11:	Systems Theory & Communication Theory
Lecture 12:	Behavioral & Cognitive Learning Theories

Contact Hours

Weekly telephone hours:	Monday	4:00 pm to 6:00 pm
	Wednesday	12:00 pm to 1:00 pm
	Friday	9:00 am to 10:30 am
Contact person:	Diane Janes	737-3413

(Diane is co-developer of the course and is currently the Learning Resources Laboratory Instructor in the Faculty of Education).

COURSE TIME LINE

Module 1: Week One

Audiotape 1. Introduction to Instructional Development
Videotape 1. Introduction to the Course
Programmed Instruction Text
    Section 1. Introduction to Instructional Development
Textbook (Leshin at al)
    Pages 1-8. Introduction
Book of Readings
    Seels: The Instructional Design Movement in Educational Technology

Module 2: Week Two

Audiotape 7. Instructional Formats
Videotape 2. Instructional Delivery Systems
Programmed Instruction Text
    Section 2. Instructional Formats
Textbook (Leshin et al)
    Pages 256-265 Interactive Message Design
Book of Readings
    Corey: Definition of Instructional Design

Module 3: Week Three

Audiotape 2. Needs Assessment
Programmed Instruction Text
    Section 3. Needs Assessment
Textbook (Leshin et al)
    Pages 10-29 Analyzing Needs

Module 4: Week Four

Audiotape 3. Learner Analysis
Programmed Instruction Text
    Section 4. Learner Analysis
Book of Readings
    Okey: Procedures of Lesson Design

Module 5: Week Five

Audiotape 4. Task Analysis
Videotape 3. Task Analysis
Programmed Instruction Text
    Section 5. Task Analysis
Textbook (Leshin et al)
    Pages 32-75: Analyze Domains

Module 6: Week Six

Audiotape 5. Objectives
Videotape 4. Objectives and Criterion-Referenced Test
Programmed Instruction Text
    Section 6. Objectives
Book of Readings
    Knirk & Gustafson: Objectives - The Cornerstone of Instructional Technology
Teleconference
    Instructionally Designed Instruction versus Traditional Instruction: Pros and Cons

Module 7: Week Seven

Audiotape 6. Criterion-Referenced Testing
Programmed Instruction Text
    Section 7. Criterion-Referenced Testing
Textbook (Leshin et al)
    Pages 80-135 Sequencing Instruction
Book of Readings
    Janes: Algorithms, Heuristics, & Instructional Development

Module 8: Week Eight

Audiotape 8. Sequencing Instruction
Audiotape 9. Instructional Message Design
Textbook (Leshin et al)
    Pages 138-200 Designing Lessons
    Pages 266-302 Instructional Message Design
Book of Readings
    Hartley: Writing Instructional Text

Audiotape 10. Evaluation
Programmed Instruction Text
    Section 8. Evaluation
Textbook (Leshin et al)
    Pages 306-323 Evaluate the Instruction
Teleconference
    Instructional Modules: Progress & Problems

Module 10: Week Ten

Programmed Instruction Text
    Section 9. Dissemination
Book of Readings
    Davies: Instructional Development: Art, Craft, or Science
    Kennedy & Brown: Instructional Development - A Conceptual Approach

Module 11: Week Eleven

Audiotape 11. Systems Theory & Communication Theory
Book of Readings
    Schiffman: Instructional Systems Design - Five Views of the Field

Module 12: Week Twelve

Audiotape 12. Behavioral & Cognitive Learning Theories
Book of Readings
    West: Introduction to Cognitive Science & Instructional Design
    DiVesta & Rieber: Characteristics of Cognitive Instructional Design: The Next Generation

Module 13: Week Thirteen

Review of Readings
Examination Preparation
Final Examination

COURSE DESCRIPTION

Education 6521 Instructional Development is a study of the development of instruction for all settings - the formal school system; the post-secondary system including community colleges, the university, and nursing schools; the military; and business and industry training. Students are introduced to the basic principles of instructional development from an historical and theoretical perspective. They apply knowledge in the development of an instructional module.

Topics covered in the course include a brief history of educational technology and instructional development, functional and theoretical approaches to instructional development, instructional development models, influences of behavioral and cognitive learning theories on instructional design, instructional delivery systems, and the instructional development process.

Course content is both theoretical and practical. Student evaluation reflects the dual thrust of the course. The final examination is based on the readings in the required textbook and the book of selected readings. The short assignments contribute to the main assignment, which is based on the application of the theory to the development of an instructional module.

Course Objectives

It is anticipated that the students in Education 6521 will attain the following objectives:

1. Develop understanding of the historical framework of educational technology and instructional development.
2. Develop understanding of the underlying theoretical frameworks of systems theory, communication theory, behavioral and cognitive learning theories.
3. Distinguish between systematic and systemic instructional development and understand their historical roots.
4. Become conversant with terminology and principles of instructional development.
5. Become conversant with instructional development models.
6. Apply principles of instructional development in the design and production of an instructional module.

Course Evaluation

The evaluation plan has been developed with the course objectives in mind. There are three components to the evaluation plan:

1. Three short assignments on specific components of the instructional development process (task analysis; objectives; criterion-referenced test). (30%)

   This evaluation activity tests objectives 2, 4, & 5.

2. The development of an instructional module based on the framework of the three small assignments. (40%)

   This evaluation activity tests objectives 2, 5, & 6.

3. Final examination on the assigned readings and lectures covering the theoretical framework of instructional development. (30%)

   This evaluation activity tests objectives 1, 2, 3, & 4.

Assignment/Examination Directions

All assignments should be presented in typed form, with appropriate margins, headings, and the like.

Assignment 1. Task Analysis (10%)

This assignment, when completed, will be used in your major assignment - the development of an instructional module.

1. Select a topic in a subject matter area that you are knowledgeable and interested in. Using the procedures outlined in the videotape, the textbook, and the programmed instruction textbook develop a task analysis for the topic.

2. Keep in mind that the instructional module should cover approximately one week of instruction in the topic, so you should limit the amount of new learning tasks to that which can be reasonably covered in one week of regular-length instructional time.

3. The assignment should be presented in the form of a flowchart.

4. Due date: End of Week 6.

Assignment 2. Objectives (10%)

1. With the same topic in mind, develop a set of learning objectives for the proposed instructional module.

2. Check the objectives against your task analysis.

3. The assignment should be presented as a list of objectives. Be sure to include a terminal objective and a set of enabling objectives, written in typical behavioral style.

4. Due date: End of Week 7.

Assignment 3. Criterion-Referenced Test (10%)

1. With the same topic in mind, develop a criterion-referenced test. Include only items that are related to the objectives.

2. Check the test against the set of objectives.

3. The assignment should be presented as the actual test that the learners would complete. It should be identical to the test that is to be completed by the learners, containing directions, illustrations and diagrams if applicable, and all other components.

4. Due date: End of Week 8.

Assignment 4. Instructional Module (40%)

1. Based on the work completed in the three previous assignments develop an instructional module for the topic you have chosen. Your work in the programmed instruction textbook will prepare you for this assignment. You should begin work on the assignment in Week 9.

2. The module may use any one medium or combination of media. It may be designed using any self-instructional or individualized instruction format. IT SHOULD NOT BE A SET OF LESSON PLANS TO BE DELIVERED BY THE TEACHER. THE FOCUS IS ON THE LEARNER LEARNING, NOT THE TEACHER TEACHING!

3. The instructional module may incorporate innovative approaches such as games or simulations, and new technologies such as computer-based instructional formats.

4. The instructional module should be subjected to preliminary evaluation activity in the form of expert appraisal. Consult at least two types of experts and use their feedback to improve the module as you are developing it.

5. The instructional module should be accompanied by a short process report which includes the following elements:
   a brief description of the learners for whom the module is designed;
   the task analysis;
   the objectives;
   the criterion-referenced test;
   a brief description of the appraisal part of the evaluation, including completed checklists by expert appraisers in an appendix.

6. Include all necessary elements of the instructional module to make it self-instructional, including directions to learners, directions to teachers, lists of materials and resources, if applicable, and so on. Be guided by Section 9 of the programmed instruction text.

7. The instructional module should be professional in appearance, and message design principles should be apparent.

8. Due date: End of Week 12.

Final Examination (30%)

1. The final examination will be a take-home examination. It may be done at home and you may use course materials and readings.

2. The examination will consist of one essay question with a number of parts. It will be based on materials in the course textbook and the book of selected readings.

3. The examination will require you to synthesize your knowledge and understanding of instructional development, and to support your position or opinions with evidence from your readings.

4. The examination is anticipated to be two hours in length. You should limit your answer to 10 double-spaced typed pages.

5. Sample question:

> Instructional developers are involved in the application of learning theories to instructional design. Most belong to either the behavioral learning camp or the cognitive learning camp.
>
> a) How does instruction designed by a behavioral adherent differ from that designed by a cognitive adherent (cite specific examples)?
>
> b) Which is likely to be the most effective for military training settings? For junior high social studies? For a beginning German course? For Adult Basic Education upgrading at the community college level? Why?
>
> c) Which camp do you belong to? Why?
>
> d) Which camp do you think the designers and instructors of this course belong to? Why?

6. The examination question will be mailed to you two weeks prior to the end of the course. Your answer is due at the end of Week 13.

Teleconference Guide

Each of the two teleconference sessions will be one hour. Directions on access sites and exact times will be forwarded to you at a later date. You should be prepared for the teleconference sessions so that you can contribute to the interaction among your instructor and fellow students. The following guide should assist you in your preparation.

Teleconference 1: Week Six

The topic for this teleconference session is Instructionally Designed Instruction versus Traditional Instruction: Pros and Cons. Based on your readings and instruction to date, be prepared to offer your insights on the following questions:

1. Is there any difference between instructionally designed instruction and traditional instruction? How do teachers traditionally design instruction? Is there any uniformity?

2. If there is a difference, describe it. Give examples from your experience.

3. What are the positive elements or advantages of traditional instruction? Are they real or perceived? What are the limitations of traditional instruction? Are they real or perceived?

4. How do teachers using a traditional approach make decisions about what to test? When do they prepare tests? Do learners know what will be on the test? Do they see the test before studying for it? Why or why not?

5. What are the positive elements or advantages of instructionally designed instruction? Are they real or perceived? What are the limitations of instructionally designed instruction? Are they real or perceived?

Teleconference 2: Week Nine

This teleconference session is designed to give you the opportunity to discuss your major assignment. The purposes are twofold: (a) to let others in the course hear about your topic area, and to provide a brief report of your progress to date; and (b) to provide the opportunity for you to raise any questions or problems concerning the main assignment. You should be prepared to participate as follows:

1. Provide a brief (maximum 2 minute) summary of your topic and progress to date.

2. Raise issues or questions regarding the assignment that you think might be of relevance to others in the course i.e. general questions as opposed to questions on the development of your specific topic. Specific questions relating only to your module can be raised via telephone with the laboratory instructor.

STUDENT PROFILE SHEET

Please complete and return at the end of Week One.

1. Course Name and Number: 6521 Instructional Development.

2. Name _____

3. Age _____under 25 _____ 25-30

   _____ 31-40 _____ 41-50

   _____ over 50

4. Check degrees held

   _____ B.A. _____ B.Sc.

   _____ B.Ed. _____ B.A.(Ed.)

   _____ (other write in)

5. Check current graduate program

   _____ Teaching _____ Curriculum

   _____ Educ. Technology _____ School Library

   _____ (other write in)

6. Check number of courses completed on graduate program.

   _____ less than 3 _____ 3-5

   _____ 6-8 _____ more than 8

7. If teaching in the school system, check level you teach.

   _____ primary _____ elementary

   _____ jr. high _____ sr. high

   _____ (other write in)

8. If working in the school system (as other than a teacher) indicate occupation/title.

   _____

9. If working outside the school system, indicate institution/place of business and type of position.

_____

10. If you hold provincial teaching certificate, indicate level.

_____ IV _____ V

_____ VI _____ VII

11. What is the main reason that you are taking this course?

_____ to complete degree requirement

_____ as elective on degree program

_____ personal enrichment

_____ career advancement

_____ (other write in)

12. Indicate total number of years experience as an educator in any setting.

_____1-5 _____6-10

_____11-15 _____16-20

_____over 20

13. Comments

_____

_____

_____

_____